

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



Monitoring Times

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'ROUND THE WORLD ON A RADIO WAVE



In this issue:

- Traveling the World in My Own Radio Shack
- Signal Reports: Ripping Open the Bandwidth
- Exchanging Words: First Battles of WW II
- RAE Goes Gold

AR-ALPHA

Communications Receiver



- Multi-mode unit capable of receiving AM (synchronous), ISB, RZ-SSB, USB, LSB, CW, WFM including FM stereo, NFM, APCO-25 digital, and TV in both NTSC and PAL formats
- 6-inch TFT color panel can display received video signals or depict spectrum activity over a wide choice of bandwidths including a "waterfall" function to show signal activity over a specified time period

Welcome to the Future!

AOR proudly introduces the AR-ALPHA, the first in a new class of professional monitoring receivers! Designed to cover 10KHz to 3.3GHz, with no interruptions,* this receiver features a 6-inch color TFT display, five VFOs, 2000 alphanumeric memories that can be computer programmed as 40 banks of 50 channels, 40 search banks, a "select memory" bank of 100 frequencies, and a user designated priority channel. It includes APCO-25 digital and a DVR with six channels that can record up to a total of 52 minutes audio. Monitoring professionals will appreciate the world class engineering and attention to detail that makes the AR-ALPHA such an amazing instrument.

- Composite video output on the rear panel of the unit
- Selectable IF bandwidths: 200 Hz, 500 Hz, 1 KHz, 3 KHz, 6 KHz, 15 KHz, 30 KHz, 100 KHz, 200 KHz and 300 KHz along with the ability to shift the IF.
- CTCSS and DCS selectable squelch functions
- DTMF tone decode
- Built-in voice-inversion descrambling
- CW pitch control, AGC, AFC
- Auto-notch feature
- User selectable spectrum display function from 250 KHz through 10 MHz in 1 KHz increments. Above 10 MHz bandwidth, it can display 20 MHz, 50 MHz, 100 MHz or 1 GHz, but above 20 MHz bandwidth, no audio will be available
- Resolution bandwidth is also user-selectable in increments of 1 KHz, 4 KHz, 32 KHz, 64 KHz, and 128 KHz.
- Fast Fourier Transform (FFT)
- Rear panel connections include 12 VDC power, RS-232C, USB 2.0, I/Q output with 1 MHz bandwidth, two antenna ports (one SO-239 and one Type N) and up to four antennas may be selected through the receiver's controls with the optional AS5000 antenna relay selector.
- Use desktop or with 19" rack mount

The AR-ALPHA redefines excellence in professional monitoring receivers. No wonder so many monitoring professionals including government, newsrooms, laboratories, military users and more, rely on AOR.



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Documentation required for qualified purchasers in the USA.

A marine receiver like no other.

At WiNRADiO, the innovation never stops.

The new WR-G33EM Marine Receiver represents a true breakthrough: It is the world's first software-defined marine receiver.

- Frequency range 9kHz to 30MHz
- AM, LSB, USB, DSB, CW standard modes
- DSC, HF Fax, NAVTEX, TELEX marine modes
- Extraordinary sensitivity
- Excellent dynamic range
- Real-time spectrum analyzer
- Spot-on tuning in 1Hz steps
- Continuously variable bandwidth 1Hz - 15kHz
- Automatic scheduling, recording and playback
- GPS option

Most of the radio signal processing with this receiver is performed in software, using computational signal processing methods, rather than using traditional hardware parts, resistors, capacitors, diodes, etc.

The received signal is digitized as early as possible in the signal processing chain, and further processing, demodulation and decoding of the digitized signal is then performed entirely in software.

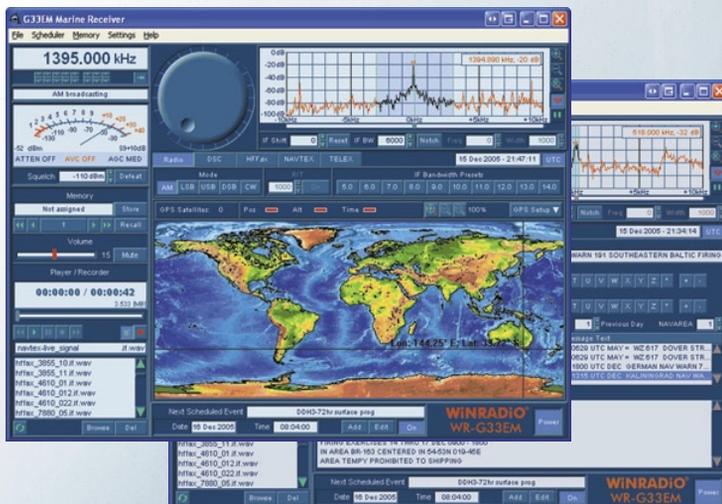
There are many advantages to this approach, especially the flexibility of demodulation modes - new modes can be added easily by simply upgrading software. The WR-G33EM also performs better than a comparable conventional receiver, thanks to advanced signal processing techniques which make it possible to implement sharper selectivity filters, more accurate demodulators and decoders than conventional hardware.



WR-G33EM Marine Receiver on-board

The performance of a Software Defined Radio receiver is also more consistent, stable and reliable because component tolerances and aging do not play such an important role as they do in a conventional receiver.

The WR-G33EM receiver also offers far more features and facilities than a typical marine receiver. For example, the real-time spectrum analyzer with continuously variable bandwidth, graphical notch filter and IF recording are just some of the many features which were previously unavailable on a typical marine radio, in particular at such an affordable price level.



For more information visit

www.winradio.com



Lead Story

A Shack of My Own By Matthew Stanley

It's not often that a crawl space is the feature that sells a piece of real estate, but it was in the case of this radio hobbyist who had long dreamed of a shack of his own. It took a little work and modification along the way, but the results were well worth it.

Now Matthew travels the world from the comfort and privacy of his own cozy shack. The story starts on page 8.

Cover concept by Bill Grove.

C O N T E N T S

Signal Reports 11 By Roy Berger

After some abortive attempts to master shortwave radio as a youngster, Roy Berger finds modern receivers much more to his liking as an adult. However, his enthusiasm and imagination haven't waned a bit, as he imagines touring the shortwaves as a kind of Olympics. As an example of the most gripping radio to be heard, Roy concludes with notes he made of transmissions made during the days of Hurricane Katrina. As he warns, his logs only guarantee that these things were truly said, not necessarily said truly.

Exchanging Words: First Battles of WW II 16 By Jim Pogue

Years before the bullets began to fly, the major players in World War II cranked up the rhetoric using radio, especially shortwave radio. International broadcasting provided the means to communicate each country's version of the news, as well as promote the culture and achievements of their country—and put down those of others.

RAE Goes Gold 19 By Eric Bryan

RAE – Radiodifusion Argentina al Exterior – officially turns 50 this month. Broadcasting from modern studios in Buenos Aires (shared with Radio Nacional), RAE is not an easy catch in North America, especially for those living on the West Coast. Using the schedules provided, give them a try!

Reviews

John Catalano has been busy this month, as all our reviews are of radio-related software! On page 66, John takes a look at two software plotter programs offered by an unlikely source – an observatory in Portugal! He reviews Orbcomm Plotter, which helps you locate and decode LEO satellites, and Plane Plotter, which can map plane locations using ACARS, ADS-B and more. More programs and help screens from COAA will be forthcoming next month as well.

The *Computers & Radio* column (page 72) visits many new websites and tests many new programs every month. The result: new, proven software for you, a new virus or worm about every six months for John's computer. This month, he offers two preventive tools: McAfee's Site Advisor warns you in advance of questionable or dangerous sites, and Sandboxie cordons off a section of computer memory where you can play with new programs for review without risk to your computer system.



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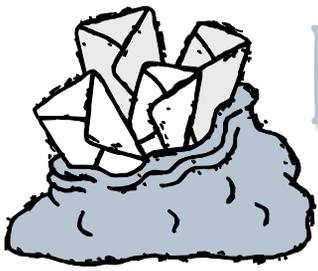
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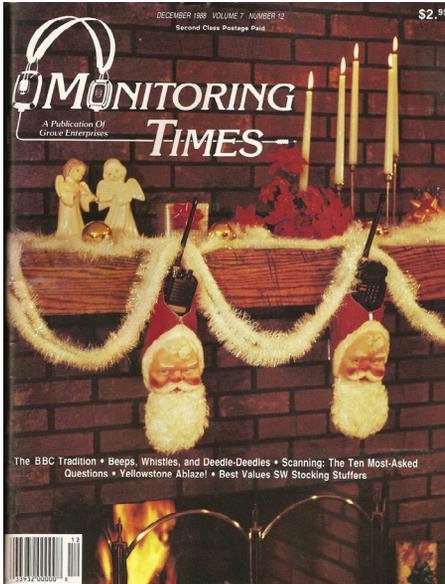
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LETTERS TO THE EDITOR



Reader Challenge

Given the number of right answers to last year's contest about the very first issue of *MT*, we were surprised no one guessed the right answer to our query about what item was repeated from a past *MT* cover. As you can see in the accompanying photo, the correct answer was the Santa head stockings. The zippered "stockings" have been used in the Baughn household since Harry was a young tyke, and they also appeared on the cover of *MT* in December 1988.

On the other hand, several readers were clever enough to realize that, technically, the *MT* covers in the stockings had been "on" previous *MT* covers. Though not the answer we had in mind, winners (as of press time) John Wilson, Bradley Lucken, and Dave White will still receive an additional two months on their subscriptions!

Bradley Lucken really did his homework – checking for a match between the Crosley radio and the cathedral radio pictured on the cover of the 1998 August issue, and even looking to see if any phonograph records were shown on the cover of the Wolfman Jack cover from February 1990! Guess Bradley's collection didn't quite go back to 1988, or he surely would have won the prize!

By the way, given our theme of "Everything old is new again," I really enjoyed the irony of hanging the 45 rpm record next to the Verbatim brand writable compact disk designed to look like a record! Did you catch that?

Powel Crosley

Bradley Lucken and Dave White did, however, point out a few errors in our lead article about Crosley Radio. Bradley says, "fifty

years from now, nobody would know anything about Rupert Murdock. However, information about Rupert **Murdoch** should still easily be found....

"Also, I don't know anything about Powell Crosley. I do, however, know a bit about **Powel** Crosley, Jr., and I know a little about **Powel** Crosley III and **Powel** Crosley IV. I know nothing about **Powel** Crosley V, outside of the fact he exists."

Both Lucken and White come from the Cincinnati area and pointed out that Louisville is hardly "across the Ohio river" from Cincinnati. Dave White says, "I ... have fond memories of my grandfather taking my brother and me to see the Reds play at Crosley Field. The rest of the time, we listened to them on WLW."

"In the interest of accuracy, while Cincinnati and Louisville are both located on the Ohio River, Louisville is about 100 miles downriver from Cincy, rather than being across from it."

An apologetic Ken Reitz writes, "Though you might not think it, I did read quite a bit of material about the Crosley for whom the piece is titled. But, it seems, once the error was typed, the ease of computer spell-checking made certain the error was duplicated throughout. So, my sincere apologies to the various Powel (one l-only) Crosley's and to any other Powell Crosley's, whomever they might be."

"And, while it's true that Louisville, KY, is literally on the south side of the Ohio River and Cincinnati is on the north side of that river, the only way you could get from one to the other is by a rather long boat ride. My sense of direction has led me astray again. My thanks to Mr. Lucken for pointing out the error of my ways."

Keep the Historical Articles!

"Even though the 25th anniversary year of *MT* is ending, please consider continuing with the historical articles. Even *MT* reprint articles from prior issues are OK with me. These articles make for fascinating and informative listening. The articles also provide a historical reference... a perspective into our hobby."

Kraig, KG4LAC

"Receiving *MT*'s December 2007 issue, with its large number of articles about radio history and nostalgia, was like getting an early Christmas present! Coming from the first wave of baby boomers, I grew up surrounded by tube model radios and was regaled with stories about old time DXers like Paul W. Dilg who, during a week's vacation in 1936, logged programs from 448 short wave stations located in over 186 countries using a 23 tube Scott receiver! (Perhaps this explains why I enjoy DXing with tube-model Trans-Oceanics and with sets dating

back to before World War II.)

"While getting the latest information about emerging radio and consumer technologies is important, I'm sure that there are many *MT* readers like myself who appreciate the articles dealing with various aspects of old time radio, including tips and techniques for modern-day DXing with the 'old timers.'

"Under separate cover, I am renewing my *MT* subscription for another 3 years. Keep up the good work!"

Eric Beheim

Cedar Fire

Jeff KF6NXQ responded to our query in the December Communications column as to how radio communications fared in 2007 as compared to 2003 (pictured on this January 2004 cover). Jeff sent a report from the San Diego County Sheriff's department, which we excerpt below:



"As flames reached the 100 ft. tall radio towers atop the peaks of San Diego County, Radio Technologists from the Sheriff's Department were busy keeping lines of communication open to the 264 agencies utilizing the Regional Communications System (RCS)."

"During the recent fires, the RCS saw a 71% improvement in radio system response and availability compared with the Cedar fire of 2003. Because of the effectiveness of communications, the RCS system saw use by local, state and federal fire and police agencies as well as mutual aid agencies. Cal Fire used the RCS to provide command and logistical support. The Army National Guard used the RCS to support the Sheriff's Department with security."

"The fire burned over four RCS radio communication towers. Despite the flames and smoke, the radio systems continued operating. ... At one point, 19 of the radio towers were operating on generators as power lines and power poles were consumed by flames."

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

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Yaesu SP-8 Speaker	SPK 4	\$159.95
GRE Superamplifier	PRE 1	\$59.95
VS6 Mobile Speaker	SPK 7	\$14.95
Speco DMS-3P Extention Speaker	SPK 3	\$49.95



COMMUNICATIONS

by Ken Reitz

Royalties Bite Internet & Satellite Radio

The Copyright Royalty Board set new rates last December that will eventually affect how much you pay for satellite radio subscriptions and whether or not Internet Radio ever gets off the ground. Both Sirius and XM satellite radio services were hit with a charge of 6% on a calculated part of revenues gained by both companies, with intent to increase to 8% of those revenues in the future.

Yahoo and AOL have threatened to shut down their Internet radio services after they were given a 38% increase in royalties to air music on their services. According to a report in Bloomberg News, users of Yahoo's Launchcast radio service, the largest web-radio site, dropped by 11% the month following the increase.

Phone-based Radio Offered

In the never-ending search to have your cell phone do everything, Nokia has recently announced its own Internet Radio Service on Nokia Series 60 phones. According to a company press release, users are able to browse hundreds of online stations. The phones also have space for up to 750 songs. No word on what the quality of the audio is like (though one can imagine) but, has the company heard yet from the Copyright Royalty Board about how much Nokia's copyright payments will be?



Nokia wants to do it all with their series 60 phones, you know, phone, Internet, TV, radio, text, laundry, no wait, that's the Maytag phone. (Courtesy: Nokia USA)

Winter Storms Prove Hams' Value

Several media outlets reported the efforts of organized ham radio operators during last December's string of fierce winter storms that swept across the country in a stinging taste of early winter.

Citizens in the Portland, Oregon, area found emergency-prepared amateur radio operators very useful when cell coverage and land-line telephone connections were cut. Ham operators were called heroes by state officials including the state police. Some 60 volunteer operators stationed along the coast and inland helped maintain 911 centers, hospitals and kept other emergency services in contact with each other.

Storm Trims Antenna

One of the series of storms that wracked the country's mid-section took most of WJCH's 460-ft tower down. According to a report in *Radio Magazine*, with only 200 feet left, the Joliet, Illinois, station has decided to put up a new one.

Back-up System Proves Worth in Boston

You never really appreciate having a back-up communications system until it has to be deployed. And, in the case of an airport, the stakes are very high. Last December, according to several media reports, workers at Logan International Airport in Boston accidentally cut the wrong communications cable during construction on the 19th floor of the tower. It took workers two hours to repair the damage, and, in the meantime, the tower switched to back-up frequencies for air coms and a back-up radar system was put into use as well. A few flights were delayed, but an FAA spokesman reported that no one was in danger at any point.

Idaho Looks to the Skies for Com Services

When you think about Idaho, you think about the wide open spaces, rocky terrain, and miles and miles between anything. The sparse population and large territory makes landline-based and cell phone-based communications an expensive proposition.

That's why the state has awarded a contract to once-faltering Iridium for satellite voice and data services for government agencies throughout the state, according to a company press release. The three year contract was awarded as part of Western States Contracting Alliance (WSCA). Iridium says it believes similar contracts with other western states will follow Idaho's initial contract.



Idaho looks to the skies for solutions to its BIG hardware problem. Mobile and land-based sets such as this Iridium Sky-Connect MOBILE dial-tone base station will help link all government agencies in Idaho. (Courtesy: Iridium)

GPS Wars: EU vs. US

A report in Agence France Presse says that

American military researchers are working on a "super-powerful update" to its current GPS satellite navigation system in an effort to best European Union's Galileo project. The report says the U.S. will roll-out its GPS III satellites – the first significant upgrade to the system since the 1990s.

The new system will have about 500 times the transmitter power, thus increasing its resistance to jamming. The new series satellites, according to the report, will have second and third frequencies for civilian signals and provide "real-time, un-augmented, one-meter accuracy" in locating objects on the ground.

When finally constructed, the new constellation will include 32 satellites. Some \$1.8 billion dollars will be handed out to contractors this year, according to the report.

Tiny FM Antenna in Production

Responding to the growing need for smaller and smaller electronic devices, a company called Fractus has introduced a fractal antenna it calls FracFM. The patented design allows tiny FM antennas about one third the size of a postage stamp, to be used in mobile and portable devices ranging from GPS, cell phones, lap-tops, video game and personal digital assistants (PDAs). According to a company report, the antenna requires no external amplification and can fit into very small devices such as Bluetooth headsets.

Ingenuity Saves County \$15k

Localities across America have been earmarking Homeland Security grants for various communications projects. One such project was to buy a portable antenna tower for emergency communications for a county in Colorado. The *Colorado Ledger* reports that two county computer analysts looking into the purchase thought the commercially built price tag of \$20,000 a little steep.

After doing their own research, the two, both of whom grew up on farms and were used to lashing together their own farm equipment, found a better way. Using a locally built trailer and buying a crank-up 45-foot telescoping tower from ham radio tower supplier U.S. Tower in Lincoln, Kansas, the two made their own tower for the county for about \$5,000.

DIY Traffic Cops in Trouble

You may have seen cars screaming through your neighborhood at twice the posted speed limit and wondered where all the traffic cops with radar guns were. There just aren't enough to go around, and that's what could get two Charlotte citizens in trouble.

According to a report in the *Charlotte Observer*, a neighborhood committee sought help

from the local police in catching speeders. The committee bought their own radar guns and the local police department trained some on their use. But, the department was unsure about whether the neighbors needed an FCC license to operate the guns, so they asked.

In typical FCC fashion, a response came eight months later in the form of a complaint against the users and a threat of a \$10,000 fine. Later, it was reported the residents didn't need a license to use the radar guns, but the guns would have to be calibrated.

Scanner Listeners Help Nab Bank Robbery Suspect

From the *South Idaho Press* comes a story about a hapless bank robbery suspect who was allegedly seen roaring away from a local bank just as word of the heist came over the local police channel. A citizen listening to his scanner saw the truck, called the local sheriff's department with a description and direction of the get-away vehicle. Another citizen listening to his scanner in a vehicle going the opposite direction heard the description, saw the vehicle in question and began pursuit. The second citizen saw enough of the license to help police find it after they had lost track of the vehicle.

A high-speed chase ensued, according to the article, "...across fields, gravel roads, highways, and eventually, a canal." The sheriff's department later presented both citizens with plaques recognizing their efforts in the capture of the bank robbery suspect.

Expensive VIPER System Aids in Suspect's Capture

Another alleged bank robber, this time in Raleigh, North Carolina, was caught thanks to an inter-agency radio system that links all public services. But, the price tag for such a system is steep. So steep, in fact, that the state had earlier refused to fund a request for the \$11 million dollar system. Instead a federal grant was used.

According to the report on the WRAL-TV web site, nearly three-quarters of the state's 100 counties can use the VIPER system. But, it's expected that it would take another \$100 million to bring the remaining counties on board.

More WRC Action

Last fall's World Radiocommunications Conference, known as WRC-07, approved use of the Euro-based digital broadcast system DRM for use in tropical-band broadcasting. According to a report in *Radio World On-line*, DRM has been endorsed for over 5 years for digital international shortwave broadcasting in the long, medium and shortwave bands, but until now, the 120, 90 and 60 meter bands have been excluded. Those bands have traditionally been reserved for domestic broadcasting in countries that are located between 30°N and 30°S of the equator.

But wait, there's more: According to the report, DRM is testing an adaptation of its system to VHF bands, including the FM band, known as DRM+. Germany is said to be ready to test DRM and HD Radio in field trials planned in Heidelberg. Stay tuned!

DXing the Ham Bands

Hams and shortwave listeners alike will have a chance to hear transmissions again from famed dark-ops broadcasting site Swan Island in the western Gulf of Mexico. The HQ8R DXpedition to Swan Island (NA-035) is scheduled to run from March 15 through 23. The group plans to be active on 160 through 10 meters in all modes including digital.

Ham and SWL reports should be sent to HR2RCH (Radio Club de Honduras, P.O. Box 273, San Pedro Sula, Cortes, Honduras). Last minute info and possible loggings may be found at www.hondurasdx.com.

The original Radio Swan was said to have been a CIA funded and staffed clandestine broadcaster which beamed anti-Castro programming and secret messages to counter-revolutionary insurgents in Cuba during the height of the Cold War. Some great photos of the island and the relics of its clandestine radio past are found on the web site. Apparent future plans for the island are as dark as its history as a Honduran penal colony.



Seems like the perfect place for an ice cold margarita or a counter-revolution. Swan Island comes to life (on the ham bands, anyway) thanks to the HQ8R DXpedition. (Courtesy: Radio Club de Honduras)

And here's kind of a switch: The Short Wave Amateur Radio Listeners group from the Mediterranean DX Club SWL section sponsors several awards for licensed hams based on the cards they receive from SWLers. For complete information on these awards go to www.mdxc.org/swl/awards.html. These awards are not easy to get and present a real challenge to ham operators who have to rely on SWLers to send in their reception reports. Good luck!

And, Finally, an IBOC Interference Complaint

Despite the anecdotal evidence by many AM DXers, *World Radio On-line* is reporting the first official complaint of an AM HD Radio interference incident. Rochester, New York, station WYSL says that adjacent channel interference from WBZ in Boston is hampering its signals at night and during the day. Industry observers have tabbed the dispute a David vs. Goliath match, pitting the small-time WYSL against the conglomerate owned, network affiliate, major metro station. WYSL, which is said to have been vocal about its resistance to HD Radio, has made several tests, including digital recordings of field

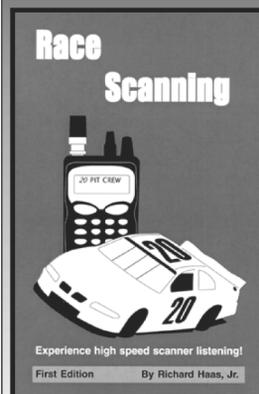
reception, to prove the interference.

According to the *Radio World* report, WYSL is not alone. In fact, they've formed an alliance called Stop IBOC (www.stopiboc.com). Members include WSM Nashville, Tennessee, and Terre Haute, Indiana-based Midwest Communications which has four stations in Indiana and Illinois. The web site urges listeners and broadcasters alike to join their alliance and file complaints about IBOC interference with the FCC. There's even an "IBOC Confessional" where broadcasters can anonymously relate pressures from management to convert to AM HD. The site is becoming the headquarters for information about AM HD Radio which goes unreported in the popular press.

And, in a related report in *Radio Magazine*: Following FCC approval to transmit IBOC at night, some AM stations in the Citadel chain switched off their IBOC night-time transmissions because of interference issues. Of the 10 Citadel stations operating IBOC at night, five reported interference problems. According to the report the issues were mostly found in the higher powered stations.

"Communications" is compiled by Ken Reitz KS4ZR from news stories submitted by our readers. Many thanks to this month's fine radio reporters: Anonymous, Rachel Baughn, Keith Harrell, Norman Hill, Brian Rogers, Doug Smith, Larry Van Horn, Sakthi Vel, and Ed Yearly. If you find a story in your local newspaper or on-line send it to "Communications" c/o Monitoring Times and your name will appear here, too.

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A Shack of My Own

By Matthew Stanley

It was a rainy Sunday morning in January when my wife and I came upon the quirky Cape Cod-style bungalow with Tudor accents. The faded-yellow four-bedroom sat at the crest of a gentle hill, halfway down a dead-end street in a quiet neighborhood on the North Shore of Long Island, New York.

To that point in time, our house search hadn't exactly caught fire; we were still ambivalent over whether or not to leave Manhattan, and none of the houses we saw in our price range were anything to cheer about. Still, the lure of better schools and being closer to family kept us on track, and we dutifully went through our usual open house routine: I waited in the car with the kids while my wife ran in for a look and, if her report was favorable – which it was this time – I'd take my own quick look. This house felt right almost instantly; we liked it so much, we came back later that day for a closer inspection – minus the kids. What we saw on our return visit

was to have a big influence on our decision to make an offer on – and buy – that house.

I still recall standing in the second floor hallway later that day when the real estate agent casually said "...and right through there is a crawl space," pointing to a small door that wouldn't have been out of place in *Alice in Wonderland*. Curious, we opened the door, crouched and went in.

The crawl space was nestled under a steeply slanted roof, over the front hall of the house. Cobwebs dangled between the exposed beams and dust covered the floor. Roofing nails protruded from odd angles. Although the space measured about ten feet by ten feet of floor space, the ceiling was so steep that I could only stand up straight in the center. One foot in either direction and I'd bang my head. Still, the space was just large enough for a good-sized table and, through an old air vent, had a direct route to the outside of the house. "I know what you're

thinking," my wife said, "This would make a great shack."

For years I had dreamed of having a real shack, a place where my radios would be king. In our Manhattan apartment, the radios had always competed for table space with cookbooks, computers, and everything in between. Back in my bachelor studio apartment, the radios occupied prominent shelf space just above a large butcher-block table, perfect for spreading everything out for an evening of listening. But with marriage came compromise, and that meant trying out different places in our tiny starter apartment – desk, dresser, nightstand – but no space ever truly qualified as a shack.

After we moved to a larger apartment, the radios settled on an antique writing desk in a corner, with antenna lead-ins stretched under the rug to the window. It wasn't perfect, but it worked well for years.

Looking back on our time in the city, I was the model urban DXer. I made do without lengthy outdoor antennas, content with my old Sony AN-1 active antenna sitting on the windowsill, random wires under the bed or dangled out our 13th-floor window only at night so the neighbors would not see. Inside, I did my best to keep all wires and surge protectors out of sight. My wife encouraged my hobby activities, knowing what it meant to me to travel the world via radio.

And travel I did, receiving close to 90 countries from my urban listening post. I also verified over 70 countries on all continents (except Antarctica). Shortwave became – and remains – my main source of information, and I spent many hours tuned to the newscasts of Radio Canada International (RCI), Deutsche Welle, and the BBC World Service (BBCWS). For entertainment, I'd listen to Charlie Gillette and John Peel's music shows on the BBCWS, as well as the various listeners' programs, including Radio Moscow's *Moscow Mailbag*, *DX Party-line* on HCJB, and *DXers Unlimited* on Radio Habana Cuba. I loved being part of a worldwide community of listeners.

Still, I quickly learned not to believe everything I heard on shortwave. I recall tuning to Radio Baghdad just after the invasion of Kuwait in 1990 to hear the announcer say that Iraq had sent troops at the request of the Kuwaiti government to help put down a coup d'état. Quite a cover



My monitoring post, set up just the way I like it, with no competition from other family activities.



The shack door displays color copies of prize QSLs and memorabilia.

story for Saddam Hussein's act of aggression. Years later, tuning to the Voice of Russia during the Kursk disaster, I heard that Russian divers had reached the submarine, delivering food, water and oxygen to the trapped sailors; rescue was imminent, the announcer said. Listening to the BBCWS later that same night, no mention was made of any contact with the stricken sub, for all aboard had perished.

Planning the Shack

As taken by the house as we were, we knew from the outset that renovations would be necessary to make the house truly "ours." Working with an architect, we began planning the addition of an upstairs bedroom and bathroom, expansion of the master bedroom, and the conversion of the downstairs bedrooms into a dining room and family room. A new front porch rounded out our plans.

When the first set of draft plans arrived for our review, my heart quietly sank; adding floor space to the master bedroom would mean shrinking the crawl space. I would be left with a seven-foot by four-foot space, barely the size of a coat closet, hardly enough for a suitable shack. I started considering other locations in the house. The basement and garage were out of the question, given how packed they were with boxes, but the attic seemed like a workable idea. I could carve out a good-sized space, erect some walls, and have a terrific shack up there.

Then my wife came up with an idea that was to change everything: to create an overhang for the new front porch, we would extend the second story of the house, just off the master bedroom. This design change brought the total size of the crawl space to about 66 square feet,

solidifying its choice as my new shack. Although the renovations took six months to complete, the time flew by, knowing that when it was all over, I would finally have a true shack.

Moving to the suburbs also gave me the opportunity to erect outdoor antennas for the first time. During the renovations, I'd eye the backyard when I'd have a free moment and try to visualize where and how to place an antenna. For background, I read *Joe Carr's Receiving Antenna Handbook* and Clem Small's antenna column in *Monitoring Times*. I pestered Bob Grove in his *Ask Bob* column about antenna types, materials and earth grounds.

Based on the dimensions of our lot and my informal study of the art and science of antennas, I decided that the backyard could accommodate two inverted vee antennas, taking advantage of two tall trees along the perimeter of our property. As inverted vees work best with signals arriving broadside, the two antennas would be erected at right angles to one another in order to give the broadest possible coverage of incoming signals. Finally, I chose one preassembled antenna, a Grove Skywire, while the other I designed and crafted myself using coated flex-weave wire and a Budwig center connector.

Seize the Moment

During the renovations, the electricians snaked hundreds of feet of coaxial cable, electrical wire, and speaker wire throughout the house in anticipation of the numerous cable television and internet hookups we planned. Watching them work, I realized I had to seize the opportunity – when the walls were nothing but studs – to have them install coaxial cable to serve as lead-ins for the various antennas I planned to erect. Specifically, I asked them to install four coaxial cables, two up from the basement and two down from the attic. (In the attic, I planned to erect a PAR EF-SWL and a homebrew slinky the day we moved in, prior to the outdoor antennas. The basement coax would link up with the backyard antennas.) If I hadn't had these lead-ins installed, I would have been poking holes through sheetrock myself – not a pretty sight.

Hoisting the antennas was an interesting task. I had read that a good method for getting your rope over a high tree limb was to tie a string around a rock and toss it up in the tree. That may sound all right in theory, but being the new guy on the block, I didn't want to take a chance on smashing someone's window and setting neighborly relations back a decade or two. Also, it was not hard to visualize the rock clearing the tree limb and arcing straight back at my head.

Instead, I came up with a contraption I'll call the "tree pole." I fastened together three

lengthy pieces of scrap molding our contractor had left behind. Although light in weight, the three pieces totaled about 20 feet in length. To one end, I fastened a hook. At the other, I cut a notch wide enough to hold the rope. Threading the rope through the hook, I pulled it until the rock hung tight, and secured the rope through the notch to keep it place. Tree pole in hand, I climbed the ladder, reached for the highest limb I could, and gently let the rope out, allowing the rock to fall slowly to the ground. No broken windows, no broken teeth.

Tying the rope to the center connector, I pulled the antenna and coaxial cable about halfway into position. At that point I climbed the ladder again, then let out the two wire elements. Using the tree pole, I carefully snaked the wire elements over the adjacent branches, taking care not to kink or break the wire, until the desired position was reached. I then hoisted the antenna to its fullest extent, and tied the rope tightly. The wire elements were secured to our new fence using a modified pulley arrangement of hooks, nylon string and rocks, to allow the lines to move in the wind. Repeating this process, I erected the second antenna from a tree high above our back fence.

Getting Grounded

Before I hooked up the antennas, however, I installed an earth ground to keep nearby lightning and static electricity from damaging my equipment. I determined that the best location for the earth ground would be an out-of-the-way corner of the backyard, away from the kids' playhouse and my wife's garden. The fence provided a good spot to fasten the grounding block, and 18 inches off that point, I drove the 8-foot copper rod into the ground with equal parts sledgehammer and brute force. Preparation was the key; first I'd dug a 12-inch square hole and saturated the soil with water before driving the rod into the earth. To complete the installation, I ran the coax lines from the grounding block through the basement wall and into the house.

Looking back on the antenna installation, I feel lucky. I'd read stories of complaining neighbors, nosy zoning inspectors, etc. The worst I dealt with was a neighbor who wondered about the coax line I was stringing along the top of my fence; when I told him it was for a shortwave antenna, he said as long as he couldn't see it, he didn't care. Both antennas, I'm happy to say, are virtually invisible, and my neighbor hasn't mentioned the matter since.

And how have the antennas performed? So far I've pulled in fifteen new radio countries, including Guatemala, Colombia, Poland, Kaliningrad (Russian Republic), Swaziland, Republic of Congo, Zambia, Abu Dhabi (United Arab Emirates), Diego Garcia (British Indian Ocean Territory), Kazakhstan, Mongolia, Japan, Taiwan, Guam, and Palau. Am I glad we moved to the suburbs? You bet.

Setting Up the Shack

Finally, the time came to set up the new shack. The contractors had sheet-rocked the space, added heat and air conditioning, and laid a new hardwood floor. The electrician had

provided ample electrical outlets and arranged the coaxial cables in a wall plate for easy access. A round window with keyhole molding (my wife's idea) added a decorative element. I painted the space using leftover paint from one of the bedrooms.

A hand-me-down IKEA table fit perfectly against one wall. On it, I arranged my radios, starting with my Grundig Satellit 800, my primary receiver, directly in the middle. To the right of the 800 I placed my antenna switches; one connects the backyard antennas to the 800, while the other brings the attic antennas to an adjacent Sony ICF-2010. The antenna switches are simple A/B/C video switches I found on clearance at Radio Shack; they work like a charm. I attached the switches to a scrap of plywood to hold them in place, and completed the ground system for the backyard antennas by grounding the coax shields to the chassis of the 800.

With limited table space, I had to start raising things up to get everything I wanted into the shack. I put the antenna switches on top of a small shelf riser I found at the Container Store. The riser holds two analog receivers, a 1970s Realistic portable (a \$5 garage sale special) and a late-1980s Toshiba RPF-11. The Toshiba was my first shortwave radio, and memories of listening to the historic events of the autumn of 1989 – the fall of communism – will always be associated with the RPF-11.

Below, I concealed a Sony TCM-929 cassette recorder under a plastic letter box, which makes a simple shelf when flipped upside down. The TCM-929 is connected to the 800 and a

digital timer for time-shift recording. I always keep a blank cassette cued up in case I hear something extraordinary while tuning around.

Next to the antenna switches, I tucked my General Electric Superadio III (SIII), used for medium wave (AM broadcast band) DXing. The TCM-929, 2010 and the SIII all rest on upside down mouse pads. Why upside down? Because the smooth “top” surface, typically used to slide a computer mouse on, allows the radios to be moved anywhere on the table I wish (accounting for cord length), while the rubber “bottom” surface holds the radio in place. If I'm in the mood to DX AM signals, I simply slide the SIII out of the corner and into position. The mouse pad also allows me to turn the SIII to and fro to better tune desired signals and null out unwanted signals.

Next to the SIII I placed my Radio Shack AM loop antenna. Loop antennas, much like the SIII's internal ferrite bar antenna, aid in tuning distant AM signals.

To the left of the 800, I placed an auxiliary power strip, since the surge protector behind my Grundig was already filled to capacity. This is good for plugging in my laptop, charging cell phones and walkie-talkies, etc. Next to the power strip I placed my Aqua Guide Aqua Meter radio direction finder (RDF), a radio receiver once used on boats for navigational purposes. Although RDFs have been made obsolete by the advent of global positioning systems (GPS), the Aqua Meter is perfect for DXing nondirectional aeronautical navigational beacons. These beacons transmit an easy-to-copy two or three-character callsign in Morse code. Between the Aqua Meter and the 800, I placed my Sony SC1 WaveHawk scanner, which I use for listening in on air traffic control, harbor traffic, and Long Island Rail Road commuter trains.

All cables are labeled with a notation (e.g., “to 2010” or “from PAR”) to indicate where they come from or are heading. All AC adaptors are similarly labeled, to avoid mix-ups. I also made a simple diagram of the coaxial cable wall plate, so I know which of the four jacks leads to which antenna.

Final Touches

A magnetic bulletin board is attached to the sloping wall directly over the 800. Here I attach station schedules, propagation forecasts and other information I want to have visible at all times. On the opposite wall hangs a large National Geographic world map, where I have affixed a tiny sticker – red for “received” – on every radio country I've received; once verified, I mark the stickers with a “V”.

The inside of the shack door is decorated with QSLs and other memorabilia from stations all over the world. For this display I use only color photocopies of my QSLs; the originals are kept in a binder in

archival-stable plastic sleeves. Bookshelves against both walls hold radio-related books, magazines, logbooks and other hobby materials.

Since moving into the house in December 2005, I've spent many hours in the shack monitoring the world as I have done for almost twenty years. This new space, dedicated to just radio and other personal pursuits – I've got my guitars, music and foreign language books there as well – has renewed my enthusiasm for the hobby.

The shack is a great place for quiet reflection, whether I'm playing guitar, studying languages or trawling for distant signals. And I'm not the only guy to carve out his own space; a recent book and newspaper article highlight the current trend of creating retreats within one's home (see sidebar).

In fact, as I came to realize how important this space is to me, I considered calling it something different, more formal – the “study” or the “library” came to mind – but I realized that if I did, I'd be abandoning my radio roots. So the “shack” is here to stay. If it hadn't been for radio, this might have been just another crawl space.

FOR FURTHER READING:

Carr, Joseph J. 1993. *Joe Carr's Receiving Antenna Handbook*. Solana Beach, CA: High Text Publications. (Available from Universal Radio and other leading radio outlets)

Jones, Finn-Olaf. 2006. “A Hideout All His Own.” In *The New York Times*, May 18, 2006, p. F1. (This article discusses the growing trend of creating retreats in attics, basements and sheds.)

Pollan, Michael. 1997. *A Place of My Own: The Education of an Amateur Builder*. New York: Random House. (The author describes the process of planning, designing and constructing – by himself – a small writing cabin in his backyard.)

Kevin Carey's *Below 500 kHz* column here in *MT* is the place to go for more information on DXing nondirectional beacons.

PRODUCT INFORMATION:

PAR EF-SWL antenna – (Universal Radio catalog #2205, \$57.95; Grove Enterprises catalog #ANT08, \$59.95)

Grove Skywire antenna – (Grove catalog #ANT2, \$29.99)

Ground rod – Radio Shack no longer sells the type I used, but AceHardware.com carries a similar item (catalog #30278, \$20.99)

Grounding Block – available at Radio Shack (catalog #15-924, \$5.99)

Antenna switch – (actually an A/B/C video switch) can be found at Radio Shack while they last (catalog #15-218, \$7.97)

Shelf riser (actually a DVD holder turned on its side) – try The Container Store (catalog #10029226, \$5.99)

Sony TCM-929 cassette recorder – (Universal Radio catalog # 0449, \$24.95)

Loop Antenna – Radio Shack no longer sells the loop antenna, but Terk makes a similar antenna (BHPPhotoVideo.com, \$27.95).

Digital timer – this type of timer is generally used for turning lamps and appliances on and off; it can be found at most hardware stores for under \$20; be sure to specify digital as the analog model is tough to set for a precise time.



If it hadn't been for radio, the room behind this door might have been just another crawl space.

SIGNAL REPORTS

Ripping Open the Bandwidth and Beating a Coronal Mass Ejection

By Roy Berger

My first experience with shortwave radio was one of longing. I knew there was something to it. Shortwaves always seemed to work their way into a Hardy Boys' mystery anticipating a pirate or foiling a plot. It deepened my want. What mysteries could Frank, Joe and I uncover?

I remember an old receiving rig from the sixties that my aunt had purchased from a department store. It was an all in one unit that had an atlas across the top lined with time zones. It looked so promising. It was 1966, it was daytime, it was a concrete apartment building. I didn't know what I was doing. I had the patience of a ten year old. My efforts were frustrated and the mystery remained. Perhaps Tom Swift would have persevered.

I always had a box of old radios, phones, wires and batteries stuffed under the bed. I didn't build anything understandable, but my projects could extend across the room and noise from the speakers proved ... well, it proved something happened. But radio, eh? Radios. What an incredible fascinating thing. Frequencies travel through the ether. You can hear it. It's free. It all has to do with electronics, history, science and humanity.

At eleven I discovered that, for some reason, at night my transistor radio could pick up AM stations from really far away. I wasn't just picking up

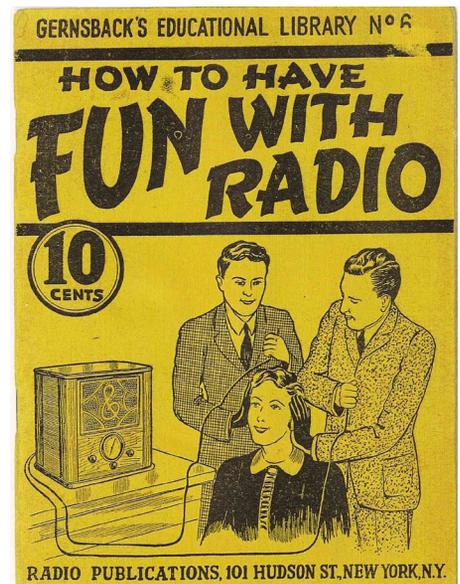
local London stations or even Tillsonburg; I was getting Detroit, New York, and even Thunderbay! I could make no account for it. I'd have brought up that little curiosity at the dinner table, but at eleven I was acquiring wisdom. My parents' answers would likely turn into questions as to why and how I was listening to a radio at two in the morning. I didn't need the heat.

I was occasionally phoning in to talk shows. I was amazed. I realize now that it was just the poor lot of some underpaid country western disc jockey trying to make his bones in the radio biz and with ratings so small that mine was the only call lighting up the line.

I couldn't get the rigs I drooled over. I saw things in *Popular Science* and the stacks of Amateur Radio *CQ* magazines down at the News Depot. The ads and articles were fascinating. The backdrops for the ads always showed smartly dressed guys with brand new thirty five thousand dollar homes. I held my breath. Every decade or so I poked my head up and checked what was out there.

Short Waves Save the Day

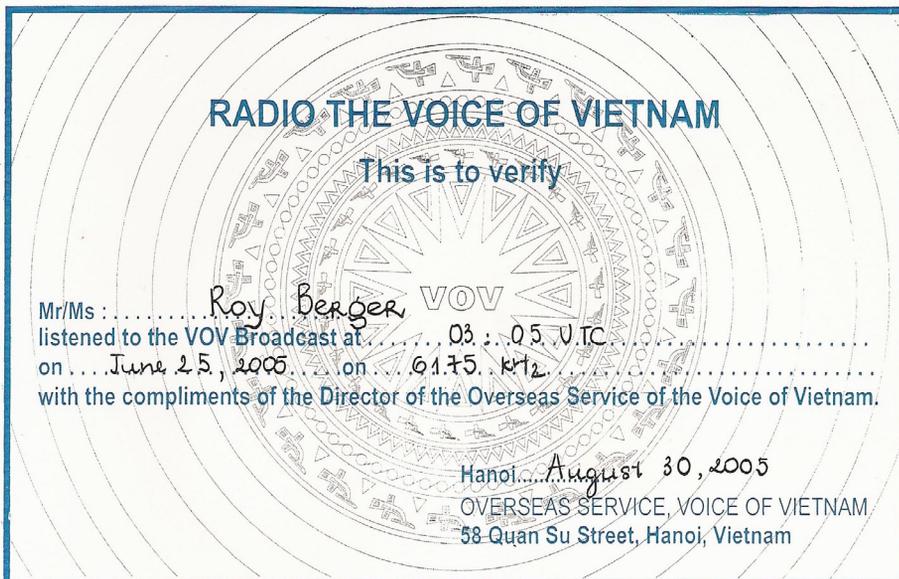
The clock ticked one decade into another. My life had a favorable synchronicity of a new job, occasional luxury time, and a forty year jump in electronic sophistication. I received a Grundig



FR-200 for my birthday. We had gone through a traumatic blackout the preceding January. Due to ice rain, power lines fell and millions in Quebec had no power for two weeks while the temperature fell to negative thirty. TV and radio stations dependent on the grid failed. The Internet died. Text messaging was writing the word "help" into a frosted window. It was shortwave or bust. Batteries gained a higher value than gold, so receiving a hand crank radio was a delight.

I hadn't experimented with shortwave frequencies for a decade or so, but was now better acquainted with time, knowledge and precious patience. Say what you like, that little FR-200 brought in the world. I thought the quality of reception and availability of stations was remarkable. I wasn't in the four transistor universe anymore: I was sluing through ten thousand at least. After a month of that and then a new job, I just had to shop. I checked out local stores and the net. Reading instant reviews on the Internet was a significant factor. It's not like I can compare notes with the average guy on the shop floor.

The local Radio Shack carried the Grundig line, including the Satellite 800. In 2003 that was Grundig's top of the line swan song. It was five hundred bones plus tax. It suited me. I figured to get better I'd have to spend twice the money. I knew there had been issues at the factory, but thanks to the net blogs I was armed with serial



numbers to differentiate between good and bad batches. I took the huge box home, extended the five foot antenna and plugged it in. I guess the old dinosaur hams bemoan this sort of thing, but it really was plug and play. This isn't the box of yesteryear. I pull stations in at will. Yea, team.

Hooked by Radio

Four years later I have a hundred pages of logs and reception reports from all around the world. I have QSLs from countries I'll never have the opportunity to visit. The Voice of Vietnam agreed I heard them on June 25th, 2005, on 6175.0 and sent me a QSL to confirm it. I caught a wild skip one night with Radio New Zealand on 9885.0. It only happened once. They sent me a bumper sticker, post card, and a frequency schedule. I got a few cool propaganda cards from Radio Moscow and a big bundle of stuff from KBS Radio in South Korea. At six in the morning the Australian Broadcasting station is usually loud and clear. I compare their news to mine.

I was astonished to hear letters I wrote being read on DX mailbag shows from Lithuania and Japan. Now I keep a small microcassette recorder on top of the radio to win beer bets. The shortwave has motivated me to draw radio cartoons which my mother closest friends assure me will catapult me to an incredible life of artistic acclaim and visionary success.

It is also worth underlining that at different places in time, history, and location, the shortwave radio is a thing of caution. It would be madness and suicide to be caught with my Grundig 800 in the Sudan. I'm sure my whole family would be done in, should I be caught with my Grundig in North Korea. There is something about the shortwave radio that raises intrigue and caution. It has to do with listening. Should shortwave radios be licensed? Did Humphrey Bogart have one in Casablanca? We never know what will happen when we open a window to the world.

Part of the lore of the shortwave has to do with data retrieval. Audio spotting = DX. Cyber space, first wave. Hardware is another aspect. Now software has added a further dimension. Some funny guys even get a kick out of bouncing signals off the moon. It's all open.

Sometimes I slide over to the lower side band and listen in on ham chats taking place from Florida, Ohio, Maine, New Brunswick and Sudbury. I listen to retired cops tell funny stories. I listen to old radio operators talk about secrets from 1944. I listened to an Idaho farmer talk about fending off ground hogs. I heard one old story just the other night. It was a DX operator talking about The Great Depression. He said that he lived in a tenement. The gas had been cut off so most people froze. Some guys in the neighborhood went around hooked up snake lines to bypass the gas meters so everyone could stay warm. There was a speak easy across the street. When the meter reader was going to come and inspect the meters, he would phone the speak easy knowing they would warn the neighborhood. "People were nice like that, back then," he said. Nice catch.

Sometimes I feel I've won a prize when I

PAR AVION
Mr Roy Berger

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QSL Verification Card

Dear Mr Berger,

This verifies your report on the reception of the Voice of Russia's broadcast
in English

Date August 5,7, 2005
Time 02.47-03.29 UTC
Freq 9860 kHz

We invite you to continue listening. Please feel free to write again with comments or questions about our programming.

Best wishes from the Voice of Russia

tune into a Pirate operator. These long distance rascals risk massive fines, confiscations, jail and everything in order to play a personal musical selection or off beat, edited sound track from their mom's basement, motel rooms and moving vans. They're crazy, but they are out there and part of it.

I was fascinated by and had my curiosity piqued when I finally comprehended radio jamming noise. I've learned to distinguish between natural and artificial noise. I was creeped out when I heard a numbers station using, I assumed, an unbreakable book code. Holy smokes, what's going on out there? It's living radio with a big beat.

Would I get a better rig? Would I jump up? I'm so tempted. No matter what rig I jumped up to, my first incentive would be a superior antenna of some kind. I suspect a decent indoor magnetic loop would do the trick. Right now I'm still spoiled by its whip. That AOR SR2000 looks pretty neat as does the Ten-Tec RX-350D. It would be cool to have a screen with moving graphs. It could have a two hundred page instruction book as long as it doesn't matter if I read too much of it or not.

Radio Olympics

Sometimes while probing for signals, I get a sense of how the atmosphere around the earth is undulating. Sometimes, I thought I felt a solar pulse. I went looking for one thing and found many others. I don't know what truths I found as I skipped around the world. There sure are a lot of them. My logs reflect only what was said. I only declare it to be truly said; I can't know if it was said truly.

Shortwave has a different beat. It's not like television and it's not like the internet. This particular amplified and modulated medium, which uses the relative thickness of ionospheric layers of the atmosphere to travel through, is intermittent, less dependent on local power stations, less dependent on advertising, and largely unpredictable.

Shortwave listening should become an Olympic sport. Imagine the brow beading sweat as I lean forward in my lawn chair, take the pencil in my hand and press a function key. We rush forward to Syria. The fans scream and wave pennants. Some ash drops off my cigarette as I spin the dial and we are off to Turkey. I casually take another sip of beer and whoosh, now we



charged particles coming from the sun are impacting on the earth's magnetic sphere disturbing the ionosphere so we have continuous noise. You contact me at, arnie@rhc.cu We are at the tail end of the solar cycle. Reception is best after local sunset. There will be four years of lower solar activity to come because sunspots are going down. The 30 to 180 meter bands remain open..."

SEPTEMBER 2-3/ 05

There was static shower on all frequencies for days except 6000.0 which just had Castro speeches. Sounds like popcorn and pebbles.

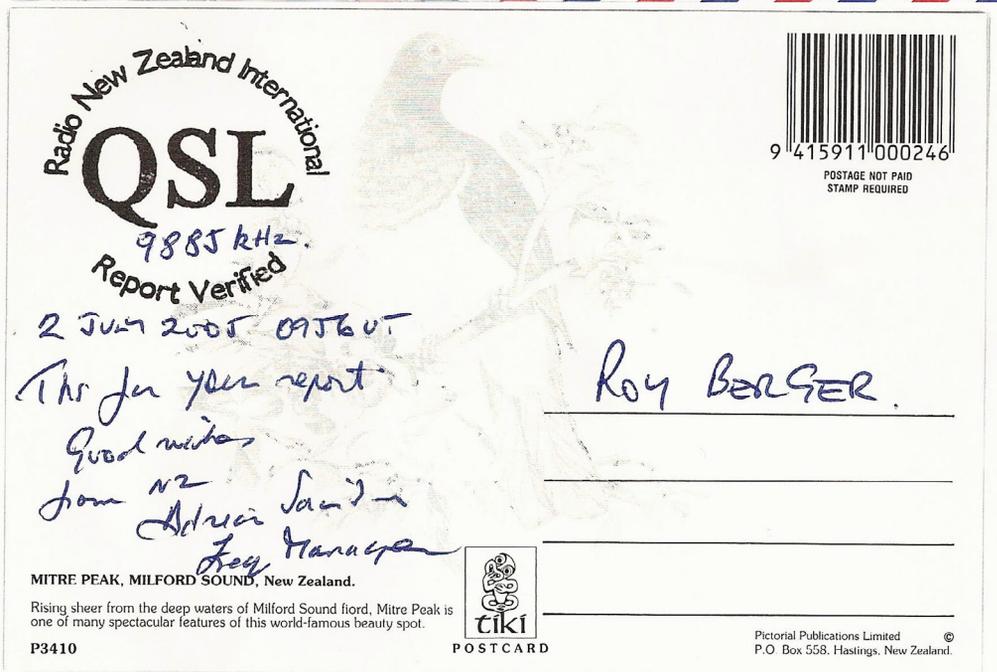
SEPTEMBER 6/05

09:41 5835.0 WHRI World Harvest Radio International From midnight to five AM United Radio Broadcasters of New Orleans Louisiana Radio Call In Show. It's on all night all day 27/7. "...four kids missing. What is FEMA? Can only buy two to five gallons of gas at a time. I'm on the highway. People are phoning in and giving their cell phone numbers. 504-905-2813 Some people went back on Sunday...they could be ok." Signal strength 5-9 wavering, mainly audible. "The information you need in the aftermath of Katrina." People phone in. "Sheriff, my kid said wow Dad. Look at all the trees still standing." "No traffic to Pearl River...take the 49 to Baton Rouge. Maybe take the 190 around Baton Rouge. My house got some damage but the electrical is working hard. The highway 1 bridge is completely intact. It passed the eyeball test...the causeway is being used for emergency personnel."

09:50 "Bam Bam, what you got there? Someone is passing out baby supplies. We're checking into that. Levies are being shored up with enormous sand bags...could take several weeks... hundred of thousands getting used to a new way of life." Lots of hiss in signal. "...living on the street Gulfport, Mississippi, getting help from church members or I'd be living in a ditch...American war planes...price of oil down a dollar. \$66.50 a barrel. Empire Diamonds. Jerry Lewis Labor Day telethon raised 54.9 million. One million earmarked for Katrina hurricane funds. WWLM Clear Channel Radio 293 Clear Channel New Orleans live update...get a pick up truck and go see if my house is still there. Pick up my kid brother. I live between the tracks on Airport Highway... plan to go to Harvey...no one answered. There is no one story here...it takes survival skills... Katrina...don't feel guilt...where people are. What works for you?"

10:09 Caller says, " I heard on the radio my father was rescued. I wondered how I could find him. Is there a national number? ...800-944-4084 Registry nrk.com <<http://nrk.com>>" Another caller. "...I'm coming in from Lafayette on 90. I can check on 2229 Bryton (the radio announcers' house) if you like. I'm the ham radio operator over there and I heard my two towers were down. I'm past Homer. Traffic is not bad here. I'm coming up to a road block maker 218 on 90. I see a big light coming up here. You gotta trust sometimes." The radio announcer put out her personal address for random travelers to check. Her house was under five feet of water. "...at my house I live on the bottom floor...recovery phase...convention center freezer room full of bodies..."

22:57 9842.5 "...New Orleans' water is rot... chemical soup. Fewer than ten thousand remaining...looters being arrested. Bus terminal and train being used as jail...no electric-



land in a public square in the Ukraine on New Years' eve. Always, but always, we stand behind the curtains listening to the great powers and the great men make decisions. My coach faints with the pressure, but we blast through the ionosphere and grab a skip from Tibet, hoping to not get hammered by a giant bubble jammer booming into the frequency all the way from China. I wipe my brow and thongs of screaming women fight for my handkerchief. The energy in the stadium would be huge. Huge, I tell ya.

Who can handle the fear, panic and energy of a shortwave sweep? Does everyone think they are tough enough to ride the waves? Maybe an I-pod would be safer. Perhaps the common herd is more comfortable with something already sanitized and smoothed over, something that flows properly the way it should. But we know that.

Signals that Sear the Soul

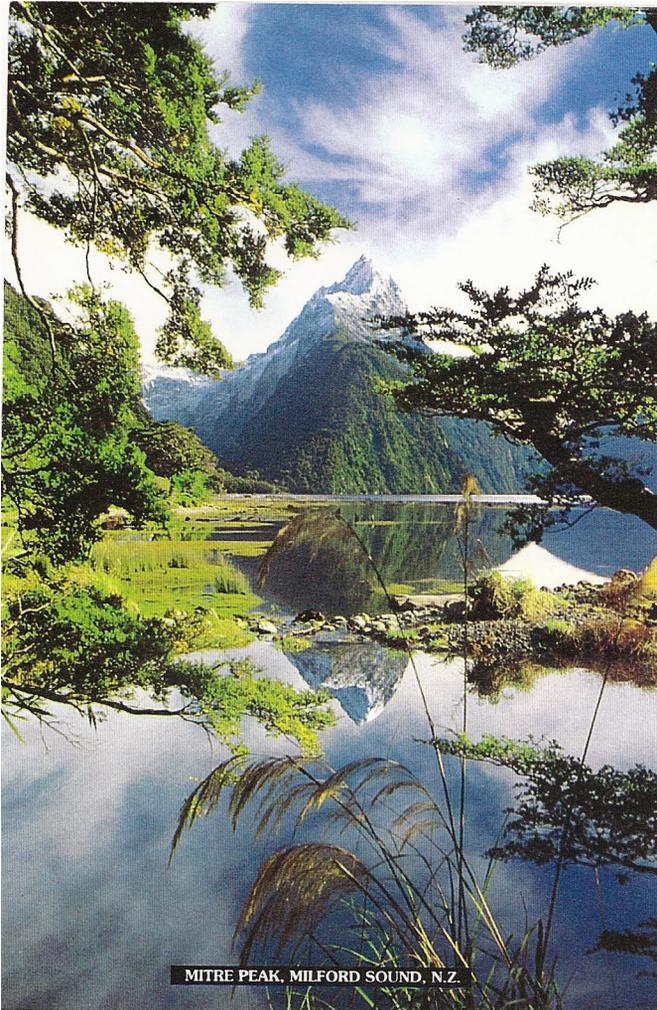
I've included a few excerpts from my logs. I suppose it's not super scientific, but it has merit. My normal method of recording a signal is to either just note the basic details on a scrap of paper or deliberately set out to type the snaps of conversation as I hear them. For the latter I

get some of it, perhaps the tone; exact words are lost to static, but I think I retain the context. The reception location is Montreal.

If radio can have charisma, one of the charismatic episodes that stands out in my logs is about Hurricane Katrina. During Katrina I was hearing live radio created out of chaos. The United Radio Broadcasters of New Orleans was invented on the spot as a dozen powerless and washed-out TV and radio stations crammed themselves into a tiny apartment. First two, then three, then a dozen reporters pooled information, reaching out to a bewildered public over the shortwave. They themselves had lost everything and their words and questions were unscripted and dynamic.

LOGS FROM HURRICANE KATRINA

AUGUST 27, 2005 Sat
21:00 11760.0 Radio Havana presented DX'ers Unlimited. "Hurricane Katrina was a tropical storm in the region. More storms to develop. Amateur radio providing links to shore. Over 850 radio amateurs in Cuba took part out of 4,000 active on the emergency radio net. Hiss, wavering signal. Cuba had a loss of 60 lives due to the storm. Stream of high speed



MITRE PEAK, MILFORD SOUND, N.Z.

Verification Card

Dear Roy Berger

Thank you for your reception report on our broadcast. Your information has been checked with our schedules and found to be correct. We hope you will continue to encourage us with your informative comments and views on our programs.

Frequency : 9650 kHz

UTC (GMT) : 13:00 ~ 14:00

Date : 2005. 06. 25



Dokdo

Dokdo is a group of volcanic outcroppings located in the East Sea of Korea. Its valuable ecosystem and marine resources have been systematically protected ever since its designation as Natural Monument No. 336 in 1982 by the Korean government.

The easternmost Korean territory comprises two small islets, Dongdo and Seodo, and over 30 smaller outcroppings nearby. The total surface area of Dokdo is 186,121 square meters. Dongdo stands 99.4 meters above sea level in the east, while Seodo stands 174 meters above sea level in the west.

Dokdo is located 92 kilometers southeast of South Korea's Ulleung Island and 160 kilometers northwest of Japan's Oki island.

ity...315,000 households registered for Federal assistance." Lots of hiss and static in signal. Signal strength 5-7. "WWL Don here...missing people...help the Red Cross. This is Radio Broadcasters of New Orleans WHRI broadcasting from North Carolina... New Orleans is 60% under water... there is criticism of response to the catastrophe of Katrina. Criticism of the President."

23:02 "We are finding survivors hungry and exhausted. Marines are rescuing. Houses are destroyed all along the river. Electricity has been restored in Hammond. Showers and air conditioning are available. There is an appeal for a lost child. 1866getinfo is the phone number... How about students that paid rent for apartments? How does the flood affect leases? "

23:35 " The Canadian RCMP (Royal Canadian Mounted Police) showed up before FEMA in Shelnet. There are two inches of oil and benzene on top of the water. It's hard to breath." Wavering static, music interference.

23:34 7415.0 WBCQ All high pitch and static. Signal 5-7. Not audible. Maybe Glenn Hauser giving a report.

SEPTEMBER 7/2005

2:03 12160.0 "...FEMA doesn't want journalists to photograph the dead in New Orleans." Jeb Scott from Liverpool England was staying at the Ramada Hotel and says, "...rescued by Game Wardens with fixed bayonets. The water was waist deep with floating bodies...there were no police at night." 2:17 Announcer says, "... the shortwave band went down along with a power outage this afternoon. Perhaps it was a solar flare or one of their new Tesla satellites...it was not loud white noise but it was very quiet up and down the band. There was no hiss, it was just quiet up and down the band. Have to ask Glenn Hauser about this...Brent...time to restructure priorities. Focus on what's important...not getting independent photographs of new Orleans."

22:52 12160.0 "In the United Kingdom a white cat turned pink. In Bratton, Cloverly in Devon a Mrs. Worth found her cat turned pink. Her vet said Mr. Worth's cat was not toxic and ok. Except now it's pink."

23:00 9842.5 "United Radio Broadcasters of New Orleans...The National Guard is patrolling. Thirty bodies were found in a nursing home. The owner drowned too. Storm moving towards Florida. People are finding each other. Families are being reunited. 911 in Jefferson Parish is working. On 1302 Marine St. Jonathan Boover has no food or water. Can someone get over there? I'm looking for MacHenry McNeil. We last saw him on Mandeville in New Orleans...oh her cell phone broke up, we lost her...let's go to line three..." Station interference and hiss "...FEMA is doing nothing for us. The lady

has no home. She is sleeping in a car with her husband and children. The shelters are dirty in East Baton Rouge. She is begging for a home. Try phoning 25-275-2483. Try hurricane housing dot net...I did but it's a FEMA recording for hotels, but the hotels are full... My brother is mentally retarded. His school has been evacuated from Hammond and we don't know where he is. His name is Charles Jason." Major static. " Baton Rouge and La Platt. I'm looking for TJ. TJ is my son who was scheduled for release from the Sheriffs' Boot Camp on Friday. Where is he? ...Too much spirit to be denied out there. FEMA asked for 25,000 body bags. Attorney offices destroyed. Evidence destroyed. Call 985-78050 for inoculations and tetanus shots."

23:45 "...police and law enforcement officers are themselves 70% homeless. A lady found her five year old son. The Red Cross can't help. Whatever you do don't get water on your skin. New Orleans is forcing people out with soldiers. You have one day left to get into Jefferson Parrish. Stay at your own risk. This is big 870 of New Orleans."

SEPTEMBER 8/05

18:24 12160.0 "...the shortwave was wiped out for two hours this afternoon. A new hurricane is growing off the east coast. Red Cross trucks were blocked to the Superdome by State Homeland Security on Monday. The first day they were told to go away while the Mayor was calling for aid. Firefighters were sent away and put in a four day meeting with FEMA in Atlanta, Georgia starting on Sunday."

22:56 9842.5 "...Jefferson Country lock down. Everybody out by six o'clock. Riot Control was called in over the debit card give a way. The debit card is now only available at the Superdome. Now it's \$350.00 per person down from \$900.00." Signal is very hissy and wavering 5-7 strength. "...there are scam people and looters...sad...trying to make a dollar...FBI Red Cross out there."

23:25 "Sixty percent of the city is under water. They are pulling out bodies. People have to go back to school...for kids. United States Postal mail change of address cards are available."

SEPTEMBER 9/05

21:31 12160.0 "Are guns being confiscated? FEMA was caught cutting lines to police stations. Homeland Security has 180,000 employees."

22:07 11920.0 "...Lt. David Shan who led an unscheduled rescue of 110 people from New Orleans is being reprimanded. FEMA head, Mr. Brown was fired today. New Orleans police begin confiscating guns. If police get shot confiscating guns and get shot it is because the police are the violator and you have every right to shoot them if they try. Some people say I shouldn't say that on air. I say, why not, it's the truth...shortwave knocked out today for a few hours. Two hundred Mexican troops in San Antonio for the first time in 150 years. People waving Mexican flags welcomed them. Foreign troops on American soil."

SEPTEMBER 10

02:50 12160.0 and 5834.0 and 9842.5 are all hiss and static. Other shortwave stations seem ok.

03:06 5835.0 "...there are 2000 dead in hospitals. Gangs number seven to ten thousand people. The Superdome is a state of total anarchy. Six to seven rapes and three to four

murders a day. On day three the National Guard was on stand by. There are seventeen dead in the washroom at the evacuation center. Jefferson Parish had shoot to kill orders issued for those looting other than food. Cajuns were not allowed in with their boats as normal. It's normal for the Cajuns to perform rescues after a hurricane. It gives the appearance of planned destruction. It's as if FEMA was trying to make matters worse by disallowing food, rescue vehicles and disarming citizens. They were allowing the gangs to burn stores and homes and they still are. There was the appearance of NATO blue helicopters flying around. It was pointed out that 150,000 homosexuals and deviants had a parade the week before to celebrate decadence."

SEPTEMBER 11/ 2005

18:36 15285.0 "...United Broadcasters of New Orleans. There is a football game Feb. 28, 2006. A new city of New Orleans will get job done. " Lots of static and hiss. Signal strength 2-3. "...work together get it done...very optimistic. Go getters can get things done in this community." Hiss static.

22:01 12160.0 Signal strength 9. Clear. No hiss or static. "...are you going to live free or as a slave...1-877-44truth. Freedom Radio. This is the Voice of Freedom. I'm Hal Turner. "...there are burn marks under the Levy wall A piece was sent to Fort Gillam Georgia. Forensics there said they found traces of boron enhanced flora nitromenia and TS-21. The ruptures took place after the hurricane struck and were discounted as gas explosions. This was military grade underwater high explosives. 22:11 " Bush talks about germ warfare agents that could be used by terrorists..." 22:20 "If I was King you couldn't form a corporation and walk away from liability. We've given you a republic if you can keep it, Jefferson said...The body count for Katrina was out sourced to a friend of the Bushes'. SCI is a subsidiary. There was a critique of this friend of the Bush's used to clean up and take care of bodies. They were found guilty in Florida of improper disposal and had suits filed against it over Florida cemetery scandals. This Katrina job was sourced out by FEMA Robert Waltrip."

22:31 "...Sheriff Harry Lee commandeered the Sams and Walmart stores in the Parish and demanded they open. These stores were told by FEMA that they could not open. The Walmart and Sams in Harvey and Kener were ordered to open as soon as possible by the Sheriff. He said, 'Anyone from FEMA who says otherwise will be arrested by my deputies.'

22:36 "Mike, president of the Parish refused to let FEMA in. Livingston Parish, Louisiana, Mike Grimmer told FEMA no to dumping trailers in his Parish. No one has a clear picture on how things are going to work. How many trailers are going to go in? No one knows what happens if you take 60 acres and a thousand and eighty trailers eight feet apart. Who maintains security? What if there is a 911 call or a fire? Where is the sewer? Who does garbage pick up? FEMA has no answer." Howling static. Mike Grimmer continues, "We had an influx of thirty thousand people in our Parish overnight. We are criticized by the media. We sheltered over three thousand. We're getting blasted because we want answers on how this trailer park thing is going to work. FEMA wants to dump the trailers and leave. It could domino into a catastrophe. Who will maintain it? We don't have the funds or manpower. FEMA so far has reimbursed us with zero. We spent over a hundred thousand dollars. We're a

small community. It's the churches here that made survival possible. The Red Cross couldn't feed everyone. The Churches could. The Red Cross was overcome. Each church is housing a hundred to a hundred and fifty people. Many of those are placed..."

SEPTEMBER 25

19:34 15285.0 "...United Radio Broadcasters of New Orleans...west bank working on repairing that. It's up to ten feet of water. We're lucky to have 19 pumps working...canals are able to protect some of those very vulnerable 17th street pilings. Right now water will go down. Rain water capacity on Orleans canal...that's where we are...no more water flowing into west or east side. There is water in the 9th Ward. The west bank had an operational pump where the breach was. We can get back on schedule...assessment teams..." 19:52 "Now its the top of the fourth quarter and the score is 24-16 , Saints vs Vikings..."

OCTOBER 1

09:25 5835.0 WHRI Signal strength 7. Some hiss and humm. "...United Radio Broadcasters of New Orleans...this city back on its feet. The army corp of engineers says the city is 95% dry. We will ease grid lock on the highway. So far 181,0000 unemployment claims have been made related to Katrina. For information phone 225-480-0251. Steve you're on the air...New Orleans was a great city when other cities were still trading posts." 04:35 "...Don Ames in the news room. Some have electricity. Heavy muck on Wednesday. All welcome back except those from the ninth Ward. New Orleans needs a levy system. The tap water is still not safe to drink. The big 870 and WRL..."

Well, that was charismatic radio! It was real history. I swear that's what I heard. To repeat: My logs reflect only what was said: I can't know if it was said truly.

In the same breath I have to point out the land of coincidence. You know how long it can take for QSL card to arrive or a signal report to be acknowledged. One early morning I turned on my Grundig and this was the first thing I heard.

JUNE 10th/ 2006

10:39 6120.0 Upper side band. NHK Radio Japan. Signal strength 3-5. Hiss poor to inaudible. "...the show is World Wide Interactive and this is DX Mailbag...we have another letter. Quebec, Canada. Kanata! Canada. Oh, I know Canada. I think they pronounce it Canata. Alright. We have another letter. It is from...Roy...Ber...ger. Berger. Bearer? I think so. But he's from Quebec so maybe he speaks French and pronounces his name Bearjea. But I'm sure it's Berger. Alright uh...I work in Montreal and work as a bench mechanic repairing electric power tools and I get up at four thirty in the morning. Laughter. That's Canadian time? Ah, I don't know. Four thirty. Laughter. I don't usually go to bed well not that late but... Laughter. Roy writes, ' I'm forty nine years old. If I'm not working on power tools I'm at home in self imposed exile writing The Great Canadian Novel...' Keep listening. I look forward to reading his novel. Yeah. Maybe we will be in it. Oh yes. It'd be a real topic. Laughter. Thank you. Ok, we have another letter..."

Gosh, what were the odds of that? A letter that I sent in months ago? The propagation just happened to be decent and that I just happened to slue into it? You can't say shortwave ain't cool. Man, that's cool.

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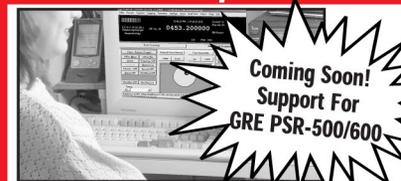
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Exchanging Words: First Battles of WW II

By Jim Pogue

The Voice of Oromo Liberation. Radio Free Asia. Shiokaze. The Voice of Iraqi Kurdistan. Shortwave listeners may recognize the names of these present-day radio stations who use the radio waves to wage war with words and ideas. Some stations seek liberty and freedom for their people, while others seek to discredit their enemies and perpetuate totalitarian regimes.

But 70 years ago a similar battle was underway between another group of nations and their leaders, intent on convincing listeners of the rightness of their own causes and the evil intentions of their enemies. With high-powered shortwave stations at their command, Germany, Italy, Japan and the Soviet Union were doing battle before bullets began flying in what eventually became World War II. As storm clouds gathered, other nations who would later be combatants like England, Japan, France and even “neutral” Spain joined in what one author of the time called “combat-by-kilocycles.”

DJ stations had big voice

In the late 1930s, Nazi Germany broadcast many hours of programs in various languages including English, French and especially Russian each day from its impressive transmitting facility at Zeesen, located south of Berlin. They were known as the “DJ Stations” because their transmitters used call letters beginning with “DJ.”

From studios at Haus des Rundfunks (Broadcasting House) in Berlin, the Deutscher Kurzwellensender (German Short Wave Station) was the mouthpiece for Hitler and his propaganda minister Josef Goebbels.

The Nazi’s took their broadcasting efforts very seriously. In the 1935 *Philco Radio Atlas of the World*, the authors stated, “Germany utilizes a complicated system of directional antennæ (sic) which project several transmissions toward America daily.”

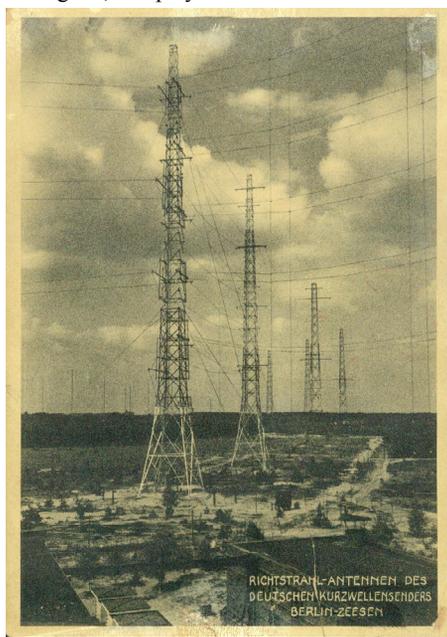
The listing also shows programs broadcast from Germany to North America non-stop from 8 a.m. to 10:30 p.m. Eastern Standard Time.

TABLE 1

The “DJ” Stations From Germany

DJC.....	6,020 kHz
DJM.....	6,079 kHz
DJN.....	9,540 kHz
DJA.....	9,560 kHz
DJD.....	11,770 kHz
DJO.....	11,795 kHz
DJP.....	11,855 kHz
DJL.....	15,110 kHz
DJB.....	15,200 kHz
DJQ.....	15,280 kHz
DJR.....	15,340 kHz
DJE.....	17,760 kHz
DJS.....	21,450 kHz

The Philco publication adds, “You’ll hear stirring military band music, gay Bavarian folk music and dances, swinging German waltzes, fine symphonic concerts, recitals by Germany’s most talented instrumentalists, news dispatched in English, and plays.”



But not all the programs coming from Germany were filled with singing, dancing and lighthearted entertainment.

Author Larry Wolters, writing in the May 1938 issue of *Radio News and Short Wave Radio* described some of the techniques the Nazis used in their programs to woo listeners and hopefully win followers.

“A most effective device is the Mail Box programs,” he wrote. “Letters and contributions to the Nazi cause from Americans are acknowledged on various Mail Box hours throughout the week.”

Wolters also explains how American tourists were extended the opportunity to talk to the folks back home directly from Germany.

“The tourists usually point out that Germany does everything better than we do at home, that great strides forward are everywhere apparent,” he writes of the propaganda efforts.

He goes on to describe the Nazi announcers as having the same Oxford accents as the announcers on the BBC, and that their transmissions follow British broadcasts on channels “just a hairsbreadth away from those of England. Many a listener must be fooled into believing that he is hearing London.”

As for the newscast format itself, he noted they usually began by listing Hitler’s activities for the day.

“The announcer seldom gets far before he gets in a plug for the dogma of the nation, or, for glorification of the doctrines of one or more of Der Fuehrer’s political bedfellows.”

It got even worse when Hitler himself stepped to the microphone. In early 1938 one of his bellicose speeches denouncing Russia and other non-fascist governments went on for two hours and forty minutes. The huge program was broadcast around the globe in no fewer than five different languages.

2RO was voice of “Il Duce”

Hitler’s best propaganda partner – at least in the late 1930s – was Italian leader Benito Mussolini. At “Il Duce’s” disposal was another



very popular station of the time, Ente Italiano Audizioni Radiofoniche (roughly translated as Italian Radio Broadcasting Board). The station was better known by its abbreviated call letters, “2RO.”

TABLE 2

The “2RO” Stations From Rome

- I2RO39,635 kHz
- I2RO411,810 kHz

The Philco Atlas states that 2RO was a favorite of many listeners. The station broadcast an “American Hour” three times a week.

“With the first broadcast of this program, Italy put into operation her new transmitting equipment which brought 2RO into many American homes at regular intervals,” the authors wrote.

Even the father of radio, Guglielmo Marconi, was at the initial broadcast of the American Hour and addressed listeners in the United States. The American Hour aired every Monday, Wednesday and Friday at 6 p.m. EST.

As for the programs, they are described as “opera, as it’s sung no where else in the world – news – dance music – symphonic concerts – recitals and even lessons in Italian.”

Yet all was not as blissful as the Philco Company – obviously wanting to sell shortwave sets – would have potential customers believe. Soviet Russia was on the short list of targets for Mussolini’s attacks.

“Everything that Germany and Italy have in common is most clearly expressed in their joint struggle against bolshevism, the modern counterpart of the darkest Byzantine tyranny – that unparalleled exploitation of the trustfulness of the lower races, that regime of starvation, bloodshed and slavery,” Il Duce said in a joint broadcast with Hitler in the fall of 1937.

In the same speech, Mussolini praised another European fascist – Spanish dictator Francisco Franco. Franco led the Nationalist forces who eventually prevailed over the Republicans in the bloody and fratricidal Spanish Civil War. He received the aid of both Germany and Italy during that horrific precursor to World War II.

“... we have faith in Spain where thousands of Italian Fascist volunteers have fallen for the sake of Europe’s culture, a culture which may yet see a revival if it will but turn a deaf ear on the false prophets of Geneva,” Mussolini said, speaking of the peace efforts of the doomed League of Nations.

Spanish Civil War also fought on the airwaves

The Spanish Loyalists, broadcasting from transmitters in Madrid, Barcelona and Valencia, had the upper hand at the beginning of the conflict.

On the other side, Franco, broadcasting from Seville, told listeners: “Believe us, this is the real truth. Do not believe what Madrid says. On all sides our armies are advancing. We have captured 12,000 prisoners.”



Madrid’s response was to jam the rebel broadcasts originating from within Spain.

Later in the conflict, Franco established Radio Nacional in Salamanca, Spain, and used other stations in far flung parts of colonial Spain to broadcast his propaganda against Loyalist forces in Madrid. These included EA9AH in Tetuan, Spanish Morocco, and Radio Club Tenerife, EAJ43 in the Canary Islands.

EA9AH, like many stations in remote parts of the globe, was a dual amateur-broadcast station. Listeners in North America reported hearing it in the 4-6 p.m. timeframe on 7,010 and 14,030 kHz. It billed itself as “La Estación Experimental Nacionalista.”

Radio Club Tenerife broadcast on 10,370 kHz. Their program was broadcast evenings at 7:40 p.m. EST. Their QSL card even featured a photo of Franco himself.

Although Spain ostensibly stayed “neutral” after World War II exploded in late 1939, Franco did assist Germany and Italy on a small scale by sending troops to aid Nazi Germany in the occupation of Russia.

Radio Tokyo also a voice of dissent

Around the globe, the third nation of what eventually became the Axis Powers was also keeping the airwaves lively. Japan’s Radio Tokyo, with its 50,000 watt transmitters at Nazaki north of the capital, beamed programs across the Far East and to North America in a variety of languages.

TABLE 3

Radio Tokyo Stations

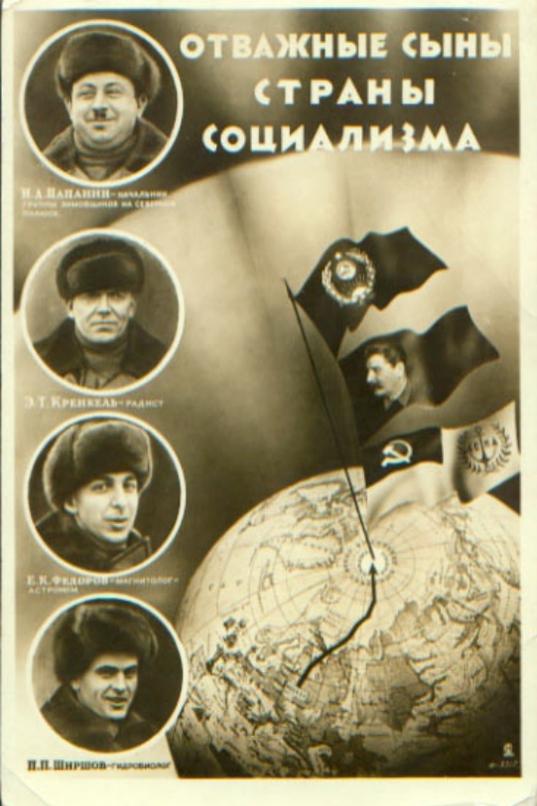
- JZH 6,095 kHz
- JZI 9,535 kHz
- JZJ 11,800 kHz
- JZK 15,160 kHz
- JZL 17,785 kHz

Its programs extolled Japan’s supposedly peaceful and enlightened attitudes, all while its military-dominated government continued wars of conquest in China, Manchuria, French Indochina and Thailand. The station would later go on to become infamous for its curious mixture of American popular music and propaganda broadcasts made by expatriate American Iva Toguri D’Aquino – better known as Tokyo Rose.

Soviets saw things differently

On the other side of this war of the waves were what the writers of the time called the





“leftists.” They included Soviet Russia, Loyalist Spain, France and China.

In these days before Radio Moscow, the voice of the Soviet state was known as “Radio Centre, Moscow.” Call signs were used to identify the stations which generally did not shift frequencies nearly as often as today’s shortwave stations. They included RAN on 9,600 kHz and RKI on 7,540 kHz.

Like Hitler, Josef Stalin also recognized the great power of radio in countering opposition to his regime – from both within and outside the Soviet Union. In the late 1930s, Moscow pretty much regarded both fascists and capitalists as equally despicable enemies.

Moscow devoted the majority of broadcast time over its powerful transmitters to attacking the policies and personalities it felt threatened by. In addition to German, broadcasts aired in Czech, Dutch, French and Spanish, as well as a number of other languages. Each evening from 7 to 8 p.m. EST, Radio Centre aimed its signal at North America.

“The rotten foreign capitalists, the Fascists, reactionary, chauvinistic dictatorships are exploiting the workers of the world,” the Moscow announcers repeated over and over again Wolters reports.

On the other hand, Moscow announcers assured listeners that their government was always on the side of oppressed peoples.

The so-called newscasts consisted of long, dull readings from leading Marxists. The broadcasts sounded amazingly similar to what came from the other side of the ideological divide, except that in Russia the triumph was all on the side of the anti-fascist forces.

Other stations considered to be on the “leftist” side of the equation then included the Spanish Loyalist station in Madrid – EAR, Paris’ Radio Mondial – TPA, and The Voice of China – XGOX in Nanking. This last station apparently succumbed to Japanese invasion forces early on and by March 1938 was reported off the air from

Nanking. It later evolved into what would be the Voice of China broadcasting from Chungking, the fallback location for Chiang Kai-shek and his Chinese Nationalist forces.

And caught in the middle ...

In the middle between the left and right were those nations and organizations trying to remain independent. Table 4 includes a list of these “in between” stations.

Tragically, just a few years after nations began battling over the airwaves, the real bombs and bullets began flying. Radio continued to be a primary weapon for both sides in the global conflict.

TABLE 4

Independent Stations

CJRO/CJRX Winnipeg, Manitoba, Canada
Canada’s Pioneer SW stations

CSW Emissora Nacional
Lisbon, Portugal

GSB, GSD, etc. British Broadcasting Corp.
London, England

HBL/HBP League of Nations
Geneva, Switzerland

HP5J La Voz de Panamá
Panama City, Panama

HVJ Vatican Radio
Vatican City

OLR Radio Prague
Czechoslovakia

VK3LR Amalgamated Wireless Asia
Lyndhurst, Australia

VK3ME Amalgamated Wireless Asia
Melbourne, Australia

TFJ Icelandic State Broadcasting Reykjavik, Iceland

Readers may have observed that the United States was notably absent from any of these lists of the late 1930s. This was a conscious decision on the part of the American government to stay out of the business of international broadcasting. Commercial broadcasters and networks still viewed shortwave as a viable money maker and didn’t want any government stations horning in on what they considered their territory.

When the first bombs fell on the Pacific Fleet at Pearl Harbor on Dec. 7, 1941, all that changed. The U.S. government took control of most commercial shortwave stations and the Voice of America was soon born.

Today, many believe that shortwave broadcasting will soon be a relic of the past. They argue that the Internet, satellite broadcasting and other delivery methods have diminished if not completely eliminated the usefulness of this more than 70-year-old technology. Yet the list of stations broadcasting their differing opinions to other nations, and the diminished but still existent practice of jamming tell a different story. One can only hope that today the worst fighting will be restricted to words and that we never again see a global conflict like that which followed the radio wars of the 1930s.

TABLE 5

BBC Stations from England with slogans

GSA	6,050 kHz	“A” for Aerial
GSB	9,510 kHz	“B” for Broadcasting
GSC	9,580 kHz	“C” for Corporation
GSD	11,750 kHz	“D” for Davenport
GSE	11,860 kHz	“E” for Empire
GSF	15,140 kHz	“F” for Fortnum
GSG	17,790 kHz	“G” for Greeting
GSH	21,470 kHz	“H” for Home
GSI	15,260 kHz	“I” for Island
GSJ	21,530 kHz	“J” for Justice
GSL	6,110 kHz	“L” for Liberty
GSO	15,180 kHz	
GSP	15,130 kHz	

WAVELENGTHS

HBH	16.23 m	18.480 Kc.
HBF	16.26 m	18.450 Kc.
HBJ	20.64 m	14.535 Kc.
HBO	26.31 m	11.402 Kc.
HBL	31.27 m	9.595 Kc.
	32.10 m	9.345 Kc.
HBP	38.48 m	7.797 Kc.
HBQ	44.94 m	6.675 Kc.

RADIO-NATIONS

CONFIRMATION

We beg to confirm that your report concerning our transmission of March 27th, 1941 on H B L. has been checked with our station log and found correct.

Yours very truly,

RADIO-SUISSE RADIO-NATIONS
12, Quai de la Poste GENEVA Switzerland

The Chief of the Wireless Service: *Ch. Calame*

Kindly add an «International Reply Coupon» if a confirmation is desired.

PROGRAMS

League of Nations bulletin:
Every Saturday
from 22.30 to 23.00 G. M. T.

Swiss Broadcast:
Every Saturday
from 23.45 to 01.00 G. M. T.

RAE Goes GOLD

By Eric Bryan

On February 12th, 2008, RAE, *Radiodifusión Argentina al Exterior*, the external shortwave service of Argentina's *Radio Nacional*, turns 50.

International shortwave broadcasts from Argentina actually predate RAE's official inauguration. On April 11th, 1949, President Juan Domingo Perón established SIRA, the International Service of the Argentine Republic. SIRA broadcast in seven languages almost 24/7 until September 1955, when Perón's constitutional government was overthrown by a military coup.

RAE, the new service, was established in 1958 and has been on the air ever since.

RAE moved its studios several times, most recently in 1990, when it moved into the modern, three-storey facilities on 555 Maipú Street, Buenos Aires. This studio, unique in Argentina (according to *Radio Nacional*), features an auditorium for live events.

RAE shares the building with LRA-1 *Radio Nacional Buenos Aires* with its three FM stations: 87.9 *Faro* (Lighthouse, aimed at teens and young adults); 96.7 *Classical*; and 98.7 *La Folklorica* (folk music).

RAE is on the air Monday to Saturday UTC transmitting almost 14 hours a day in Spanish, Japanese, English, French, German, Portuguese, and Italian. There is a weekly roundup on Saturdays (not in English), and on Sundays RAE relays LRA-1's 870 kHz AM signal (not in English), carrying national events such as soccer matches.

According to their website (www.radiodifusion.gov.ar/rae), RAE's mission is "introducing Argentina to the rest of the world," from "its economy, politics, industry, social and cultural life," to "its history, geography, traditions and customs." They further state that RAE "represents the only permanent source of State Government news on what is daily going on in the country . . . with a keen eye on transmitting exact and clear-cut information."

Music, especially the tango, native to Argentina, is also featured in RAE's programming.

For North American listeners, RAE broadcasts in English Tuesday through Saturday at 0200-0300 UTC on 11710 kHz. But why is RAE's signal to North America famously unreliable, even elusive?

According to Glenn Hauser, RAE has outmoded transmitters which are subject to breakdowns, and the equipment's age makes finding spare parts a challenge. He also surmises that the transmitters aren't running at their full listed power of 50 or 100 kW (HFCC listed 11710 kHz

as 100 kW aimed at 335 degrees for the 0200 UTC English broadcast, in the B-04 schedule).

Glenn notes that, though 0200 is a good all-around prime-time broadcast slot for North America, a later transmission might be better for the West Coast. And he states that RAE is hindered by sticking to 11710 at 0200 year in and year out, with no seasonal changes, when fluctuating propagation conditions would favor a higher or lower frequency.

Glenn also points out that RAE's signal has a long haul from Buenos Aires to the US, especially the West Coast (almost 6000 nautical miles to the Seattle-Tacoma International Airport). He says the signal at 25 meters requires a few bounces, with most of them made overland – less effective than when signals are reflected over water.

And, to all of these obstacles Glenn adds this capper: RAE's 11710 frequency is not presently listed with HFCC, heightening the possibility of interference from another 11710 station.

Table One shows RAE's complete A-07 broadcast schedule.

Dxer's Challenge

Listening from the Pacific Northwest using a Degen DE1103 portable multi-band receiver and a simple indoor wire antenna, reception of RAE here is sporadic. They were coming in during the late winter and early spring this past year, but as of late spring, their signal was usually poor or inaudible again.

The regular pattern of RAE's English program for North America is a long, multilingual ID, leading into a formal English ID and announcement. There follows news headlines, usually alternated between a male and female announcer. But instead of continuing with the news in detail, the broadcast detours into music, usually classic tango recordings. There is the occasional news interlude during this time, with in-depth news continuing after 15 or 20 minutes.

RAE's news coverage is surprisingly broad-ranging, with coverage of not only South American countries such as Chile, Paraguay, Uruguay, Brazil, and Bolivia, but also of Holland, Europe, Cuba, Italy, Belarus, Russia, the US, and Iraq. And of course, there is news on The Falklands Islands, and on *Tierra*

del Fuego, the archipelago at the southern tip of South America, which is owned jointly by Argentina and Chile.

After the news, there is the cultural programming, and this is also often interspersed with music. This is sometimes tango, but there are also Latin waltzes based around piano and acoustic guitar, folk music centering on sweet acoustic guitar and indigenous percussion, and ballads in three-quarter time with male vocals in harmony.

Considering all the challenges there are to hearing this station, North American SW listeners have reason to celebrate when they get a good signal from RAE. When RAE does come in well, or well enough to be listenable, SW enthusiasts might keep in mind these closing words from Glenn Hauser:

"The station seems long overdue for an upgrade in its facilities, and we are probably lucky it is still operating on SW at all."

(Thank you to Glenn Hauser for his time and help in researching this article.)

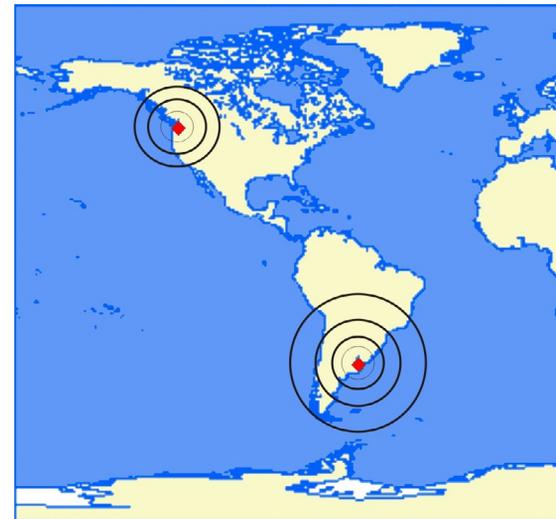


Table 1: Radiodifusión Argentina al Exterior

UTC Sked	Lang.	Freq.	Target
0900-1200	Spanish	6060	am
1000-1200	Japanese	11710	as
1200-1400	Spanish	11710	am
1800-1900	English	9690 15345	eu
1900-2000	Italian	9690 15345	eu
2000-2100	French	9690 15345	eu/af
2100-2200	German	9690 15345	eu/af
2200-2400	Spanish	6060 11710 15345	eu/af/am
0000-0200	Portuguese	11710	am
0200-0300	English	11710	am
0300-0400	French	11710	am

Note: the 0900-1200 broadcast is the relay of LRA-1 *Radio Nacional Buenos Aires*

Small Dish Satellite TV Options

Several months ago I had a question from an *MT* reader regarding the use of readily available used dishes from DISH Network or DirecTV for use in MPEGII Free-To-Air satellite TV reception. I had explained that there were three basic problems: DBS satellites are very high-powered and that reception of a much lower powered broadcast satellite on such as small dish would be very difficult, if not impossible. Secondly, DBS transmissions are circularly polarized as opposed to linear polarization of the broadcast satellites. Third, the range of frequencies used on the DBS satellites is different from broadcast satellites.

But, what if you could swap the DBS circularly polarized LNBF for a linear polarized LNBF? Would that work? That's when I discovered a fourth problem: the mounting arm that holds the LNBF on the DBS dishes use a "D" shaped arm so you need to have a "D" shaped LNBF mount to fit it. Later, I found out that Skyvision, the national satellite TV catalog company, offers just such an LNBF. So, I gave it a try.

I spent hours using various DISH Network and DirecTV dishes trying to receive common FTA satellite signals on such popular satellites as Galaxy 25 which has dozens of FTA video and audio channels including MHz Networks, World Radio Network and Radio Netherlands Worldwide. I could get no signals. There was no question about it: the little 18" (46 cm) dishes just didn't cut it. I then tried a 60 cm dish and had more success. I found that some of the strongest transponders on G25 would lock nicely, but not the weaker ones. So, how big a dish do you need to be able to lock in an FTA signal? You need at least 85 cm (33.5") to do the job.

One nice aspect about this is that 85 cm falls well within the guidelines set out by the FCC as to the size dish that must be allowed by homeowner's associations and rental companies. The guidelines, known as the FCC Fact Sheet for Over-The-Air Reception Devices (OTARD) can be found here: www.fcc.gov/cgb/consumerfacts/consumerdish.html

❖ Skyvision-SRL Step up to the Dish

Since doing those initial experiments, Skyvision has unveiled a new satellite TV system which uses a receiver dubbed the DSR-410, based on the long popular Motorola 4DTV digital receiver. It is designed to tune into the DigicipherII transmissions found on Ku-band

side of broadcast satellite Galaxy 16 (99°W), also known by the designator X4.

The DSR-410 is a refurbished receiver with new software installed to receive the X4 programming which is sold by Satellite Receivers Ltd. (SRL). SRL is a third party programming provider that buys wholesale cable programming from cable-TV sources and retails it to its own satellite customers. In this case, they're buying the programming from Headend-in-the-Sky, which is known by the acronym HITS.

The system includes an 85 cm (33-1/2") dish and .5 dB Ku-band linear LNBF. The whole system, with receiver, sells for \$229.95 plus shipping, but if you have a similar sized dish/LNBF or have a large steerable dish with a Ku-band LNB, you can buy the receiver by itself for \$129.95.

Once installed, the customer calls SRL for authorization of the system. And, once authorized, the customer can choose from several programming packages. Monthly charge for the "410 Basic" package is \$19.99/month. Full packages of additional channels including dozens of movie channels can be added for \$17.50/month. Lower prices are available by extending the subscription period. For example, the Showtime/Movie Channel package, which includes 14 movie channels, goes down to \$15.50/month with a paid annual subscription. There is a Starz Super Pac which is also \$17.50/month that includes 19 channels. All subscriptions include 38 DMX music channels which are 24/7 without announcers or commercials.

❖ A Basic Receiver with some Frills

The 410 receiver has a traditional channel 3 or 4 modulator through an "F" connector output, but it also has RCA cables to carry separate video and left/right audio channels. It has "S" video output which can be used in conjunction with a digital audio output via a single RCA cable to your surround-sound stereo receiver/amplifier. This makes the audio from all of the channels,

particularly the DMX music channels, sound even better.

The 410 receiver has no dish drive option, so it can't be used to drive a big dish. However, it can be "slaved" to any analog receiver that does have a dish drive so you can watch the channels on G16 (provided you also have a Ku-band LNB). You can also use the analog receiver to pick up the wild feeds still being sent via C and Ku-band transponders. The 410 receiver can't be used to receive any DigicipherII signals other than the HITS channels on X4.

The on-screen guide on the 410 receiver is excellent. It can be customized to display only the channels you watch regularly. You can set up daily, weekly, or monthly recording schedules. Feeding the output of the receiver into a DVD recorder lets you time shift programs or watch off-air TV or MPEGII channels while recording off the 410 receiver or any combination of the three. If you have a TV that allows picture-in-picture, you can watch two different satellite feeds or a satellite feed and local TV at the same time.

❖ Local Network HD Reception

Many people are buying the new flat screen 16:9 aspect ratio HDTV sets for reception of local channels in HD. These sets have a large number of inputs, and you can take advantage of this by feeding the output of the 410 receiver to the new HDTV set any number of ways. Even in rural locations, with the addition of a large, rotatable UHF-TV antenna with a mast-mounted pre-amplifier, you can watch your local digital channels. And, with the touch of a remote button, you can switch the input to bring in the satellite delivered channels via the 410 receiver.

Many older wide-screen sets don't have digital tuners built-in. If you have such a set you can add an outboard HDTV tuner found at most electronics retailers at a wide variety of prices. By adding a stand-alone, off-air tuner, you can watch the secondary channels most digital TV stations are broadcasting along with their usual network fare. You can even do this on old analog TV sets. Here's how:

Attach an outdoor antenna to the antenna jack on the tuner. Take the RCA video and left/right stereo outputs and put them into your VCR or DVD recorder. The output of this is then sent to your old-fashioned analog TV set. By using the remote control on the digital tuner, you can



Skyvision/SRL's new venture brings no-frills basic cable TV to your backyard with this 85 cm dish, .5 dB Ku-band LNBF and DSR410 receiver from Motorola. (Courtesy: Skyvision)

set up the output of the tuner to accommodate a standard 4:5 aspect ratio analog TV screen. You'll get black bars at the top and bottom or the sides as it re-sizes the picture, but you'll watch a crystal clear picture and have access to all of the extra digital channels.

❖ Installing the Skyvision/SRL System

The dish package includes a wall mount and sturdy bracket, but the dish may also be installed in your yard using a 1-1/2 inch diameter galvanized steel pole 4 feet long which can be found in the plumbing section of most building supply stores. The Samsonic dish is very easy to assemble. There are few parts and the diagram that comes with the dish is excellent.

Once assembled, take it to the dish site and pound the pipe into the ground using a block of wood on top of the pipe to absorb the hammer blows and avoid misshaping the top which will make it difficult for the mount to slide over it. In most cases 18 inches of pipe in the ground is all you need to make it secure. Use a carpenter's level to make sure it's plumb. Check for plumb on all sides of the pole.

After you mount the dish on the pole, set the dish elevation by aligning the elevation indicator so that it corresponds to your location's latitude. If your location is at latitude 45 degrees, for instance, set the guide edge to 45 degrees and tighten the bolts.

Finding the Satellite

Now you're ready to align the dish to G16. The best way to do this is to take a long exten-

sion cord out to the dish site and plug in the 410 receiver and a small TV set. Take a short length of coax cable and connect the LNBF to the back of the 410 receiver where it indicates the LNBF should go. Connect the 410 receiver to the TV.

Now, turn on the TV and the 410. Tune the TV to channel 3 or 4, depending on to which modulator output you've set the 410. You should be seeing a screen indicating the 410 is on. Press "options" on the remote and then "change system settings." Next press "change installation settings" and then press "tune in satellite signal." Turn the volume up on the TV and you'll hear a low tone.

Once you lock into the digital signal on G16, the tone changes pitch, rising as you increase the signal strength. You'll also see the display indicating the signal strength number and a bar graph. The bar graph turns from red to green when the signal is locked on and increases in size as you increase signal strength.

Now, pivoting the dish very slowly east or west, you'll hear the tone change and see the graph change if you encounter the signal. Move the dish ever so slowly up-down and side-to-side on the mounting pole until you get the strongest signal. Lock down all the bolts and you're done. I had to rotate the LNBF in its holder about 20 degrees off perpendicular so that it would change polarity when switching transponders.

To finish the installation, run a length of RG6 coax from the dish into the house and to the location of the receiver. Try to keep the run of RG6 to less than 100 feet.

Slow and Easy Does It

Reading about how to do this is one thing, but if it's your first satellite dish installation prepare to spend a couple of hours searching for the signal. The beam width on this dish is extremely tight and you can sail right past it without any indication on the signal meter. It wasn't until I had adjusted the LNBF that I got the first signal indication from the receiver.

Keep in mind that the mount should be loose enough to rotate the dish east and west, but that if it's too loose you'll be missing the satellite by a wide margin. If the mount is too tight, you'll risk rotating the mounting pole instead. That will make it easy for a gust of wind to rotate the dish and take it completely off the satellite once you've finished the installation.

I put this dish on a pole I had originally used for a DirecTV installation which was no longer in use. The pole and run of RG6 were already in place. All I had to do was assemble the dish, place it on the pole and align it with G16.

❖ Contact Info

The 410 receiver, dish and LNBF are all of excellent quality and relatively inexpensive. Skyvision maintains a tech support number for purchasers and SRL has a customer support number for their subscribers.

For more information about the Skyvision 410 system call 800-500-9275 or visit www.skyvision.com/store/dsr410.html. To order programming, call 800-500-9268.

Kaito KA-1121

NEW! KAITO KA1121 multiband radio with MP3 recorder/player!

This potent portable offers dual conversion and single sideband (SSB) detection, as well as a 256M MP3 recorder/player for 10 hours of high quality sound! Plug in an external audio device like your MP3 or iPod and play it on this amplified speaker!

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Q. *Whatever became of all the preamps that used to be available for scanners? (Frank Heath, Carpinteria, CA)*

A. Scanners improved in sensitivity, and the scanner accessory market in general has slimmed. I recall years ago during one of my annual meetings with the chief engineer for Bearcat, asking him why they didn't offer preamps for scanners. "Preamps?" he asked. "What they need are attenuators!"

Because the scanner market is a competitive consumer item, there are cost-saving compromises in design. One of these is narrow dynamic range – the ability of a receiver to respond to weak and strong signals without signal distortion (overload). Wideband preamps aggravate that problem by amplifying a wide swath of spectrum, including very strong signals which then tend to cause overload problems like desensitization and image/intermod products.

That said, there are legitimate applications for preamps when long transmission lines are being used, but then the preamp really should be remotely located right at the antenna to overcome transmission line losses, not at the scanner.

If a low-noise, modest-gain preamp is employed for frequency ranges where the receiver/scanner is lacking in sensitivity, strong signals can be blocked by narrow-frequency notch filters.

Q. *Can I use the discone antenna for CB? (Thomas H. Fal-lone, email)*

A. Not the standard 25-1000+ MHz scanner models with the whip on top. The impedance falls dramatically below the 50 MHz range used for the vertical element, and the CB band is at 27 MHz; the VSWR is so high that it causes most CB radios to shut down with their protection circuitry.

Q. *What are the dish antennas used for on many rural service stations? (J.J.O., NC)*

A. Rather than tying up phone lines, these Ku band links are mostly used for processing credit cards. They can also be used for other house-keeping purposes like inventory control.

Q. *Our local police department has video cameras with sound in*

their patrol cars. What frequency ranges would they use for wireless mikes?

A. I'm unaware of any wireless mikes made specifically for law enforcement (other than bugs), although Motorola's MOTOMESH® integrated video/audio surveillance package operates in the 4940-4990 MHz spectrum. If the patrolman is wearing a commercial wireless mike, it would most likely be in the 72, 88, 170-216, 450-467, 902-928 or 944-952 MHz range.

Q. *I am hearing music from CD players on my FM radio on 87.9, 88.1 and 88.3 MHz from wireless something. It will occasionally skip several songs, then stop on one to play. What am I getting and what kind of range does it have? (Jim, email)*

A. You are hearing short-range, portable, wireless MP3 players that transmit recorded digital music to a nearby FM stereo system. You can plug a USB memory stick or even a CD player into many of them.

They can sometimes be heard from adjacent vehicles on the road, or from nearby businesses or residences. Because some of these transmitters use illegal power levels and cause interference to the reception of licensed broadcasters, the FCC is currently clamping down on manufacturers to reduce power and, thus, range to a few feet.

Q. *I have two clothesline poles in the middle of my yard, 25 feet apart and 6-1/2 feet high. Can I use this for a shortwave dipole and run the feedline underground through PVC pipe? Should I use a preamp to boost the signals for my shortwave portable? (Greg Smith, email)*

A. This low an antenna will work; the disadvantage is that ground reflections will favor signals arriving from overhead rather than from the horizon which is preferable. Nonetheless, it will certainly receive plenty of signals if you have no alternative for higher elevation.

Most coax has a moisture-proof vinyl jacket and can be buried unprotected, but certainly the PVC pipe will provide additional protection from moisture – and squirrels!

But don't use the preamp unless virtually all signals are very weak; portables are infamous for being easily overloaded by strong signals, producing phantom signals everywhere you tune!

Q. *I have an ICOM R-75 receiver and I'm interested in listening to 3-5 MHz tropical broadcasters, but I'm in an area with considerable electrical noise and reception with a 75-ft wire antenna is very poor. Is it the weather or my antenna? (Robert Steckbeck, Manheim, PA)*

A. The R75 is a fine receiver, so the problem in reception is band conditions, choice of antennas, or electrical interference. The bottom line is that we want to capture the greatest amount of signal with the least amount of noise.

During summer months, tropical DX is difficult to receive due to the number of thunderstorms in the northern hemisphere, but you still need to give attention to an appropriate antenna. First, the broadside of the antenna should face the signal; in other words, since the tropics are south of you, you would run the axis of the wire east to west. If you are feeding the end of the wire with coax, the shield must be grounded to the receiver, but it can float unconnected at the antenna wire.

With the receiver on but no signal is present, is the S meter showing near zero, or is it up scale with background noise (more than S1 or 2)? If noise is present, you may need to take corrective action. Ideally, the antenna wire should be as far from the building as practical, and nowhere near electrical lines; if the lines are unavoidable, the antenna wire should be at right angles, not parallel to them.

Many low-frequency DXers use loop antennas; this allows a choice of facing the direction which minimizes noise or maximizes signal, whichever works.

A sloper might help as well; it's a center-fed dipole mounted in the vertical plane, with the bottom wire a foot or two off the ground, but closer to the signal than the top, so the dipole makes about a 45 degree angle with the earth.

Finally, you may need a noise canceller between the antenna and the receiver; they can be adjusted to null out nearby electrical noise.

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

Help Desk Update

I always read your Help Desk column with great interest and the December 2007 issue was no exception. I have a supplementary comment about the answer you gave to Mike Hardester's Nitellogger question. You said "The downside is, it doesn't record the frequency being heard."

Some old wideband radios, like R9000 with speech synthesizer option installed, do read the frequency when the squelch opens as it stops. It could be recorded from its record / speech jacks. Unfortunately, more recent scanners don't have this capability. (Ismail Ozguc, KT6LN via email)

Q. *I was reading one of your articles and doing some research on air show teams' channels and was curious to know if you would know if they allow handheld scanners at Nellis AFB for the aviation nation show. This will be my first time at the show this year and I wanted to know if I should even bother to pack it. (Joe Ciccia Jr. via email)*

A. I know of no restrictions at Nellis AFB, Joe. Best bet is to Google the show's website and see if they mention any restrictions. I have only heard of a handful of restricted shows and even those were inconsistent or unclear about what was allowed.

Q. *Last night I noticed a lot of signals I have never heard before. Does temperature have anything to do with it? Because it has been cooler than normal here in West Texas. Or was last night exceptionally good propagation? I am new to HF DXing and am still learning. (Steffen Hymel - Dyess AFB, Texas)*

A. The only effect that weather would have on HF propagation is the reduced noise levels in the lower HF frequencies during the winter months, thanks to fewer thunderstorms and static crashes. HF propagation is more dependent on solar weather conditions and the day/night propagation patterns. Tropo weather doesn't figure into the equation except as noted above.

Q. *I want to monitor digital modes that use FSK or PSK on my Uniden BCD-996T. I understand I need a discriminator tap. What can you tell me about adding one to my scanner? (Several readers via email)*

A. You get the best results in monitoring digital modes on your scanner if you use the unfiltered audio from your receiver. You can find that signal at the discriminator point on your receiver. A discriminator is the heart of an FM receiver. After the discriminator stage, audio

filters and amplifiers that follow heavily distort most digital signals. If you want to decode digital systems (FSK and PSK) a discriminator tap is necessary.

Usually, scanners are not equipped with a discriminator output as a standard. You need to "operate" on your scanner to make the discriminator signal available to the outside world. On the www.mods.dk/index.php website you can find pictures and descriptions of more than 100 scanners, receivers, and marine VHF transceivers that have been modified with a discriminator tap.

The modifications presented at the URL above are not verified or tested by that website, so if you try any of them on your own equipment, it's at your own risk. Performing modifications of some equipment may be a violation of local laws and will void your warranty if you have one on your unit. If you have any doubts, do not perform any modification on your scanner. MT and Grove Enterprises are not responsible for any damage you may inflict by performing any mods to your radio equipment.

Q. *I am now just getting started in the world of ALE. My question is, is there a website that offers the identifications for the addresses that you receive on the ALE? There are some that I'm not sure who they are. (Allen via email)*

A. Absolutely the best site on the Internet for ALE address information is on the website run by MT Digital Digest columnist, Mike Chace. You can visit Mike's website at www.chace-ortiz.org/umc/. Click on the ALE networks link on the left side of the main page.

Q. *Scanning has evolved rapidly over the years from standard, single-frequency FM systems to trunked systems and then to digital. I was happy to see the Uniden BCD-996T come out, because it seemed to cover all possible methods of VHF/UHF transmission, and I came very close to ordering one. But now the OPEN SKY system is showing up in many areas here in Pennsylvania and it appears destined for other areas of the country as well. Suddenly, this new system has managed to antique even the newest scanner for those of us who loved to listen to many of the Pennsylvania state frequencies.*

One has to wonder where all this will stop. In your opinion, will it ever be possible to build a scanner that is able to monitor OPEN SKY transmissions, or is OPEN SKY so sophisticated that such an occurrence is unlikely? (Pete via email)

A. Actually, Uniden wants to put the digital

modes such as Open Sky and ProVoice in their scanners. They asked M/A-Com for a license to do so and were soundly rejected. Bottom line: unlike re-engineering the decoding of the Motorola control channel data stream that resulted in the early trunking scanners made by Uniden, these digital modes use a proprietary code, and we will never have a scanner that covers these modes unless M/A-Com reverses its licensing decision.

Given all the problems that have been experienced with the Open Sky protocol, I don't expect to see this mode in wide use across the country. The M/A-COM ProVoice seems to be the digital mode of choice from these folks these days. Strangely, in this post-9/11 Homeland Security age, neither of these modes is APCO P25 compatible.

Q. *I am hearing voice communications in USB on 5550.0 kHz. What service does this correspond with? (Giordano-Italy via email)*

A. This is a civilian aeronautical frequency. Here in the United States, the most commonly reported station on this frequency is New York Radio which oversees air traffic control communications for the Caribbean-A MWARA (Major World Aeronautical Air Route).



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Scanning in Wisconsin

When you're first getting started with scanning, it's not always easy to figure out exactly how to get your equipment set up properly and be confident that you're hearing everything that's going on. This month we take a more in-depth look at getting a newcomer up to speed and provide some guidance about what's out there to find.

❖ Wisconsin

Hi Dan,

I just read your article on trunk scanning, "Understanding trunking." It was very easy to understand even for an old retired trucker who only knows how to turn a scanner on and off. My son got a BC-796D scanner from Scanner Master for me as a retirement gift about 1-1/2 years ago. I only have one channel programmed into it, 154.755 MHz. That is the Racine, Wisconsin Sheriff's Department.

I now understand Racine will be changing over to trunk scanning after January 1st, 2008. Can you please tell me how I can get my scanner programmed to get them and also Muskego, Wisconsin and Milwaukee, Wisconsin, Police. Someone told I have to send my scanner back to the store to get it reprogrammed for trunk scanning as they will have to program it. Can you tell me if this is true or what must I do to get the correct frequencies into it?

Harold in Wisconsin

Racine, Wisconsin

Racine is both a city and a county located on the shores of Lake Michigan between Chicago and Milwaukee. The county has nearly 200,000 residents, with about 80,000 of those living in the City of Racine.

Most of the current public safety activity occurs on conventional (non-trunked) frequencies in the VHF and UHF bands. You're already hearing the Sheriff dispatcher on 155.7550 MHz, but there are many other frequencies your scanner could be monitoring. Across the county you should hear activity on the following frequencies:

Frequency Description

151.0250 County Highway Department
151.1750 Sheriff (West Dispatch)
154.2950 County Fireground ("Blue")

154.7550 Sheriff (Dispatch)
155.0400 Sheriff (Tactical and Car-to-Car)
155.2200 County Humane Society
155.3400 Ambulances
155.3700 County Point-to-Point
453.6000 County Jail
453.8000 Sheriff (Paging)
453.9000 County Courthouse Security
458.8000 Helicopter Operations
460.0125 County Fire (Dispatch)
463.1500 Racine Emergency Medical Service

In the City of Racine itself, the following frequencies should be of interest:

Frequency Description

151.1300 City Fire (Dispatch)
151.6850 Festival Park
151.7450 Festival Park
154.0550 City Public Works
154.2350 City Fireground
154.2800 City Fireground
154.2950 City Fireground ("Blue")
154.3700 City Fire (Dispatch)
154.8450 City Police (Car-to-Car)
155.0400 City Police (Tactical)
155.4750 Wisconsin Police Emergency Radio Network (WISPERN)
155.5500 City Police (Dispatch)
155.7600 City Public Works
155.8050 City Public Works
159.2100 City Police (Street Crimes)
453.2000 Public Library (Bookmobile)
453.4500 City Buses
856.2625 City Water Department

The radio frequency of 155.4750 is used by the Wisconsin Police Emergency Radio Network, known by its acronym WISPERN, across the state. It provides a simple, well-known way for police officers from different jurisdictions to communicate with one another.

Regarding a change to the Racine radio system - I don't have any current information indicating a move away from the current VHF equipment. If there are readers local to southeast Wisconsin that have any information about a possible new Racine system, please send an email and let us know!

Muskego, Wisconsin

Muskego is a town of 22,000 in the southeast corner of Waukesha County, about 20 minutes southwest of downtown Milwaukee. As with many areas of the country which have a mix of urban, suburban and rural areas, you will find both conventional and trunked public safety radio traffic in Waukesha County. On the conventional side, here are a few frequencies to check:

Frequency Description

155.3550 Muskego Fire Dispatch
154.4300 County Fire Paging (Simulcast from TRS)
155.3400 County Ambulances (Basic Life Support)
155.2800 County Ambulances (Paramedics)
155.4750 Wisconsin Police Emergency Radio Network (WISPERN)
155.3700 County Police (Point-to-Point)
453.7375 County Jail

There are also *simplex* frequencies, in which all of the conversation occurs on the same radio frequency. This is different from the usual *duplex* arrangement, where the mobile radios transmit on one frequency (sometimes called the *repeater input frequency*) and the repeater transmits on a different frequency (*repeater output frequency*). Scanner listeners typically tune to the repeater output frequency, since the repeater transmits with much more power, and is therefore heard further away than mobile radios.

In Waukesha County there are three simplex channels in the 800 MHz band that might be worth programming into your scanner: 854.9875, 856.2625 and 860.2625 MHz.

❖ Trunking Types

If you've read the previous explanations about trunking, then you understand that trunking systems have two basic pieces of information you need to know to get started. The first necessary piece of information is the type of trunking system. The most popular types in the United States are:

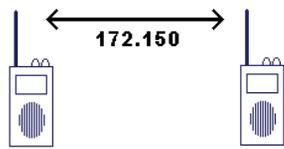
Motorola

Although strictly speaking Motorola is the manufacturer of the equipment, the common analog systems built by "the Big M" can use both Motorola and some third-party radios. There are two main types of Motorola systems: a Type I and a Type II. The Type I systems require the use of a "Fleet Map" to help the scanner understand how conversations are identified. The Type II systems use a somewhat more sophisticated way of identifying activity and do not need a Fleet Map. Some active systems are a combination of Type I and Type II radios and are referred to as *hybrid* systems, sometimes identified as Type III. All of the scanners on the market today are able to trunk-track these analog systems.

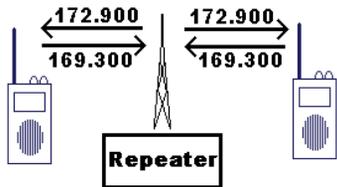
APCO Project 25

More recent systems being installed across the country carry the voice activity as streams of digital information rather than the traditional





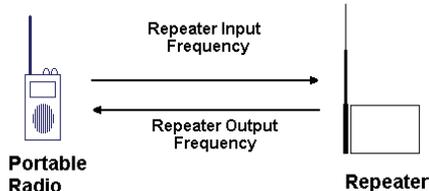
Simplex Mode



Repeater Mode

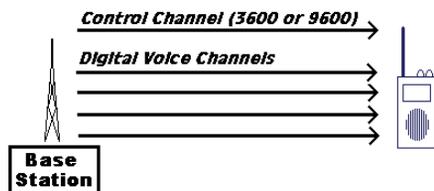
analog signals. The Association of Public Safety Communications Officials (APCO) publishes a set of digital radio standards known as Project 25. These standards, available to any manufacturer, specify the exact contents of the digital streams and therefore make it possible for equipment from different companies to work together on the same system. This was intended to introduce competition in the public safety radio marketplace and allow smaller companies to provide innovative products and services.

APCO Project 25 (P-25) standards include a specification for trunking, but it is optional.



You may find some systems using it, and these are known as “pure” P-25 systems. They may also be referred to as 9600-baud systems, since the trunking information on the control channel is transmitted at that rate. More recent scanners, including the BC796D, are able to follow this digital trunking standard. The first generation of digital scanners, such as the Uniden BC250D and BC785D, are not able to track this kind of trunking and are unable to follow conversations on pure P-25 systems.

Many systems, however, choose not to use the P-25 trunking standard but do make use of



P-25 Trunked System Channels

the P-25 voice standard. On these systems the control channel messages use the same signaling formats found on Motorola Type II trunked systems. Since the Motorola control channel operates at a signaling rate of 3600-baud, this is sometimes referred to “3600-baud” trunking.

All of the digital-capable scanners on the market are able to track this type of system. In fact, all of the trunk-tracking scanners on the market can follow the activity on these 3600-baud systems; however, only those scanners with digital capability will be able to make sense of the digital voice found there.

EDACS

The Enhanced Digital Access Communications System (EDACS) is an analog trunked radio system that is similar in many ways to Motorola Type II systems. One significant difference for scanner owners, however, is the way frequencies are handled. Because of the way EDACS transmits channel assignment information, scanner owners must program frequencies in Logical Channel Number (LCN) order. An LCN of 01, for instance, must be entered in the scanner’s memory at location 01. Putting in frequencies in the wrong location will cause a scanner to miss transmissions or fail to track conversations properly.

LTR

Logic Trunked Radio (LTR) is an older technology developed by E. F. Johnson back in the late 1970s. It is more common to find LTR in use by private companies and service utilities. LTR radios are assigned a “home repeater” to which as many as 250 radios may be assigned. Not all trunk-tracking scanners are capable of following LTR activity, so if you’re interested in a local LTR system, be sure to check the “Features” portion of the scanner manual before heading out!

❖ Radio Frequency Lists

The second piece of necessary information is a list of radio frequencies used by the system. These used to be found in printed guides and directories, and sometimes on printed sheets at local electronics stores. These days they are most often found on the Internet, either on web pages or in special interest groups.

Frequency lists on the Internet are usually in printed form, like what you would see in magazines. This means you’ll need to take the listing and either carefully enter the frequencies directly into your scanner using the keypad or type in the frequencies into a software program on your personal computer. If you have them on the computer, you can use a special cable to connect your computer to your scanner and *upload* them directly. The software program will convert what you typed into the proper format for your scanner to understand.

In a special interest group dedicated to your model of scanner you may be able to find frequencies already in a form that is immediately compatible with your particular scanner. More on that below.

Waukesha County, Wisconsin

Waukesha County operates a Motorola Type II trunked radio system on the following frequencies:

- 866.1250, 866.2125, 866.7500, 867.1125,
- 867.2625, 867.5375, 867.8000, 867.8250,
- 868.1000, 868.1375, 868.3500, 868.6875
- and 868.7125 MHz

Talkgroups in use on the system include:

Decimal	Hex	Description
1328	053	County Fire (Dispatch C)
1616	065	County Police Area 1 (Dispatch)
2448	099	Municipal Channel (Police / Fire / DPW)
12368	305	County Fireground
12400	307	County Fireground
12432	309	County Fireground
12464	30B	County Fireground
12560	311	County Fireground
12592	313	County Fireground
12624	315	County Fireground
12656	317	County Fireground
12688	319	County Fireground
12720	31B	County Fireground
12752	31D	County Fireground
12784	31F	County Fireground
12816	321	County Fireground
12848	323	County Fireground
12880	325	County Fireground
12912	327	County Fireground
12944	329	County Fireground
12976	32B	County Fireground
13008	32D	County Fire Mutual Aid
13040	32F	County Fireground
13104	333	County Fireground
13168	337	Helicopter Operations
13616	353	Police Assistance
13872	363	Police Pursuit
13904	365	Countywide Police (Tactical)
16646	410	Civil Defense
16976	425	County Emergency
18512	485	County Public Works (Administration)
18544	487	Highway Department (Operations)
18576	489	Highway Department
18608	48B	Highway Department
18640	48D	Highway Department
18672	48F	Highway Department
18704	491	Highway Department
19248	4B3	Drug Enforcement Unit
19344	4B9	County Police Area 4 (Dispatch)
19376	4BB	County Courthouse
19408	4BD	Sheriff
19440	4BF	Mutual Aid 1
19472	4C1	Mutual Aid 2
19536	4C5	Metro Drug Enforcement Unit
19600	4C9	County Fire (Dispatch B)
19632	4CB	Police and Fire (Link to Sheriff)
20144	4EB	Waukesha County Parks (Muskego area)
20496	501	Waukesha County Parks (Rangers/Snow Control)
20784	513	Waukesha County Parks (Fleetwide)
21968	55D	County Police Area 3 (Dispatch)
22032	561	County Fire (Dispatch A)
32816	803	County Police Area 1 (Operations)
32848	805	County Police Area 2 (Operations)
32880	807	County Police Area 3 (Operations)
32912	809	County Police Area 4 (Operations)
33008	80F	County Police (Squad-to-Squad)
33040	811	County Police Area 2 (Dispatch)
33136	817	County Fire (Paging)

The County system also carries talkgroups specific to the town of Muskego:

Decimal Hex Description

6288	189	Muskego Police (Dispatch)
6320	18B	Muskego Police (Secondary)
6352	18D	Muskego Police (Tactical)
6512	197	Muskego Police (Special)
6544	199	Muskego Warning Sirens
6576	19B	Highway Department
6608	19D	Muskego
6736	1A5	Parks and Recreation
6768	1A7	Parks and Recreation
7376	1CD	Muskego Fire (Dispatch)
7408	1CF	Muskego Fire (Fireground 2)
7440	1D1	Muskego Fire (Fireground 3)
7504	1D5	Muskego Fire (Channel 4)
7536	1D7	Muskego Fire (Channel 5)

Milwaukee, Wisconsin

Milwaukee County operates an APCO Project 25 digital trunked radio system on the following frequencies: 866.0875, 866.1500, 866.1750, 866.2375, 866.5375, 866.5625, 866.5875, 866.6500, 867.0375, 867.0625, 867.8500, 868.0625, 868.1625, 868.2125, 868.2375, 868.3250, 868.5250, 868.5500, 868.6125 and 868.6375.

Unfortunately, scanning the City of Milwaukee is not possible for scanner owners at this time. The city is using a trunked radio network from equipment supplier M/A-COM that uses their proprietary *OpenSky* technology. No consumer scanner on the market today is able to track or monitor the voice activity on an OpenSky network.

Several large OpenSky systems are in the process of being installed, including statewide networks in Pennsylvania and New York. These new systems can take a long time and almost always have difficulties during the build-out process. For example, the New York system, under a \$2.1 billion contract to M/A-COM, is undergoing initial tests in the eastern part of the state and is currently experiencing problems with inadequate coverage and lack of proper training.

The Pennsylvania system was originally funded by the legislature in 1996 and construction began a few years later. Finally, in May of 2006, the State Police began dispatching voice calls on the system for the first time, from one facility in Lancaster County.

Milwaukee's OpenSky system is also suffering from schedule and budget overruns. A local investigative news report from last fall detailed some of the problems with the installation and operation of the new equipment.

❖ Bearcat BC796D

Specific to the scanner that Harold mentions, the Uniden Bearcat BC796D is a base/mobile scanner capable of tracking digital as well as analog radio transmissions. It was introduced in December 2003 along with its handheld counterpart, the BC296D. Both models come with enough memory to store 1,000 channels and are capable of tracking the various types of trunked radio systems listed above.

Although I do hear about certain Radio Shack locations with helpful employees who offer to program your scanner for you, it's certainly not necessary to return the scanner to the store. One great resource to check is the Internet.

There are several Yahoo! groups related to the BC796D, which you can find by going to the web page groups.yahoo.com and entering "BC796D" in the search box. Two of the largest groups can be found at groups.yahoo.com/group/UnidenBC796D/ and groups.yahoo.com/group/BC796D/

You'll need to sign up to Yahoo!, which is free, and you'll need to join one or more groups, which is also free. Once you've joined, you will have access to the message archives and file sections, both of which contain a lot of helpful advice and resources. You will also be able to post messages to the hundreds of other group members, including questions and concerns you might have.

One question newcomers might try is politely asking if there is a knowledgeable scanner owner in your local area who could help you program your scanner. Having someone show you, in person, how to best operate your scanner is extremely helpful. If that person has the same model of scanner that you do, a relatively easy way of getting your scanner programmed is to perform a process called *cloning*, where you connect your scanner to another scanner and copy over all of the frequencies and settings. This is a quick and painless way to get up and running quickly.

In addition to special interest groups, there are also web sites with additional hints and information. Richard Wells operates the Strong Signals web site and has a dedicated page at www.strongsignals.net/access/clubs/bc796d/index.cgi for the BC796D.

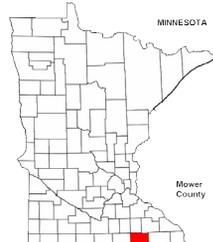
❖ Mower County, Minnesota

A reader by the name of Douglas contacted the Monitoring Times editorial office and said his county just switched over to some other frequency/system from 155 MHz but he doesn't know where they went. It's Mower County, Minnesota, where it was one degree above zero on the day he called!

Mower County is located on the southern border of Minnesota and is home to just under 40,000 people, nearly two-thirds of whom live in the county seat of Austin. Interstate 90 passes through Austin, twenty miles or so east of where it crosses Interstate 35.

Mower County has five police departments, all of which use the Sheriff's radio frequency. It also has eight volunteer fire departments, all using the County Fire frequency. The towns of Brownsdale and Lyle have their own frequencies for fire operations. The City of Austin has a paid full-time department and has separate radio frequencies for police and fire.

Five years ago the State of Minnesota put forward a plan to build a Statewide Public Safety Radio System. As with all other radio systems of this magnitude, the reasons for spending taxpayer money on all of



this new equipment and training revolve around safety and interoperability. New radio equipment is expected to be more reliable and have greater coverage than the aging gear it replaces. Having one system, or at least one common set of frequencies, gives different agencies the ability to communicate directly with each other.

The Minnesota statewide system will follow APCO Project 25 standards and is expected to be operational across the state by 2012.

Minnesota began their statewide system with a nine-county digital trunked radio system in the Minneapolis-St. Paul Metro area. The state owns and operates the towers and other infrastructure, sharing it with county and local agencies. Establishing the system and transitioning users to it were phases one and two of the statewide plan. Phases three through six are as follows:

Phase	Counties	Area	State Patrol Districts
3	23	Southeast and West	Rochester and St. Cloud
4	12-1/2	Northeast	Duluth and Brainerd
5	31	Southwest and West	Mankato, Marshall and Detroit Lakes
6	11-1/2	North	Virginia and Thief River Falls

Despite the availability of a statewide network, Mower County decided to implement a separate three-site analog radio system. County representatives decided that the cost of equipment to join the Statewide Public Safety Radio System was too high. Instead, the county made a deal to provide land to the state for construction of a new repeater site, in exchange for space on that tower for their new equipment.

The following frequencies are currently licensed in Mower County. These frequencies are broadcast from a variety of towers around the county, including half a dozen in and around the town of Austin as well as the top of community water tanks in Dexter, Elkton and Le Roy.

Frequency Description

151.0100	County Fire
151.2350	County Sheriff
154.1450	County Fire (including Austin, Brownsdale and Lyle)
154.3850	Austin Fire (Fireground)
154.7250	County Sheriff
154.8300	County Sheriff
155.0625	County Sheriff
155.1300	Austin Police (Dispatch)
155.3700	County Sheriff
155.3850	Austin Medical Center
155.4300	Austin Police (Tactical)
155.4750	County Sheriff
155.6400	County Sheriff (Dispatch)
155.7600	Southeastern Minnesota Emergency Operations
156.2250	County Highway Department
159.0600	County Highway Department
453.1750	County Fire
453.4750	County Fire
857.4375	County Highway Department
859.0875	County Highway Department

That's all for this month. Stay warm, if you're in a winter locale, and keep close to your radio. More information about scanner equipment is available on my web site at www.signalharbor.com. Until next month, happy scanning!

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 backlight controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control and programming with RS232C 9 pin port (cable not supplied), Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for \$29.95. For complete details, download the owners manual from the www.usascan.com web site. For fastest delivery, order on-line at www.usascan.com.

Bearcat® BCT8 Trunk Tracker III

Manufacturer suggested list price \$299.95

CEI Special Price \$169.95

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

Frequency Coverage: 25,000-54,000 MHz., 108,000-174,000 MHz., 400,000-512,000 MHz., 806,000-823,987.5 MHz., 849,012.5-868,995.0 MHz., 894,012.5-956,000 MHz.

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



Bearcat® BCD396T Trunk Tracker IV

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

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

Frequency Coverage:

25,000-512,000 MHz., 764,000-775,987.5 MHz., 794,000-823,987.5 MHz., 849,012.5-868,976.5 MHz., 894,012.5-956,000 MHz., 1,240,000 MHz.-1,300,000 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.

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25,000-54,000 MHz., 108,000-174,000 MHz., 216,000-224,980 MHz., 400,000-512,000 MHz., 806,000-823,987.5 MHz., 849,012.5-868,987.5 MHz., 894,012.5-956,000 MHz., 1,240,000 MHz.-1,300,000 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

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No HF Changes at 2007 Radio Conference

On November 16, 2007, members of the International Telecommunication Union (ITU) wrapped up their World Radiocommunication Conference (WRC-07) in Geneva, Switzerland.



Despite a month of often contentious sessions, there will be no noticeable change in world high-frequency (HF) radio regulations.

❖ 4-10 Megahertz

By far the most relevant agenda item for HF utility was number 1.13, "to review the allocations to all services in the HF bands between 4 MHz and 10 MHz, excluding those allocations to services in the frequency range 7000-7200 [kilohertz]." This discussion was one of the most contentious at the conference, with mostly European interests seeking 350 new kilohertz (kHz) for international broadcasting.

Other ITU nations had little interest in any new broadcast spectrum at all. Finally, the proposal was allowed to die. WRC-07 did call for further study of new technologies such as Digital Radio Mondiale, but that was it.

Another interesting matter that came up briefly during debate on this agenda item was the European call for a full, international adoption of fixed-frequency amateur radio operations near 5000 kHz. This, too, went nowhere. Countries allowing this operation will continue to do so, and those that don't, won't. While this is something of a minor loss for the hams, they won a major victory in hanging onto all of 40 meters.

There is little interest in reopening the HF allocation matter at the next WRC in 2011. It does not appear on preliminary agendas.

❖ Maritime Service:

Agenda item 1.14 was intended "to review the operational procedures and requirements of the Global Maritime Distress and Safety System (GMDSS) and other related provisions of the Radio Regulations." A working group recommendation was adopted. Changes involve legal language technicalities, and "regulatory embedding" of the Digital Selective Calling (DSC) used in this service. Believe it or not, these also involved some contention.

Item 1.16 concerned "provisions for Maritime Mobile Service Identities (MMSIs) for equipment other than shipborne mobile equipment." MMSIs are those long numbers that we're starting to see used in DSC calls and similar

automated communication. Members adopted a new format for search-and-rescue aircraft, aids to navigation, and small craft associated with a parent ship. The technical details will avoid potential confusion with existing transmissions from ships and coastal stations.

❖ Other New Amateur Bands:

Item 1.15 was "to consider a secondary allocation to the amateur service in the frequency band 135.7-137.8 kHz." This passed. Individual nations will decide exactly what amateur operation will be authorized here.

This is kind of cool. It's the first long wave amateur allocation since the infamous 1912 "200 meters and down" regulation shifted hams off the "valuable" long waves and onto those (supposedly) useless short ones.

The equally interesting idea of another secondary amateur allocation around the historic old 500-kHz medium wave band was put off until 2011. Too bad.

Well, that's it for WRC-07. Most of the real changes relate to mobile phone and wireless data services. Obviously, the average utility listener won't hear much difference at all. A good summary of all this is at www.arrl.org/

❖ Winter is Beacon Time!

There's still plenty of winter left to spin the dial and try to log some of the many hobbyist beacons all over the lower half of HF. Like most radio marker beacons, these automated transmitters broadcast Morse code identifiers or strings of beeps. Unlike most others, they are completely homebrew, typically breadboards in weatherproof enclosures with wire antennas or short whips. Most are continuous-wave (CW) emission.

Some of these (called "HiFERs" as the

HF counterpart to "LowFER"

low frequency experimental radio beacons) are legal under Part 15 of the US Federal Communications Commission (FCC) rules. These are allowed a paltry 1.5 milliwatts effective radiated power. They operate in a cluster just below the

13.6-megahertz frequency allocated to various consumer devices. If you hear any of these, you've made a good catch. A full list is at the Longwave Club of America site, www.lwca.org.

Other beacons run 100-200 milliwatts. These are most definitely not authorized by the FCC. Technically, they're illegal, though fortunately no one seems to be in any hurry to close them down. With much better antennas than the "HiFERs," they can really get out. A quick run through the band just above 80-meter amateur around zero Zulu just bagged five of them here.

Some of these, the "dashers," send beeps (Morse code dashes) of varying lengths. Others identify with letter strings. A few have telemetry. I have the 4079.61 kHz temperature beacon on right now. It sends "TMP," followed by the number of degrees Fahrenheit (currently 55). Flipping over to 4102.3 kHz, I hear "W," plus a string of Morse dits at a variable rate said to indicate wind speed.

Many of these unauthorized beacons belong to members of the High-Frequency Beacon Society. Their great web site is at <http://high-frequencybeaconsociety.bravehost.com>. This particular group of experimenters tends to place its creations far out into the great outdoors, away from "civilization." We are definitely hearing voices from the wilderness here. One is even high up Pike's Peak in Colorado.

Here's a list of "pirate" hobby beacons that have been heard in the past couple of months. Keep in mind that frequencies vary considerably from day to day, which is why I've rounded off anything past the 100-hertz place. Along with listening, try looking for these on the computer screen. Many people use software like Spectrum Lab or Argo to find CW way below the noise and zero in on the most accurate frequency.

kHz	Identifier	Location	Hours
3449.6	OK	Oklahoma	24/7
4024.2	JA	?	24/7
4077.3	MO	Oklahoma	24/7
4079.6	TMP+temperature	California	24.7
4089.2	Dasher	?	24/7
4094.0	PA	Arkansas	Night (photo eye)
4096.2	Dasher	?	24/7
4096.3	Six dits, long dah	Virginia	24/7
4096.6	Dasher	?	24/7
4102.3	W+wind speed	?	24/7
4111.5	Dasher	Florida	24/7
5499.2	Dasher	Washington	24/7
7382.3	K	?	?
8000.3	S	Arizona	Daylight-solar power
8188.7	W	Colorado	Daylight-solar power
10237.8	Dasher	Florida	24/7
10245.2	Dasher	Pike's Peak, CO	24/7

ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
AM.....	Amplitude Modulation
AWACS.....	Airborne Warning and Control System
CAMSLANT.....	Communication Area Master Station, Atlantic
CAMSPAC.....	Communication Area Master Station, Pacific
CAP.....	US Civil Air Patrol
CW.....	On-off keyed "Continuous Wave" Morse telegraphy
DGPS.....	Differential Global Positioning System
DSC.....	Digital Selective Calling
E07.....	Russian KGB, "English Man" AM machine voice
E10.....	Israeli phonetic station (xxx2=null message)
E11b.....	"Strich," English "oblique" callup, 5-figure groups
EAM.....	Emergency Action Message
FEMA.....	US Federal Emergency Management Agency
FBI.....	US Federal Bureau of Investigation
HFDL.....	High-Frequency Data Link
HF-GCS.....	High-Frequency Global Communication System
JSTARS.....	Joint Surveillance Target Attack Radar System
LSB.....	Lower Sideband
M08a.....	Cuban 3-msg CW/MCW, ANDUWRIGMT = 1-0
MARS.....	Military Affiliate Radio System
MCW.....	Modulated CW or AM tone Morse telegraphy
MFSK.....	Minimum Frequency Shift Keying
NASA.....	US National Aeronautics and Space Administration
Navtex.....	Navigational Telex
PSK31.....	Phase-Shift Keying teleprinting at 31.25 baud
RTTY.....	Radio Teletype
Selcal.....	Selective Calling
SITOR-A.....	Simplex Telex Over Radio, Automatic Repeat Request
SITOR-B.....	Simplex Telex Over Radio, Forward Error Correction
SK01.....	Generic for Cuban numbers in ham digital modes
Unid.....	Unidentified
US.....	United States
USAF.....	United States Air Force
USCG.....	United States Coast Guard
UK.....	United Kingdom
V02a.....	"Atencion" Spanish numbers, 3-msg format
VOLMET.....	Formatted aviation weather broadcasts
XC.....	The Crackle, probable Russian channel marker

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 ().

289.5	451-DGPS beacon, Hammerodde Light, Denmark, MFSK corrections and messages, at 0221. (Ary Boender-Netherlands)	2789.0	FUE-French Navy, typical RY/SG test loop in RTTY, at 0913. (Boender-Netherlands)
290.0	452-DGPS, Blavandshuk, Denmark, MFSK at 0217. (Boender-Netherlands)	2810.0	OFK-Turku Radio, Finland, navigation warnings at 1448. (Boender-Netherlands)
298.0	468-DGPS, Nynasham, Sweden, MFSK at 0054. (Boender-Netherlands)	2872.0	Condor 163-Condor Air Service, working Gander at 0513. (Allan Stern-FL)
299.5	463-DGPS, Skutskar, Sweden, MFSK at 0059. (Boender-Netherlands)	2887.0	Air Canada 090-Flight passing position to New York at 0539. (Stern-FL)
303.5	493-DGPS, Zeven, Germany, MFSK at 0124. (Boender-Netherlands)	2899.0	Gander Radio-Oceanic air route control, Canada, working US Air 750 at 0559. (Stern-FL)
304.0	503-DGPS, Lista Light, Norway, MFSK at 0129. (Boender-Netherlands)	2962.0	Santa Maria Radio-Oceanic air route control, Azores, working airliners at 0551. (Stern-FL)
305.5	341-DGPS, Sagres, Portugal, 200 baud MFSK, at 0140. (Boender-Netherlands)	2971.0	Gander, working Jordanian 262, at 0650. (Stern-FL)
310.5	500-DGPS, Faerder Light, Norway, MFSK at 0207. (Boender-Netherlands)	3016.0	Reach 167-USAF Air Mobility Command, moved to 5598 kHz by New York, at 0726. (Stern-FL)
516.6	TFA-Reykjavik, Iceland, SITOR-B Navtex at 1850. OXJ-Thorshavn, Faroe Islands, SITOR-B Navtex at 2030. (Patrice Privat-France)	3167.0	"M-0-G"-US Navy, Link-11 coordination net with "Z-5-T," at 0009. (Mark Cleary-SC)
2182.0	PBK-Netherlands Coast Guard, mayday relay for ECHU, motor vessel Lorena B, at 0812. LK7158-Private yacht, working UK Coast Guard, Yarmouth, regarding a medical evacuation, at 2319. (Boender-Netherlands)	3292.0	Cuban AM Spanish female "numbers" voice (V02a), at 0403. (Tom Sevart-KS)
2187.5	OXZ-Lyngby Radio, Denmark, calling Russian vessel Mekhanik Pustoshnyy, DSC at 1522. (Boender-Netherlands)	3450.0	"OK"-High-Frequency Beacon Society, OK, CW marker at 2336. (Mark Morgan-OH)
2226.0	Aberdeen-UK Coast Guard, weather at 0734. (Boender-Netherlands)	3476.0	Gander, sending Continental 24 to 3014 for Shanwick, at 0522. (Stern-FL)
2598.0	Saint Anthony-Canadian Coast Guard, NFD, weather at 0638.	3925.0	VP97-Drift net beacon, CW identifier and long dashes, at 0559. (Sevart-KS)
		3926.0	Cuban "cut numbers" station (M08a), letter-substituted CW messages at 0404. (Sevart-KS)
		4017.0	V02a, AM 5-figure groups in progress, at 0340. (Sevart-KS)
		4028.0	V02a, AM 5-figure groups in progress, at 0520. (Sevart-KS)
		4094.0	"PA"-High-Frequency Beacon Society, AR, CW marker at 0147. (Barry Williams-AL)
		4096.3	Unid-Possible beacon, 6 CW dits and a long dash, at 0453. (Sevart-KS)
		4096.6	Unid-Pirate CW dasher beacon, long dahs at 0444. (Sevart-KS)
		4125.0	Sector St. Pete-USCG, St. Petersburg, FL, working unid distressed vessel at 2136. (Cleary-SC)
		4149.0	WBN5040-Crowley Maritime seagoing tug Pioneer, checking in with WPE Jacksonville, at 0459 and 0611. (Cleary-SC) WPE, working tugs at 0503. (Sevart-KS)
		4214.0	IGJ42-Rome Radio, Italian Navy CW marker at 0455. (Sevart-KS)
		4369.0	WLO-Mobile Radio, AL, synthesized "female" weather and traffic list, also on 4396, at 0504. (Sevart-KS)
		4420.0	OH5-US National Disaster Medical System, Dayton, OH, ALE sound at 1454. (Jack Metcalfe-KY)
		4426.0	NMC-USCG, Pt. Reyes, CA, marine weather at 0455. (Williams-AL)
		4506.0	Iowa CAP 101-CAP net, at 1321. (Metcalfe-KY)
		4517.0	AFF3K-USAF MARS net, at 1330. (Metcalfe-KY)
		4721.0	JNR-USAF, Salinas, Puerto Rico, calling UKE302 (UK Royal Air Force E-3D AWACS), ALE at 0755. (Cleary-SC)
		4780.0	INGEZ-Indiana National Guard, Shelbyville Municipal Airport, ALE sound, also on 4775.5 and 5091.5, at 0058. South Bend-Indiana Joint Forces Headquarters Emergency Radio Net, LSB with Brazil, Golden Pirate, Elwood, Frankfort, Rockville, and Shelbyville, at 1302. (Metcalfe-KY)
		4894.0	The English Man-Russian intelligence/security (E07), bad AM audio, partial preamble 998-1, at 2140. (Mike-West Sussex, UK)
		5058.5	KX1-FBI, Knoxville, TN, calling IP1, Indianapolis, IN, ALE at 1957. (Cleary-SC)
		5065.0	TF131-Alabama National Guard, ALE sound at 1628. (Metcalfe-KY)
		5153.5	NNNOANE-US Navy/ Marine Corps MARS, net with NNN0YQB, at 1625. (Metcalfe-KY)
		5217.0	AAR5AM-US Army MARS net, at 1106. (Metcalfe-KY)
		5388.5	NK1-FBI, Newark, NJ, calling QT1, Quantico, VA, ALE at 0702. (Cleary-SC)
		5505.0	Shanwick VOLMET-Shannon Radio, Ireland, aviation weather at 0647. (Stern-FL)
		5547.0	San Francisco, working N578FE, a Federal Express MD-11F freighter, at 0618. (Stern-FL)
		5696.0	CAMSLANT Chesapeake-USCG, working "N-1-J" at 0030. (Privat-France)

- (Sevart-KS) Coast Guard 2131-USCG helicopter, working CAMSLANT, VA, in a search at 0227. (Cleary-SC)
- 5708.0 R23742-US Army helicopter, calling T12 (12th Aviation), ALE at 2250. (Cleary-SC)
- 5711.0 *Freedom Star*-NASA Booster Recovery Vessel, passing splash-down position to Booster Recovery Director, at 1551. (Cleary-SC)
- 5717.0 Rescue 903-Canadian Coast Guard, patch via Halifax Military to Rescue Coordination Centre, on a search at 2304. (Cleary-SC)
- 5732.0 PAC-USCG CAMSPAC, working helicopter J40, ALE at 0707. (Privat-France) Coast Guard 1712-USCG HC-130, reporting an aircraft debris field to CAMSLANT, at 2151. (Cleary-SC)
- 5778.5 R26609-US Army National Guard, calling B1Z171 (1-171 Aviation), ALE at 1344. (Cleary-SC)
- 5833.5 R24588-US Army National Guard, calling T3Z238 (3-238 Aviation, MI), ALE at 2244. (Cleary-SC)
- 5850.0 TF131-Alabama National Guard, calling 01VUL in ALE, at 1657. (Metcalf-KY)
- 5851.5 R23346-US Army National Guard, calling T1Z137 (1-137 Aviation, OH) ALE at 2232. (Cleary-SC)
- 5875.0 R00241-US Army CH-47D Chinook, calling R23614 (a UH-60A), ALE at 1326. (Cleary-SC)
- 6586.0 New York-Oceanic air route control, announcing frequency change to primary 5520, secondary 3455, at 0825. (Stern-FL)
- 6604.0 New York VOLMET-US Federal Aviation Agency, NY, aviation weather with Gander, also on 10051, at 0753. (Stern-FL)
- 6628.0 Santa Maria-Atlantic oceanic air route control, Azores, position and selcal with Delta 35 at 0754, USAF Reach 388 at 0757. (Stern-FL) New York, working KLM 736 at 2323. (Sevart-KS)
- 6640.0 New York-Aeronautical Radio, Inc. Long-Distance Operational Control, working unknown aircraft at 0015. (Williams-AL) New York, working Avianca 018 at 0953. (Stern-FL)
- 6710.0 Unid-Unknown military, reading 5-letter groups, then "End of message," at 0135. (Williams-AL)
- 6721.0 48500033-USAF tanker, calling ADW (Andrews AFB, MD), ALE at 2059. (Cleary-SC)
- 6739.0 Unknown US Air Force HF-GCS, EAM at 2235. (Williams-AL)
- 6754.0 Trenton Military-Canadian Forces VOLMET, aviation weather for bases and airports at 0050. (Williams-AL)
- 6768.0 V02a, AM in progress at 0428. (Sevart-KS)
- 6805.0 USAIS1012-US Army, working USAF1250, USAF in ALE, at 1630. (Metcalf-KY)
- 6809.0 WGY911-FEMA, MA, working WGY9485, FEMA Auxiliary Station, at 1504. WGY908-FEMA Region 8, CO, working WGY968, Golden, CO, at 1625. (Metcalf-KY)
- 6840.0 EZI-Israeli Intelligence (E10), callup and message at 0615. (Williams-AL)
- 6855.0 V02a, AM callup 17840 81347 18288, at 2101. V02a, AM callup 21632 73400 83166, at 2102. V02a, AM callup 78535 06034 27421, started late at 2106. (Cam Castillo-Panama)
- 6865.0 Probably V02a [Old M08 frequency -Hugh], AM in progress at 1636. (Williams-AL)
- 6911.5 R26611-US Army National Guard, calling B1Z171, ALE at 1351. (Cleary-SC)
- 6931.0 The Crackle-Descriptively named AM oddity (XC), became the "English Man" (E07), partial preamble 998-1, bad AM audio at 2100. (Mike-UK)
- 7361.5 R26154-US Army, calling T12 (12th Aviation), ALE at 2158. (Cleary-SC)
- 7457.0 AFA2VA-USAF MARS net, at 1401. (Metcalf-KY)
- 7527.0 Panther-US Drug Enforcement Administration, Bahamas, working Coast Guard 6042 on a medical evacuation, at 2156. (Cleary-SC)
- 7635.0 Middle East 34-CAP net at 1406. (Metcalf-KY) Head Cap 40-CAP net control at 1508. (Cleary-SC)
- 7642.0 EXBNN0-US Navy/Marine Corps MARS, NNN0EXB in the turned-around ALE format, at 1152. (Metcalf-KY)
- 7650.0 R23477-US Army National Guard, IN, calling KGEZNG (Shelbyville), ALE at 1307. (Cleary-SC)
- 7887.0 V02a, AM callups 21632 73400 83166 and 51540 46573 14606, at 2001. V02a, callup 55721 55658 38313, AM at 2002. V02a, callup 78535-06034 27421, AM at 2004. (Castillo-Panama)
- 7892.0 Probably V02a [Another old M08 freq -Hugh], AM in progress at 2040. (Williams-AL)
- 8003.0 R23894-US Army helicopter, working T01185, ALE at 0844. (Privat-France)
- 8023.0 025CDCNHQ-US Centers for Disease Control headquarters, GA, ALE and voice with FEMA WGY9030, at 1640. (Metcalf-KY)
- 8097.0 M08a, MCW callup 16042 26356 10206, at 1801. M08a, MCW callup 43631 50677 66273, at 1901. (Castillo-Panama)
- 8156.0 Coral Harbour Base-Royal Bahamas Defence Force, radio checks with C6R2066, at 2208. (Cleary-SC)
- 8294.0 WBN3011-Crowley Maritime tug *Pilot*, working WPE Jacksonville, at 2000. (Cleary-SC)
- 8337.6 Shark 15-USCG, working helicopter Dolphin 79, at 2210. (Cleary-SC)
- 8424.5 SVO-Olympia Radio, Greece, "DE SVO" CW in SITOR-A marker, at 0310. (Williams-AL)
- 8734.0 SVO-Olympia Radio, Greece, voice identification loops in English and Greek, at 0630. (Williams-AL)
- 8806.0 WLO-Mobile Radio, AL, traffic list at 1404. (Metcalf-KY)
- 8828.0 Auckland Radio-Pacific VOLMET, New Zealand, aviation weather at 0550. (Williams-AL)
- 8891.0 Gander, working aircraft at 0600. (Williams-AL)
- 8971.0 Fiddle-US Navy, FL, working P-3Cs Red Talon 711 and 71B, at 1338. (Cleary-SC)
- 8980.0 Coast Guard 2129-USCG helicopter, patch via CAMSLANT to District 1, at 1454. (Cleary-SC)
- 8983.0 CAMSLANT Chesapeake-USCG, relaying a search request from Sector Key West to Rescue 05, at 2330. (Stern-FL)
- 8992.0 Red Talon 712-US Navy P-3C, patch via Andrews HF-GCS to Tactical Support Center Jacksonville, at 1645. (Cleary-SC)
- 9007.0 Wizard Alpha-USAF, patch via Trenton Military to Tinker AFB Radar Maintenance, at 2223. (Cleary-SC)
- 9025.0 280057-USAF C-17A, calling MCC (McClellan HF-GCS, CA), ALE at 2331. (Cleary-SC)
- 9031.0 Ascot 6640-UK Royal Air Force, giving selcal JKES, at 0940. (Privat-France)
- 9224.0 BQGNNN-US Navy/Marine Corps MARS, NNN0BQG, ALE sound at 1505. (Metcalf-KY)
- 10066.0 UP0033-United Parcel Service freighter in South Pacific, HF DL position for Hat Yai, Thailand, at 1508. (Privat-France)
- 10375.0 GHARIAN-Great Man-Made River Authority, Libya, working MIZDA, ALE at 0942. (Privat-France)
- 10993.6 Dolphin 96-USCG helicopter, working Sector at 1506. (Cleary-SC)
- 11175.0 Nighthawk 06-Probable US Marine Corps HMX-1 presidential/distinguished visitor transport, patch via unknown HF-GCS station at 0044. (Stern-FL) Tuff 10-USAF B-52H, patch via McClellan HF-GCS to Barksdale AFB regarding range activity, at 1425. (Cleary-SC) Offutt HF-GCS, NE, 6-character EAM "for Willy Winkle" at 1622. (Jeff Haverlah-TX)
- 11205.0 Smasher-US Joint Task Force, working Evergreen 423, at 1616. (Cleary-SC)
- 11220.0 Sherlock 25-US military, patch via Andrews to Key West Naval Air Station, weird coded traffic regarding some sort of search, at 1543. (Stern-FL)
- 11232.0 Shado 91-USAF Special Ops MC-130, patch via Trenton Military to Raven 68 for air refueling coordination, at 1834. (Cleary-SC)
- 12164.0 KGD825-US Environmental Protection Agency, MA, ALE sound at 1754. (Metcalf-KY)
- 12359.0 "Herb"-Daily maritime weather net, passing information on Tropical Storm Noel to many vessels, at 1952. (Cleary-SC)
- 13170.0 SVO-Olympia Radio, Greece, voice loops at 1524. (Metcalf-KY)
- 13907.0 CAMSLANT-USCG, working helicopter Juliet 15, at 1618. (Cleary-SC)
- 13909.0 Terra 5-Northrop Grumman JSTARS Ground Station, FL, equipment testing with Wizard (E-8 test bed aircraft), at 1605. (Stern-FL)
- 13927.0 Bolt 21 USAF tanker, patch via US Air Force MARS AFA3HS, KS, at 1604. (Cleary-SC)
- 15016.0 Hickam-USAF HF-GCS, passing a lightning warning "in the blind" for HKY30, at 1340. (Metcalf-KY)
- 17346.0 SK01-Digital version of Cuban M08a numbers, PSK31 on an AM carrier at 1700. (Sevart-KS)
- 17436.0 V02a, AM callups 58062 26484 20344 and 43257 23035 72875, at 1701. V02a, AM callup 19351 05650 81683, at 1702. (Castillo-Panama)
- 17478.0 V02a, AM callup 10838 58470 36777, and messages, at 1601, repeated on 17436 at 1700. (Sevart-KS)
- 18594.0 MEMSEC-Unknown Customs Over-The-Horizon Enforcement Network, ALE sound at 1930. LNT-USCG CAMSLANT, calling 711, ALE at 2155 and 2251. (Hugh Stegman-CA)
- 20890.0 LNT-USCG CAMSLANT, working J42, ALE at 2302. 100-Possible drug enforcement, calling WST, ALE at 2242 and 2245. (Stegman-CA)

Analyzing PSK with the Hoka Code300-32

This month we answer a question sent in by reader Mark Smith from Kansas City, who treated himself to a new setup recently, complete with JRC NRD545 DSP receiver and the Hoka Code300-32 decoder software.

Mark upgraded from an Icom PCR1000 computer radio and various bits of free software including PC-ALE, and says that his main rationale was “to explore the more exotic signals” on shortwave. Not a bad reason at all, I’m sure we’d all agree! Mark found analysis of FSK signals pretty straightforward, but came a little unstuck in the world of PSK signals. We’ll see what we can do to help unravel this mystery.

❖ Mexican PEMEX Oil and Gas ALE Network

Before we look at PSK analysis, however, let’s revisit a new ALE network that was first found on 11095 kHz USB in late October. With non-obvious identifiers like AKALN2 and AKALJ1, the network looked like a perfect target for deeper investigation. A quick search of the WUN (now UDXF) archived emails revealed pretty much the same set of identifiers on 9265 kHz and on 2182 kHz after some listening.

As usual, there ensued a few nights’ worth of detective work searching for the identifiers on the web. I finally hit the best lead in the most bizarre of places – someone’s resume listed on the business relationships website “LinkedIn.” Buried in the resume was a mention of an engineer’s work in procurement and management of various projects on an accommodation platform (essentially a floating hotel for oil rig workers) in PEMEX’s Akal oil field in the Gulf of Mexico, a few miles off the coast from Ciudad del Carmen.

You can only marvel at the sheer amount of useful radio research you can do on the web with so little to go on. Here’s the run-down of identifiers so far:

- 57341 UNID Platform or facility
- CARMEN HQ Ciudad del Carmen
- EXEST1, 2 Exest Gas Interconnect
- ATASTA1, 2 Atasta Complex
- AKALL1, 2 Akal L1 and L1 Platforms
- AKALN1, 2 Akal N1 and N2 Platforms
- REBOM1,2 Rebomero Platform

AKALJ1, 2 Akal J1 and J2 Platforms

❖ PSK Signals

Now to deconstructing PSK signals with the Code300-32. An excellent test case for this example is the often-heard Russian MS5 12 tone modem (aka FIRE, aka AT3000-series, AKA CIS-12). Let’s take a look at the modem’s spectrum to begin with.

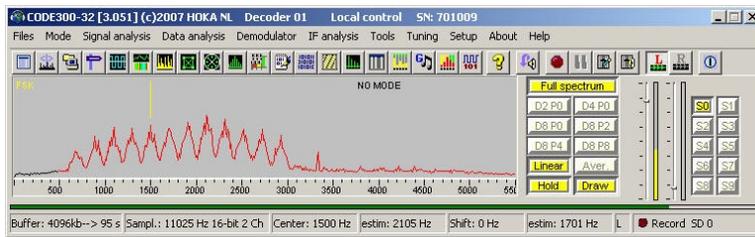


Figure 1: MS5 frequency spectrum

From Figure 1, you can see clearly that there are 12 “tones” equally spaced at 200Hz with a steady and much narrower tone at approximately 3300Hz above the zero (carrier) point. Switching to the waterfall spectrum tool (Figure 2), we can see the signal characteristics more clearly.

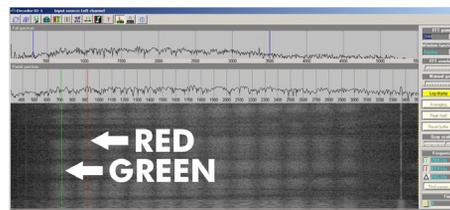


Figure 2: MS5 spectrum in waterfall mode

Note the red and green measurement cursors, which we moved to the mid point of two of the tones. Look to the bottom right hand corner and you can see that the software conveniently measures both the absolute frequency of each cursor and the difference, confirming the 200Hz spacing. In analyzing any new signal, one should, of course, verify the midpoint frequency of all the tones or channels in addition to the spacing between each and record them appropriately.

Note the width of each of the 12 “tones” and compare with the final tone at +3300Hz. The more information conveyed by a signal, the wider the bandwidth required (Shannon’s Law) to carry that signal. Notice that the final tone is much sharper than each of the 12 tones. Looking at these features, it’s a pretty

good guess that the final tone is unmodulated and that each of the other tones is carrying information. Note, too, that each of the 12 “tones” is a lump of energy spreading over approximately 100Hz. This is a good “eyeball” characteristic of PSK signals. If this modem carried, say, six channels of FSK data (representing our 12 tones), each of the tones would be much sharper, like our one at +3300Hz.

So, we’re now guessing that the modem is 12 channels of PSK data and an unmodulated pilot tone.

Let’s confirm that hypothesis. To do this, we can use the PSK analysis tools. However, with such a complex signal, before we can go any further, we need to isolate the suspected

pilot tone and at least one of the 12 other “tones.”

By narrowing the receiver’s filter bandwidth controls to around 200Hz and retuning the receiver so that the part of the modem we’re interested in is centered within that band, we can eliminate everything but the signal we want to analyze.

Using the PSK constellation tool is a good way to see what type of PSK signal we have. An unmodulated carrier will produce a steady dot constellation (it carries no phase information), a 2PSK (BPSK) signal will show two dots 180 degrees apart, a 4PSK signal will show four dots, and an 8PSK signal will show 8.

First, tuning the radio to put the +3300Hz signal in focus shows that this is indeed an unmodulated signal (see Figure 3). It’s a pretty good guess that this is a so-called pilot tone that helps the receiver lock onto the sending modem.

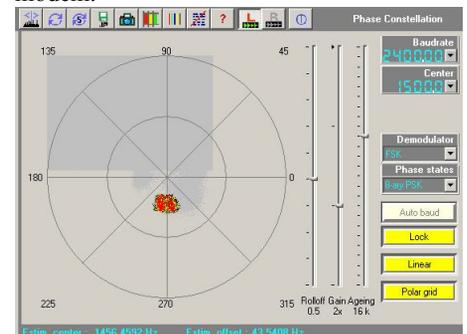


Figure 3: Constellation of unmodulated carrier

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Digital Radio Mondiale to Invade Tropical Bands

That's not quite the way the DRM Consortium put it in their press release: "DRM is Approved by the International Telecommunication Union (ITU) For Tropical Band Shortwave Broadcasting."

"At the last World Radiocommunication Conference (WRC) of the ITU in Geneva, the conference officially approved DRM system in the broadcasting bands between 3200 and 5900 kHz for domestic coverage in the 'tropical zone' countries. This major regulatory achievement opens up a huge market for the benefit of the citizens from this part of the world."

Don Messer, DRM representative at the WRC, wrote in the *NASB Newsletter*: "This is the real regulatory triumph for us in the shortwave band use of DRM. At WRC-03, I was able, along with others, to get DRM accepted officially for use in the HF bands that are governed by Article 12. That is the regulation that specifies the use of HFCC-like coordination twice a year, etc. for the bands above 5900 kHz."

"It took a massive amount of modifications in various Articles, Appendices, Resolutions and Recommendations to get to that point. This time, in modifying Resolution 517, we finally got to remove any mention of single-side band signals. This is something I could not get rid of at WRC-03."

"In the process, with the 'stroke of the pen' we lowered the bands under consideration from 5900 to 3200 kHz, thereby including the 'tropical zone' bands. The suggested change sailed right through the Plenary session without any objection. This new aspect finishes the DRM official ITU recognition in the HF broadcasting bands."

Raúl Saavedra, an inhabitant of the tropical zone in Costa Rica, replies in *DX Listening Digest*: "It's clear that hi-jacking of the major SW bands by this beast wasn't enough. It's now Tropical Bands Time! Sad reality: SW listeners are a thing of the past – at least for the ITU, and we DXers don't count for them. DRM is not the salvation of short wave listening."

Kim Elliott in his blog says: "Reception of DRM often is problematic in long-distance circuits of the international bands above 5900 kHz. Tropical bands, 3200-3400 and 4750-4995 kHz are generally used for domestic or regional short-haul circuits. DRM will probably prove more reliable over such distances and on such frequencies. And DRM

could provide a 'poor man's FM' for listeners in remote areas of some countries." (See also GUIANA FRENCH)

CODAR Also Interferes

Listeners to 60 and 90 m analog broadcasts already have to cope with utilities sharing the bands, notably Coastal Ocean Dynamics Application Radar (CODAR), ocean wave radar – those swishing pulses once a second in large portions of the 60m band.

Nick, WPE2BSW wrote to CODAR and received a reply from Dr. Donald E. Barrick, President, CODAR Ocean Sensors Ltd. in Mountain View, California, <http://www.codar.com> explaining the system and the need for it, that there are over 100 of them in the U.S. alone, supposedly restricted to 4.4-4.7 MHz, staying out of 4.7-5.0 MHz, and resulting in very few complaints from SWLs. Powers are only 40 watts.

Jerry Lenamon in Waco, Texas, found that of the 55 channels between 4750 and 5000 kHz, only 11 were not subject to CODAR, which could be heard at: 4730-4765, 4780-4835, 4845-4875, 4905-4945, 4965-4995 kHz.

Chuck Bolland, FL, KA4PRF, wrote to one of the CODAR operators, San Francisco State University, complaining that CODAR is indeed operating above 4.7 MHz. Toby Garfield replied that within NOAA, Jack Harlan jack.harlan@noaa.gov is the point person for dealing with frequency issues. "We are following FCC rules and trying very hard to be good airwave citizens. Jack is doing his best."

... And OTH Radar

Then there is Chinese over-the-horizon radar, described in our October 2007 column. We believe we have been hearing it on lower bands in the mornings when East Asian propagation is favorable. These rapid pulses seem to group in segments about 50 kHz wide, which change from time to time. Approximate ranges where we heard it, not all at the same time: 5100-5235 (overlapped with CODAR 5225-5240, and QRMed a MARS net on 5215); 5195-5240; 5355-5410; 5550-5590; 6610-6650; 6695-6740; 6895-6945 changing to 6945-6990; 7045-7090. Fortunately, these seem to be avoiding the broadcast, but not the ham bands.

AFGHANISTAN [non] R. Solh, via Rampisham, UK, 15265 at 1200-1500 added 13830 in Dec at 1200-1400 (Wolfgang Büschel, Germany, DXLD) Then 13830 just at 1230-1330 (gh)

ALBANIA The director of the European Broadcasting Union suggested to the director of R. Tirana that it close down shortwave and program only via Internet, saving transmission costs and increasing salary of program producers. The General Director of ARTV also said the SW service might be closed soon because of the high expenses (Drita Çiço, R. Tirana Monitoring Center, DXLD)

Thus it was necessary once again to point out the advantages of shortwave, which we all know, but are not always understood by management. Look at Radio Tashkent, which went this route, only to disappear altogether about a year later. A great way to lose the audience you have built up over the decades (gh) Radio Moldova International is almost forgotten since they took exactly this step years ago (Kai Ludwig, DXLD)

AUSTRALIA Thanks to the NT stations for keeping 60m interesting and unpredictable. On rare occasions, these transmitters stay on much later than their usual 0830 switch to 120 m. One day we found VL8K Katherine, 5025 at 1330 past 1510 giving Cuba a run for its money; and on a couple of other days, 4910, VL8T, Tennant Creek at 1336 relaying ABC Darwin, in the clear (gh, OK) 5025 was readable as late as 1640 (Dan Sheedy, CA, DXLD)

BELARUS [non] New on 5815 until 1729, something in Russian, no // found (Wolfgang Büschel, DXLD) R. Racja, the service from Poland to Belarus, via Lithuania at 1530-1730, 100 kW, 79 degrees, ex-6225 (Ivo Ivanov, Bulgaria, *ibid.*)

BRAZIL 5045 reactivated by R. Guarujá, with

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; sesqui = one and a half; B-07=fall/winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

R. Guarujá FM programming instead of R. Globo Santos (Édison Bocorny Júnior, RS, via Célio Romais, DXLD)

CANADA After years of dormancy, the RCI Action Committee website came back to life in Dec to explain what has happened to RCI, following testimony at a parliamentary committee (gh)

Questions about the international mandate of Radio Canada International were once again raised at a parliamentary committee as it prepared to issue a report on CBC/Radio-Canada, which is responsible for RCI. According to Canada's Broadcasting Act, it is part of the CBC/Radio-Canada's condition of licence to provide an international service. However, RCI employees and others are raising questions about how the mandate of Canada's Voice to the World has been affected by its focus on programming on immigration and new immigrants in Canada. Start reading at www.geocities.com/rciaction/RCIHeritageCtee20071127Mandate.html (via Wojtek Gwiazda, QC, DXLD) Management tries to justify converting it to a domestic service for immigrants, which we call "Radio Canada Internal" (gh)

Although it's still off the air, CFRX, the SW outlet of Toronto's CFRB, at least has a new vertical antenna. CFRB is planning for a new transmitter very soon. Listen on 6070 kHz! (ODXA Listening In)

CONGO DR [non] 9525, Ascension, which normally carries Star Radio for Liberia at 0700-0730, instead on Nov 22 broadcast Radio Okapi, in French and vernacular, many jingle IDs; 0730 to usual Cotton Tree News for Sierra Leone (Brian Alexander, PA, DXLD) Quite a mixup; all supported by Hirondelle Foundation (gh)

CUBA R. Rebelde's excellent music show

"Hecho en Cuba," winter timing 1730-1800 weekdays, best here on 17735 and 15370, weaker on 15570, mixing with WYFR on 17555, and with RN Madagascar on 11655. 1800 into major daily newscast *Noticiero Nacional de Radio* (gh, OK)

CZECHIA [and non] R. Prague's *Mailbag* announced that in Nov and Dec there would be an additional English broadcast to C&WNA on 0200 on 5995. Just about useless here due to Cuba 6000; is 5995 direct? (Kraig Krist, VA, DXLD) No, Sackville relay along with 0400 on 5990 (gh) Also added to 0000 on 11665 another Spanish via Ascension at 0100 on same (DX Mix News, Bulgaria) During the last 3 minutes of each half-hour transmission, R. Prague announces its full schedule in a certain language, but it is the next language, not the preceding one. E.g. at 2327 after French on 7345, gives English schedule. But some relays on WRMI in English are thus followed by French announcements. And there is a new one at 0000 Tue-Sat on 9955 (gh)

ECUADOR Radio CRI, 3380, reactivated, Nov 23 at 2340 until off around 0100, fair signal with Ecuadorian folk music, testing? No announcements except request for phone calls. Not heard the next morning. It's Centro Radiofónico de Imbabura, in Ibarra (Rafael Rodríguez R., Colombia, *condi-glist* yg) Last reported in early 2004 by the late Björn Malm, Ecuador, also on harmonic 6760.14, and 4609.99 (Dario Monferini, DXLD) 3380 heard a week later, very weak, 2340-0108*, last five minutes the Ecuadorian national anthem (Anker Petersen, Denmark, *DSWCI DX Window*)

On 21455 USB, HCJB, La Voz de los Andes, on a Saturday at 1145-1200 with *Galápagos* program, better here than // 11960 and 11690; the next week heard on 11690 and 11960 only (Manuel Méndez, Spain, DXLD) Best by far here on 11960. The A-07 program schedule, www.radiohcb.org/images/anexos/programacionondacorta.xls latest available, shows additional times for it: Sat 2100 on 1200; Mon 0130 on 9745. Also check out *Conozca el Ecuador*, M-F 2230-2300 on 1200, Sun & Mon 0430-0500 9745, all also on 21455-USB, even in the middle of the night (gh)

EGYPT R. Cairo is not well-coordinated in switching from one site to another in Arabic at 0000 on 6290. As early as 2354 we hear the first site with good modulation being covered by a carrier from the other with a heavy SAH of 15 to 20 Hz lasting until 0003, after which only the second, very distorted site is heard (gh, OK)

ERITREA [non] WHRA's clandestine broadcast Voice of Meselna Delina, in Tigrinya, M-F 1800-1830 replaced 17650 with 12015, still 250 kW, 90 degrees to E Africa, and excellent here off the back. On occasion, another half hour in similar language followed (gh, OK)

ETHIOPIA [non] Another exotic transmission appeared on WHRA, Mondays at 1900-2000 on 11785, *Dimitse Tewahedo*, in Amharic, an Ethiopian Orthodox service, if not clandestine.

If these are jammed, we can't detect it, but the only two major non-religious SW broadcasters in Amharic have not been so fortunate. Ethiopia has joined the dubious club headed by China and Cuba of major jammers of the airwaves. Deutsche Welle's Amharic hour at 1400 was hit by jamming by mid-November, so it added more frequencies from more sites: 15660, 15640, 15620 and 11645. White noise or other jamming could be heard even in Oklahoma, except on 15620 via Rwanda.

Then VOA's Amharic at 1800-1900 (flanked by other Ethiopian languages weekdays during the previous and following half-hours) also got jammed on all five frequencies, 9320, 9860, 11675, 11905, 13870, says Chris Greenway, UK.

Exile sites report that Ethiopia has acquired a number of jamming transmitters from China. Greenway says it may be no coincidence that at other hours, several extra 49m SW frequencies have been added for Ethiopian stations, Radio Fana and Voice of Tigray Revolution.

After they finish with DW at 1500, the jammers pile on Tensae Voice of Ethiopian Unity, 11900, as heard in OK and by José Miguel Romero, Spain. Wolfgang Büschel thinks the transmitter site for Tensae changed to South Africa (gh)

FINLAND The inactive Pori SW site came back for two weeks in late Nov and Dec for tests of Family Radio relays in English: 18-19 6125, 19-20 6130 (Ivo Ivanov, Bulgaria, DXLD) 6130 collided with V. of Russia (Joe Hanlon, NJ, *ibid.*)

GABON RTV Gabonaise heard in French on 14540, harmonic of 7270 (Ignacio Sotomayor, Spain, DXLD) Female-fronted French phone-in with African-sounding music bridges from 0830, fair/good but weakening. Not found at 1600, nor on 9554 after 1600, also worth trying (Thorsten Hallmann, Germany, DXLD) 9554 being 2 x 4777 (gh)

GERMANY European DX groups were buzzing about an announced broadcast by Radio 700, on 6005, the former RIAS Berlin channel, Sat Nov 24 at 1000-1200, no site given, leading to much speculation. This webradio station would be on SW as a pirate? Claimed to be licensed. It was widely heard in Europe, and we have it on good authority that it was 100 kW from Wertachtal (gh) See also ETHIOPIA

GHANA Minister for Finance and Economic Planning, Kwadwo Baah-Wiredu, presented the 2008 budget to parliament. He said the Ghana Broadcasting Corporation (GBC) would install a 50 kW transmitter to improve its shortwave service (GNA via *ModernGhana.com* via *Media Network* blog) So keep an ear on inactive 3366, 4915, 6130 (gh)

GREECE In B-07, no sign of Katerina's *Hellenes Around The World* English hour on the VOG schedule or at previously heard times. *Greek in Style*, music is still heard at 0005-0105 UT Mondays on 7475, 9420, 12105; also Sundays 1105 on 9420, 15650 (John Babbis, MD, DXLD)

GUIANA FRENCH The DRM transmitter of TDF at Montsinéry was heard irregularly on 17870-17875-17880, then switched to 15790-15795-15800, and

later for a few days apparently on 13860-13865-13870, when checked around 1400-1500, now with RFO Guyane programming, rather than RFI Paris, per postings in the *DRMNA* yahoo group. Official DRM schedules could not keep up with the changes. When missing from any of these frequencies, it appears they were trying lower channels in the daytime for domestic coverage, such as 6175; or 5055 which was registered and available 24 hours, 150 kW at 36 degrees – but why aimed out into the Atlantic? So look out for "QRDRM" 5050-5060 if on at night. This could collide with RHC's yet unfulfilled plan to try 5055 (gh)

INDONESIA 4925: a puzzle, between 0940 fade-in to about 1400, it's definitely RRI Jambi, heard often with many IDs. After 1400 on some days what might be a pirate station, e.g. chats in BI, many phone-ins, callers giving their name and place, no IDs, time checks or news, past 1520, gone at 1555. Or just a "late night show" on RRI Jambi? Audio quite good. Ten years ago when I lived here, came across several times pirate stations occupying an RRI frequency after close-down of latter (Gerhard Werdin touring in Bandung, Indonesia, BC-DX)

VOI back on 9526.0, Dec 11, cutting on and off between 1020 and 1045 (Ron Howard, CA, DXLD) Back on to stay for a while, two days later until 1504* in Indonesian, also Korean hour at 1300. Why not 9525.0? (gh, OK)

IRAN [non] VOIRI's English to Europe at 1930-2028 is sometimes reported on 6265, other times on 6225. Lithuania's relay frequencies seem rather flexible (via Wolfgang Büschel, DXLD)

ISRAEL Israel Broadcasting Authority, which has been walking a financial tightrope for several years with repeated threats of closure spurred by growing deficits, once again won a reprieve. An agreement was signed in mid-Nov with the Treasury by Eran Horn, the IBA's deputy director-general for finances, enabling transfer of interim funds needed to pay IBA salaries till the end of the year (*Jerusalem Post*, via *Media Network* blog) No mention of SW, which was threatened yet again with closure at yearend. By the time you read this, we should know (gh)

LIBERIA ELWA 4760 reactivated, Nov 14 2125-2301* closing with Liberian anthem (Scott R. Barbour, Jr., Intervale, NH, DXLD) Then widely reported in Europe and NAM, partly in English with religion (gh)

ELWA was testing its new ELCOR 5 kW on 4760, then off for technical work to return shortly. Presently testing at 2 kW with higher power possible later. Reports appreciated. [Later:] another week of tests on 6070 instead, 05-09 & 16-23; based on listener comments will decide on when to use which frequency. Many receivers here do not cover 60 meters, but 49 has much more QRM. Gradually going up to 5 kW if nothing blows up (John Stanley, formerly of HCJB, at ELWA doing installation and tests, DXLD) Never saw any reports of 6070; if used in the local mornings, will collide with CVC Chile, but not yet CFRX (gh) 4759.97 also heard at 0630-0705 (Brian Alexander, PA, DXLD)

As of Dec 17: We left the 4760 transmitter running at 1 kW. This is the one they have been using for several years, but was damaged. The new ELCOR is running at 2 kW, pending installation of cooling ducts and an air conditioning unit. It may run at either 3 or 5 kW after that if sufficient operating funds are available. Diesel fuel in Liberia is very expensive. Both will run from 0600 to 0900 and 1600 to 2300 UT on both frequencies for a few weeks. Based on response in the target area, they will then decide on which hours on which frequency will best meet the needs of the listeners (John Stanley, DXLD)

LITHUANIA KBC Radio, 6235, heard on a Sat in Nov at 2218-2230, in English, music from the 60s, ex-6255 (José Miguel Romero, Spain, DXLD) Probably to avoid Cairo 6250 (gh) See www.kbcradio.eu/ for schedule; Fri & Sat 22-23 Eu on 6235 with *Wolfman Jack* on Fri; UT Sun 01-02 on 6255 to NAM (gh) *Wolfman* heard last Fri in Nov until 2258 (Raúl Saavedra, Costa Rica, DXLD; Harold Frodge, MI, MARE)

MÉXICO After almost 4 months' absence, XEXQ, R. Universidad de San Luis Potosí, heard again on 6045 Nov 23 with classical music, 1359 ID lasting past 1452. Then it was sporadic, on several days and then missing again, as of mid-Dec. Noteworthy that most of Mexico's active SW stations are cultural, unthinkable north of the border (gh, OK)

XEXQ Director Leticia Zavala informs me that they have a new 1 kW transmitter, made in Chile, but so far running only the authorized 250 watts. They were experimenting with different antennas, such as inverted V and dipoles. Schedule is 1300-0500 (Julián Santiago Díez de Bonilla, DF, DXLD) Lic. María Leticia Zavala Pérez also replied to my inquiry, adding that they hope to expand to 24 hours in 2008, and add webcasting by mid-year (gh)

XEOI, Radio Mil, DF, 6010, is weaker than XEXQ when it's on; after 0700 interference from LV de tu Conciencia, Colombia, only 2.5 Hz away. Best time for XEOI without interference is around 1330 past 1400 with *Vive La Música de México*, their slogan. Announced website www.radiomil.com.mx leads to daily program schedule.

XEYU, Radio UNAM, 9599.3, classical music and news, usually on the air and sometimes one of the best signals on band when more distant stations aren't propagating.

XERTA, 4810 had been off the air for months, but occasional reports appeared in Nov and Dec; we never heard it, with the big blob on 4810 interfering (gh, OK) QSL for a 2004 reception reports shows a new address, XERTA, Radio Transcontinental de América, López 157-4, Col. Centro, México DF, C.P. 06070, México; or info@xertaradio.com They want \$1 r.p. I visited the station and found out from Sr. Carrillo that their new frequency will be 4800 (Ewald Glantschnig, Switzerland, A-DX via BC-DX)

MOLDOVA Radio PMR on 6240 at 2300 in English, mid-November, no longer heard at 1700 (Chris Lewis, England, DXLD) Kishinev is registered on

6240 at 2300-0100 with 500 kW, 309 degrees to USA E of 90, Atlantic Canada, Ireland, UK and France, same azimuth as for VOR after 0100. Finally a NAm service. The 1700 to Europe moved to 7370. (gh, *ibid.*) Then many listeners monitored both frequencies, and the new schedule emerged: M-F, a quarter-hour each in English, French and German, at 15, 16, 17, 18 and 19 on 7370; 23 and 24 on 6240; Radio PMR from the breakaway Trans-Dniester republic in Moldova (Pridnestrovye in Russian) (Dave Kenny, *BDXC-UK*)

"Here is Tiraspol... Radio PMR, of the Pridnestrovian Moldavian Republic." The entire cast was about PMR's diplomatic status and relations with Russia, Moldova, Ukraine, Georgia, Kosovo, USA. If this English broadcast was typical, it's at the behest of the *polwonx* and will be exceedingly boring to the listener. Nothing about PMR arts or science, nothing remotely entertaining (gh) Processed audio that eliminated normal pauses in speech. I've heard the same in commercials, so more words can fit into the time. Removing normal pauses causes listening fatigue; sounded like one long run-on sentence, made understanding difficult (Kraig, *KG4LAC*, Krist, VA, *DXLD*) From the same Grigoriopol site used for various customers including clandestines to Mideast (gh)

Let us not forget the real Radio Moldova International, which was on SW via Romania for a few years, now supposedly webcasting. Notice the webpages are unabashedly framed in Romanian, unlike PMR's. About English: www.trm.md/index.php?add=8 English is scheduled M-F at 1200-1230 (gh)

MONGOLIA 7260, at 0838, Mongolian Radio 2nd program, Ulaanbaatar. Good signal with news in English and ID: "This is the news bulletin of the Voice of Mongolia in English on the Blue Sky Radio. We are on the air on Tuesday and Thursday." (Mauno Ritola, Finland, *WORLD OF RADIO*)

MOROCCO More to last month's item on IBB closing the Briech relay in March: The facility includes about 2,000 acres of land with 80,000 square feet of buildings and 10 high-power (500 kW) shortwave transmitters. U.S. officials expect to save \$3 to \$4 million a year; actual savings will depend on cost of new lease arrangements and other expenses related to continuing transmissions, says Letitia King, chief of media relations. There are 56 government employees there, including four U.S. citizens and 52 local employees. U.S. international broadcasting in Morocco started in 1949 with the Tangier Relay Station. The current facility is 18 miles southwest of Tangier and began broadcasting in 1993. Plans for redeploying the equipment have not been finalized (*Radio World Newsbite* via Artie Bigley)

The Morocco announcement was the most shocking. That site is a Cold War stalwart. But that might also explain its demise. Most of its single hops would land in Eastern Europe, where the pesky outbreak of freedom has greatly reduced the incentive to listen to shortwave. I don't know where sufficient transmitters-for-lease will be found. The promise is to maintain broadcast hours, not specifically frequency hours. Broadcast hours could be fulfilled entirely via Internet (Kim Andrew Elliott, *NASWA Journal*)

Current English sked for the VOA from Morocco. Log and QSL them while you still can, all daily, with azimuths.

7205	0100-0200	67
9650	1830-2000	43
9885	0430-0700	172
13615	1600-1700	148
15580	1600-2000	148
15775	1730-1800	140

(David Ross, *CIDX Messenger*)

Many other services will become harder for us to hear back in the USA, where Morocco puts in good signals in reverse, e.g. Radio Farda; and VOA Kurdish at 14-15 on 17750 (gh)

OMAN R. Sultanate of Oman, 15140, English hour at 1400 heard on three Saturdays out of five in Nov-Dec, weak but readable, threshold signal. Pop music, news on the half-hour (Brian Alexander, PA, *DXLD*) Rarely audible here; may be sporadic (gh)

RUSSIA R. Rossii heard in Dec on 6075 at 1808-1834 with Russian ballads, folk songs, opera, // 5935, 7320. Good reception conditions for Russia still continue (Ron Howard, CA, *DXLD*) From Petropavlovsk, Kamchatka site. Holds up so late in winter (gh)

SERBIA [non] International R. Serbia did not quite make its Dec 1 target for reactivating the 250 kW Bijeljina, Bosnia transmitter, but it was back by Dec 13, on 6100 or 7240 kHz to Europe (gh) Also on satellite and webcast; details at www.glassrbije.org (Dragan Lekic, Serbia, *DXLD*)

7240 is a bad choice with interference, and programs actually starting at 4 and 34 minutes past the hours (Udo Krueger, Germany, *BC-DX*) 7240 too strong now to be the low power transmitter at Stubline in Serbia (Kai Ludwig, Germany, *DXLD*) 7240 supposedly running only 125 kW, non-directional, not strong but better than the old 10 kW (Wolfgang Büschel, Germany, *ibid.*) Then English to NAm resumed at 0200-0230 on 7115 (Joe Hanlon, NJ, *ibid.*)

Revised website sked showed: 0030-0230 7240 ND and 7115 310 degrees to NAm (with day of week variations); 1100-1900 7240 ND; 1900-2230 7240 ND and 6100 310. Power claimed is 250 kW on all three, i.e. 2 x 250 kW active, contrary to observations (gh, *ibid.*) Looking to a better future, but one of them is really the old 10 kW; it's 50 Hz off frequency low when used on 7240 (Wolfgang Büschel, *ibid.*)

SLOVAKIA Following last month's evidence that IRRS and European Gospel Radio transmit via Rimavská Sobota, that info was removed from this

webpage www.panambc.com/europe.htm (Jari Savolainen, Finland, *DXLD*) Covering their tracks, but too late (gh) Retrieved cache Nov 20 still saying Slovakia (Wolfgang Büschel, *DXLD*)

SPAIN Something in Spanish on 4395, Dec 1 at 0703 (Lúcio Otávio Bobrowiec, Brasil, *DXLD*) It's a relay of Radio Nacional de España, heard same date at 1535, and next day at 1700 (José Miguel Romero, Spain, *ibid.*) Same frequency used in October to relay Onda Cero, Spain (Tomás Méndez, Spain, *ibid.*) RNE/R1 I hear on both 4395.30 and 4396.30. No trace of Onda Cero Radio. Also hear harmonics of COPE 1224 kHz on 4896 and 6120 (Ignacio Sotomayor, Spain, *ibid.*)

SRI LANKA [non] IBC Tamil Radio via Wertachtal, Germany at 0000-0100 moved from 6175 to 6045 (*DX Mix News*, Bulgaria)

TAIWAN Fu Hsing Broadcasting, Kuanyin, readable signal at last on 15375 at 0900 (Mauno Ritola, Finland, *DXLD*) What a lucky 10 kW station. Per Aoki, has 15375 to itself until 1100 when RFA and Communist Chinese jamming come on. Fu Hsing also on 9410 with more QRM, both at 23-01, 04-06, 08-10, 11-13 (gh)

TAJIKISTAN Tajik Radio, 4635, 0053-0105 weak but clear with vocal music (Scott R. Barbour, Jr., NH, *DXLD*) 4635.05, Tajik Radio, Yangiyul; 0246-0315, really nice signal, the best I can recall in ages, very nice local vocals and instrumentals, decent modulation for a change, but a slight 50 cycle hum as always (Terry L. Krueger, FL, *DXLD*) 1202 with Indian-sounding traditional music (Murray Lycan, Japan, *ABDX*) 2252-2320, news, 2310 very nice local songs (Arnald Laen, Argentina, *DXLD*) One of my favorites; Central Asian music gives wing to my imagination. They also have a distinctive style of speaking and like to add reverb (Moisés Knochen, Uruguay, *condiglist* yg)

USA AFGE Local 1812 has approached a Congressional office to request a GAO investigation into the Broadcasting Board of Governor's (BBG) use of Purchase Order Vendors (POVs) at VOA. BBG claims that these individuals are "independent contractors" thus denying them many rights they would be entitled to as employees. It is a way to cheat workers out of basic legal rights such as civil service protections and union representation (AFGE Local 1812 website)

VOA added another hour in Somali, 13-14 on 13580, 15600 (Noel Green, England, *DXLD*) The original Somali is at 16-18 on 13580, 15620. The latter changes transmitter site every half hour, why? From Botswana to Morocco to Sri Lanka to São Tomé (gh) See also ETHIOPIA

Smyrna Baptist Church in Pensacola Florida, applied for an HF station. On June 2, 2006, FCC marked the application acceptable for filing; on December 14, 2007, FCC granted a construction permit (Benn Kobb, DC, *DXLD*) Between 10 and 18 MHz, fundamentalist based on KJV (Christer Brunström, HCJB *DX Partyline*) Same church had an unlicensed low power FM on 93.5 closed by the FCC in April 2004 (*Pensacola News Journal* via Terry Krueger's Florida LP radio list, via Mike Cooper)

WBCQ's Area 51 show, daily 22-24 on 5110, includes another *WORLD OF RADIO* time, Fridays 2330 (Allan Weiner, WBCQ)

KAIJ online schedule showed a new *Scripture to China* ministry in Mandarin, Mon-Tue-Wed 0900-1100 UT on 5755. Of all the conterminous US SW Stations, KAIJ may have the best chance of actually reaching China direct, with its 315 degree antenna from mid-continent. But KAIJ went missing in December following some power problem at the transmitter site; webcasts continued via <http://kaij.us> (gh)

English religious station on 4915 at 2210 and also at 1005 (Steve Price, PA, *DXLD*) Finally figured it out as WWCR, 9985 minus 5070, so 4915 happens when both those are on, 10-11 and 22-24 (gh)

WYFR had to leave 6855, for 6875, but after a brief stay there, moved again to 6915, at 03-13 and 20-23. This provoked pirates to parody it on 6925, or even collide on 6915. Strangely enough, KNLS also moved onto 6915 overlapping WYFR (gh) One night at 0409 past 0454, 6915 had double audio feed echoing, humorous and scary at the same time (Larry Will, MD, *DXLD*) Same problem later in Chinese on 5985, 13695 (gh)

VENEZUELA The timezone change from UT -4 to UT -4:30, postponed several times, finally took place on December 9 (Adán González and Henri González, Venezuela, *DXLD*) So now if you hear a timecheck in Spanish half an hour off, that's a good clue (gh)

ZAMBIA CVC's long-projected new transmitter here for WAF finally appeared testing in mid-Nov, 13590 at 0625-0630 with local time checks (Dan Sheedy, CA, *DXLD*) Also music only tests on 13650 at 1530 past 1615 (Noel R. Green (NW England), *ibid.*)

Schedule: 05-06 9430, 06-14 13590, 14-17 13650, 17-21 13590, all 100 kW at 315 degrees (Wolfgang Büschel, *ibid.*) Regular programming was then relayed from Australia // 13635 at times but out of synch (David Pringle-Wood, Zimbabwe, *ibid.*) Doubt 9430 is Zambia, as heard when other southern Africans are not propagating; still Germany? (Craig Seager, NSW, *ADXX*) 9430 best here, better than 13590 from 0600 (Udo Krueger, Germany, *BC-DX*) The German relays got another extension to Dec 31 at least, including 9430, but not 13590 or 13650, so the latter two may really be Zambia (gh)

ZANZIBAR What a pleasure to still have RT Zanzibar around, 11735 crashing in for more than two hours, until sign off 2100, all at a fantastic level, producing a great mp3 of the final 30 minutes of East African/Arabic sounding music. We should cherish every moment they're around (Dan Robinson, DC, ex-Nairobi, *DXLD*)

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

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

http://mt-shortwave.blogspot.com

0010 UTC on 9680

THAILAND: Radio Thailand. Text on educational system in Thailand. SIO 353. (Peter Ng, Malaysia)



Internet streaming for AM, FM and shortwave: <http://nbt.prd.go.th/home2.jsp> **Bangkok Meteo** 6765 USB, *1400-1403.* (John Wilkins, Wheat Ridge, CO)

0000 UTC on 6240

PRIDNESTROVIE: Radio PMR. Good signal into Colorado in English to 0015, all via male announcer, followed by French service. Identification, "Ici Tiraspol, la capitale de la republique..." Noisy band observed. Audible on 7370 at *1500 with similar signal strength as 6240 kHz. (Wilkins). Radio PMR (Pridnestrovian Moldavian Republic) is from the breakaway Trans-Dniester Republic in Moldova (Pridnestrovyie in Russian), broadcasting in English, French and German, Monday-Friday.

0122 UTC on 15344.37

ARGENTINA: Radio Nacional. Spanish. Nice music program of jazz instrumentals and vocals. Time tips to "Radio Nacional Sante Fe" ID. Parallel on 6059.9 of poor signal quality. According to website program was *Soberania y Cultura*. (Ron Howard, Monterey, CA) **RAE** 11710, 0330 French news and focus on film festival. (Joe Wood, Greenback, TN) Argentina's **Radio Baluarte** 6214.2, 2328-2330 (Spanish). (Jim Evans, Germantown, TN).



Internet streaming audio for RAE, AM and FM www.radionacional.gov.ar/.

0255 UTC on 6110

ETHIOPIA: Radio Fana (*Radio Torch*). Program sign-on with interval signal and opening promos to announcements and regional *Horn of Africa* style music. Good signal. Parallel 7210 fair. Brian Alexander, PA).



Internet streaming audio: www.radiofana.com. Ethiopian clandestine Radio Xoriyo on-demand and streaming audio at Radio Xoriyo link: www.ogaden.com

0306 UTC on 9610

VATICAN STATE: Vatican Radio. Announcer pair with Spanish programming of news and comments // 11910 (SIO 232).



Internet streaming, on-demand and Podcast: www.radiovaticana.org/en1/diretta.asp **Voice of Russia relay** 7350, 0330// 6240 (Stewart MacKenzie WDX6AA, Huntington Beach, CA).

0328 UTC on 4985

BRAZIL: Rádio Brasil Central Portuguese. Station identification at 0330 to 1980's U.S. pop tunes in Portuguese. (Wood). Brazilian stations in Portuguese; **Rádio Clube do Para** 4885, 0418 (Wood) **Rádio Novad De Paz** 9515, 0829-0845; **Rádio Tupi** (tentative) 9565, 0841-0850; **Rádio Bandeirantes** 9645.28, 0900-0915. **Rádio Difusora De Macapá** 4914.96, 2305-2320. + (Chuck Bolland, Clewiston, FL). **Rádio Imaculada Conceição** 4754.9, 0140-0150; **Rádio Difusora do Amazonas** 4805, 2240-2245; **Rádio Educação Rural de Tefé** 4925, 2249-2255. (Evans).

0343 UTC on 4780

DJIBOUTI: Radio Télévision de Djibouti. Arabic. Signal near arm-chair quality. Middle Eastern pop variety to traditional Arabic music. Station ID at 0400 into newscast. (Wood). 2050-2101.* (Alexander). 0518-0534 in French.



Internet on-demand video and audio, plus streaming audio www.rtd.dj/

0358 UTC on 4775

SWAZILAND: Trans World Radio. English/German. Station identification as "Trans World Radio-Swaziland." German service of religious text and music. Contemporary religious music noted past 0404. Poor signal quality. 3240, 0322-0330 in Vernaculars. (Wood)



Internet on-demand video, audio and Podcast at Multimedia link: www.channelafrica.org/portal/site/channelafrica/

0700 UTC on 9525

CONGO: (Democratic Republic) Radio Okapi. Noted station on frequency instead of Star Radio via Ascension Island. "Okapi" jingles at sign-on to French and Vernaculars text. Mentions of "Congo" and "Okapi" throughout broadcast. CTN programming to Sierra Leone at 0730 with English CTN news at 0730. "CTN" identification at 0758.* Assume this broadcast relayed via Ascension Island. Noted on 9635, 0502-0600* via Meyerton, South Africa. (Alexander) Station is part of a joint project of Foundation Hirondelle and U.N. Mission in Democratic Republic of the Congo.



Internet streaming and on-demand audio: [www.http://www.radiookapi.net/](http://www.radiookapi.net/)

1033 UTC on 7285

VIETNAM: Voice of. Khmer newscast amid poor reception of SIO 333 and interference via RTM Malaysia on 7295 kHz. (Ng)



Internet streaming and on-demand audio www.vov.org.vn

1215 UTC on 6350 USB

USA: AFRTS/Armed Forces Network via Hawaii. Warble jammer present during news program and discussion on laptop computers. (Mark Morgan, Cincinnati, OH) Website: <http://myafn.dodmedia.osd.mil/WWRB> 6370, 0510-0525 noted on second harmonic of 3185 kHz.(Alexander)

1550 UTC on 17770

SOUTH AFRICA: Channel Africa. Financial program on various financial interest. Station identification and frequency announcement to 1600. Good signal via Meyerton. (Wood). 7390, 0318 English; 0424 French service. (MacKenzie).3345, 0349 (Wood).



Internet streaming and on-demand audio: www.channelafrica.org/portal/site/channelafrica/

1609 UTC on 15475

GABON: Afrique Numero Un. Numerous French voice and jingle identifications. *Made in Africa* program of French/English disco tunes. Very good signal quality. **RTV Gabonaise** 4777, 0506-0527 (Wood).



Internet streaming and Podcast: www.africa1.com/

1800 UTC on 11735

TANZANIA: Voice of Tanzania (via Dole, Zanzibar). Presumed vernacular or Swahili language. Newscast audible though very weak signal quality, and only heard sporadically. (Brian Bagwell, St. Louis, MO) Noted SIO 333 at 1913 in unknown language. (MacKenzie). 11735, 1759-1820 in Swahili (Alexander).

2008 UTC on 13695

FRANCE: Radio France International. French service for male/female announcer duo with comments and updates. SIO 433 (MacKenzie). **RFI** in English 9805, 0400-0430; 11995, 0500-0530. (Tom Banks, Dallas, TX).



Internet streaming and on-demand audio: www.rfi.fr

2040 UTC on 4975.97

UGANDA: UBC Radio (formerly Radio Uganda). Variety of Afro-pops, local regional, Afro-rap and U.S. pop music. Phone-in conversations in English and vernaculars. Noted station on later than usual, monitored to 2225 despite CODAR interference. Additional monitoring 2225-2235 (Alexander).

2110 UTC on 4760

LIBERIA: ELWA (*Eternal Love Winning Africa*). Religious text to contemporary religious vocals presented by lady announcer. Several mentions of "Liberia." Signal poor, SINPO 23222 (Evans) 4759.97, 0630-0705 (Alexander) 2125-2301.* Hymns to California contact address and Liberian national anthem. (Barbour). Website: www.elwaministries.org/

2215 UTC on 9760

CYPRUS: Cyprus BC Corp. Sign-on to local Greek music and Greek text. Signal weak and only threshold signal by 2244. Parallel 7210 fair signal level mixing with China's CRI; // 6180 very weak under Brazil's Nacional do Amazonia. (Alexander)



Internet streaming audio for CyBC 1, CyBC 2, CyBC 3: www.cybc.com.cy/radio/live_radio.html On-demand CyBC Television newscast in English www.cybc.com.cy/tv/latest_news_en.html.

2325 UTC on 5030

BURKINA FASO: Radiodiffusion du Burkina. Nice music mix of Afro pops and reggae to occasional French announcements by host. Closing station announcements to national anthem and 0000.* Pretty good signal with a



bit of splatter from 5025 kHz (Wilkins).
Internet streaming audio: www.radio.bf/.

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

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

PROGRAMMING SPOTLIGHT

WHAT'S ON WHEN AND WHERE?

Fred Waterer

fredwaterer@monitoringtimes.com

www.doghousecharlie.com/radio

Canada, Eh?

Canada. The country I call home is a complicated place at times, and periodically seems to suffer from an identity crisis. Canada is a unique amalgam of British, French and American influences.

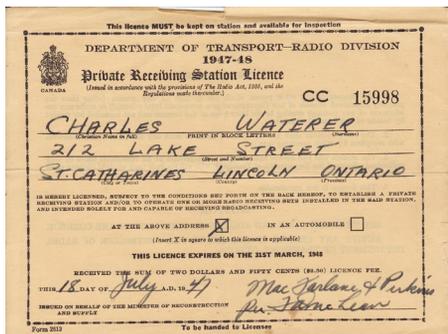
For instance, Canada is governed by a parliament based on the British model, yet party leaders are chosen in American-style conventions. The Canadian Broadcasting Corporation (CBC) is largely state funded on the BBC model, but it co-exists with an American-style, relatively free market of commercial radio. Stuck in the middle is a large French-speaking minority, uneasy about being swamped by the English language spoken in the rest of the country, and American culture imported from abroad.

The CRTC (Canadian Radio-television and Telecommunications Commission) is the Canadian regulatory body, similar to the FCC (Federal Communications Commission) in the United States. It licenses stations and monitors their activities and formats. In addition, it monitors compliance with the "CanCon" laws (in the case of music stations). Depending on their format, a station must play a specific percentage of Canadian music, based on a specific formula.

❖ History

Broadcasting in Canada dates back to the very beginnings of radio. CFCF in Montreal claims to be the world's first broadcaster, beginning in 1919. This is disputed by KDKA, so suffice it to say that Canada was in the forefront of this new emerging medium. In the 1920s, as my father in his youth was building homemade "cat's whisker" radios and essentially DXing, radio stations began popping up across the country.

Broadcasting was largely unregulated, and this led to a number of problems. For example,



in the Toronto area, three radio stations, one Catholic, one Baptist and one Jehovah's Witness, were in apparent open warfare with each other. In 1936 the government stepped in and took over regulation of broadcasting, seizing the licenses of a number of stations. Some stations were closed and others had their licenses transferred to the newly created CBC. British style radio license fees were implemented. In fact, until the 1950s, the CBC not only competed with the rest of the radio industry, but it (rather unfairly) regulated it, too.

❖ CBC

CBC has two networks in English. CBC Radio One is mainly a current affairs and news channel. Radio Two presents mostly classical music. Both are, for the most part, on FM across Canada. Thanks to the internet age, one can also listen to them live online, as well as (in many cases) via podcasts.

🔊 www.cbc.ca

A third mode is satellite radio. I believe CBC Radio One programming can be heard on Sirius Satellite 137.

There is actually a third network, but it is only available via the web or satellite: "CBC Radio 3 is...available 24/7 on Sirius channel 94. Generally speaking, the world is a biggish place with lousy access to the internet, so satellite is your best bet for listening to the very best in Canadian rock, pop, hip-hop, electronica and alt-country."

As you can probably guess, it's a youth oriented music service.

🔊 <http://radio3.cbc.ca/>

A few highlights I would like to mention from the CBC Radio One line-up include:

The Current/Sounds Like Canada –

Hosted by Anna Maria Tremonti and Sheila Rogers respectively, these programs attempt to fill the shoes of the late Peter Gzowski and his *Morningside* program. **The Current** deals

with more serious issues; **Sounds Like Canada** talks to Canadians of various walks of life, usually but not restricted to those connected with the arts. Weekdays from 08:30am - 11:30 am local time.

Afghanada –

A drama series. "Three Canadian soldiers have been shipped out to Afghanistan and are based deep in the heart of the conflict: Kandahar Province, where the Taliban insurgency is fiercest. Every day, Canadian soldiers on the ground confront the chaos and violence of life "outside the wire." They don't have the big picture; they're not interested in the policy. They're just trying to help the people, protect each other...and survive.

"**Afghanada** gives us a grunts'-eye-view of the conflict. The sound is edgy and gritty, the impact immediate, pushing the listener into an auditory journey that is impossible to escape. It is a reflection of the very real situation Canadian soldiers are facing every day in Afghanistan." (The series may be over by the time you read this, but look for repeats in the future). It can be heard Wednesdays at 11:00 p.m. and Fridays at 11:30 a.m.

As it Happens –

Long running current affairs program with a slightly twisted sense of humor at times. Weekdays at 630pm local.

Rewind –

Gems from the CBC archives. Thursdays at midnight local time

Randy Bachman's Vinyl Tap –

Saturdays at 7pm local. Hosted by legendary Canadian musician Randy Bachman of the Guess Who and Bachman-Turner Overdrive fame, Randy presents great music and the stories behind it from someone who was there. Easily my favorite CBC show. Continuing the musical theme it is followed by **A Propos** (music from French Canada) and **Saturday Night Blues**.

The Vinyl Café with Stuart MacLean –

"Stories and the misadventures of Dave, the owner of the 'Vinyl Café', the world's smallest record store, where the motto is 'We may not be big, but we're small.'" Sundays at noon local.

Cross-Canada Checkup –

Hosted by Rex Murphy, Canada's national

phone in program. Always interesting. Sundays at 4pm.

And finally, don't forget **CBC Overnight** from Midnight to 6 am, featuring programming from around the world via the World Radio Network.

❖ Radio-Canada

Radio-Canada is the French language arm of the CBC. It operates two radio networks, **La Première Chaîne** and **Espace Musique**. The first focuses on News and Current Affairs. The second, exclusively on FM, focuses on Arts, Culture and Music.

While most Radio-Canada transmitters have gone exclusively to FM, Radio-Canada's transmitter in Toronto is a 50kW blowtorch on 860 kHz, which can be heard widely. The call sign is CIBC... a left over from the religious radio wars of the 1930s, referenced earlier. The calls stood at one time for Jarvis Street Baptist Church. As with CBC Radio One and Two programming, you can also listen online at

 www.radio-canada.ca

❖ RCI

Radio Canada International is Canada's "Voice to the World." It was born in the midst of conflict. During the Second World War, it was determined that Canada needed a radio service for her soldiers abroad. Construction began in 1943 and transmissions followed in 1945. Known then as the CBC International Service, broadcasts began in February 1945 in English, French and German. Through the forties and fifties it would expand to include Czech, Dutch, Swedish, Norwegian, Danish, Spanish, Portuguese, Slovak, Italian, Finnish, Russian, Ukrainian and Polish. This expansion didn't last, and by the mid to late fifties, the Scandinavian, Dutch, Spanish and Portuguese broadcasts were scaled back.



In 1961, Scandinavian and Dutch broadcasts were eliminated altogether and a new emphasis was put on Africa. In 1970 the service was renamed Radio Canada International and during the course of the 1970s and 1980s, RCI added relay stations abroad and began broadcasting to Asia in Japanese and Chinese, and in Arabic to the Middle East.

In the 1990s, RCI was almost eliminated altogether, but survived. Henceforth, the domestic CBC networks provided English and French programming, for the most part.

RCI today has very limited programming choices to North America in English. There are three main programs.

"**The Link** is a two-hour daily radio show aimed at connecting new immigrants to Canada

and Canada to the world. Plug in to our show for immigration news and stories. Find out what's new and exciting on Canada's cultural landscape. And get the pulse on what's happening in Canada today. Whether you live inside or outside the country, just click on **The Link** and get connected." Hosted by Marc Montgomery

 www.rcinet.ca/rci/en/emissions/1952.shtml

The Maple Leaf Mailbag – "This pastiche of Canadiana focuses on you, the audience! Ian reads your letters, answers your questions, and shares your impressions of Canada with listeners from around the world. There's always lots of fun, along with special guests, short-wave news, contests and giveaways. You can even join RCI's Maple Leaf Pen Pal Club. If you want to hear what the international community thinks about Canada this is the place to be." Hosted by Ian Jones

 www.rcinet.ca/rci/en/emissions/1450.shtml

Blink – "If you're unable to tune in to our daily programme **The Link**, don't despair. We're repeating a selection of the Link's best stories on a special Saturday edition. It's "The Best of the Link" - let's just call it "Blink", Saturday's on RCI. Hosted by Jim Craig.

 www.rcinet.ca/rci/en/emissions/1951.shtml

The programs can be heard on the following schedule to the US:

0005-0105 Tue-Sat 9755 kHz

The Link, Sun Blink, Mon Maple Leaf Mailbag

0105-0205 Tue-Sat 9755 kHz

The Link

1605-1705 Mon-Fri 9610 kHz, 9800 kHz (DRM)

The Link, Sat Blink, Sun Maple Leaf Mailbag

1705-1805 Mon-Fri 9610 kHz, 9800 kHz (DRM)

The Link, Sat Blink, Sun Maple Leaf Mailbag

2200-2300 Mon-Fri 9800 (DRM)

The Link, Sat Blink, Sun Maple Leaf Mailbag

❖ CBC Northern Quebec

Heard on 9625 kHz, the CBC Northern Quebec Service originates in Sackville at the RCI transmitter site. It is intended to cover remote regions of Quebec, but the signal has a tendency to be heard in wide areas. It is routinely heard throughout North America and even gets into Europe at times.

It is a unique mix of CBC Radio One programming in English, Radio-Canada programming in French, and a number of programs in the aboriginal languages such as Cree and Inuktitut.

For those without access to the internet, it gives you an opportunity to sample some diverse CBC programming. The schedule I have is from fall 2006, so some details may have changed, but you can hear Aboriginal programming most weekday local mornings and afternoons.

As It Happens can be heard for an hour at 7pm Eastern (0000 UTC). Such weekend programs as **The House** (a review of events in Parliament) can be heard at 9am (1400 UTC) Saturdays. Later in the day one can hear **Definitely**



Not the Opera at 1800 UTC, Randy Bachman's excellent music show **Randy's Vinyl Tap** at 0000 UTC Sunday, and later **A Propos**, a look at musical trends in Quebec. Sundays, one can hear **The Sunday Edition** at 1400-1700 UTC, and various CBC music programs at 0000 UTC (Monday).

At other times, one can sample the French programming of Radio-Canada. When major events happen, such as Federal Election debates or results, CBC Radio One programming is heard.

❖ CKZN

CKZN is a CBC Radio One shortwave relay on 6160 kHz of CFGB-FM in Happy Valley-Goose Bay, Newfoundland. It is intended for remote areas of Labrador. I have heard its 1kW transmission a number of times here in Central Canada. One thing to remember is that CKZN carries the **CBC Overnight** programming from World Radio Network from midnight-6 am Newfoundland time (UTC minus 3.5 hours). So if you hear CKZN, you could mistake it for a broadcast from Radio Prague, Deutsche Welle, or any number of stations heard in this block of programming.

The half hour time zone inspired a joke in the 1970s, based on CBC programming announcements. Bumper stickers and buttons were available which read, "The world will end at midnight; 12:30 in Newfoundland."

❖ CKZU

CKZU is a 1kW relay of CBC Radio One in Vancouver. As with CKZN, don't get caught confusing the World Radio Network programming overnight.

❖ CFRX

CFRX has had some transmitter issues recently, but when it is on the air, it carries the programming of CFRB 1010 in Toronto on 6070 kHz with 1 kW of power. CFRB is one of the oldest call-signs in Canada and stood for Canada's First Rogers' Batteryless. E.S. (Ted) Rogers invented the world's first alternating-current tube, allowing radios to be operated by ordinary household current, and launched CFRB, which has been broadcasting for 80 years.

CFRB/CFRX's format is News-Talk.

❖ Conclusion

So there you have a quick survey of Canadian public and shortwave broadcasters. I barely scratched the surface of broadcasting in Quebec, or of private broadcasting in Canada. Canada is incidentally the origin of the "Jack-FM" format. On behalf of Canadians everywhere, I'd like to apologize for that one. ©

It's about Time ...

QSLing Standard Time & Frequency Stations

Next time you're band scanning, tune around 5,000, 10,000 or 15,000 kHz, and you'll hear continuous transmissions of 'beeps' or 'pips' every second, with the time announced in UTC at every minute.

Known in the hobby as *Time Signals* or an STF, these stations are WWV from Ft. Collins, Colorado, and WWVH in Kauai, Hawaii. Many listeners use STFs for checking the performance of their equipment and they are invaluable as a means to synchronize station clocks to UTC. DXers also use them to check propagation and reception paths or quality, and the receiver's frequency accuracy.

While WWV and WWVH broadcast 24 hours a day, other world time stations may broadcast for a few hours or only on certain days of the week. Additional world time stations broadcast their identifications

in Morse code, while others may be heard as only a 'beep' or 'pip' signal. CHU in Ottawa, Canada, uses continuous voice transmissions in English and French to identify their time signal transmissions. Additional stations are located in Argentina, Belarus, China, Ecuador, France, Germany, Japan, South Korea, Kyrgyzstan, Russia, Switzerland, Taiwan, United Kingdom and Venezuela.

Both U.S. stations and Canada's CHU are easy to verify. Two mint stamps will assist WWV/ WWVH stations, while CHU will accept mint Canadian stamps or one IRC. Most foreign stations will generally accept IRCs or mint stamps from their country.

For station frequencies and broadcasting hours, refer to the 2008 edition of *World Radio TV Handbook*.

AMATEUR RADIO

Luxembourg LX1KC, 14 MHz CW. Full data verification card. Received in two months for follow up report to another LX operator, along with his card. Received in 28 years ...a new record for me! QSL address: LX1KC, C. Kiefer, 39 Route de Reisdorf, L-3611 Beaufort, Luxembourg. (John Wilkins, Wheat Ridge, CO)

Russia RA3RCL, 10 meter SSB. Full data color card. Received in 338 days via ARRL bureau. Website: www.arrl.org. (L Van Horn, NC)

AUSTRALIA

ABC-Northern Territory Service, VL8T-Tennant Creek 4910 kHz. Verification on station letterhead, plus ABC NT stickers. Received in one month for an English report. Administrative Center for the Northern Territory SW Service, Box 9994, GPO Darwin, NT 0801 Australia. Address via *World QSL Book*. (Peter Ng, Malaysia)

CLANDESTINE

SW Radio Africa. Electronic QSL from Les Mommsen-Technical Manager, including notation "transmitter location restricted for security reasons." Received in five months with apology for delay. Email: les@swradioafrica.com Station address: SW Radio Africa Ltd., P.O. Box 243 Borehamwood, Herts WD6 4WA, United Kingdom. (Ron Howard, Monterey, CA) SW Radio Africa is an independent station relayed via various locations, often categorized as a *quasi-clandestine*. Programming opposes the Mugabe government and run by exiled Zimbabweans in the United Kingdom.

Internet streaming and on-demand audio www.swradioafrica.com

IRELAND

RTÉ Radio 1, 17,860/ 17,710 kHz. Full data verification on station letterhead, signed by Mrs. Bernie Pope-Network Support. Received in 17 days for an English report to info@rte.ie for special broadcast of Hurling Games. Station address: RTÉNL, Nutley Building, Donnybrook, Dublin 4, Ireland. (Alokesh Gupta, New Delhi, India) Website: www.rte.ie Email: Bernie.pope@rte.ie

Internet streaming of RTÉ Radio 1, FM services, TV video and Podcast: www.rte.ie/radio/index.html.

MEDIUM WAVE

CJOR, 1240 kHz AM. Verification letter signed by Jeremy McGoran. Received in 25 days for a CD report and \$2.00 US. Station address: 33 Carmi Avenue, Penticton, BC Canada V2A 3G6. (Patrick Martin, Seaside, OR)

WCXH, 780 kHz AM. Verification card signed by Allan H. Weiner. Received in ten days for tentative CD report, of Morse code from DX Test. Station address: 28 Houlton Road, Presque Isle, ME 04769 USA. (Martin) *Very pleased with this one, my second Maine verified from Oregon!*

STANDARD TIME & FREQUENCY STATION

RWM, 14, 996 kHz. Moscow, Russia. Full data purple clock verification card. Received in 19 years and one month. This holds the record for me, for a 1988 reception after at least five follow up reports. Also received a personal reply in Russian Cyrillic on station letterhead. Very pleased with this reply, as RWM was the only STF station not verified. Station address: Russian State Time and Frequency Service, Institute of Metrology for Time and Space (IMVP) FGUP, VNIIFTRI, Moscow Region, Mendeleev 141570, Russia. (Jim Pogue, Memphis, TN) Address via *World QSL Book*.

WWV, 10,000 kHz. Full data WWV *Native American sketch* card unsigned, plus station brochure. Received in 26 days for an English report and two mint stamps. Station address: NIST Radio Station WWV, 200 East County Road # 58, Ft. Collins, CO 80524 USA. (Brian Bagwell, St Louis, MO) Website: <http://tf.nist.gov/>

WWVH 15,000 kHz. Full data WWVH *Hawaiian sketch* card unsigned. Received in 42 days for an English report and two mint

stamps. Station address: U.S. Department of Commerce, NIST Radio Station WWVH, P.O. Box 417, Kekaha, HI 96752-0417 USA (R.S. Evans, Hobbs, NM) Website: <http://tf.nist.gov/>.

THAILAND

BBC Asia Relay Station, 5980 kHz. Full data color Thailand transmitter photo card unsigned. Received in 22 days for an English report, \$2.00 US and souvenir postcard of Ka'anapali Beach. Transmitter site via Passport 2008. "Thank you for your wonderful book (*World QSL Book*), as it helped me get a QSL from the BBC. I got the addressing information from your book." Station address: Mr. Eakkalak K., BBC Asia Relay Station, P.O. Box 20, Muang District, Nakhon Sawan 6000, Thailand. (Michael Bornstein, Bakersfield, CA) *Thank you for the kind comments. I continue to receive many success stories! GVH*



UTILITY

Non-Directional Beacons: NM 278 kHz. Matagami, Quebec, Canada. Full data prepared card returned as verified by Gestionnaire-Manager. Received in 44 days for a utility report and \$1.00 US. Card verified as 500 watts. Station address: Nav Canada, C.P. 340, Val d'Or, Quebec J9P 4P4 Canada. (Pogue)

FS 245 kHz. Rocky NDB - Sioux Falls, SD. Full data prepared card returned as verified by Michael Marnach-Airport Manager. Received in seven days for an SASE. Card noted as question mark for beacon power, though RNA list 100 watts. Station address: Joe Foss Field Airport, 2801 Jaycee Lane, Sioux Falls, SD 57104 USA. (Pogue)





HOW TO USE THE SHORTWAVE GUIDE

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

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during 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. 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:

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

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

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

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment prob-

lems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

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

Target Areas

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

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Thank You ...

Additional Contributors to This Month's Shortwave Guide:

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Shortwave Broadcast Bands

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

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

For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!

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

0000 0020	Japan, NHK World/Radio Japan	5920eu
	6145na 13650as 17810as	
0000 0030	Australia, HCJB Global	15525as
0000 0030	Thailand, Radio 9680af	
0000 0030	UK, BBC World Service	7340as 17615as
0000 0030	USA, Voice of America	7405af
0000 0045	India, All India Radio	9705as 9950as
	11620as 11645as 13605as	
0000 0057	Canada, Radio Canada Intl	9880as
0000 0057	Netherlands, Radio	6165na
0000 0100	Anguilla, University Network	6090am
0000 0100	Australia, ABC NT Alice Springs	2310do
	4835do	
0000 0100	Australia, ABC NT Katherine	5025do
0000 0100	Australia, ABC NT Tennant Creek	4910do
0000 0100	Australia, Radio Australia	9660as 12080as
	13690as 15240pa 17715as 17750va	
	17775va 17795va	
0000 0100	Bulgaria, Radio	7400na 9400na
0000 0100	Canada, CFRX Toronto ON	6070na
0000 0100	Canada, CFVP Calgary AB	6030na
0000 0100	Canada, CKZN St John's NF	6160na
0000 0100	Canada, CKZU Vancouver BC	6160na
0000 0100	China, China Radio Intl	6075as 11885as
	7130eu 7180as 9570na	
	13750as 15115as	
0000 0100	Costa Rica, University Network	5030va
	6150va 7375va 9725va	
0000 0100	Germany, Deutsche Welle	9785as 15595as
0000 0100	Guyana, Voice of 3291do	
0000 0100	Malaysia, RTM/Trax FM	7295as
0000 0100	New Zealand, Radio NZ Intl	15720pa
0000 0100	New Zealand, Radio NZ Intl	17675pa
0000 0100	Papua New Guinea, Wantok R. Light	7325va
0000 0100	Singapore, MediaCorp Radio	6150do
0000 0100	Spain, Radio Exterior Espana	6055na
0000 0100	UK, BBC World Service	6195as 9740as
	15335as 15360as	
0000 0100	UK, Bible Voice BC	6140as
0000 0100	USA, American Forces Radio	4319usb
	5446usb 5765usb 6350usb 7811usb	
	10320usb 12133usb 13362usb	
0000 0100	USA, KAIJ Dallas TX	5755va
0000 0100	USA, KTBN Salt Lake City UT	7505na
	15590na	
0000 0100	USA, WBCQ Monticello ME	5110am
0000 0100	USA, WBCQ Monticello ME	7415am
0000 0100	USA, WBCQ Monticello ME	7415am 9330am
0000 0100	USA, WBOH Newport NC	5920am
0000 0100	USA, WEWN Vandiver AL	5810va
0000 0100	USA, WHRA Greenbush ME	5890eu
0000 0100	USA, WHRI Cypress Creek SC	7315am
0000 0100	USA, WINB Red Lion PA	9265am
0000 0100	USA, WRMI Miami FL	9955am
0000 0100	USA, WTJC Newport NC	9370na
0000 0100	USA, WWCR Nashville TN	3215na 7465na
	13845na	
0000 0100	USA, WWRB Manchester TN	3185va 5050va
	5745va 6890va	
0000 0100	USA, WYFR/Family Radio FL	6085na
	9505na 9715na 11720am	
0005 0100	Canada, Radio Canada Intl	9755am
0005 0100	Greece, Voice of	7475va 12105va
	9420va	
0030 0045 Sun	Germany, Pan American BC	6165as
0030 0100	Australia, Radio Australia	15415as
0030 0100	Austria, Radio Austria Intl	7325am
0030 0100	Lithuania, Radio Vilnius	11690na
0030 0100	Thailand, Radio	12095na
0030 0100	UK, Bible Voice BC	6030as
0030 0100	USA, Voice of America	7200va 7405va
	9620va 11695va 11705va 11805va	
	12005va 15185va 15205va	
0043 0100 Sat	Austria, Radio Austria Intl	7325am

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

0100 0105	Canada, Radio Canada Intl	9755am
0100 0105	Greece, Voice of	7475va 12105va
0100 0127	Czech Rep, Radio Prague	6200na 7345na
0100 0128	Vietnam, Voice of	6175na
0100 0130	Australia, Radio Australia	17775as
0100 0130	Slovakia, Radio Slovakia Int	7230na 9440sa
0100 0156	Romania, Radio Romania Intl	6145na
	9515na	

0100 0157	China, China Radio Intl	7130eu
0100 0157	Netherlands, Radio	6165na
0100 0159	Canada, Radio Canada Intl	5840va 7255va
0100 0200	Anguilla, University Network	6090am
0100 0200	Australia, ABC NT Katherine	5025do
0100 0200	Australia, ABC NT Tennant Creek	4910do
0100 0200	Australia, Radio Australia	9660as 12080as
	13690as 15240pa 15415as 17715as	
	17795va	
0100 0200	Canada, CFRX Toronto ON	6070na
0100 0200	Canada, CFVP Calgary AB	6030na
0100 0200	Canada, CKZN St John's NF	6160na
0100 0200	Canada, CKZU Vancouver BC	6160na
0100 0200	China, China Radio Intl	9535as 11870as
	15115as 15785as	
0100 0200	Costa Rica, University Network	5030va
	6150va 7375va 9725va	
0100 0200	Cuba, Radio Havana	6000na 6180na
0100 0200	Guyana, Voice of 3291do	
0100 0200	Indonesia, Voice of	9525al 11785pa
	15150as	
0100 0200	Malaysia, RTM/Trax FM	7295as
0100 0200	New Zealand, Radio NZ Intl	15720pa
0100 0200	New Zealand, Radio NZ Intl	17675pa
0100 0200	North Korea, Voice of Korea	7140as
	9345as 9730as 11735sa 15180sa	
0100 0200	Papua New Guinea, Wantok R. Light	7325va
0100 0200	Singapore, MediaCorp Radio	6150do
0100 0200	Sri Lanka, SLBC	6005as 9770as 15745as
0100 0200	Taiwan, Radio Taiwan Intl	11875as
0100 0200	UK, BBC World Service	6195as 7320as
	11750as 15335as 15360as	
0100 0200	UK, Bible Voice BC	6140as
0100 0200	Ukraine, Radio Ukraine Intl	7530na
0100 0200	USA, American Forces Radio	4319usb
	5446usb 5765usb 6350usb 7811usb	
	10320usb 12133usb 13362usb	
0100 0200	USA, KAIJ Dallas TX	5755va
0100 0200	USA, KTBN Salt Lake City UT	7505na
0100 0200	USA, KWHR Naalehu HI	17525as
0100 0200	USA, Voice of America	7200va 9865va
	11705va	
0100 0200	USA, WBCQ Monticello ME	5110am
0100 0200	USA, WBCQ Monticello ME	7415am
0100 0200	USA, WBCQ Monticello ME	7415am 9330am
0100 0200	USA, WBOH Newport NC	5920am
0100 0200	USA, WEWN Vandiver AL	5810va
0100 0200	USA, WHRA Greenbush ME	5890eu
0100 0200	USA, WHRI Cypress Creek SC	7315am
0100 0200	USA, WHRI Cypress Creek SC	7490va
0100 0200	USA, WINB Red Lion PA	9265am
0100 0200	USA, WRMI Miami FL	9955am
0100 0200	USA, WTJC Newport NC	9370na
0100 0200	USA, WWCR Nashville TN	3215na 5935na
	7465na	
0100 0200	USA, WWRB Manchester TN	3185va 5050va
	5745va 6890va	
0100 0200	USA, WWRB Manchester TN	3185va 5050va
	5745va 6890va	
0100 0200	USA, WYFR/Family Radio FL	6065na
	9505na 15195as	
0100 0200	Uzbekistan, CVC International	9480as
0105 0200	Canada, Radio Canada Intl	9755am
0130 0145	Albania, Radio Tirana	6110na
0130 0200	Iran, Voice of the Islamic Rep	7160na 6120na
	7160na	
0130 0200	USA, Voice of America	5960va 7405va

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

0200 0205	Canada, Radio Canada Intl	9755am
0200 0215	Croatia, Voice of Croatia	7285na 9470eu
0200 0227	Czech Rep, Radio Prague	5995na 6200na
	7345na	
0200 0230	Iran, Voice of the Islamic Rep	6120na
	7160na	
0200 0230	South Korea, KBS World Radio	15575sa
0200 0230	Thailand, Radio	15275na
0200 0300	Anguilla, University Network	6090am
0200 0300	Argentina, RAE	11710am
0200 0300	Australia, ABC NT Alice Springs	2310do
	4835do	
0200 0300	Australia, ABC NT Katherine	5025do
0200 0300	Australia, ABC NT Tennant Creek	4910do
0200 0300	Australia, Radio Australia	9660as 12080as
	13690as 15240pa 15415as 15515as	
	17750va 21725va	

0200 0300	Canada, CFRX Toronto ON	6070na	
0200 0300	Canada, CFVP Calgary AB	6030na	
0200 0300	Canada, CKZN St John's NF	6160na	
0200 0300	Canada, CKZU Vancouver BC	6160na	
0200 0300	China, China Radio Intl	11770as	13640as
0200 0300	Costa Rica, University Network	5030va	
	6150va	7375va	9725va
0200 0300	Cuba, Radio Havana	6000na	6180na
0200 0300	Egypt, Radio Cairo	7270na	
0200 0300	Germany, Deutsche Welle	14665as	
0200 0300	Guyana, Voice of 3291do		
0200 0300	Malaysia, RTM/Trax FM	7295as	
0200 0300	New Zealand, Radio NZ Intl	15720pa	
0200 0300	New Zealand, Radio NZ Intl	17675pa	
0200 0300	North Korea, Voice of Korea	13650as	
	15100as		
0200 0300	Papua New Guinea, Wantok R. Light	7325va	
0200 0300	Philippines, Radio Pilipinas	12025va	15285va
	17770va		
0200 0300	Russia, Voice of	6140na	7250na
	13735na	12040na	
0200 0300	Singapore, MediaCorp Radio	6150do	
0200 0300	Sri Lanka, SLBC	6005as	9770as
0200 0300	Taiwan, Radio Taiwan Intl	5950na	9680na
0200 0300	UK, BBC World Service	6030af	6195me
	6195me	7320va	11750as
	17760as	15360as	
0200 0300	USA, American Forces Radio	4319usb	
	5446usb	5765usb	6350usb
	10320usb	12133usb	13362usb
0200 0300	USA, KAIJ Dallas TX	5755va	
0200 0300	USA, KJES Vado NM	7555na	
0200 0300	USA, KJES Vado NM	7555na	
0200 0300	USA, KTVN Salt Lake City UT		7505na
0200 0300	USA, KWHR Naalehu HI	17525as	
0200 0300	USA, WBCQ Monticello ME	5110am	
0200 0300	USA, WBCQ Monticello ME	9330am	
0200 0300	USA, WBCQ Monticello ME	7415am	
0200 0300	USA, WBCQ Monticello ME	7415am	9330am
0200 0300	USA, WBOH Newport NC	5920am	
0200 0300	USA, WEWN Vandiver AL	5810va	
0200 0300	USA, WHRA Greenbush ME	5890eu	
0200 0300	USA, WHRI Cypress Creek SC	7490va	
0200 0300	USA, WHRI Cypress Creek SC	5835na	
0200 0300	USA, WHRI Cypress Creek SC	7315am	
0200 0300	USA, WINB Red Lion PA	9265am	
0200 0300	USA, WRMI Miami FL	9955am	
0200 0300	USA, WRMI Miami FL	7385na	
0200 0300	USA, WTJC Newport NC	9370na	
0200 0300	USA, WWCR Nashville TN	3215na	5935na
	7465na		
0200 0300	USA, WWRB Manchester TN	3185va	5050va
	5745va	6890va	
0200 0300	USA, WYFR/Family Radio FL	5985am	
	6065na	9505na	9525na
		11855am	
0200 0300	Uzbekistan, CVC International	9480as	
0215 0230	Nepal, Radio	3230as	5005as
	7165as	6100as	
0230 0258	Vietnam, Voice of	6175na	
0230 0300	South Korea, KBS World Radio	9560na	
0230 0300	Sweden, Radio	6010na	11550as
0245 0300	Albania, Radio Tirana	7425na	
0245 0300	Myanmar, Myanma Radio	9730do	
0250 0300	Vatican City, Vatican Radio	6040na	7305na
0255 0300	Rwanda, Radio	6055do	

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

0300 0330	Egypt, Radio Cairo	7270na	
0300 0330	Myanmar, Myanma Radio	9730do	
0300 0330	Philippines, Radio Pilipinas	12025va	15285va
	17770va		
0300 0330	UK, Sudan Radio Service	5975af	
0300 0330	USA, KJES Vado NM	7555na	
0300 0400	Anguilla, University Network	6090am	
0300 0400	Australia, ABC NT Alice Springs	2310do	
	4835do		
0300 0400	Australia, ABC NT Katherine	5025do	
0300 0400	Australia, ABC NT Tennant Creek	4910do	
0300 0400	Australia, Radio Australia	9660as	12080as
	13690as	15240pa	15415as
	17750va	21725va	15515as
0300 0400	Bulgaria, Radio	7400na	9400na
0300 0400	Canada, CBC NQ SW Service	9625na	
0300 0400	Canada, CFRX Toronto ON	6070na	
0300 0400	Canada, CFVP Calgary AB	6030na	

0300 0400	Canada, CKZN St John's NF	6160na	
0300 0400	Canada, CKZU Vancouver BC	6160na	
0300 0400	China, China Radio Intl	9690na	9790na
	11770as	13750as	15110as
	15785as		15120as
0300 0400	Costa Rica, University Network	5030va	
	6150va	7375va	9725va
0300 0400	Cuba, Radio Havana	6000na	6180na
0300 0400	Germany, Deutsche Welle	9785as	13790as
0300 0400	Greece, Voice of	7475va	9420va
0300 0400	Guyana, Voice of 3291do		12105va
0300 0400	Malaysia, RTM/Trax FM	7295as	
0300 0400	Malaysia, RTM/Voice of Malaysia	6175as	
	9750as	15295as	
0300 0400	New Zealand, Radio NZ Intl	15720pa	
0300 0400	New Zealand, Radio NZ Intl	17675pa	
0300 0400	North Korea, Voice of Korea	7140as	
	9345as	9730as	
0300 0400	Oman, Radio Oman	15355as	
0300 0400	Papua New Guinea, Wantok R. Light	7325va	
0300 0400	Russia, Voice of	6155na	6240na
	12040na	13735na	7350na
0300 0400	Rwanda, Radio	6055do	
0300 0400	Singapore, MediaCorp Radio	6150do	
0300 0400	South Africa, Channel Africa	3345af	7390as
0300 0400	Sri Lanka, SLBC	6005as	9770as
0300 0400	Taiwan, Radio Taiwan Intl	5950na	15215sa
	15320as		
0300 0400	UK, BBC World Service	3255af	6005af
	6145af	6190af	6195me
	7160af	9510va	975-af
	15335as	15360as	21660as
0300 0400	USA, American Forces Radio	4319usb	
	5446usb	5765usb	6350usb
	10320usb	12133usb	13362usb
0300 0400	USA, KAIJ Dallas TX	5755va	
0300 0400	USA, KTVN Salt Lake City UT		7505na
0300 0400	USA, KWHR Naalehu HI	17525as	
0300 0400	USA, Voice of America	4930af	6080af
	9885af	15580af	
0300 0400	USA, WBCQ Monticello ME	9330am	
0300 0400	USA, WBCQ Monticello ME	5110am	7415am
0300 0400	USA, WBOH Newport NC	5920am	
0300 0400	USA, WEWN Vandiver AL	5810va	
0300 0400	USA, WHRA Greenbush ME	5890eu	
0300 0400	USA, WHRI Cypress Creek SC	7490va	
0300 0400	USA, WHRI Cypress Creek SC	5835na	
0300 0400	USA, WHRI Cypress Creek SC	7315am	
0300 0400	USA, WINB Red Lion PA	9265am	
0300 0400	USA, WRMI Miami FL	9955am	
0300 0400	USA, WRMI Miami FL	7385na	
0300 0400	USA, WTJC Newport NC	9370na	
0300 0400	USA, WWCR Nashville TN	3215na	5935na
	7465na		
0300 0400	USA, WWRB Manchester TN	3185va	5050va
	5745va	6890va	
0300 0400	USA, WYFR/Family Radio FL	5985am	
	6065na	9505na	9525na
		11855am	
0300 0400	Uzbekistan, CVC International	9480as	
0300 0400	Vatican City, Vatican Radio	7360af	9660af
0300 0400	Bahrain, Radio Bahrain	6010as	
0300 0358	Vietnam, Voice of	6175sa	
0300 0400	Albania, Radio Tirana	6110na	
0300 0400	Sweden, Radio	6010na	
0300 0400	UK, BBC World Service	11665af	
0350 0400	Vatican City, Vatican Radio	6100am	7305am

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

0400 0420	Vatican City, Vatican Radio	6100am	7305am
0400 0427	Czech Rep, Radio Prague	5990na	6200na
	7345na		
0400 0430	France, Radio France Intl	7315af	9805af
0400 0430	Sri Lanka, SLBC	6005as	9770as
0400 0430	USA, Voice of America	4930af	4960af
	6080af	9885af	15580af
0400 0430	USA, WBCQ Monticello ME	7415am	
0400 0430	USA, WWRB Manchester TN	3185va	
0400 0430	Vatican City, Vatican Radio	7360af	9660af
0400 0445	USA, WBCQ Monticello ME	7415am	
0400 0455	Turkey, Voice of	6020va	7240va
0400 0456	Romania, Radio Romania Intl	6115va	
	9515na	9690va	11895va
0400 0458	New Zealand, Radio NZ Intl	15720pa	
0400 0458	New Zealand, Radio NZ Intl	17675pa	
0400 0459	South Africa, Channel Africa	3345af	

0400 0500	Anguilla, University Network	6090am
0400 0500	Australia, ABC NT Alice Springs 4835do	2310do
0400 0500	Australia, ABC NT Katherine 5025do	
0400 0500	Australia, ABC NT Tennant Creek	4910do
0400 0500	Australia, Radio Australia	9660as 12080as
	13690as 15240pa 15415as	17750va
	21725va	
0400 0500 twhf	Canada, CBC NQ SW Service	9625na
0400 0500	Canada, CFRX Toronto ON	6070na
0400 0500	Canada, CKZN St John's NF	6160na
0400 0500	Canada, CKZU Vancouver BC	6160na
0400 0500	China, China Radio Intl	6020na 6080as
	13750as 15120as 15785as	17725as
	17855as	
0400 0500	Costa Rica, University Network	5030va
	6150va 7375va 9725va	
0400 0500	Cuba, Radio Havana	6000na 6180na
0400 0500	Germany, Deutsche Welle	5905af 5945af
	6180af 7225af 15455	af
0400 0500	Guyana, Voice of 3291do	
0400 0500	Malaysia, RTM/Trax FM	7295as
0400 0500	Malaysia, RTM/Voice of Malaysia	6175as
	9750as 15295as	
0400 0500 vl	Papua New Guinea, Wantok R. Light	7325va
0400 0500	Russia, Voice of	6155na 6240na 7150na
	7350na 9550as 9840na 9855na	
	12010na 12030na 12040na	12090na
	13580as 15455as 15530as	15765as
	17695as 17840as	
0400 0500 DRM	Russia, Voice of	15735as
0400 0500 vl	Rwanda, Radio	6055do
0400 0500	Singapore, MediaCorp Radio	6150do
0400 0500 vl	Uganda, UBC Radio	4976do 5026do
0400 0500	UK, BBC World Service	3255af 6005af
	6190af 7120af 7160af 9410as	
	11665af 12095af 15335as	15360as
	17760as 21660as	
0400 0500	Ukraine, Radio Ukraine Intl	7530na
0400 0500	USA, American Forces Radio	4319usb 7811usb
	5446usb 5765usb 6350usb	
	10320usb 12133usb 13362usb	
0400 0500	USA, KAIJ Dallas TX	5755va
0400 0500	USA, KTBN Salt Lake City UT	7505na
0400 0500	USA, KWHR Naalehu HI	17525as
0400 0500	USA, WBCQ Monticello ME	5110am
0400 0500 m	USA, WBCQ Monticello ME	7415am
0400 0500	USA, WBOH Newport NC	5920am
0400 0500	USA, WEWN Vandiver AL	5810va
0400 0500	USA, WHRA Greenbush ME	5890eu
0400 0500	USA, WHRI Cypress Creek SC	7490va
0400 0500 twhf	USA, WHRI Cypress Creek SC	5835na
0400 0500 sm	USA, WHRI Cypress Creek SC	7315am
0400 0500	USA, WMLK Bethel PA	9265va
0400 0500	USA, WRMI Miami FL	9955am
0400 0500	USA, WTJC Newport NC	9370na
0400 0500	USA, WWCR Nashville TN	3215na 5890na
	5935na	
0400 0500	USA, WWRB Manchester TN	3185va
0400 0500	USA, WYFR/Family Radio FL	6065na
	6875na 7780va 9505na	9715na
0400 0500	Uzbekistan, CVC International	13685as
0430 0445	Israel, Kol Israel	6280va 7545va
0430 0457	Czech Rep, Radio Prague	9890va
0430 0500 twhf	Albania, Radio Tirana	7425na
0430 0500	Australia, Radio Australia	15415as
0430 0500	Nigeria, Radio/Kaduna	6090do
0430 0500	Swaziland, TWR 3200af	4775af
0430 0500	USA, Voice of America	4930af 4960af
	9885af 15580af	
0459 0500	New Zealand, Radio NZ Intl	17675pa
0459 0500 DRM	New Zealand, Radio NZ Intl	15720pa

0500 0600	Australia, ABC NT Tennant Creek	4910do
0500 0600	Australia, Radio Australia	9660as 12080as
	13630as 13690pa 15160as	15240pa
	17750va	
0500 0600	Bhutan, BBS	6035as
0500 0600	Canada, CFRX Toronto ON	6070na
0500 0600	Canada, CKZN St John's NF	6160na
0500 0600	Canada, CKZU Vancouver BC	6160na
0500 0600	China, China Radio Intl	11710af 11880as
	15350as 15465as 17505as	17540as
	17725as 17855as	
0500 0600	Costa Rica, University Network	5030va
	6150va 7375va 9725va	
0500 0600	Cuba, Radio Havana	6000na 6060na
	6180na 9550na 11760am	
0500 0600	Germany, CVC Intl/Voice Africa	9430af
0500 0600	Guyana, Voice of 3291do	
0500 0600	Malaysia, RTM/Trax FM	7295as
0500 0600	Malaysia, RTM/Voice of Malaysia	6175as
	9750as 15295as	
0500 0600	New Zealand, Radio NZ Intl	17675pa
0500 0600 DRM	New Zealand, Radio NZ Intl	15720pa
0500 0600	Nigeria, Radio/Kaduna	4770do 6090af
0500 0600 vl	Papua New Guinea, Wantok R. Light	7325va
0500 0600	Russia, Voice of	7150na 7350na 9550as
	9840na 12040na 12090as	13580as
	15455as 15530as 15765as	17695as
	17840as	
0500 0600 DRM	Russia, Voice of	15735as
0500 0600	Singapore, MediaCorp Radio	6150do
0500 0600	South Africa, Channel Africa	7230af 9685af
0500 0600	Swaziland, TWR 3200af	4775af 9500af
0500 0600	Thailand, Radio	11730va
0500 0600 vl	Uganda, UBC Radio	4976do 5026do
0500 0600	UK, BBC World Service	3255af 6005af
	6190af 6195va 7160af 9410va	
	11665af 11695as 11765af	11955as
	12095eu 15335as 15360as	15420af
	17640af 17760as 21660as	
0500 0600 DRM	UK, BBC World Service	5895eu
0500 0600	USA, American Forces Radio	4319usb 7811usb
	5446usb 5765usb 6350usb	
	10320usb 12133usb 13362usb	
0500 0600	USA, KAIJ Dallas TX	5755va
0500 0600	USA, KTBN Salt Lake City UT	7505na
0500 0600	USA, KWHR Naalehu HI	11565as 15610as
0500 0600	USA, Voice of America	4930af 5855af
	6080af 9885af 15580af	
0500 0600	USA, WBCQ Monticello ME	5110am
0500 0600 m	USA, WBCQ Monticello ME	7415am
0500 0600	USA, WBOH Newport NC	5920am
0500 0600	USA, WEWN Vandiver AL	5810va
0500 0600	USA, WHRA Greenbush ME	7465va
0500 0600 twhf	USA, WHRI Cypress Creek SC	7490va
0500 0600	USA, WHRI Cypress Creek SC	5835na
0500 0600	USA, WMLK Bethel PA	9265va
0500 0600	USA, WRMI Miami FL	9955am
0500 0600	USA, WTJC Newport NC	9370na
0500 0600	USA, WWCR Nashville TN	3215na 5890na
	5935na	
0500 0600	USA, WWRB Manchester TN	3185va
0500 0600	USA, WYFR/Family Radio FL	6875na
	7520va	
0500 0600	Uzbekistan, CVC International	13685as
0500 0600	Zambia, CVC International	6065af
0515 0530 vl	Rwanda, Radio	6055do
0530 0600	Australia, Radio Australia	15415as
0530 0600 vl	Rwanda, Radio	6055do
0530 0600 mtwhf	UK, Sudan Radio Service	9525af 9560af
	13720af	

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

0600 0600 sm	USA, WHRI Cypress Creek SC	7315am
0600 0605	Croatia, Voice of Croatia	11690pa
0600 0615 Sat/Sun	South Africa, TWR	11640af
0600 0630 Sat/Sun	Australia, Radio Australia	15415as
0600 0630 mtwhf	France, Radio France Intl	7315af 11995af
	13680af	
0600 0630	Germany, Deutsche Welle	5945af 7240af
	12045af	
0600 0630	Nigeria, Radio, Natl Svc/Abuja	7275do
0600 0630	Vatican City, Vatican Radio	7360af 9660af
	11625af	
0600 0645 mtwhf	South Africa, TWR	11640af
0600 0657	China, China Radio Intl	6115na

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

0500 0507 twhf	Canada, CBC NQ SW Service	9625na
0500 0515 Sun	Sri Lanka, SLBC	6005as 9770as 15745as
0500 0530 mtwhf	France, Radio France Intl	9805af 11995af
0500 0530	Germany, Deutsche Welle	7285af 9755af
	12045af 15410af	
0500 0530	Japan, NHK World/Radio Japan	5975eu
	6110na 9725af 9875af	17810as
0500 0600	Anguilla, University Network	6090am
0500 0600	Australia, ABC NT Alice Springs	2310do
	4835do	
0500 0600	Australia, ABC NT Katherine 5025do	

0600 0658	New Zealand, Radio NZ Intl	17675pa	
0600 0658 DRM	New Zealand, Radio NZ Intl	15720pa	
0600 0700	Anguilla, University Network	6090am	
0600 0700	Australia, ABC NT Alice Springs	2310do	
	4835do		
0600 0700	Australia, ABC NT Katherine	5025do	
0600 0700	Australia, ABC NT Tennant Creek	4910do	
0600 0700	Australia, CVC International	15360as	
0600 0700	Australia, Radio Australia	9660as 12080as	
	13630as 13690as 15160as 15240pa		
	17750va		
0600 0700 mtwhfa	Austria, Radio Austria Intl	17870me	
0600 0700	Bhutan, BBS	6035as	
0600 0700	Canada, CFRX Toronto ON	6070na	
0600 0700	Canada, CFVP Calgary AB	6030na	
0600 0700	Canada, CKZN St John's NF	6160na	
0600 0700	Canada, CKZU Vancouver BC	6160na	
0600 0700	China, China Radio Intl	11870as 11880as	
	13660as 15140as 15350as 15465as		
	17505as 17540as 17710as		
0600 0700	Costa Rica, University Network	5030va	
	6150va 7375va 9725va 11870va		
0600 0700	Cuba, Radio Havana	6000na 6060va	
	6180na 9550na 11760na		
0600 0700	Germany, CVC Intl/Voice Africa	11720af	
0600 0700	Guyana, Voice of 3291do		
0600 0700	Malaysia, RTM/Trax FM	7295as	
0600 0700	Malaysia, RTM/Voice of Malaysia	6175as	
	9750as 15295as		
0600 0700	Nigeria, Radio/Kaduna	4770do 6090al	
0600 0700 vl	Papua New Guinea, Wantok R. Light	7325va	
0600 0700	Russia, Voice of 9550as	15765as	
	17665pa 17805pa		
0600 0700	Singapore, MediaCorp Radio	6150do	
0600 0700 vl	Solomon Islands, SIBC	5020do 9545al	
0600 0700	South Africa, Channel Africa	7230af 15255af	
0600 0700	Swaziland, TWR	3200af 4775af 9500af	
0600 0700	UK, BBC World Service	6005af 6190af	
	7160af 9410va 9825af 11760va		
	11765af 11940af 11955as 15335as		
	15360as 15420af 17640af 17760as		
0600 0700 DRM	UK, BBC World Service	5895eu	
0600 0700	Ukraine, Radio Ukraine Intl	7440eu	
0600 0700	USA, American Forces Radio	4319usb	
	5446usb 5765usb 6350usb 7811usb		
	10320usb 12133usb 13362usb		
0600 0700	USA, KAIJ Dallas TX	5755va	
0600 0700	USA, KTBN Salt Lake City UT	7505na	
0600 0700	USA, KWHR Naalehu HI	11565as 15610as	
0600 0700	USA, Voice of America	6080af 9885af	
	15580af		
0600 0700	USA, WBCQ Monticello ME	5110am	
0600 0700 m	USA, WBCQ Monticello ME	7415am	
0600 0700	USA, WBOH Newport NC	5920am	
0600 0700	USA, WEWN Vandiver AL	5810va	
0600 0700	USA, WHRA Greenbush ME	7465va	
0600 0700	USA, WHRI Cypress Creek SC	5835va	
	7315am		
0600 0700	USA, WMLK Bethel PA	9265va	
0600 0700	USA, WRMI Miami FL	9955am	
0600 0700	USA, WTJC Newport NC	9370na	
0600 0700	USA, WWCR Nashville TN	3215na 5070na	
	5890na 5935na		
0600 0700	USA, WWRB Manchester TN	3185va	
0600 0700	USA, WYFR/Family Radio FL	5745va 11580af	
	6000am 9860na 11530va		
0600 0700 vl	Vanuatu, Radio	4960do	
0600 0700	Yemen, Rep of Yemen Radio	9780me	
0600 0700	Zambia, CVC International	6065af	
0630 0700	Romania, Radio Romania Intl	7180va	
	9690va 15135va 17780va		
0659 0700	New Zealand, Radio NZ Intl	9765pa	
0659 0700 DRM	New Zealand, Radio NZ Intl	9870pa	

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

0700 0706	UK, BBC World Service	6005af	
0700 0730	France, Radio France Intl	11725af	
0700 0730	Slovakia, Radio Slovakia Int	13715pa 15460pa	
0700 0730	UK, BBC World Service	15575va	
0700 0730	Vatican City, Vatican Radio	5965eu 7250eu	
0700 0800	Anguilla, University Network	6090am	
0700 0800	Australia, ABC NT Alice Springs	2310do	
	4835do		
0700 0800	Australia, ABC NT Katherine	5025do	

0700 0800	Australia, ABC NT Tennant Creek	4910do	
0700 0800	Australia, CVC International	15360as	
0700 0800	Australia, Radio Australia	9475as 9710as	
	11880as 12080as 13630pa 15160as		
	15240pa		
0700 0800	Bhutan, BBS	6035as	
0700 0800	Canada, CFRX Toronto ON	6070na	
0700 0800	Canada, CFVP Calgary AB	6030na	
0700 0800	Canada, CKZN St John's NF	6160na	
0700 0800	Canada, CKZU Vancouver BC	6160na	
0700 0800	China, China Radio Intl	11785eu 11880as	
	13660as 15350as 15465as 17490eu		
	17540as 17710as		
0700 0800	Costa Rica, University Network	5030va	
	6150va 7375va 9725va		
0700 0800	Germany, CVC Intl/Voice Africa	15640af	
0700 0800	Greece, Voice of 7475va	9420va 12105va	
0700 0800	Guyana, Voice of 3291do	5950do	
0700 0800 Sat	Latvia, Radio SWH	9290eu	
0700 0800	Liberia, Star Radio	9525af	
0700 0800	Malaysia, RTM/Trax FM	7295as	
0700 0800	Malaysia, RTM/Voice of Malaysia	6175as	
	9750as 15295as		
0700 0800	Myanmar, Myanma Radio	9730do	
0700 0800	New Zealand, Radio NZ Intl	9765pa	
0700 0800 DRM	New Zealand, Radio NZ Intl	9870pa	
0700 0800	Nigeria, Radio/Kaduna	4770do 6090al	
0700 0800 vl	Papua New Guinea, Wantok R. Light	7325va	
0700 0800	Russia, Voice of 9550as	13580as	
0700 0800 DRM	Russia, Voice of 11615eu	11635eu	
0700 0800	Singapore, MediaCorp Radio	6150do	
0700 0800 vl	Solomon Islands, SIBC	5020do 9545al	
0700 0800 vl	South Africa, Channel Africa	9625af	
0700 0800	Swaziland, TWR	4775af 9500af	
0700 0800	Taiwan, Radio Taiwan Intl	5950na	
0700 0800 DRM	UK, BBC World Service	5875eu	
0700 0800	UK, BBC World Service	6190af 6195va	
	9410va 11760me 11765af 11940af		
	11955as 12095va 13620af 15360as		
	15400af 15420af 17760as 21660as		
0700 0800	USA, American Forces Radio	4319usb	
	5446usb 5765usb 6350usb 7811usb		
	10320usb 12133usb 13362usb		
0700 0800	USA, KAIJ Dallas TX	5755va	
0700 0800	USA, KTBN Salt Lake City UT	7505na	
0700 0800	USA, KWHR Naalehu HI	11565as 15610as	
0700 0800	USA, WBOH Newport NC	5920am	
0700 0800	USA, WEWN Vandiver AL	5810va	
0700 0800	USA, WHRI Cypress Creek SC	5835va	
	7315am		
0700 0800	USA, WMLK Bethel PA	9265va	
0700 0800	USA, WRMI Miami FL	9955am	
0700 0800	USA, WTJC Newport NC	9370na	
0700 0800	USA, WWCR Nashville TN	3215na 5070na	
	5890na 5935na		
0700 0800	USA, WWRB Manchester TN	3185va	
0700 0800	USA, WYFR/Family Radio FL	6875na 9985af	
	7455na 9495am 9715na		
0700 0800 vl	Vanuatu, Radio	4960do	
0700 0800	Zambia, CVC International	6065af	
0730 0800	Australia, HCJB Global	11750pa	
0730 0800	Bulgaria, Radio	7400eu 9400eu	
0730 0800	Pakistan, Radio	15100eu 17835eu	
0730 0800 Sat/Sun	UK, BBC World Service	15575va	
0730 0800	Vatican City, Vatican Radio	7360af 9660af	
	11625af		
0745 0800 mtwhfa	Australia, HCJB Global	11750pa	
0745 0800 Sun	Germany, TWR Europe	6105eu	
0745 0800 Sun	Monaco, TWR Europe	9800eu	

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

0800 0825	Malaysia, RTM/Voice of Malaysia	6175as	
	9750as 15295as		
0800 0827	Czech Rep, Radio Prague	7345eu 9860eu	
0800 0830	Australia, ABC NT Katherine	5025do	
0800 0830	Australia, ABC NT Tennant Creek	4910do	
0800 0830	Myanmar, Myanma Radio	9730do	
0800 0830	Pakistan, Radio	15100eu 17835eu	
0800 0845 Sat	Guam, TWR/KTWR	11840pa	
0800 0850 mtwhf	Germany, TWR Europe	6105eu	
0800 0850 mtwhf	Monaco, TWR Europe	9800eu	
0800 0857	China, China Radio Intl	11785eu 17490eu	
0800 0900	Anguilla, University Network	6090am	
0800 0900	Australia, ABC NT Alice Springs	2310do	
	4835do		

0800 0900	Australia, CVC International	15360as	
0800 0900	Australia, HCJB Global	11750pa	
0800 0900	Australia, Radio Australia	5995va 9475va	9475va
	9580as 9590va	11880as 12080as	12080as
	13630as		
0800 0900	Canada, CFRX Toronto ON	6070na	
0800 0900	Canada, CFVP Calgary AB	6030na	
0800 0900	Canada, CKZN St John's NF	6160na	
0800 0900	Canada, CKZU Vancouver BC		6160na
0800 0900	China, China Radio Intl	11620as 11880as	11880as
	15350as 15465as	17540as	
0800 0900	Costa Rica, University Network		5030va
	6150va 7375va	9725va 11870va	11870va
			15640af
0800 0900	Germany, CVC Intl/Voice Africa		
0800 0900 DRM	Germany, Deutsche Welle	12005as	
0800 0900 Sun	Germany, TWR Europe	6105eu	
0800 0900 mtwhf	Guam, TWR/KTWR	11840pa	
0800 0900	Guyana, Voice of 3291do	5950do	
0800 0900	Indonesia, Voice of	9525al 11785pa	11785pa
	15150as		
0800 0900	Malaysia, RTM/Trax FM	7295as	
0800 0900 Sun	Monaco, TWR Europe	9800eu	
0800 0900	New Zealand, Radio NZ Intl	9765pa	
0800 0900 DRM	New Zealand, Radio NZ Intl	9870pa	
0800 0900	Nigeria, Radio/Kaduna	4770do	6090al
0800 0900	Nigeria, Voice of/Ext. Svc Lagos		9690af
0800 0900	Papua New Guinea, NBC	4890do	
0800 0900 vl	Papua New Guinea, Wantok R. Light		7325va
0800 0900	Russia, Voice of 9550as	13580as 13660as	13660as
	15195as 17495pa	17665pa 17805pa	17805pa
0800 0900 DRM	Russia, Voice of 11615eu		
0800 0900	Singapore, MediaCorp Radio		6150do
0800 0900 vl	Solomon Islands, SIBC	5020do	9545al
0800 0900 vl	South Africa, Channel Africa	9625af	
0800 0900 Sun	South Africa, DX Amateur League		7205af
	17570af		
0800 0900	South Korea, KBS World Radio		9570as
0800 0900	Swaziland, TWR	4775af 6120af	9500af
0800 0900	UK, BBC World Service	6190af 6195as	6195as
	9740as 11760me	11940af 12095va	12095va
	15285as 15400af	17640af 17760as	17760as
	17830af 21470af	21660as	
0800 0900 Sat/Sun	UK, BBC World Service	15575va	
0800 0900 fas	UK, Bible Voice BC	5945eu	
0800 0900	USA, American Forces Radio		4319usb
	5446usb 5765usb	6350usb 7811usb	7811usb
	10320usb 12133usb	13362usb	
0800 0900	USA, KAIJ Dallas TX		5755va
0800 0900	USA, KNLS Anchor Point AK		9615as
0800 0900	USA, KTVN Salt Lake City UT		7505na
0800 0900	USA, KWHR Naalehu HI	9930as	11565as
0800 0900	USA, WBCQ Monticello ME	5110am	
0800 0900	USA, WBOH Newport NC	5920am	
0800 0900	USA, WHRI Cypress Creek SC		5835va
	7315am		
0800 0900	USA, WMLK Bethel PA	9265va	
0800 0900	USA, WRMI Miami FL	9955am	
0800 0900	USA, WTJC Newport NC	9370na	
0800 0900	USA, WWCR Nashville TN	3215na 5070na	5070na
	5890na 5935na		
0800 0900	USA, WWRB Manchester TN	3185va	
0800 0900	USA, WYFR/Family Radio FL		5950na
	6875na 7455na	9985af	
0800 0900 vl	Vanuatu, Radio	4960do	
0800 0900	Zambia, CVC International	6065af	
0805 0900 twhf	Guam, TWR/KTWR	15170as	
0815 0850 Sat	Germany, TWR Europe	6105eu	
0815 0850 Sat	Monaco, TWR Europe	9800eu	
0830 0900	Australia, ABC NT Katherine	2485do	
0830 0900	Australia, ABC NT Tennant Creek		2325do
0830 0900 Mon	Guam, TWR/KTWR	15170as	

0900 UTC - 4AM EST / 3AM CST / 1AM PST

0900 0915 Sat	UK, Bible Voice BC	5945eu	
0900 0920 Sun	Germany, TWR Europe	6105eu	
0900 0920 Sun	Monaco, TWR Europe	9800eu	
0900 0930	Australia, HCJB Global	11750pa	
0900 0930	Japan, NHK World/Radio Japan		9825as
	11815as 12000pa	15590as	
0900 0945 Sun	UK, Bible Voice BC	5945eu	
0900 0957	China, China Radio Intl	15270eu 17490eu	17490eu
	17570eu		
0900 1000	Anguilla, University Network		6090am
0900 1000	Australia, ABC NT Alice Springs		2310do
	4835do		

0900 1000	Australia, ABC NT Katherine	2485do	
0900 1000	Australia, ABC NT Tennant Creek		2325do
0900 1000	Australia, CVC International	15360as	
0900 1000	Australia, Radio Australia	9475va 9580va	9580va
	11880as		
0900 1000	Bhutan, BBS	6035as	
0900 1000	Canada, CFRX Toronto ON	6070na	
0900 1000	Canada, CFVP Calgary AB	6030na	
0900 1000	Canada, CKZN St John's NF	6160na	
0900 1000	Canada, CKZU Vancouver BC		6160na
0900 1000	China, China Radio Intl	11620as 15210pa	15210pa
	15535as 17690pa	17750as	
0900 1000	Costa Rica, University Network		5030va
	6150va 7375va	9725va 11870va	11870va
	13750va		
0900 1000 DRM	Germany, CVC Intl/Voice Africa		7120as
0900 1000	Germany, Deutsche Welle	17710as	21840as
0900 1000	Guyana, Voice of 3291do	5950do	
0900 1000	Malaysia, RTM/Trax FM	7295as	
0900 1000	New Zealand, Radio NZ Intl	9765pa	
0900 1000 DRM	New Zealand, Radio NZ Intl	9870pa	
0900 1000	Nigeria, Radio/Kaduna	4770do	6090al
0900 1000	Nigeria, Voice of/ Ext. Svc Lagos		9690af
0900 1000	Papua New Guinea, NBC	4890do	
0900 1000 vl	Papua New Guinea, Wantok R. Light		7325va
0900 1000	Russia, Voice of 9550as	13580as 13660as	13660as
	15195as 17495pa	17665pa	
0900 1000 DRM	Russia, Voice of 11615eu		
0900 1000	Saudi Arabia, BSKSA	15250af	
0900 1000	Singapore, MediaCorp Radio		6150do
0900 1000 vl	Solomon Islands, SIBC	5020do	9545al
0900 1000 vl	South Africa, Channel Africa	9625af	
0900 1000	UK, BBC World Service	6190af 6195as	6195as
	9740as 11760me	11895as 11940af	11940af
	12095va 15285as	15400af 15575va	15575va
	17640af 17760as	17830af 21470af	21470af
	21660as		
0900 1000	USA, American Forces Radio		4319usb
	5446usb 5765usb	6350usb 7811usb	7811usb
	10320usb 12133usb	13362usb	
0900 1000	USA, KAIJ Dallas TX		5755va
0900 1000	USA, KTVN Salt Lake City UT		7505na
0900 1000	USA, KWHR Naalehu HI	9930as	11565as
0900 1000	USA, WBCQ Monticello ME	5110am	
0900 1000	USA, WBOH Newport NC	5920am	
0900 1000	USA, WHRI Cypress Creek SC		5835va
	7315am		
0900 1000	USA, WRMI Miami FL	9955am	
0900 1000	USA, WTJC Newport NC	9370na	
0900 1000	USA, WWCR Nashville TN	3215na 5070na	5070na
	5890na 5935na		
0900 1000	USA, WWRB Manchester TN	3185va	
0900 1000	USA, WYFR/Family Radio FL		5950na
	6875na 7455na	9985af	
0900 1000 vl	Vanuatu, Radio	4960do	
0900 1000	Zambia, CVC International	6065af	
0915 0945 Sat	UK, Bible Voice BC	5945eu	
0930 1000	Lithuania, Radio Vilnius	9710na	
0930 1000	Mongolia, Voice of	12085va	

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

1000 1027	Czech Rep, Radio Prague	9955na 15710as	15710as
	21745af		
1000 1030	Mongolia, Voice of	12085va	
1000 1030	UK, BBC World Service	15285as 17760as	17760as
1000 1057	Netherlands, Radio	6040as 9795as	9795as
	12065as		
1000 1058	New Zealand, Radio NZ Intl	9765pa	
1000 1100	Anguilla, University Network		11775am
1000 1100	Australia, ABC NT Alice Springs		2310do
	4835do		
1000 1100	Australia, ABC NT Katherine	2485do	
1000 1100	Australia, ABC NT Tennant Creek		2325do
1000 1100	Australia, CVC International	15270as	
1000 1100	Australia, Radio Australia	9475va 9580va	9580va
	11880as		
1000 1100 DRM	Austria, CVC International	11815eu	
1000 1100	Canada, CFRX Toronto ON	6070na	
1000 1100	Canada, CFVP Calgary AB	6030na	
1000 1100	Canada, CKZN St John's NF	6160na	
1000 1100	Canada, CKZU Vancouver BC		6160na
1000 1100	China, China Radio Intl	5995as 6040na	6040na
	11610as 11635as	11650as 11795as	11795as
	13590as 13620as	13720as 15190as	15190as
	15210as 15350as	17490eu 17690pa	17690pa

1000 1100	Costa Rica, University Network 6150va 7375va 9725va 11870va 13750va	5030va	
1000 1100 DRM	Germany, CVC Intl/Voice Africa	7120as	
1000 1100	Guyana, Voice of 3291do	5950do	
1000 1100	India, All India Radio	7270as 13710pa 15020as 15235as 15260as 17510pa 17800as 17895pa	
1000 1100	Malaysia, RTM/Trax FM	7295as	
1000 1100 DRM	New Zealand, Radio NZ Intl	9870pa	
1000 1100	Nigeria, Radio/Kaduna	4770do	
1000 1100	Nigeria, Voice of/ Ext. Svc Lagos	9690af	
1000 1100	North Korea, Voice of Korea 6285sa 9325sa 9850as	6185as	
1000 1100	Papua New Guinea, NBC	4890do	
1000 1100 vl	Papua New Guinea, Wantok R. Light	7325va	
1000 1100	Saudi Arabia, BSKSA	15250af	
1000 1100	Singapore, MediaCorp Radio	6150do	
1000 1100 Sun	Slovakia, European Gospel Radio	9510va	
1000 1100 vl	Solomon Islands, SIBC	5020do	9545al
1000 1100 vl	South Africa, Channel Africa	9625af	
1000 1100	UK, BBC World Service	6190af 6195as 9740as 11760me 11895as 11940af 15575va 17640af 21470af	
1000 1100 Sat/Sun	UK, BBC World Service	15400af	17830af
1000 1100	Ukraine, Radio Ukraine Intl	9950eu	
1000 1100	USA, American Forces Radio 5446usb 5765usb 6350usb 7811usb 10320usb 12133usb 13362usb	4319usb	
1000 1100	USA, KAIJ Dallas TX	5755va	
1000 1100	USA, KNLS Anchor Point AK	6150as	
1000 1100	USA, KTBN Salt Lake City UT		7505na
1000 1100	USA, KWHR Naalehu HI	9930as	11565as
1000 1100	USA, WBOH Newport NC	5920am	
1000 1100	USA, WHRI Cypress Creek SC 9865am		5835va
1000 1100	USA, WRMI Miami FL	9955am	
1000 1100	USA, WTJC Newport NC	9370na	
1000 1100	USA, WWCN Nashville TN 5935na 9985na	5070na	5890na
1000 1100	USA, WWRB Manchester TN	3185va	
1000 1100	USA, WYFR/Family Radio FL 6000am 6875na 6890na 7455na 9460as 11725am 11830am	5950na	
1000 1100	Zambia, CVC International	6065af	
1015 1045 Sun	UK, Bible Voice BC	5985as	
1030 1045	Israel, Kol Israel	13855va 15760va	
1030 1058	Vietnam, Voice of	7285as	
1030 1100	Iran, Voice of the Islamic Rep 17660as		15460as
1059 1100	New Zealand, Radio NZ Intl	13840pa	

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

1100 1128	Vietnam, Voice of 7285as	9840as	7220as
1100 1130	Iran, Voice of the Islamic Rep 17600as		15460as
1100 1130	UK, BBC World Service	15400af	
1100 1200	Anguilla, University Network		11775am
1100 1200	Australia, ABC NT Alice Springs 4835do		2310do
1100 1200	Australia, ABC NT Katherine	2485do	
1100 1200	Australia, ABC NT Tennant Creek		2325do
1100 1200	Australia, CVC International	13635as	
1100 1200	Australia, Radio Australia 9475va 9560as 9580va 9590va 11880as 12080as	6020va	
1100 1200 Sat/Sun	Canada, CBC NQ SW Service		9625na
1100 1200	Canada, CFRX Toronto ON	6070na	
1100 1200	Canada, CFVP Calgary AB	6030na	
1100 1200	Canada, CKZN St John's NF	6160na	
1100 1200	Canada, CKZU Vancouver BC		6160na
1100 1200	China, China Radio Intl 13655eu 17490eu	6040na	11750na
1100 1200	Costa Rica, University Network 6150va 7375va 9725va 11870va 13750va	5030va	
1100 1200 DRM	Germany, CVC Intl/Voice Africa		7120as
1100 1200	Malaysia, RTM/Trax FM	7295as	
1100 1200 DRM	New Zealand, Radio NZ Intl	9870pa	
1100 1200	New Zealand, Radio NZ Intl	13840pa	
1100 1200	Nigeria, Radio/Kaduna	4770do	6090al
1100 1200	Nigeria, Voice of/ Ext. Svc Lagos		9690af
1100 1200	Papua New Guinea, NBC	4890do	
1100 1200 vl	Papua New Guinea, Wantok R. Light		7325va

1100 1200	Saudi Arabia, BSKSA	15250af	
1100 1200	Singapore, Radio Singapore Intl 6150as		6080as
1100 1200 Sun	Slovakia, European Gospel Radio		9510va
1100 1200 vl	South Africa, Channel Africa	9625af	
1100 1200	Taiwan, Radio Taiwan Intl	7445as	
1100 1200	UK, BBC World Service 6195as 9660am 9740as 9750am 11760me 11895as 11940af 15575va 17640af 17830af 21470af	5875am	6190af
1100 1200 Sat	UK, Bible Voice BC	5950as	
1100 1200	USA, American Forces Radio 5446usb 5765usb 6350usb 7811usb 10320usb 12133usb 13362usb		4319usb
1100 1200	USA, KAIJ Dallas TX	5755va	
1100 1200	USA, KTBN Salt Lake City UT		7505na
1100 1200	USA, KWHR Naalehu HI	9930as	
1100 1200	USA, WBOH Newport NC	5920am	
1100 1200	USA, WHRI Cypress Creek SC 7315na		5875va
1100 1200	USA, WINB Red Lion PA	9265am	
1100 1200	USA, WRMI Miami FL	9955am	
1100 1200	USA, WTJC Newport NC	9370na	
1100 1200	USA, WWCN Nashville TN 5935na 15825na	5070na	5890na
1100 1200	USA, WWRB Manchester TN	3185va	
1100 1200	USA, WYFR/Family Radio FL 6890na 7780na		5950na
1100 1200	Zambia, CVC International	6065af	
1105 1200	Greece, Voice of	9420va	15650va
1115 1130 mtwhf	UK, Bible Voice BC		5950as
1115 1200 Sun	UK, Bible Voice BC		5950as
1120 1157	Czech Rep, Radio Prague 175451euva	11640eu	
1130 1200	Guam, AWR/KSDA	15260as	
1130 1200	Micronesia, PMA/The Cross	4755as	

1200 UTC - 7AM EST / 6AM CST / 4AM PST

1200 1215 f	UK, Bible Voice BC	5950as	
1200 1227	Netherlands, Radio	11675na	
1200 1230	Australia, HCJB Global	15400as	
1200 1230	France, Radio France Intl	21620af	
1200 1230	Germany, AWR Europe	15495as	
1200 1230	Japan, NHK World/Radio Japan 9625pa 13660as 17585eu		6120na
1200 1230 Sun	UK, Bible Voice BC	5945eu	
1200 1257	China, China Radio Intl 17490eu	13655eu	13790eu
1200 1257 DRM/ mtwhf	Netherlands, Radio	5955eu	
1200 1258	New Zealand, Radio NZ Intl	13840pa	
1200 1258 DRM	New Zealand, Radio NZ Intl	9870pa	
1200 1300	Anguilla, University Network		11775am
1200 1300	Australia, ABC NT Alice Springs 4835do		2310do
1200 1300	Australia, ABC NT Katherine	2485do	
1200 1300	Australia, ABC NT Tennant Creek		2325do
1200 1300	Australia, CVC International	13635as	
1200 1300	Australia, Radio Australia 9560pa 9590as 11880as	6020va	9475as
1200 1300 DRM	Australia, Radio Australia	5995va	
1200 1300 Sat/Sun	Canada, CBC NQ SW Service		9625na
1200 1300	Canada, CFRX Toronto ON	6070na	
1200 1300	Canada, CFVP Calgary AB	6030na	
1200 1300	Canada, CKZN St John's NF	6160na	
1200 1300	Canada, CKZU Vancouver BC		6160na
1200 1300	China, China Radio Intl 9730as 9760pa 11650as 11660as 11690as 11760pa 11980as	5995as	9460as
1200 1300	Costa Rica, University Network 11870va 13750va		9725va
1200 1300 Sun	Latvia, Radio SWH	9290eu	
1200 1300	Malaysia, RTM/Trax FM	7295as	
1200 1300	Nigeria, Radio/Kaduna	4770do	6090al
1200 1300	Nigeria, Voice of/ Ext. Svc Lagos		9690af
1200 1300	Papua New Guinea, NBC	4890do	
1200 1300 vl	Papua New Guinea, Wantok R. Light		7325va
1200 1300	Saudi Arabia, BSKSA	15250af	
1200 1300	Singapore, Radio Singapore Intl 6150as		6080as
1200 1300 Sun	Slovakia, European Gospel Radio		9510va
1200 1300	South Korea, KBS World Radio		9650na
1200 1300 DRM/ Fri	Taiwan, Radio Taiwan Intl	7445as	
1200 1300	UK, BBC World Service 6195as 9660am 9740as 9750am 11760me 11895as 11940af	5875am	6190af

1200 1300	17640af	17830af	21470af	
1200 1300	Ukraine, Radio Ukraine Intl	9950eu		
	USA, American Forces Radio		4319usb	
	5446usb	5765usb	6350usb	7811usb
	10320usb	12133usb	13362usb	
1200 1300	USA, KAIJ Dallas TX	9480va		
1200 1300	USA, KNLS Anchor Point AK	6150as	6915as	
1200 1300	USA, KTBN Salt Lake City UT		7505na	
1200 1300	USA, KWHR Naalehu HI	12130as		
1200 1300	USA, Voice of America	9640va	9760va	
	11705va	11730va	15190va	
1200 1300	USA, WBOH Newport NC	5920am		
1200 1300	USA, WHRA Greenbush ME	13650va		
1200 1300	mtwhf USA, WHRI Cypress Creek SC		7520na	
1200 1300	USA, WHRI Cypress Creek SC		9660am	
1200 1300	USA, WINB Red Lion PA	9265am		
1200 1300	USA, WRMI Miami FL	9955am		
1200 1300	USA, WTJC Newport NC	9370na		
1200 1300	USA, WWCR Nashville TN	5070na	5890na	
	5935na	15825na		
1200 1300	USA, WWRB Manchester TN	3185va		
1200 1300	USA, WYFR/Family Radio FL		6890na	
	7780na	11530am	11970na	
1200 1300	Zambia, CVC International	6065af		
1215 1300	Egypt, Radio Cairo	17835as		
1230 1245 Sun	Australia, HCJB Global	15540as		
1230 1258	Vietnam, Voice of	9840as	12020as	
1230 1300	Bangladesh, Bangla Betar	7185as		
1230 1300	Bulgaria, Radio	11700eu	15700eu	
1230 1300	Thailand, Radio	9810va		
1245 1300 Sat/Sun	UK, Bible Voice BC	5950as		

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

1300 1330	Egypt, Radio Cairo	17835as		
1300 1330 Sun	Slovakia, Universal Life	15750as		
1300 1356	Romania, Radio Romania Intl		15105eu	
	17745eu			
1300 1357	China, China Radio Intl	13610eu	13790eu	
	15540sa			
1300 1400	Anguilla, University Network		11775am	
1300 1400	Australia, CVC International	13635as		
1300 1400	Australia, Radio Australia	6020va	9560as	
	9580va	9590va		
1300 1400 DRM	Australia, Radio Australia	5995va		
1300 1400 mtwhf	Austria, Radio Austria Intl	17715va		
1300 1400 Sat/Sun	Canada, CBC NQ SW Service		9625na	
1300 1400	Canada, CFRX Toronto ON	6070na		
1300 1400	Canada, CFVP Calgary AB	6030na		
1300 1400	Canada, CKZN St John's NF	6160na		
1300 1400	Canada, CKZU Vancouver BC		6160na	
1300 1400	China, China Radio Intl	5995as	9570na	
	9650na	9730as	9760pa	9765as
	9870as	11660as	11760pa	11980as
	13755as	15260na		
1300 1400	Costa Rica, University Network		9725va	
	11870va	13750va		
1300 1400	Malaysia, RTM/Trax FM	7295as		
1300 1400	New Zealand, Radio NZ Intl	5950pa		
1300 1400	Nigeria, Radio/Kaduna	4770do	6090al	
1300 1400	Nigeria, Voice of/ Ext. Svc Lagos		9690af	
1300 1400	North Korea, Voice of Korea	7570eu		
	9335na	11710na	12015eu	
1300 1400	Papua New Guinea, NBC	4890do		
1300 1400 vl	Papua New Guinea, Wantok R. Light		7325va	
1300 1400	Poland, Polish Radio	5975eu	9450eu	
1300 1400	Singapore, Radio Singapore Intl		6080as	
	6150as			
1300 1400	South Korea, KBS World Radio		9570na	
	9770as			
1300 1400	UK, BBC World Service	5975as	6190af	
	6195as	9740as	11895as	11940af
	15420af	15575va	17640af	17830af
	21470af			
1300 1400	USA, American Forces Radio		4319usb	
	5446usb	5765usb	6350usb	7811usb
	10320usb	12133usb	13362usb	
1300 1400	USA, KAIJ Dallas TX	9480va		
1300 1400	USA, KJES Vado NM	11715na		
1300 1400	USA, KTBN Salt Lake City UT		7505na	
1300 1400	USA, KWHR Naalehu HI	12130as		
1300 1400	USA, Voice of America	9760va	11705va	
1300 1400	USA, WBOH Newport NC	5920am		
1300 1400	USA, WHRA Greenbush ME	15665va		
1300 1400	USA, WHRI Cypress Creek SC		9840na	
1300 1400 Sat/Sun	USA, WHRI Cypress Creek SC		11785na	

1300 1400	USA, WINB Red Lion PA	9265am	13570am	
1300 1400	USA, WRMI Miami FL	9955am		
1300 1400	USA, WTJC Newport NC	9370na		
1300 1400	USA, WWCR Nashville TN	5890na	9985na	
	13845na	15825na		
1300 1400	USA, WWRB Manchester TN	3185va	9385va	
1300 1400	USA, WYFR/Family Radio FL		7175as	
	7560as	7780na	11520as	11560as
	11830na	11855na	11970na	13700as
1300 1400	Zambia, CVC International	6065af		
1305 1330 Sat	Austria, Radio Austria Intl	17715va		
1310 1340	Japan, NHK World/Radio Japan		9875as	
1315 1330 mwa	Australia, HCJB Global	15540as		
1330 1345 Sun	Austria, Radio Austria Intl	17715va		
1330 1357 DRM/Fri-Sat	Czech Rep, Radio Prague	9750eu		
1330 1400 mtwhfa	Guam, AWR/KSDA	15660as		
1330 1400	India, All India Radio	9690as	11620as	
	13710as			
1330 1400	Laos, National Radio	7145as		
1330 1400	Sweden, Radio	7420as	15240na	
1330 1400	Turkey, Voice of	11735va	12035eu	

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

1400 1415 Sat	Germany, Pan American BC	13645me		
1400 1415	Russia, FEBA	7150eu		
1400 1425	Turkey, Voice of	11735va	12035eu	
1400 1429	Czech Rep, Radio Prague	11600as	13580na	
1400 1430 w	Germany, Pan American BC	15205as		
1400 1430 mh	Guam, TWR/KTWR	9975as		
1400 1430	Japan, NHK World/Radio Japan		7200as	
	9875as	11705na	11780af	17580af
1400 1430	Serbia, International Radio Serbia		7240eu	
1400 1430	Thailand, Radio	9725va		
1400 1457	China, China Radio Intl	9700eu	9795eu	
1400 1457	Netherlands, Radio	9345as	12080as	
	15595as			
1400 1500	Anguilla, University Network		11775am	
1400 1500	Australia, CVC International	13635as		
1400 1500	Australia, Radio Australia	5995va	6080va	
	7240va	9590va		
1400 1500	Bhutan, BBS	6035as		
1400 1500 Sat/Sun	Canada, CBC NQ SW Service		9625na	
1400 1500	Canada, CFRX Toronto ON	6070na		
1400 1500	Canada, CFVP Calgary AB	6030na		
1400 1500	Canada, CKZN St John's NF	6160na		
1400 1500	Canada, CKZU Vancouver BC		6160na	
1400 1500	China, China Radio Intl	5995as	9560as	
	9765as	9870as	11675as	11765as
	11775as	13685af	13740na	17630af
1400 1500	Costa Rica, University Network		9725va	
	11870va	13750va		
1400 1500	Germany, Overcomer Ministries		6110va	
	13810va	15325va		
1400 1500 tw	Guam, TWR/KTWR	9975as		
1400 1500	India, All India Radio	9690as	11620as	
	13710as			
1400 1500	Libya, Voice of Africa	17725af	21695af	
1400 1500	Malaysia, RTM/Trax FM	7295as		
1400 1500	New Zealand, Radio NZ Intl	5950pa		
1400 1500	Nigeria, Radio/Kaduna	4770do	6090al	
1400 1500	Nigeria, Voice of/ Ext. Svc Lagos		9690af	
1400 1500 vl	Papua New Guinea, Wantok R. Light		7325va	
1400 1500	Singapore, MediaCorp Radio		6150do	
1400 1500 vl	South Africa, Channel Africa	9625af		
1400 1500	UK, BBC World Service	5975as	6190af	
	6195as	9740as	11760va	11895as
	11920as	11940af	17830af	21470af
	21660af			
1400 1500 Sat	UK, BBC World Service	9410va		
1400 1500 Sat/Sun	UK, Bible Voice BC	11695as		
1400 1500	USA, American Forces Radio		4319usb	
	5446usb	5765usb	6350usb	7811usb
	10320usb	12133usb	13362usb	
1400 1500	USA, KAIJ Dallas TX	9480va		
1400 1500	USA, KJES Vado NM	11715na		
1400 1500	USA, KNLS Anchor Point AK	6150as		
1400 1500	USA, KTBN Salt Lake City UT		7505na	
	15590na			
1400 1500	USA, KWHR Naalehu HI	9930as		
1400 1500	USA, Voice of America	4930af	6080af	
	9760va	9865va	11885va	12150va
	15205va	15580af	17715af	17895af
1400 1500	USA, WBCQ Monticello NC	9330am		
1400 1500	USA, WBOH Newport NC	5920am		
1400 1500	USA, WHRA Greenbush ME	15665va		

1400	1500	mtwhf	USA, WHRI Cypress Creek SC	9495na	
1400	1500		USA, WHRI Cypress Creek SC	9840na	
1400	1500	Sat/Sun	USA, WHRI Cypress Creek SC	11785na	
1400	1500		USA, WINB Red Lion PA	13570am	
1400	1500		USA, WRMI Miami FL	9955am	
1400	1500		USA, WTJC Newport NC	9370na	
1400	1500		USA, WWCR Nashville TN	5890na	9985na
			13845na	15825na	
1400	1500		USA, WWRB Manchester TN	9385va	
1400	1500		USA, WYFR/Family Radio FL	5920as	
			7560as	11560as	11855na
			13695na	17760na	
1400	1500		Zambia, CVC International	6065af	
1415	1430	mtwhfa	Germany, Pan American BC	13645as	
1415	1430		Nepal, Radio	3230as	5005as 6100as
			7165as		
1415	1445	Mon	UAE, FEBA	12025eu	
1425	1500		Micronesia, PMA/The Cross	4755as	
1430	1445	Sun	Germany, Pan American BC	13645as	13750as
1430	1445	Fri	UAE, FEBA	12025eu	
1430	1500		Australia, Radio Australia	9475va	11660pa
1430	1500		Ethiopia, Radio	5990af	9704af
1430	1500	DRM	South Korea, KBS World Radio	9750eu	
1430	1500		Sweden, Radio	9440va	
1430	1500		USA, Voice of America	6105va	7225va
			9715va	15130va	

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

1500	1510	mtwhfa	Turkmenistan, Turkmen Radio	5015eu	
1500	1527		Czech Rep, Radio Prague	7385na	
1500	1528		Vietnam, Voice of	9550va	9840va
			12020va	13860va	
1500	1530		Guam, AWR/KSDA	12105as	
1500	1530		Nigeria, Radio, Natl Svc/Abuja	7275do	
1500	1530		UK, BBC World Service	11860af	15420af
			17640af		
1500	1530	ta	UK, Bible Voice BC	11895as	
1500	1530	Sat/Sun	UK, Sudan Radio Service	9840af	
1500	1530		USA, Voice of America	6105va	9760va
			15460va		
1500	1545		Sweden, IBRA Radio	7340as	
1500	1557		Canada, Radio Canada Intl	9635va	11975va
1500	1557		China, China Radio Intl	9435eu	9525eu
1500	1557		Netherlands, Radio	9345af	12080as
			15595as		
1500	1600		Anguilla, University Network	11775am	
1500	1600		Australia, CVC International	13635as	
1500	1600		Australia, Radio Australia	5995va	6080va
			7240as	9475va	9590as
					11660pa
1500	1600	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1500	1600		Canada, CFRX Toronto ON	6070na	
1500	1600		Canada, CFVP Calgary AB	6030na	
1500	1600		Canada, CKZN St John's NF	6160na	
1500	1600		Canada, CKZU Vancouver BC	6160na	
1500	1600		China, China Radio Intl	5955as	6100af
			7160as	7325as	9785as
			11775as	13685af	13740na
					17630af
1500	1600		Costa Rica, University Network	9725va	
			11870va	13750va	
1500	1600		Germany, CVC Intl/Voice Africa	15680af	
1500	1600		Germany, Overcomer Ministries	6110va	
			13810va	15325va	
1500	1600		Libya, Voice of Africa	17725af	21695af
1500	1600		Malaysia, RTM/Trax FM	7295as	
1500	1600		Myanmar, Myanma Radio	5985as	
1500	1600		New Zealand, Radio NZ Intl	5950pa	
1500	1600		Nigeria, Radio/Kaduna	4770do	6090al
1500	1600		Nigeria, Voice of/ Ext. Svc Lagos	9690af	
1500	1600		North Korea, Voice of Korea	7570eu	
			9335na	11710na	12015eu
1500	1600	vl	Papua New Guinea, Wantok R. Light	7325va	
1500	1600		Russia, Voice of	7350as	7260as
1500	1600	DRM	Russia, Voice of	5905eu	
1500	1600		Singapore, MediaCorp Radio	6150do	
1500	1600	vl	Slovakia, Miraya FM	9825af	
1500	1600		South Africa, Channel Africa	17770af	
1500	1600		UK, BBC World Service	6040as	6190af
			6195as	9740as	11920as
			12095va	15105af	17640af
			21470af	21660af	17830af
1500	1600	Sat	UK, BBC World Service	9410va	
1500	1600		USA, American Forces Radio	4319usb	
			5446usb	5765usb	7811usb
			10320usb	12133usb	13362usb
1500	1600		USA, KAIJ Dallas TX	9480va	

1500	1600		USA, KTBN Salt Lake City UT	7505na	
			15590na		
1500	1600		USA, KWHR Naalehu HI	9930as	
1500	1600		USA, Voice of America	4930af	6080af
			7125af	9520va	9865va
			11765va	12150va	13375va
			17715af	17895af	15580af
1500	1600		USA, WBCQ Monticello ME	9330am	
1500	1600		USA, WBOH Newport NC	5920am	
1500	1600		USA, WEWN Vandiver AL	11530na	
1500	1600	mtwhfa	USA, WHRA Greenbush ME	15665va	
1500	1600		USA, WHRI Cypress Creek SC	9840na	
1500	1600		USA, WHRI Cypress Creek SC	11785na	
1500	1600		USA, WINB Red Lion PA	13570am	
1500	1600		USA, WRMI Miami FL	7385na	
1500	1600		USA, WTJC Newport NC	9370na	
1500	1600		USA, WWCR Nashville TN	9985na	12160na
			13845na	15825na	
1500	1600		USA, WWRB Manchester TN	9385va	
1500	1600		USA, WYFR/Family Radio FL	5920as	
			6280as	11565na	11855va
			15210am	17760na	17690af
1500	1600		Zambia, CVC International	4965af	
1510	1545		Swaziland, TWR	4760af	
1515	1600	Sat	UK, Bible Voice BC	12035as	
1530	1545		India, All India Radio	7255af	9820af
			9910af		
1530	1600	mtwhfa	Albania, Radio Tirana	13640na	
1530	1600		Germany, AWR Europe	11675as	
1530	1600		Iran, Voice of the Islamic Rep	6160as	
			7330as		
1530	1600		Sweden, Radio	7440va	15240na
1530	1600	mh	UK, Bible Voice BC	12035as	
1530	1600		UK, Sudan Radio Service	9840af	
1530	1600		USA, Voice of America	6105va	7175va
			9760va	15460va	
1551	1600	DRM	New Zealand, Radio NZ Intl	7145pa	

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

1600	1615		Pakistan, Radio	6230eu	7520eu	11570eu
1600	1628		Vietnam, Voice of	7280va	9550va	
			9730va	11630va	13860va	
1600	1630		Guam, AWR/KSDA	9585as	11690as	
1600	1630		Iran, Voice of the Islamic Rep	6160as		
			7330as			
1600	1630		Myanmar, Myanma Radio	9730do		
1600	1630		Nigeria, Voice of/ Ext. Svc Lagos	9690af		
1600	1630	Sat/Sun	Swaziland, TWR	4760af		
1600	1657		China, China Radio Intl	7255eu	9435eu	
			9525eu			
1600	1700		Anguilla, University Network	11775am		
1600	1700		Australia, CVC International	13635as		
1600	1700		Australia, Radio Australia	5995va	6080va	
			7240as	9475va	9710pa	11660pa
1600	1700	mtwhf	Austria, Radio Austria Intl	13675am		
1600	1700	Sat	Canada, CBC NQ SW Service	9625na		
1600	1700		Canada, CFRX Toronto ON	6070na		
1600	1700		Canada, CFVP Calgary AB	6030na		
1600	1700		Canada, CKZN St John's NF	6160na		
1600	1700		Canada, CKZU Vancouver BC	6160na		
1600	1700		China, China Radio Intl	6100af	9570af	
			11800af			
1600	1700		Costa Rica, University Network	11870va		
			13750va			
1600	1700		Egypt, Radio Cairo	11740af		
1600	1700		Ethiopia, Radio	7165af	9560af	
1600	1700		France, Radio France Intl	11615af	15160af	
1600	1700		Germany, CVC Intl/Voice Africa	15680af		
1600	1700		Germany, Deutsche Welle	5965as	9795as	
1600	1700	Sun	Germany, Overcomer Ministries	6110eu		
1600	1700		Jordan, Radio	11690na		
1600	1700		Malaysia, RTM/Trax FM	7295as		
1600	1700		New Zealand, Radio NZ Intl	5950pa		
1600	1700	DRM	New Zealand, Radio NZ Intl	7145pa		
1600	1700		Nigeria, Radio/Kaduna	4770do	6090al	
1600	1700		North Korea, Voice of Korea	9990va		
			11545va			
1600	1700	vl	Papua New Guinea, Wantok R. Light	7325va		
1600	1700		Russia, Voice of	4965va	4975va	6130eu
			7260as	7305as	7320eu	9470me
1600	1700	vl	Rwanda, Radio	6055do		
1600	1700	vl	Slovakia, Miraya FM	9825af		
1600	1700		South Korea, KBS World Radio	9515eu		
1600	1700		Taiwan, Radio Taiwan Intl	9785as	11550as	
1600	1700		UK, BBC World Service	3255af	3915as	

	6190af	6195as	11665va	11920as	
	11940af	12095va	15105va	15400af	
	17830af	21470af	21660af		
1600 1700 Sat	UK, BBC World Service	9410va			
1600 1700	USA, American Forces Radio		4319usb		
	5446usb	5765usb	6350usb	7811usb	
	10320usb	12133usb	13362usb		
1600 1700	USA, KAIJ Dallas TX	9480va			
1600 1700	USA, KJES Vado NM	11715na			
1600 1700	USA, KTBN Salt Lake City UT		15590na		
1600 1700	USA, KWHR Naalehu HI	9930as			
1600 1700	USA, Voice of America	4930af	6080af		
	15580af	13600va	13615va	15445va	
	17715af	17895af			
1600 1700	USA, WBCQ Monticello ME	9330am			
1600 1700	USA, WBOH Newport NC	5920am			
1600 1700	USA, WEWN Vandiver AL	11530na			
1600 1700	USA, WHRA Greenbush ME	17650af			
1600 1700	USA, WHRI Cypress Creek SC		9840na		
	15285am				
1600 1700	USA, WINB Red Lion PA	13570am			
1600 1700 smtwhf	USA, WMLK Bethel PA	9265va			
1600 1700	USA, WRMI Miami FL	7385na			
1600 1700	USA, WTJC Newport NC	9370na			
1600 1700	USA, WWCR Nashville TN	9985na	12160na		
	13845na	15825na			
1600 1700 Sun	USA, WWRB Manchester TN	11920af			
1600 1700	USA, WWRB Manchester TN	9385va	12180va		
1600 1700	USA, WYFR/Family Radio FL		6085am		
	9885af	11565na	11830na	11845af	
	12010as	13695na	15325af	17690af	
	17760na	18980va	21455va		
1600 1700	Zambia, CVC International	4965af			
1605 1630 Sat/Sun	Austria, Radio Austria Intl	13675am			
1605 1700	Canada, Radio Canada Intl	9610na			
1615 1645 mtwhf	Swaziland, TWR 6130af				
1615 1700 Sat/Sun	UK, BBC World Service	11860af	15420af		
	17640af				
1630 1645 Sun	Germany, Pan American BC	9850me			
1630 1700	Guam, AWR/KSDA	11980as			
1630 1700	Nigeria, Voice of/ Ext. Svc Lagos		15120af		
1630 1700 Sat/Sun	Swaziland, TWR 6130af				
1630 1700 Sun	UK, Bible Voice BC	9460me			
1640 1650 mtwhfa	Turkmenistan, Turkmen Radio		4930eu		
1640 1700 mtwhf	UK, Bible Voice BC	9460me			
1645 1700 f	Sweden, IBRA Radio	9830as			
1645 1700	Tajikistan, Tajik Radio	7245as			
1645 1700 Sat	UK, Bible Voice BC	9460me			

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

1700 1715	Swaziland, TWR 6130af				
1700 1715 twhfa	UK, Bible Voice BC	9460me			
1700 1720 mtwh	Moldova, Radio PMR	6235eu			
1700 1727	Czech Rep, Radio Prague	5930eu	15710af		
1700 1730	Jordan, Radio	11690na			
1700 1740 f	Moldova, Radio PMR	6235eu			
1700 1745	UK, BBC World Service	6005af	9630af		
1700 1750	New Zealand, Radio NZ Intl	5950pa			
1700 1750 DRM	New Zealand, Radio NZ Intl	9890pa			
1700 1757	China, China Radio Intl	6100eu	7205eu		
	7255eu	7335eu			
1700 1800	Anguilla, University Network		11775am		
1700 1800	Australia, CVC International	13635as			
1700 1800	Australia, Radio Australia	5995va	6080va		
	9475as	9580va	9710as	11880as	
1700 1800 Sat	Canada, CBC NQ SW Service		9625na		
1700 1800	Canada, CFRX Toronto ON	6070na			
1700 1800	Canada, CFVP Calgary AB	6030na			
1700 1800	Canada, CKZN St John's NF	6160na			
1700 1800	Canada, CKZU Vancouver BC		6160na		
1700 1800 DRM	Canada, Radio Canada Intl	9800na			
1700 1800	China, China Radio Intl	9570af	11900af		
1700 1800	Costa Rica, University Network		11870va		
	13750va				
1700 1800	Egypt, Radio Cairo	11740af			
1700 1800	Eq. Guinea, Radio Africa	15190af			
1700 1800	Germany, CVC Intl/Voice Africa		15680af		
1700 1800	Malaysia, RTM/Trax FM	7295as			
1700 1800	Nigeria, Radio/Kaduna	4770do	6090al		
1700 1800	Nigeria, Voice of/ Ext. Svc Lagos		15120af		
1700 1800 vl	Papua New Guinea, Wantok R. Light		7325va		
1700 1800	Russia, Voice of	6125as	7125as	7235as	
	7270va	7320eu	9470me		
1700 1800 vl	Rwanda, Radio	6055do			
1700 1800 vl	Slovakia, Miraya FM	9825af			

1700 1800	South Africa, Channel Africa	15235af			
1700 1800	Swaziland, TWR 3200af				
1700 1800	Taiwan, Radio Taiwan Intl	11850af			
1700 1800 DRM	UK, BBC World Service	5895eu			
1700 1800	UK, BBC World Service	3255af	3915as		
	6190af	11665va	11755af	11955as	
	12095af	15400af	17830af	21470af	
1700 1800 Sun	UK, Bible Voice BC	9460me			
1700 1800	USA, American Forces Radio		4319usb		
	5446usb	5765usb	6350usb	7811usb	
	10320usb	12133usb	13362usb		
1700 1800	USA, KAIJ Dallas TX	9480va			
1700 1800	USA, KTBN Salt Lake City UT		15590na		
1700 1800	USA, KWHR Naalehu HI	9930as			
1700 1800	USA, Voice of America	6080af	13710af		
	15580af	17895af			
1700 1800	USA, WBCQ Monticello ME	9330am			
1700 1800 mtwhfa	USA, WBCQ Monticello ME	17495va			
1700 1800	USA, WBCQ Monticello ME	7415am	9330am		
1700 1800	USA, WBOH Newport NC	5920am			
1700 1800	USA, WEWN Vandiver AL	11530na			
1700 1800	USA, WHRI Cypress Creek SC		15285am		
1700 1800	USA, WINB Red Lion PA	13570am			
1700 1800 smtwhf	USA, WMLK Bethel PA	9265va			
1700 1800	USA, WRMI Miami FL	9955am			
1700 1800	USA, WTJC Newport NC	9370na			
1700 1800	USA, WWCR Nashville TN	9985na	12160na		
	13845na	15825na			
1700 1800 Sun	USA, WWRB Manchester TN	11920af			
1700 1800	USA, WWRB Manchester TN	9285va	12180va		
1700 1800	USA, WYFR/Family Radio FL		3955va		
	9885af	13695na	17555na	18980va	
	21455va	21680af			
1700 1800	Zambia, CVC International	4965af			
1715 1730 h	UK, Bible Voice BC	9460me			
1715 1745 t	UK, Bible Voice BC	9460me			
1730 1745 h	UK, Bible Voice BC	9460me			
1730 1800	Guam, AWR/KSDA	9980me			
1730 1800	Slovakia, Radio Slovakia Int	5915eu	6055eu		
1730 1800	Swaziland, TWR 9500af				
1730 1800 Sat	UK, Bible Voice BC	9460me			
1730 1800 Sun	UK, Bible Voice BC	9615me			
1730 1800 mtwhf	UK, Sudan Radio Service	9840af			
1730 1800 Sat/Sun	USA, Voice of America	4930af	12080af		
	15775af				
1730 1800	USA, Voice of America	4930af	12080af		
	15775af				
1730 1800 mtwhf	USA, Voice of America	4930af	12080af		
	15775af				
1745 1800	Bangladesh, Bangla Betar	7185as			
1745 1800	India, All India Radio	7410eu	9445af		
	9950eu	11620eu	11935af	13605af	
	15075af	15155af	17670af		
1745 1800 t	UK, Bible Voice BC	9460me			
1751 1800	New Zealand, Radio NZ Intl	9615pa			
1751 1800 DRM	New Zealand, Radio NZ Intl	9890pa			

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

1800 1805	Canada, Radio Canada Intl	9610na			
1800 1805 DRM	Canada, Radio Canada Intl	9800na			
1800 1809	Tanzania, Voice of	11735af			
1800 1815 t/vl	UK, Bible Voice BC	9460me			
1800 1815 Sat	UK, Bible Voice BC	7210as			
1800 1827	Czech Rep, Radio Prague	5930eu	9400va		
1800 1828	Vietnam, Voice of	5955eu	7280va		
	9730va				
1800 1830	Nigeria, Radio, Natl Svc/Abuja		7275do		
1800 1830	South Africa, AWR Africa	3215af	3345af		
	11830af				
1800 1830	UK, BBC World Service	11955as			
1800 1830 Sat/Sun	UK, Bible Voice BC	9460me			
1800 1830	USA, Voice of America	4930af	6080af		
	11975af	13710af	15580af	17895af	
1800 1856	Romania, Radio Romania Intl		7215eu		
	9640eu				
1800 1857	China, China Radio Intl	6100eu	7110eu		
1800 1857	Netherlands, Radio	6020af	11655af		
	12050af				
1800 1900	Anguilla, University Network		11775am		
1800 1900 mtwhf	Argentina, RAE 9690eu	15345eu			
1800 1900	Australia, Radio Australia	6080va	7240as		
	9475va	9580as	9710as	11880as	
1800 1900	Bangladesh, Bangla Betar	7185eu			
1800 1900	Canada, CFRX Toronto ON	6070na			
1800 1900	Canada, CFVP Calgary AB	6030na			

1800 1900	Canada, CKZN St John's NF 6160na		
1800 1900	Canada, CKZU Vancouver BC	6160na	
1800 1900	Canada, Radio Canada Intl 17790af		
1800 1900	Costa Rica, University Network	11870va	
	13750va		
1800 1900	Eqf. Guinea, Radio Africa	15190af	
1800 1900	Germany, CVC Intl/Voice Africa	9490af	
1800 1900	India, All India Radio	7410eu	9445af
	9950eu	11620eu	11935af
	15075af	15155af	17670af
1800 1900	Kuwait, Radio Kuwait	11990na	
1800 1900	Malaysia, RTM/Trax FM	7295as	
1800 1900	New Zealand, Radio NZ Intl	9615pa	
1800 1900 DRM	New Zealand, Radio NZ Intl	9890pa	
1800 1900	Nigeria, Radio/Kaduna	4770do	6090al
1800 1900	Nigeria, Voice of/ Ext. Svc Lagos		15120af
1800 1900	North Korea, Voice of Korea	7570eu	
	12015eu		
1800 1900 vl	Papua New Guinea, Wantok R. Light	7325va	
1800 1900	Poland, Polish Radio	6015eu	7130eu
1800 1900	Russia, Voice of	6125as	7105eu 7125as
	7235as	7270af	7320eu 7335va
	11510af		
1800 1900 Sat/Sun	Russia, Voice of	6055eu	6175eu
1800 1900 vl	Rwanda, Radio	6055do	
1800 1900 fas	Slovakia, European Gospel Radio	7285va	
1800 1900	South Korea, KBS World Radio	7275eu	
1800 1900	Swaziland, TWR 9500af		
1800 1900	Taiwan, Radio Taiwan Intl	3965eu	
1800 1900	UK, BBC World Service	3255af	5875va
	5955as	6005af	6190af 6195va
	9410af	9480va	11755af 12095af
	15400af	17830af	
1800 1900 DRM	UK, BBC World Service	5895eu	
1800 1900 Sat	UK, Bible Voice BC	9615me	
1800 1900	USA, American Forces Radio		4319usb
	5446usb	5765usb	6350usb 7811usb
	10320usb	12133usb	13362usb
1800 1900	USA, KAIJ Dallas TX	9480va	
1800 1900	USA, KJES Vado NM	15385na	
1800 1900	USA, KTBN Salt Lake City UT		15590na
1800 1900 mtwhfa	USA, WBCQ Monticello ME	17495va	
1800 1900	USA, WBOH Newport NC	5920am	
1800 1900	USA, WEWN Vandiver AL	11530na	
1800 1900 mtwhf	USA, WHRI Cypress Creek SC		15670va
1800 1900 Sat/Sun	USA, WHRI Cypress Creek SC		15285va
1800 1900	USA, WINB Red Lion PA	13570am	
1800 1900 smtwhf	USA, WMLK Bethel PA	9265va	
1800 1900	USA, WRMI Miami FL	9955am	
1800 1900	USA, WTJC Newport NC	9370na	
1800 1900	USA, WWCR Nashville TN	9985na	12160na
	13845na	15825na	
1800 1900 Sun	USA, WWRB Manchester TN	11920af	
1800 1900	USA, WWRB Manchester TN	9385va	12180va
1800 1900	USA, WYFR/Family Radio FL		7240eu
	7345va	7395af	9785me 9885af
	9895af	11665af	13660af 13695na
	15115af	17555na	18980va
1800 1900	Yemen, Rep of Yemen Radio	9780me	
1800 1900	Zambia, CVC International	4965af	
1830 1845	Israel, Kol Israel	6985va	7545va 9345va
	15640af		
1830 1900	Bulgaria, Radio	7400eu	9400eu
1830 1900 whf	Sweden, Radio	6065va	
1830 1900	UK, BBC World Service	6005af	9630af
1830 1900 f	UK, Bible Voice BC	9460me	
1830 1900 Sun	UK, Bible Voice BC	9615me	
1830 1900	USA, Voice of America	4930af	6080af
	6105va	7220va	9650af 11975af
	13710af	15580af	17895af
1830 1900	Vatican City, Vatican Radio	9755af	11625af
	13725af		
1845 1900 Sun	UK, Bible Voice BC	7260af	

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

1900 1928	Vietnam, Voice of	7280va	9720va
1900 1930	Germany, Deutsche Welle	9735af	11690af
	13780af	15275af	
1900 1930 Sat	UK, Bible Voice BC	9460me	
1900 1930 Sun	UK, Bible Voice BC	6010eu	7245af
1900 1930	USA, Voice of America	9785va	12020va
1900 1935 DRM	New Zealand, Radio NZ Intl	9890pa	
1900 1945	India, All India Radio	7410eu	9445af
	9950eu	11620eu	11935af 13605af
	15075af	15155af	17670af

1900 1945 Sat	UK, Bible Voice BC	6010eu	
1900 1950	New Zealand, Radio NZ Intl	9615pa	
1900 1957	Netherlands, Radio	7120af	11655af
	11805af	12050af	17810af
1900 1957 Sat/Sun	Netherlands, Radio	15315na	15525na
1900 2000	Anguilla, University Network		11775am
1900 2000	Australia, Radio Australia	6080va	7240as
	9500va	9580va	9710as 11880as
1900 2000	Canada, CFRX Toronto ON	6070na	
1900 2000	Canada, CFVP Calgary AB	6030na	
1900 2000	Canada, CKZN St John's NF	6160na	
1900 2000	Canada, CKZU Vancouver BC		6160na
1900 2000	Canada, Radio Canada Intl	17790af	
1900 2000	China, China Radio Intl	7295va	9435va
	9440va		
1900 2000	Costa Rica, University Network		11870va
	13750va		
1900 2000	Egypt, Radio Cairo	15375af	
1900 2000	Eqf Guinea, Radio Africa	15190af	
1900 2000	Germany, CVC Intl/Voice Africa		9490af
1900 2000	Malaysia, RTM/Trax FM	7295as	
1900 2000	Nigeria, Radio/Kaduna	4770do	6090al
1900 2000	Nigeria, Voice of/ Ext. Svc Lagos		15120af
1900 2000	North Korea, Voice of Korea		7100af
	9975va	11910af	11535va
1900 2000	Papua New Guinea, NBC	4890do	
1900 2000 vl	Papua New Guinea, Wantok R. Light		7325va
1900 2000	Russia, Voice of	5955as	6175eu 7105eu
	7290eu	7335af	11510af
1900 2000 vl	Rwanda, Radio	6055do	
1900 2000 fas	Slovakia, European Gospel Radio		7285va
1900 2000 vl	Solomon Islands, SIBC	5020do	9545al
1900 2000 vl	South Africa, Channel Africa	3345af	
1900 2000 Mon	South Africa, DX Amateur League		3215af
1900 2000	Thailand, Radio	9805eu	
1900 2000 vl	Uganda, UBC Radio	4976do	5026do
1900 2000	UK, BBC World Service	3255af	5875va
	6005af	6190af	6195va 9410af
	9480va	9630af	12095af 15400af
	17830af		
1900 2000 DRM	UK, BBC World Service	5895eu	
1900 2000 Sat/Sun	UK, Bible Voice BC	9470me	
1900 2000 Sun	UK, Bible Voice BC	7260af	
1900 2000	USA, American Forces Radio		4319usb
	5446usb	5765usb	6350usb 7811usb
	10320usb	12133usb	13362usb
1900 2000	USA, KAIJ Dallas TX	9480va	
1900 2000	USA, KJES Vado NM	15385na	
1900 2000	USA, KTBN Salt Lake City UT		15590na
1900 2000	USA, Voice of America	4930af	6080af
	11975af	13710af	15580af 17895af
1900 2000	USA, WBCQ Monticello ME	7415am	9330am
1900 2000 mtwhfa	USA, WBCQ Monticello ME	17495va	
1900 2000	USA, WBOH Newport NC	5920am	
1900 2000	USA, WEWN Vandiver AL	11530na	
1900 2000	USA, WHRA Greenbush ME	11785va	
1900 2000	USA, WHRI Cypress Creek SC		9840na
	17640am		
1900 2000	USA, WINB Red Lion PA	13570am	
1900 2000 smtwhf	USA, WMLK Bethel PA	9265va	
1900 2000	USA, WRMI Miami FL	9955am	
1900 2000	USA, WTJC Newport NC	9370na	
1900 2000	USA, WWCR Nashville TN	9975na	12160na
	13845na	15825na	
1900 2000 Sun	USA, WWRB Manchester TN	11920va	
1900 2000	USA, WWRB Manchester TN	9385va	12180va
1900 2000	USA, WYFR/Family Radio FL		3230af
	6020af	6085am	7160af 7395af
	13695na	15115af	15565va 17555na
	17535na	18980va	
1900 2000	Zambia, CVC International	4965af	
1900 2000	Kuwait, Radio Kuwait	11990na	
1930 2000 Sat/Sun	Germany, Pan American BC	6020va	
1930 2000	Iran, Voice of the Islamic Rep		6010eu
	6225eu	7320eu	9855af 11695af
1930 2000	Lithuania, Radio Vilnius	6010eu	6225eu
	7320eu		
1930 2000	Serbia, International Radio Serbia		7240eu
1930 2000	Slovakia, Radio Slovakia Int	5915eu	7345eu
1930 2000	Turkey, Voice of	6055eu	
1930 2000 f	UK, Bible Voice BC	9470me	
1930 2000	USA, Voice of America	6105va	7220va
	9650va	9785va	12020va
1936 1950 DRM	New Zealand, Radio NZ Intl	11675pa	
1945 2000 mtwhfa	Albania, Radio Tirana	6135eu	7465eu
1951 2000	New Zealand, Radio NZ Intl	17675pa	
1951 2000 DRM	New Zealand, Radio NZ Intl	15720pa	

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

2000 2015	Sun	Germany, Pan American BC	6020va	
2000 2025		Turkey, Voice of	6055eu	
2000 2028		Lithuania, Radio Vilnius	6010eu	6225eu
			7320eu	
2000 2030		China, China Radio Intl	7160eu	
2000 2030		Egypt, Radio Cairo	15375af	
2000 2030	fa	Germany, Pan American BC	6020me	
2000 2030		Iran, Voice of the Islamic Rep		6010eu
			6225eu	9855af
			7320eu	11695af
2000 2030		South Africa, AWR Africa	9655af	
2000 2030	Sun	UK, Bible Voice BC	6010eu	
2000 2030		USA, Voice of America	4930af	4940af
			6080af	11975af
			11975af	13710af
2000 2045		USA, WYFR/Family Radio FL		5745va
			6020af	6240va
			6240va	6875va
			15195af	17535na
			17535na	17575an
2000 2057		China, China Radio Intl	7190eu	9600eu
2000 2057		Netherlands, Radio	11655af	18910af
2000 2100		Anguilla, University Network		11775am
2000 2100		Australia, ABC NT Alice Springs		2310do
			4835do	
2000 2100		Australia, ABC NT Katherine	2485do	
2000 2100		Australia, ABC NT Tennant Creek		2325do
2000 2100	Sat/Sun	Australia, Radio Australia	12080as	
2000 2100		Australia, Radio Australia	6080va	7240as
			9500va	11650pa
			11650pa	11880as
2000 2100		Canada, CFRX Toronto ON	6070na	
2000 2100		Canada, CFVP Calgary AB	6030na	
2000 2100		Canada, CKZN St John's NF	6160na	
2000 2100		Canada, CKZU Vancouver BC		6160na
2000 2100		China, China Radio Intl	5960eu	7285eu
			7295af	9440af
			9440af	11640af
			11640af	13630af
2000 2100		Costa Rica, University Network		13750va
2000 2100		Eq Guinea, Radio Africa	15190af	
2000 2100		Germany, CVC Intl/Voice Africa		7285af
2000 2100		Germany, Deutsche Welle	9690af	9880af
			12780af	
2000 2100		Indonesia, Voice of		9525al
			15150as	11785pa
2000 2100		Kuwait, Radio Kuwait		11990na
2000 2100	vl	Liberia, ELWA	4760do	
2000 2100		Malaysia, RTM/Trax FM		7295as
2000 2100		New Zealand, Radio NZ Intl	17675pa	
2000 2100	DRM	New Zealand, Radio NZ Intl	15720pa	
2000 2100		Nigeria, Radio/Kaduna	4770do	6090al
2000 2100		Nigeria, Voice of/ Ext. Svc Lagos		15120af
2000 2100		Papua New Guinea, NBC	4890do	
2000 2100	vl	Papua New Guinea, Wantok R. Light		7325va
2000 2100		Russia, Voice of	6145eu	7105eu
2000 2100	vl	Rwanda, Radio	6055do	
2000 2100	vl	Solomon Islands, SIBC	5020do	9545al
2000 2100	vl	South Africa, Channel Africa	3345af	
2000 2100	mtwhf	Spain, Radio Exterior Espana		9605af
			9690eu	
2000 2100	vl	Uganda, UBC Radio	4976do	5026do
2000 2100		UK, BBC World Service	3255af	6005af
			6190af	6195va
			6195va	9410af
			9410af	9630af
			12095af	15400af
			15400af	17830af
2000 2100	DRM	UK, BBC World Service	5875eu	
2000 2100		Ukraine, Radio Ukraine Intl	5840eu	
2000 2100		USA, American Forces Radio		4319usb
			5446usb	5765usb
			5765usb	6350usb
			10320usb	12133usb
			12133usb	13362usb
2000 2100		USA, KAIJ Dallas TX	9480va	
2000 2100		USA, KJES Vado NM	15385na	
2000 2100		USA, KTBN Salt Lake City UT		15590na
2000 2100		USA, WBCQ Monticello ME	7415am	9330am
2000 2100	mtwhfa	USA, WBCQ Monticello ME	17495va	
2000 2100		USA, WBOH Newport NC	5920am	
2000 2100		USA, WEWN Vandiver AL	11530na	
2000 2100	mtwhf	USA, WHRA Greenbush ME	7520va	
2000 2100	Sat/Sun	USA, WHRA Greenbush ME	11785af	
2000 2100		USA, WHRI Cypress Creek SC		17640sa
2000 2100	mtwhfa	USA, WHRI Cypress Creek SC		11765na
2000 2100	f	USA, WHRI Cypress Creek SC		15665af
2000 2100		USA, WINB Red Lion PA	13570am	
2000 2100	smtwhf	USA, WMLK Bethel PA	9265va	
2000 2100		USA, WRMI Miami FL	9955am	
2000 2100		USA, WTJC Newport NC	9370na	
2000 2100		USA, WWCR Nashville TN	9975na	13845na
			15825na	
2000 2100	Sun	USA, WWRB Manchester TN	11920af	
2000 2100		USA, WWRB Manchester TN	9385va	12180va

2000 2100		Zambia, CVC International	4965af	
2005 2100		Syria, Radio Damascus	9330eu	12085eu
2030 2045		Thailand, Radio	9535eu	
2030 2058		Sweden, Radio	7420pa	
2030 2100		USA, Voice of America	4930af	4940af
			6080af	7595af
			7595af	11975af
			11975af	13710af
2030 2358		Vietnam, Voice of	9840as	12020as
2045 2100		India, All India Radio	7410eu	9445eu
			9910pa	9950eu
			9950eu	11620eu
			11620eu	11715pa
2045 2100	DRM	Vatican City, Vatican Radio	9800eu	

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

2100 2127		Czech Rep, Radio Prague	5930va	9430va
2100 2130	mtwhfa	Albania, Radio Tirana	7430eu	9915na
2100 2130		Australia, ABC NT Katherine	2485do	
2100 2130		Australia, ABC NT Tennant Creek		2325do
2100 2130		Austria, AWR Europe	9830af	
2100 2130	Sat	Canada, CBC NQ SW Service		9625na
2100 2130		China, China Radio Intl	11640af	13630af
2100 2130		Nigeria, Radio, Natl Svc/Abuja		7275do
2100 2130		South Africa, AWR Africa	9830af	
2100 2130		South Korea, KBS World Radio		3955eu
2100 2130		Vatican City, Vatican Radio	7365af	9755af
			11625af	
2100 2157		China, China Radio Intl	5960eu	6135eu
			7190eu	7285eu
			7285eu	9600eu
2100 2159		Canada, Radio Canada Intl	5850eu	9770eu
2100 2200		Anguilla, University Network		11775am
2100 2200		Australia, ABC NT Alice Springs		2310do
			4835do	
2100 2200		Australia, Radio Australia	9500as	9660as
			11650pa	11660pa
			11660pa	11695as
			13630as	15515as
2100 2200		Belarus, Radio	6090eu	7360eu
2100 2200		Canada, CFRX Toronto ON	6070na	7390eu
2100 2200		Canada, CFVP Calgary AB	6030na	
2100 2200		Canada, CKZN St John's NF	6160na	
2100 2200		Canada, CKZU Vancouver BC		6160na
2100 2200		Costa Rica, University Network		13750va
2100 2200		Eq Guinea, Radio Africa	15190af	
2100 2200		Germany, Deutsche Welle	7280af	9545af
			11690af	13780af
2100 2200		Guyana, Voice of	3291do	5950do
2100 2200		India, All India Radio	7410eu	9445eu
			9910pa	9950eu
			9950eu	11620eu
			11620eu	11715pa
2100 2200	vl	Liberia, ELWA	4760do	
2100 2200		Malaysia, RTM/Trax FM		7295as
2100 2200		New Zealand, Radio NZ Intl	17675pa	
2100 2200	DRM	New Zealand, Radio NZ Intl	15720pa	
2100 2200		Nigeria, Radio/Kaduna	4770do	6090al
2100 2200		Nigeria, Voice of/ Ext. Svc Lagos		7255af
2100 2200		North Korea, Voice of Korea		7570eu
			12015eu	
2100 2200		Papua New Guinea, NBC	4890do	
2100 2200	vl	Papua New Guinea, Wantok R. Light		7325va
2100 2200		Russia, Voice of	6145eu	7290eu
2100 2200		Russia, Voice of	6145eu	7290eu
2100 2200	vl	South Africa, Channel Africa	3345af	
2100 2200		Syria, Radio Damascus	9330eu	12085eu
2100 2200		UK, BBC World Service	3255af	3915as
			5965as	6005af
			6005af	6125as
			6125as	6190af
			6195va	9410af
			9410af	9525am
			9525am	11675am
2100 2200	DRM	UK, BBC World Service	5875eu	
2100 2200		USA, American Forces Radio		4319usb
			5446usb	5765usb
			5765usb	6350usb
			10320usb	12133usb
			12133usb	13362usb
2100 2200		USA, KAIJ Dallas TX	9480va	
2100 2200		USA, KTBN Salt Lake City UT		15590na
2100 2200		USA, Voice of America	6080af	15580af
2100 2200		USA, WBCQ Monticello ME	7415am	9330am
2100 2200		USA, WBOH Newport NC	5920am	
2100 2200		USA, WEWN Vandiver AL	11530na	
2100 2200		USA, WHRA Greenbush ME	7520af	
2100 2200		USA, WHRI Cypress Creek SC		9575am
2100 2200	mtwhfa	USA, WHRI Cypress Creek SC		11765na
2100 2200		USA, WINB Red Lion PA	13570am	
2100 2200		USA, WRMI Miami FL	9955am	
2100 2200		USA, WTJC Newport NC	9370na	
2100 2200		USA, WWCR Nashville TN	9975na	12160na
			13845na	15825na
2100 2200	Sun	USA, WWRB Manchester TN	11920af	
2100 2200		USA, WWRB Manchester TN	9385va	12180va
2100 2200		USA, WYFR/Family Radio FL	5745va	
			6240va	6875eu
			6875eu	15195af
			15195af	15565af

2115 2200	Egypt, Radio Cairo	6250eu	
2115 2200	USA, WYFR/Family Radio FL	11875af	
2127 2157	Sweden, Radio	7120af	
2130 2156	Romania, Radio Romania Intl	6055va	
	6155va	7145va	9755va
2130 2200	Australia, ABC NT Katherine	5025do	
2130 2200	Australia, ABC NT Tennant Creek	4910do	
2130 2200 mtwhfa	Canada, CBC NQ SW Service	9625na	
2130 2200	Guam, AWR/KSDA	9720as	
2130 2200	Turkey, Voice of	7180va	
2130 2200	USA, Voice of America	7405af	
2150 2200	Vatican City, Vatican Radio	5885eu	7250eu

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

2200 2210	Syria, Radio Damascus	9330eu	12085eu
2200 2220	Japan, NHK World/Radio Japan	13640pa	
2200 2220	Vatican City, Vatican Radio	5885eu	7250eu
2200 2230	India, All India Radio	7410eu	9445eu
	9910pa	9950eu	11620eu
			11715pa
2200 2230	Papua New Guinea, NBC	4890do	
2200 2230	Turkey, Voice of	7180va	
2200 2240	New Zealand, Radio NZ Intl	17675pa	
2200 2240 DRM	New Zealand, Radio NZ Intl	15720pa	
2200 2245	Egypt, Radio Cairo	6250eu	
2200 2257	China, China Radio Intl	7170eu	
2200 2300	Anguilla, University Network	6090am	
2200 2300	Australia, ABC NT Alice Springs	2310do	
	4835do		
2200 2300	Australia, ABC NT Katherine	5025do	
2200 2300	Australia, ABC NT Tennant Creek	4910do	
2200 2300	Australia, Radio Australia	9660va	11840va
	12010va	12080as	13630pa
		15240pa	15515as
			15560pa
2200 2300	Belarus, Radio	6090eu	7360eu
2200 2300	Bulgaria, Radio	7400eu	9400eu
2200 2300 smtwhf	Canada, CBC NQ SW Service		9625na
2200 2300	Canada, CFRX Toronto ON	6070na	
2200 2300	Canada, CFVP Calgary AB	6030na	
2200 2300	Canada, CKZN St John's NF	6160na	
2200 2300	Canada, CKZU Vancouver BC	6160na	
2200 2300	China, China Radio Intl	9590as	
2200 2300	Costa Rica, University Network	13750va	
2200 2300	Eqt Guinea, Radio Africa	15190af	
2200 2300	Guyana, Voice of 3291do		
2200 2300 vl	Liberia, ELWA	4760do	
2200 2300	Malaysia, RTM/Trax FM	7295as	
2200 2300	Nigeria, Radio/Kaduna	4770do	6090al
2200 2300	Nigeria, Voice of/ Ext. Svc Lagos	7255af	
2200 2300 vl	Papua New Guinea, Wantok R. Light	7325va	
2200 2300 vl	Solomon Islands, SIBC	5020do	9545al
2200 2300 Sat/Sun	Spain, Radio Exterior Espana	6125eu	
2200 2300 Sun	Spain, Radio Exterior Espana	9595af	
2200 2300	Taiwan, Radio Taiwan Intl	9355eu	
2200 2300	UK, BBC World Service	5955as	5965as
	5975am	6195as	9410af
		9740as	15400af
2200 2300 DRM	UK, BBC World Service	5875eu	
2200 2300	Ukraine, Radio Ukraine Intl	5830eu	
2200 2300	USA, American Forces Radio	4319usb	
	5446usb	5765usb	6350usb
		10320usb	12133usb
			13362usb
2200 2300	USA, KAIJ Dallas TX	9480va	
2200 2300	USA, KTBN Salt Lake City UT		15590na
2200 2300	USA, Voice of America	5910va	7120va
	7220va	7405af	7425va
			9490va
			11725va
2200 2300 mtwhf	USA, WBCQ Monticello ME	17495va	
2200 2300	USA, WBCQ Monticello ME	7415am	9330am
2200 2300	USA, WBOH Newport NC	5920am	
2200 2300	USA, WEWN Vandiver AL	7560va	9975na
2200 2300	USA, WHRA Greenbush ME	7520af	
2200 2300	USA, WHRI Cypress Creek SC	9575am	
2200 2300 Sun	USA, WHRI Cypress Creek SC	7490na	
2200 2300	USA, WINB Red Lion PA	13570am	
2200 2300 mtwhfa	USA, WRMI Miami FL	9955am	
2200 2300 Sun	USA, WRMI Miami FL	7385na	
2200 2300	USA, WTJC Newport NC	9370na	
2200 2300	USA, WWCN Nashville TN	7465na	9985na
	12160na	13845na	
2200 2300	USA, WWRB Manchester TN	12180va	
2200 2300	USA, WYFR/Family Radio FL	7305af	
	11740na	11875af	17690af
2230 2257	Czech Rep, Radio Prague	5930na	9435af
2230 2300	Guam, AWR/KSDA	15320as	
2230 2300	Papua New Guinea, NBC	9675do	

2230 2300	Sweden, Radio	6065va	
2230 2300	USA, Voice of America	7230va	9780va
	15445va		
2241 2300	New Zealand, Radio NZ Intl	15720pa	
2241 2300 DRM	New Zealand, Radio NZ Intl	17675pa	
2245 2300	India, All India Radio	9705eu	9950as
	11620as	11645as	13605as

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

2300 0000	Anguilla, University Network	6090am	
2300 0000	Australia, ABC NT Alice Springs	2310do	
	4835do		
2300 0000	Australia, ABC NT Katherine	5025do	
2300 0000	Australia, ABC NT Tennant Creek	4910do	
2300 0000	Australia, Radio Australia	9660as	11840va
	12010pa	12080pa	13690pa
		15240pa	15560va
			17795va
2300 0000 smtwhf	Canada, CBC NQ SW Service	9625na	
2300 0000	Canada, CFRX Toronto ON	6070na	
2300 0000	Canada, CFVP Calgary AB	6030na	
2300 0000	Canada, CKZN St John's NF	6160na	
2300 0000	Canada, CKZU Vancouver BC	6160na	
2300 0000	China, China Radio Intl	5915as	5990va
	6145na	7180as	11685as
			11840na
			13750va
2300 0000	Costa Rica, University Network	9505am	9550am
2300 0000	Cuba, Radio Havana	9505am	
2300 0000	Guyana, Voice of 3291do		
2300 0000	Malaysia, RTM/Trax FM	7295as	
2300 0000	New Zealand, Radio NZ Intl	15720pa	
2300 0000 DRM	New Zealand, Radio NZ Intl	17675pa	
2300 0000	Papua New Guinea, NBC	9675do	
2300 0000 vl	Papua New Guinea, Wantok R. Light	7325va	
2300 0000	Singapore, MediaCorp Radio	6150do	
2300 0000 vl	Solomon Islands, SIBC	5020do	9545al
2300 0000	UK, BBC World Service	5965as	5985as
	9740as	11955as	
2300 0000	USA, American Forces Radio	4319usb	
	5446usb	5765usb	6350usb
		10320usb	12133usb
			13362usb
2300 0000	USA, KAIJ Dallas TX	9480va	
2300 0000	USA, KTBN Salt Lake City UT		15590na
2300 0000	USA, Voice of America	5910va	7120va
	7405va	9490va	11725va
			15185va
			7415va
			9330am
2300 0000	USA, WBOH Newport NC	5920am	
2300 0000	USA, WEWN Vandiver AL	7560va	9975na
2300 0000	USA, WHRA Greenbush ME	7520eu	
2300 0000 mtwhfa	USA, WHRI Cypress Creek SC	9575na	11765na
2300 0000 Sun	USA, WHRI Cypress Creek SC	7490na	
2300 0000 mtwhfa	USA, WHRI Cypress Creek SC	7315am	
2300 0000	USA, WINB Red Lion PA	9265am	
2300 0000	USA, WRMI Miami FL	9955am	
2300 0000	USA, WTJC Newport NC	9370na	
2300 0000	USA, WWCN Nashville TN	3215na	7465na
	9985na	13845na	
2300 0000	USA, WWRB Manchester TN	12180va	
2300 0000	USA, WYFR/Family Radio FL	9430am	
	11740na	15400am	
2300 2305 vl	Liberia, ELWA	4760do	
2300 2310	Croatia, Voice of Croatia	7285na	
2300 2315	Nigeria, Radio/Kaduna	4770do	6090al
2300 2315	USA, WYFR/Family Radio FL	11875af	
2300 2330	USA, Voice of America	6180va	7205va
	15150va		
2300 2330 whf	USA, WBCQ Monticello ME	17495va	
2300 2345	USA, WYFR/Family Radio FL	11740na	
2300 2345 DRM	Vatican City, Vatican Radio	7370am	
2300 2355	Turkey, Voice of	5960va	
2300 2356	Romania, Radio Romania Intl	6015va	
	6115va	7105va	9610va
2330 0000	Australia, Radio Australia	15415as	17750va
2330 0000 mtwhf	Austria, Radio Austria Intl	9870sa	
2330 0000	Lithuania, Radio Vilnius	9875na	
2330 0000 DRM	Sweden, Radio	9800na	
2330 0000	UK, BBC World Service	3915as	5935as
	5965as	6170as	6195as
		7340as	7105as
2330 0000	USA, Voice of America	6180va	7205va
	11655va	13640va	15150va
2330 2357	Czech Rep, Radio Prague	5930na	7345na
2335 0000 Sun	Austria, Radio Austria Intl	9870sa	
2343 0000 Sat	Austria, Radio Austria Intl	9870sa	

Monitoring the Jacksonville ARTCC

You may not have a military base near your monitoring location, but there is a way to monitor a lot of military aircraft traffic that may be transiting through your area of the country. If you program the frequencies for the Air Route Traffic Control Center (ARTCC) that serves your area, you will eventually hear some military aircraft traffic.

The Federal Aviation Administration defines an ARTCC as a facility established to provide air traffic control service to aircraft operating on instrument flight rules (IFR) flight plans within controlled airspace, principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to visual flight rules (VFR) aircraft. Pilots, controllers and monitors commonly call these facilities "centers."

The airspace controlled by a center is further administratively subdivided into sectors; each sector may use a distinct set of communications frequencies and personnel. An aircraft passing from one sector to another may be handed off and requested to change frequencies to contact the next sector controller.

Air traffic controllers working within a center communicate via radio with pilots of instrument flight rules aircraft passing through the center's airspace. A center's communication frequencies (typically in the 118 to 137 MHz (civilian) and 225 to 400 MHz (military) bands using the AM mode) are published in aeronautical charts and manuals, and will also be announced to a pilot by the previous controller during a hand-off.

In addition to radios to communicate with aircraft, center controllers have access to communication links with other centers and terminal radar approach controls (TRACON). In the United States, centers are electronically linked through the National Airspace System, which allows nationwide coordination of traffic flow to manage congestion. Centers in the United States also have electronic access to nationwide radar data.

Controllers use remotely controlled radar systems co-located with the communications equipment to monitor the progress of flights and instruct aircraft to perform course adjustments as needed to maintain separation from other aircraft. These remotely located radar/radio facilities are known as RCAGs (Radio Communications Air-to-Ground).

Now that you know what an ARTCC does, it's time to pass along some frequencies. *MT Milcom* regular reporter Jack NeSmith recently passed along the latest list of frequencies for the Jacksonville Air Route Traffic Control Center (ARTCC), located in Hilliard, Florida. (See Table 1.) Thanks, Jack, for passing along this valuable frequency list.

Table One: Jacksonville Air Route Traffic Control Center (ARTCC)

119.100/379.300	Panama City FL	Low - Panama Sector 27: App/Dep services	125.050/360.800	Tallahassee FL	High - Geneva Sector 33
120.125/307.050	Charleston SC	Ultra High - Knemo Sector 51	125.175/360.700	Lowell FL	High - Mayo Sector 16
120.200/346.400	Crestview FL	Low - Crestview Sector:10 App/Dep services	125.375/254.325	Lake City FL	Low - Taylor Sector 77
120.850/322.500	Savannah GA	Low - Allendale Sector 73: App/Dep services	125.750/263.150	Albany GA	Low - Taylor Sector 12: App/Dep services
121.500/243.000	Jacksonville (Hilliard) FL	International Emergency/Distress/Calling	126.125/285.650	Savannah GA	High - States Sector 68
124.075/351.700	Charleston SC	High - Summer Sector 47	126.350/307.250	St. Augustine FL	Low/High - St. Augustine Sector 58
124.475/323.050	Crestview FL	High - Brewton Sector 11	126.750/277.400	Brunswick GA	Low - Brunswick Sector 53: App/Dep services
124.675/282.200	Brunswick GA	Low - Jekyll Sector 54	127.475/346.250	St. Augustine FL	High - Green Cove Sector 75
124.700/269.550	Columbia SC	Low - Columbia Sector 72: App/Dep services (Midnight Sector)	127.800/352.000	Perry Foley FL	Low - Tallahassee Sector 28: App/Dep services
124.775/346.350	Panama City FL	Ultra High - Nepta Sector 30: Oceanic Control via Gulf Routes (Midnight Sector)	127.875/319.200	Colombia SC	High - Aiken Sector 32
			127.950/379.100	Charleston SC	Low - Charleston Sector 59: App/Dep services
			128.050/335.550	Lowell FL	Low - Darbs Sector 88
			128.075/307.200	Tallahassee FL	High - Seminole Sector 34 (Midnight Sector)
			128.425/291.700	Gainesville FL	Ultra High - Zephyr Sector 86
			128.625/380.250	Tallahassee FL	Ultra High - Micanopy Sector 85
			128.700/343.600	Myrtle Beach SC	Low - Charleston Sector 59: App/Dep services
			132.300/290.400	Alma GA	Low - Waycross Sector 29: App/Dep services
			132.425/290.350	Savannah GA	Ultra High - Hunter Sector 67
			132.500/363.200	Millen GA	Low - Allendale Sector 73: App/Dep services
			132.825/269.600	St. Augustine FL	Ultra High - Lawtey Sector 87
			133.300/346.300	Alma GA	Ultra High - Moultrie Sector 49 (Midnight Sector)
			133.325/269.250	Lowell FL	Low - Ocala Sector 15
			133.450/306.300	Florence SC	Low - Florence Sector 71: App/Dep services
			133.625/370.950	Charleston SC	High - Georgetown Sector 48
			133.700/256.900	Valdosta GA	Low - Baxly Sector 79: App/Dep services
			133.875/322.475	Lake City FL	High - Lake City Sector 78 (Midnight Sector)
			134.000/273.550	Daytona Beach FL	Low - St. Johns Sector 57
			134.150/338.300	Crestview FL	Low - Crestview Sector 10
			134.300/353.500	Dothan AL	Low - Ashburn Sector 13: App/Dep services
			134.450/381.550	Albany GA	Low - Ashburn Sector 13
			134.850/327.100	Daytona Beach FL	Low/High - Torry Sector 35
			134.850/327.100	Jacksonville FL	Low/High - Torry Sector 35
			134.975/278.300	Columbia SC	Ultra High - Ridgeway Sector 65
			135.050/none	Charleston SC	Low/High - Metta Sector 52: South Atlantic Control North of 31/30N
			135.050/273.525	Myrtle Beach SC	Low/High - Metta Sector 52: South Atlantic Control North of 31/30N
			135.325/380.250	Tallahassee FL	Low - Tallahassee Sector 28: App/Dep services (Mid-Shift Only)
			135.450/256.875	St. Augustine FL	High - Keystone Sector 76 (Midnight Sector)
			135.625/317.525	Valdosta GA	High - Perry Sector 17
			135.750/317.600	Lowell FL	Low - Cedar Key Sector 14: App/Dep services
			135.975/282.300	Alma GA	High - Alma Sector 50
			364.800		Various High Special Use TSU [Amber-03]

❖ Monitoring the New York ARTCC

We have recently received another update for the New York ARTCC. Table Two contains that list:

If you have up-to-date information on any of the air route traffic control center frequencies, please drop us an email or snail mail note and let us know what you are hearing.

Table Two: New York ARTCC

134.325/323.300	Millville NJ	High - Sector 09
133.475/270.300	Big Flat PA	High - Sector 10
132.500/322.500	Joliet PA	Low - Sector 11
135.450/335.600	Modena PA	Low - Sector 25
133.675/239.050	Joliet PA	Low - Sector 26
132.200/322.400	Big Flat PA	Low - Sector 27
132.175/298.900	Elk Mountain PA	High - Sector 34
132.600/285.500	Huguenot NY	Low - Sector 35
133.150/290.400	Elk Mountain PA	Low - Sector 36
132.100/339.800	Flint Hill PA	Low - Sector 39
127.175/350.300	Matawan NJ	High - Sector 42
121.325/273.600	North Mountain PA	High - Sector 49
133.350/372.000	Sayre PA	Low - Sector 50
134.450/363.200	Elk Mountain PA	Low - Sector 51
134.600/290.200	Flint Hill PA	Low - Sector 55
125.325/282.300	Matawan NJ	High - Sector 56
125.925/284.750	Barnstable MA	High Oceanic - Sector 65
128.300/353.500	Ship Bottom NJ	Low - Sector 66
118.975/307.800	Colts Neck NJ	Low - Sector 68
132.875/306.200	Philipsburg PA	High - Sector 73
133.500/282.350	North Mountain PA	Low - Sector 74
128.575/269.100	North Mountain PA	High - Sector 75
126.025/none	Unknown	High - Sector 82
133.325/none	Unknown	High - Sector 83
132.150/354.000	Barnegat NJ	High - Sector 86
134.800/338.300	Philipsburg PA	Low App/Dep services - Sector 91
124.625/278.300	Flint Hill PA	Low - Sector 92
123.625/279.550	North Mountain PA	Low App/Dep services - Sector 93
None/364.800	North Mountain PA	High Altitude [Amber-03]

Other Known Frequencies:
285.650 327.600 336.075

❖ Air Force Tanker Callsigns

I recently had a friend ask me about the callsigns used by US Air Force tankers. Here is my latest list of callsigns that have been monitored across the country and in Europe.

Callsign	Plane	Unit	Mission
Adobe ##	Various	Coronet Tanker Mission	
Agiule ##	KC-135	927ARW	Selfridge
Anker ##	KC-135	22ARW	McConnell
Aspen ##	KC-135	366 Wing	Mountain Home
Astra ##	KC-135	92ARW	Fairchild
Astro ##	KC-10	60AMW	Travis
Auto ##	KC-135	927ARW	Selfridge
Backe ##	KC-135	916ARW	Seymour Johnson
Bat ##		KC-135	185ARW Sioux City
Beach ##	KC-135	92ARW	Fairchild
Beak ##	KC-135	92ARW	Fairchild
Blue ##	Various	Coronet Tanker Mission	
Bobby ##	Various	Coronet Tanker Mission	
Bolt ##	KC-135	6ARW/	MacDill
Boom ##	KC-135	22ARW	McConnell
Cacti ##	Various	Coronet Tanker Mission	
Caesar ##	KC-135	121ARW/	Rickenbacker
Cafe ##	KC-10	305AMW	McGuire
Chena ##	KC-135	168ARW	Eielson
Claw ##	KC-10	305AMW	McGuire
Clown ##	KC-135	Pemco Aeroplex	Birmingham
Coder ##	KC-135	126ARW	Scott
Copper ##	KC-135	161ARW	Sky Harbor
Darr ##	KC-135	940ARW	Beale
Decee ##	KC-135	459AW	Andrews
Deuce ##	KC-10/KC-135	Various	McGuire
Dime ##	KC-10	NATO Alliance	Europe
Dinar ##	KC-10/KC-135	NATO Alliance	Europe

Dixie ##	KC-135	117ARW	Birmingham
Dollar ##	KC-10/KC-135	NATO Alliance	Europe
Duce ##	KC-10	305AMW	McGuire
Earl ##	KC-135	92ARW	Fairchild
Eskan ##	KC-135	6ARW	MacDill
Esso ##	KC-135	141ARW	Fairchild
Ethyl ##	KC-10	305AMW	McGuire
Evac #####	KC-10/KC-135	Various units	
Force ##	KC-10	305AMW	McGuire
Frank ##	KC-10	NATO Alliance	Europe
Fuzzy ##	KC-135	107ARW	Niagara Falls
Gassr ##	KC-135	97AMW	Altus AFB
Ghost 8#	KC-10	412TW	Edwards
Gilder	KC-10/KC-135	NATO Alliance	Europe
Gold ##	Various	Coronet Tanker Mission	
Grizzly ##	KC-135	163ARW	March
Gucci ##	KC-10	60AMW	Travis
Gunfighter ##	KC-135	366 Wing	Mountain Home
Happy ##	KC-135	126ARW	Scott AFB
Hire ##	KC-135	19ARG	Robins
Hoist ##	KC-10	305AMW	McGuire
Hoku ##	KC-135	154 Wing	Hickam
Hoser ##	KC-135	108ARW	McGuire
Huskr ##	KC-135	155ARW	Lincoln
Indy ##	KC-135	434ARW	Grissom
Irish ##	KC-135	434ARW	Grissom
Jake ##	KC-135	186ARW	Meridian
Jersey ##	KC-135	108ARW	McGuire
Jest ##	KC-135	97AMW	Altus
Juno ##	KC-135	19ARG	Robins
Kanza ##	KC-135	931ARW	McConnell
Keys ##	KC-135	186ARW	Meridian
Knight ##	KC-135	92ARW	Fairchild
Lobby ##	KC-135	6ARW	MacDill
Maine ##	KC-135	101ARW	Bangor
Mash ##	KC-135	434ARW	Grissom
Mogas 45	KC-135	319ARW	Grand Forks
Mover ##	KC-10	305AMW	McGuire
Nickel ##	KC-10	NATO Alliance	Europe
Okie ##	KC-135	507ARW	Tinker
Pack ##	KC-135	157ARW	Pease
Pemco ##	KC-135	Pemco Aeroplex	Birmingham
Petro ##	Various	Coronet Tanker Mission	
Piston ##	KC-135	927ARW	Selfridge
Power ##	KC-135	107ARW	Niagara Falls
Primo ##	KC-10	60AMW	Travis
Quest ##	KC-10	60AMW	Travis
Quid ##	KC-135	100ARW	Mildenhall
Raid ##	KC-135	319ARW	Grand Forks
Ratt ##	KC-135	452AMW	March
Reach #####	KC-10/KC-135	Various units	
Rhett ##	KC-135	19ARG	Robins
Roach ##	KC-135	452AMW	March
Rocco ##	KC-135	108ARW	McGuire
Roving ##	KC-10/KC-135	NORAD CAP Tanker Mission	
Sheena ##	KC-135	168ARW	Eielson
Sierra ##	KC-10	60AMW	Travis
Sluff ##	KC-135	121ARW	Rickenbacker
Soda ##	KC-135	134ARW	McGhee Tyson
Start ##	KC-135	18 Wing	Kadena
Steel ##	KC-135	171ARW	Pittsburgh
Sting ##	KC-135	22ARW	McConnell
Stout ##	KC-135	939ARW	Portland
Tahoe ##	KC-135	940ARW	Beale
Tanker ##	KC-10/KC-135	NORAD CAP Tanker Mission	
Tazz ##	KC-135	121ARW	Rickenbacker
Team ##	KC-10	305AMW	McGuire
Tempo ##	KC-135	190ARW	Topeka
Texaco ##	KC-135	121ARW	Rickenbacker
Tina ##	KC-135	168ARW	Eielson
Toga ##	KC-10	60AMW	Travis
Topcat ##	KC-135	108ARW	McGuire
Tora ##	KC-135	18 Wing	Kadena
Turbo ##	KC-135	22ARW	McConnell
Upset ##	KC-135	128ARW	Milwaukee
Utah ##	KC-135	151ARW	Salt Lake City
Vega ##	KC-10	60AMW	Travis
Woodn ##	Various	Coronet Tanker Mission	
Woody ##	KC-135	92ARW	Fairchild
Wylie ##	KC-135	190ARW	Topeka

And that does it for this month. Next month we present our annual air show monitoring guide. If you are a fan of air shows, this is one issue of *MT* you should not miss. Until next time, 73 and good hunting.

FM, FM Everywhere

OK, enough for the nostalgia (grin)... Last time, we delved back into the 1920s. This month, it's back to the future.

The FCC generally only accepts applications for new broadcast stations during "filing windows." Applicants may prepare applications at any time, but they may only be submitted during occasional windows of roughly a week's duration. One such window was opened, specifically for new non-commercial FM radio stations, between October 12th and the 22nd of last year.

This was the first time such applications have been accepted in seven years. You might imagine there would be a lot of pent-up demand, and you'd be right: 3,630 applications were filed. This does not mean there will be 3,630 new FM stations. Many of these applications have already been dismissed and many more will be rejected over the next few months.

To speed processing, the FCC announced that only applications filed over the **fcc.gov website** would be accepted. Several dozen applications that had been filed with the old paper forms were rejected.

A filing window for FM *translators* – low-power relay stations – in 2003 resulted in 13,000 applications. The Commission still hasn't sorted them all out. To prevent a repeat of this free-for-all, they announced that a single applicant in the non-commercial FM window would be limited to ten applications. Several applicants exceeded this limit. (One might think they ignored it, but I suspect some plan to challenge the limit in court.) These applications – any beyond ten from the same organization – have been dismissed.

Eight applicants filed for Class D stations – stations with less than 100 watts of power. New Class D stations are not allowed outside Alaska. One of the eight was the Hoonah, Alaska School District, which probably will get a station – but the other seven have been dismissed. One of these applicants actually believed he could get a license for a new radio station in New York City!

Other stations proposed locations too close to other stations on the same or nearby frequencies. They proposed locations too far from the city they proposed to serve – facilities that wouldn't cover at least half the city's area or population. They proposed directional antennas that were "too directional": FM regulations require that the power in the direction of minimum signal can't be less than 15dB below the power in the direction of maximum signal. All were dismissed.

Quite a few applicants specified powers

either too high or too low for their station class. The Milwaukee Symphony Orchestra applied for a 70,000-watt Class B station in Saukville, Wisconsin: the power limit for Class B stations is 50,000 watts, and Saukville is in Zone I where more powerful Class C stations are not permitted. Three applications were filed for 3,000,000-watt Class A stations – if built, these would be by far the most powerful FM stations in existence – but the power limit for Class A is 6,000 watts. (I suspect the applicants meant to apply for 3,000 watts but entered 3,000 kilowatts by mistake – might they be allowed to correct their errors?) An application for an 8,000-watt Class B station near Rockford, Illinois, is not likely to see the light of day: Class B stations must operate using at least 25,000 watts. More dismissals.

Many valid applications will not result in stations, either. Many are mutually-exclusive with other applications. Ten different organizations filed for the use of 88.5MHz in the greater Milwaukee area; only one of these can be granted. Applicants are being given a few months to work out private solutions to these situations. Some will amend their applications to remove the conflicts – reducing power, moving the tower, proposing a directional antenna, etc. Others will negotiate agreements with other applicants to withdraw their applications.

But in the end, some (probably many) conflicts will remain. For commercial stations, the conflict would be resolved through an auction. The channel would go to the highest bidder, and the money to the government. However, non-commercial stations use a point system. An applicant gets three points for being locally-based (headquarters or 3/4 of its board members within 25 miles). Two points are awarded if the applicant owns no other broadcast stations. Two points are also awarded if the applicant is a state agency with a statewide network. One or

two points can be awarded to applicants with significantly better coverage.

If points don't resolve the conflicts, three tie-breakers are provided: First, the applicant with the fewest existing stations; next, the applicant with the fewest pending applications. Finally, if a conflict remains after the tie-breakers, all the conflicting applications will be granted – with the stations expected to share time.

This method has already been used once, earlier in 2007. Most of the conflicts were in Iowa. The state's public radio organizations seem to have had the most success in the conflict-resolution system. This is probably because most of the larger competing organizations were based out-of-state and could only qualify for one or two points for coverage; while the smaller competing organizations might have qualified for three points for localism but offered inferior coverage areas. Will it work out the same way this time? Stay tuned...

There were some applications that *didn't* conflict. 270 "singletons" have been identified. By the time you read this, unless some serious errors are found in their applications, most or all of these will have already been granted. Many of these are in isolated areas, like Dillingham, Alaska (89.9 for the Dillingham City School District) or West Yellowstone, Montana. (91.7 for BYU-Idaho) On the other hand, a new station will be appearing in the Florida Panhandle (91.1 for Radio Marianna, Inc.) and in the western suburbs of Madison, Wisconsin. (90.9 for Pierced Communications in Cross Plains)

❖ TV on the Radio

Or is it Radio on the TV? Also in October, DXers started reporting a very strong station broadcasting in Russian on 87.9 MHz in the New York City area. IDs sounded like "WNYC." This



It says KIDO but it's really KFXD. The two Boise, Idaho, stations swapped call letters in 2002.

appears to be a TV station, WNYZ-LP channel 6, licensed for 3,000 watts from a site on Brighton Beach in Brooklyn. The audio channel of an analog TV-6 station is on 87.75 MHz (+/-10 kHz) and can be received on many FM radios; indeed, some TV stations promote this fact. (I've seen billboards in southern Illinois suggesting motorists tune to 87.7 to hear WPSD-TV audio.) Four low-power TV stations are known to have taken advantage of this phenomenon by operating as radio stations: WNYZ; KZND in Anchorage, Alaska (modern rock); KSFV Los Angeles (tropical/Caribbean); and K06NC Kauai, Hawaii (contemporary music). Something seems to be different with WNYZ, though.

Firstly, WNYZ's signal is *strong!* I have reports of it being heard as far away as Delaware, and on a car radio 90 miles away in southern New Jersey. Some listeners claim it's stronger than the New York stations that actually are radio stations.

Secondly, it's *loud!* As you may remember, "FM" stands for "frequency modulation" – the station's frequency is changed slightly, in step with the program being broadcast. For FM broadcasting stations, the maximum frequency change is 75 kHz. For TV sound (which is also frequency modulated), the maximum frequency change is limited to 25 kHz. Therefore, WNYZ should sound rather quiet when monitored on a FM radio – it should only come up to -8 or so on an audio meter. But listeners are reporting WNYZ is as loud as a regular FM radio station.

Thirdly, it's on the *wrong frequency!* I've got five reliable reporters insisting the station is in fact on 87.9 MHz, not 87.76 where it should be. The sound of WPVI-TV in Philadelphia (a channel 6 TV station that actually thinks it's a TV station <grin>) is being heard, lower on the dial than WNYZ – WNYZ is well above its licensed frequency. While their website says they're on 87.7, press releases indicate the station has changed frequency to 87.88.

None of the reporters I've heard from can prove that WNYZ-LP is running too much power, nor that it's overmodulating. However, they seem quite certain that the station is operating much higher in frequency than they should be – and the station itself seems to be admitting as much. They seem to think it's legal. I can't find a way to justify it in the FCC regulations. It will be *very* interesting to see what happens with this station!

❖ IBOC

No news is, well, no news. Nothing noteworthy has happened on the IBOC front since last time. The ABC/Citadel stations still aren't running their digital signals at night. I can't recall the last time a new IBOC-AM station has been reported (though IBOC-FM does seem to continue to grow, slowly).

The Canadian Digital Radio Co-ordinating Group has released its report. This group was formed to study the technical issues involved in expanding IBOC digital radio into Canada. Members represented commercial and non-commercial broadcasters; technical researchers and consultants; and the regulatory agencies.

The Group decided that U.S. studies

have not adequately proven that IBOC can be implemented without causing interference. They called for additional studies north of the border. Canada has not yet tested IBOC on AM (and doesn't seem inclined to do so). The Group did find harmful interference caused by IBOC tests on Toronto's CIBC-FM (90.3) to analog station CBLA-FM-1 (90.5) in the Niagara Falls area.

❖ Till next month

Some of the new FM stations may now be on the air – have you heard any of them? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

WEBSITES IN THIS MONTH'S COLUMN:

<http://americanbandscan.blogspot.com>
My AM DX blog
www.vseru.com/ WNYZ-LP channel 6, a.k.a. 87.7 FM. (site is in Russian)
<http://biz.yahoo.com/prnews/071114/nyw136.html?v=101> Press release indicating WNYZ-LP is on 87.88MHz.
www.ccbroadcasters.com/filingwindow.htm more information on filing windows – how they work and why.
www.cab-acr.ca/english/radio/dab/DRCG_Report_final.pdf Final report of the Canadian Digital Radio Co-ordinating Group.
www.stopiboc.com/ A group of radio engineers fighting IBOC.

AMERICAN BANDSCAN STATION REPORT

NEW

New station permits granted:

Ewa Beach, Hawaii	1320	5,000/5,000 ND
Dalhart, Texas	1600	3,000/250 DA-N

CHANGES

Stations granted moves to new cities:

University City, Mo.	1190	KRFT	from DeSoto; 10,000/6,500 DA-2.
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Granted, rescinded, and granted again.

Frequency changes granted:

Brookfield, Mo.	1210	KFMZ	from 1470; 5,000/50 DA-2
Huntington, W. Va.	1200	WEMM	from 1470; 22,000/9 ND

Stations moved to new frequencies:

Cantonment, Fla.	1070	WNVY	from 1090; 15,000/28 ND
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Stations deleted:

Taunton, Mass.	1570	WPEP	surrendered license to FCC for cancellation. Will allow WNSH Beverly to increase power.
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Call letters changed:

Centre, Ala.	1560	WLYJ	from WZTQ
Fairhope, Ala.	660	WWFF	from WDLT
Gadsden, Ala.	1350	WJBY	from WGAD
Jasper, Ala.	1240	WZTQ	from WLYJ
Rainbow City, Ala.	930	WGAD	from WJBY
Beverly Hills, Cal.	1260	KGIL	from KMZT
Washington, D.C.	1500	WWWT	from WTWP
Coral Gables, Fla.	1080	WMCU	from WTPS
Elberton, Ga.	1400	WSGC	from WNGA
Honolulu, Hawaii	690	KHNR	from KHCM
Honolulu, Hawaii	880	KHCM	from KHNR
Muncie, Ind.	990	WRFM	from WLHN
Williamsburg, Ky.	1440	WCWC	from WEZJ
Frederick, Md.	820	WWWB	from WTWT
Moorhead, Minn.	1280	KVXR	from KVOX
Watertown, Minn.	1600	KPNP	from KZGX
Manchester, N.H.	1250	WGAM	from WKBR
Nashua, N.H.	900	WGHM	from WGAM
Newport, N.H.	1010	WCNL	from WNTK
Cortland, N.Y.	920	WYBY	from WKRT
Rensselaer, N.Y.	1300	WTMM	from WEEV
Fargo, N.D.	740	KVOX	from KKAG
Huntingdon, Tenn.	1530	WWDX	from WDAP
Midland, Tex.	1150	KVDG	from KJBC
San Saba, Tex.	1410	KNVR	from KBAL
Warrenton, Va.	1250	WKDL	from WPRZ
Newport, Tenn.	1060	WGGQ	from WNPC
Marion, Va.	1330	WITM	from WHGB
Petersburg, Va.	1240	WTPS	from WROU
Auburn, Wash.	1210	KTBK	from KWOM
Sunnyside, Wash.	1230	KDYM	from KZTS
Union Gap, Wash.	1020	KDYK	from KYXE

Call letters assigned to new stations:

Wink, Tex.	1480	KNIW
Quantico, Va.	920	WURA
Jackson, Wyo.	1490	KJNT

ND: non-directional

DA-N: directional at night only

DA-D: directional during daytime only

DA-2: directional all hours, two different patterns

Radar, ADS-B, and the Future

No doubt you have noticed large rotating radar antennas near some airports or elsewhere. Most of what you can see is a reflector for focusing the transmitted radar signal into the distance and for collecting what is reflected back from objects that encounter the beam. Let's explore how this works and look at what the future may hold!

❖ Primary Surveillance Radar (PSR)

Air Traffic Control (ATC) radar came into being after WWII as an outgrowth of military radar. PSR formed the building block upon which more advanced radar technologies have evolved.

The rotation of a radar antenna and the controller's display (the "radar screen") are precisely synchronized. That is, the screen is refreshed or redrawn at the same rate that the antenna rotates. If at a given instant, the antenna is pointed 130 degrees clockwise from north, the refresh line on the screen will be at 130 degrees from north. Should there be an aircraft out there in that exact direction within radar range, it will be added to the scope presentation in that direction.

Transmitted radar signals (microwave radio energy) in this ATC application are sent out as a stream of continuous but very brief and uniform pulses. The system listens in between

the transmitted pulses for any reflected energy from aircraft, often called "targets."

Radar signals, like light waves, travel very fast but not so fast that the time it takes for a pulse to go out and return from a target can't be measured accurately. Targets closer to the antenna have pulses with shorter round trip times. Assuming the controller is looking at a round radar display with the antenna represented at its center, the targets that are closer to the antenna are shown on the display closer its center – all based on pulse round-trip time.

With a radar of this simpler level of sophistication, the controller simply sees unidentified "blips" or bright spots of varying distinctness, directions, and distances from the center. The quality of any blip depends on the size of the plane, how reflective it is, and the distance it is from the radar antenna. Direction and speed of flight with such a radar system is determined by observing targets through several sweeps of the antenna to refresh the display. Each rotation takes twelve seconds for longer distance enroute radars and about five seconds for terminal area radars.

It may surprise some readers to realize that PSR systems acquire no aircraft altitude information, just direction and distance. The distance is actually called "range," which is the diagonal (slant range) and not the horizontal distance to the aircraft. The direction is more properly called "azimuth."

❖ Secondary Surveillance Radar (SSR)

Located above the PSR antenna on the same rotating structure is a smaller and flatter antenna, the SSR antenna (see image). It, too, sends out pulses but different in frequency from the radar signals. These SSR pulses interrogate transponders, specialized receiver-transmitters onboard aircraft. This development was a major step up from a radar beam just reflecting off aircraft since the transponders send back a transmitted return with significantly greater power – and with information, all resulting in computer-enhanced targets on radar displays.

Squawk Codes: As you listen to aircraft communications on your scanner, you will hear the term "squawk." A squawk code, also known as "a transponder code," "a beacon code," or, more formally as an "Air Traffic Control Radar Beacon System (ATCRBS) code" consists of four numerical digits.

The FAA computers use squawk codes to identify and to keep track of the aircraft in their

systems and on their displays. The *National Beacon Code Allocation Plan* allocates blocks of codes to the different ATC facilities and for certain flight activities.

The controller-assigned squawk codes (zero to seven for each digit) are entered by the pilot on the transponder control panel, see photo. There are only 4096 possible squawk codes so some must be repeated – but in separated parts of the country. The replies from transponders include the squawk codes in the data that they send.

Squawk codes are assigned to aircraft flying under Instrument Flight Rules (IFR) and given to pilots by controllers while on the ground prior to a flight. They also are assigned during flight to aircraft flying under Visual Flight Rules (VFR) that request radar "Flight Following."

When a pilot cancels his IFR Flight Plan and continues VFR, or when proceeding VFR from a controlled airspace boundary, or when Flight Following is discontinued, you will hear the controller say, "Radar service terminated, squawk VFR (a squawk setting of 1200), frequency change approved."

Data Blocks: ATC radar displays include alphanumeric "data blocks" next to each displayed aircraft. The data blocks follow aircraft on the display giving information about the flight, and for airliners for example, display the airline three-letter code, the flight number, altitude, and whether the plane is ascending, descending, or level. There can also be other limited info. Data blocks, as presented by FlightAware, give the idea. Go to <http://flightaware.com/live/airport/KMEM> as an example, and then click on the map at the upper right.

Altitude: PSR acquires range and azimuth information for each aircraft but not the altitude. How does an aircraft's altitude information end up appearing in the data block on the display? A barometric altimeter on the aircraft inputs the altitude information into the transponder's "Mode C" reply, thus the controller knows the aircraft's "reported altitude" – and ideally, its correct altitude. It reports altitude in hundred foot increments. Occasionally, you will hear a controller say: "I'm not receiving your Mode C," which means that he is not receiving altitude information.

Mode A / Mode C: A transponder will respond to a Mode A interrogation from the ground by sending the squawk code dialed in by the pilot. It will respond to a Mode C interrogation by sending the aircraft's altitude. The



Pictured here is a single rotating structure, the lower part being the Primary Surveillance Radar (PSR) antenna and topped by the long rectangular Secondary Surveillance Radar (SSR) antenna. Photo courtesy Raytheon Company.

PSR and the much stronger SSR data along with some controller input are crunched and combined by FAA computers. This results in computer enhanced targets and each accompanied by a data block. (Note: Military Mode 3 is the same as civilian Mode A and is sometimes written as "Mode 3/A.")

The Mode A and Mode C interrogations each contain three precise pulses but differ in their spacing – somewhat analogous to a lock and key. The interrogations are sent out on 1030 MHz and transponders reply on 1090 MHz. These two, as well as other types of interrogations, share the same frequency and therefore are sequenced one after another.

Mode C equipped transponders are FAA required in Class A, Class B, and Class C airspace areas and in all airspace within 30 nautical miles, and up to 10,000 feet MSL, of specified airports. [For more info on airspace and altitude, see *MT Planes* column for August 2007 *Airspace* and August 2005 *Altitudes, Altimeters, Settings, and More*. For *MT Anthologies*, see www.grove-ent.com/SWMWBOOKS.html]

IDENT: You may hear a controller say, "Squawk 4243 (or whatever code) and



This KT-70 transponder is set to squawk 1200 – the number at the right. Each of the four knobs selects a digit. The IDENT button is at the top left. Photo courtesy Bendix/King AlliedSignal.

IDENT. When the pilot presses the IDENT button on the transponder panel, it will cause the plane to stand out briefly on a busy scope presentation so the controller can find it quickly.

Video Maps: As radar evolved, overlays and "video maps" were added electronically to the radar displays. These show airports, NAVAIDS, navigational fixes, reporting points, airways and routes, a variety of airspace boundaries, controller handoff points, obstructions, prominent geographic features, and more. The immense value to controllers and the ATC process is obvious.

❖ Mode S

This is a step in the evolution beyond Mode A/Mode C ATCRBS transponders. The plan is to phase out ATCRBS with four-digit, temporarily-assigned squawk codes. Mode S uses unique address codes that are assigned for the life of each aircraft.

Mode S operates on the same frequencies as ATCRBS and aircraft will still reply to Mode A and C interrogations.

Instead of routinely interrogating all aircraft in a given direction in a blanket fashion, SSR can optionally send individually addressed interrogations using a Mode S unique address code.

Mode S transponders periodically squitter (transmit without being interrogated) their address code and other data to establish their

presence with other aircraft equipped with Traffic Alert and Collision Avoidance Systems (TCAS) II and with ground stations, see: www.allstar.fiu.edu/AERO/TCAS.htm

❖ Automatic Dependent Surveillance-Broadcast (ADS-B)

The FAA is banking on ADS-B, a major component of NexGen (Next Generation Air Transportation System). In late August 2007, ITT Corporation was awarded a three-year contract for \$207 million to lead the U.S. development of the ADS-B program. Ground station coverage is hoped for by 2013. Through year 2025, the projected full implementation date, subsequent contracts will total some tens of billions of dollars!

This will be a major system change and is driven by evermore crowded skies with increased needs for accuracy, fast update speed, capacity, pilot situational awareness, cost-effectiveness, and safety.

In the simplest terms, aircraft will use onboard equipment to take advantage of navigation satellites, such as the Global Positioning System (GPS), to learn of their own precise locations in the airspace. Aircraft will then squitter this, and other digital data once per second for all to hear, which is called "ADS-B Out." ADS-B differs from what has existed for decades, since the FAA has had to reach out to acquire the information via PSR and SSR, whereas with the new system, aircraft will broadcast it without being asked or interrogated.

The same data will also be received by a system of networked Ground Based Transceivers (GBTs) and from there will be routed to Air Traffic Control facilities and to controllers for presentation on their displays.

"ADS-B In" also includes data from Traffic Information Service - Broadcasts (TIS-B) and Flight Information Service - Broadcasts (FIS-B).

TIS-B will provide data from the ground-based sensors such as PSR and SSR in addition to that acquired directly by aircraft.

FIS-B can uplink weather graphics and text, Temporary Flight Restrictions (TFRs), Notices to Airmen (NOTAMs), Special Use Airspace (SUA) status, Digital Automated Terminal Information Service (D-ATIS), and more.

Competing Systems: And then.... there are two competing but complementary ADS-B technologies – and not without some controversy. One is the 1090 MHz Extended Squitter (1090ES) on 1090 MHz, and the other is Universal Access Transceiver (UAT) on 978 MHz. The FAA is proposing that "aircraft flying at or above FL240 have ADS-B Out performance capability using the 1090ES broadcast link. For operations below FL240, operators could equip their aircraft with either the 1090ES or UAT broadcast links."

Both 1090ES and UAT support TIS-B. FIS-B, however, has a greater bandwidth requirement that can only be met by UAT. The "dual link decision" means that ground stations

must uplink data using both protocols.

ADS-B will also work for aircraft on the ground, at low altitude, in many remote areas, and in mountainous terrain where our current radar systems have little or no capability. This can be done plane-to-plane, but for TIS-B capability and for Air Traffic Controllers to become involved, it will depend on the planned placement of hundreds of GBTs scattered around the country – some reportedly even being at specially equipped cell phone towers.

ADS-B equipment can be installed in airport service and emergency vehicles that operate on airport taxiways and runways and can be used to mark fixed and movable obstacles to broadcast their existence so they will appear on aircraft and controller displays.

As a hobby aircraft listener, I cannot help but wonder if hobbyists will have fully capable ADS-B displays for home use. Current products already exist along these lines which listen on 1090 MHz. One is the "SBS-1 Real-Time Virtual Radar" www.kinetic-avionics.co.uk/sbs-1.php and the more recent market entry, the AirNav "RadarBox" www.airnavsystems.com/radarbox/

❖ The Future

ADS-B has been demonstrated to be successful but it is not intended to be a total surveillance system replacement. About half of the current SSR systems are proposed to remain in operation beyond 2020. The plan is to retain all the PSR systems in terminal areas – all this as a ground system back-up and to aid aircraft experiencing avionics failures. ADS-B is major. It is very expensive. It will take many years, will include transitional stages of implementation, and likely have midcourse design changes along the way. It will be interesting to see how it all unfolds.

Books by Ernest H. Robl:

THE BASIC RAILFAN BOOK

UNDERSTANDING INTERMODAL

THE POWDER RIVER BASIN

Detailed descriptions at

<http://www.robl.w1.com>

Longwave Resources

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

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

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

Loggings Bonanza

We have a huge list of loggings this month, thanks to the excellent winter receiving conditions on LF. The list is so extensive, that I had to limit the coverage from 25 to 345 kHz for this issue. The remaining logs will be presented next time. I occasionally cross-post loggings from LWCA members and *MT* readers to provide the widest possible sampling of “who’s hearing what” on the longwave band. This month’s list reflects that change.

Do you have some loggings you’d like to send in? Simply e-mail them to the address in the masthead, but please use the free Loggings Template available for download at www.monitoringtimes.com/html/below_500_khz.html. Using the template will help streamline the process of compiling logs and keep things in a consistent format. I look forward to hearing from you!

Our contributors this month are identified by their initials and state in the Loggings table below. Detailed information for each contributor is as follows:

B.S. (MA): Bill Smith, W1OW, Douglas, MA. Bill uses an FT847 Receiver, and a 463-foot long-wire antenna, NW/SE, 14 feet high.

J.C. (WI): John Collins, KN1H, Charlestown, NH. Loggings made with an IC-R75 Receiver with DSP-599zx filter.

K.G. (WI): Kevin Graniero, KF9AQ, Madison, WI. Kevin uses a TS-440 Transceiver w/Butternut HF2V 40/80/160 vertical antenna.

R.H. (MI): Russ Hill, Oak Park, MI. Receiver is a Kenwood R-5000, w/ Datong FL-3 filter, Palomar loop antenna.

R.P. (AZ): Richard Palmer, W7KAM, Green Valley, AZ. Loggings made with an Icom R75 Receiver, Timewave DSP599zx Audio Noise Reduction Filter, Home brew active whip with amplifier, 13 feet high.

S.R. (OR): Steve Ratzlaff, Elgin, OR. Steve uses an Icom R75 Receiver w/external audio filter, 1600-foot E/W wire, 400-foot N/S wire.

W.H. (ON): William R. Hepburn, Grimsby, ON.

Receiver is a JRC NRD-535D with Wellbrook ALA1530 loop antenna, 57-foot longwire antenna with magnetic balun. Also using Universal M-7000 decoder, & Quantum phaser.

TABLE 1. SELECTED LF LOGGINGS (25-345 kHz)

FREQ	ID	ST/PR/ITU*	CITY	BY
25.2	NML4	ND	Lamoure	W.H. (ON)
45.9	NSY	I	Signonella	W.H. (ON)
68	GBY20	G	Rugby	W.H. (ON)
68.5	BPC	CHN	Henan Shangqui	S.R. (OR)
82.75	GYB	G	London	W.H. (ON)
198	DIW	NC	Dixon	B.S. (MA)
199	GAO	LA	Lafourche	R.P. (AZ)
200	HXF	WI	Hartford	K.G. (WI)
200	UAB	BC	Anahim Lake	W.H. (ON)
205	ORE	MA	Orange	B.S. (MA)
206	YI	NS	Yarmouth	B.S. (MA)
209	DKB	IL	Dekalb	K.G. (WI)
209	MQ	J	Miyako	R.P. (AZ)
212	SJ	NB	Saint John	B.S. (MA)
214	XA	J	Oshima	R.P. (AZ)
215	DLZ	OH	Delaware	W.H. (ON)
215	PZQ	MI	Rogers City	W.H. (ON)
219	GAV	ALS	Gustavus	R.P. (AZ)
223	YYW	ON	Armstrong	K.G. (WI)
227	LCE	HND	La Ceiba	R.P. (AZ)
227	TAN	MA	Taunton	B.S. (MA)
230	BNZ	LA	Abbeville	R.P. (AZ)
242	GM	WI	Milwaukee	K.G. (WI)
245	CB	NU	Cambridge Bay	R.P. (AZ)
248	FRT	SC	Spartanburg	B.S. (MA)
248	MBJ	JMC	Montego Bay	R.P. (AZ)
254	EUD	PA	York	B.S. (MA)
254	SM	NT	Fort Smith	R.P. (AZ)
257	FFF	MA	Plymouth	B.S. (MA)
260	NF	NFK	Norfolk Island	R.P. (AZ)
263	UYF	OH	London	W.H. (ON)
270	FA	SMO	Upolo	R.P. (AZ)
270	TST	??	UNID	R.P. (AZ)
272	YQA	ON	Muskoka	B.S. (MA)
273	ZV	QC	Sept Iles	B.S. (MA)
276	LAH	NH	Lebanon	B.S. (MA)
276	TVL	AUS	Townsville	S.R. (OR)
276	YEL	ON	Elliott Lake	B.S. (MA)
276	YHR	QC	Chevery	B.S. (MA)
278	BST	ME	Belfast	B.S. (MA)
280	IPA	PAQ	Easter Island	R.P. (AZ)
281	DEQ	AR	DeQueen	R.H. (MI)
281	VIR	ALS	Pt. Barrow	S.R. (OR)
282	OXD	OH	Oxford	R.H. (MI)
282	ROS	MN	Rush City (AWOS)	W.H. (ON)
283	RT	OCE	Rurutu	R.P. (AZ)
285	MH	OCE	Manihi Atoll	R.P. (AZ)
289	#765	KS	Topeka (DGPS)	W.H. (ON)
289	YLQ	QC	La Tuque	B.S. (MA)
300	LAP	MEX	La Paz	R.P. (AZ)
303	YPP	ON	Parent	B.S. (MA)
304	#777	WI	Mequon (DGPS)	W.H. (ON)
305	#782	TN	Dandridge (DGPS)	W.H. (ON)
307	NA	FJI	Nausori	S.R. (OR)
311	CH	AUS	Coffs Harbour	S.R. (OR)
316	MAJ	MHL	Majuro	R.P. (AZ)
322	#862	MO	St. Louis (DGPS)	W.H. (ON)
322	UWP	NL	Argentina	B.S. (MA)
323	PNX	??	UNID	R.P. (AZ)
326	VV	ON	Warton	B.S. (MA)
327	VYI	HWA	Valley Island	S.R. (OR)

328	BZJ	PA	Indiantown Gap	B.S. (MA)
328	LC	NH	Laconia	B.S. (MA)
329	YHN	ON	Hornepayne	K.G. (WI)
330	MUI-E	??	UNID	W.H. (ON)
332	BG	NY	Binghamton	W.H. (ON)
332	FIS	FL	Key West	J.C. (WI)
332	POA	HI	Pahoa	R.P. (AZ)
332	QT	ON	Thunderbay	K.G. (WI)
332	YFM	QC	La Grande	B.S. (MA)
333	AA	OCE	Anaa	R.P. (AZ)
334	BNR	OH	Findlay	W.H. (ON)
334	RM	ME	Rockland	J.C. (WI)
335	MK	VA	Marion	J.C. (WI)
335	YLD	ON	Chapleau	K.G. (WI)
336	BDB	VA	Melfa	J.C. (WI)
336	BV	QC	Champlain	B.S. (MA)
338	5Y	NS	Trenton	W.H. (ON)
338	NA	QC	Natash	B.S. (MA)
340	BOG	CLM	Bogota	J.C. (WI)
340	GN	KY	Lexington	W.H. (ON)
341	CCJ	OH	Springfield	B.S. (MA)
341	DB	YT	Burwash Landing	R.P. (AZ)
341	HVS	SC	Hartsville	B.S. (MA)
341	PRG	IL	Paris	W.H. (ON)
344	BKU	MT	Baker	R.H. (MI)
344	JA	FL	Jacksonville	J.C. (WI)
344	LNT	ME	Millinocket	J.C. (WI)
344	UNU	WI	Juneau	K.G. (WI)
344	YC	AB	Calgary	R.H. (MI)
344	ZIY	CYM	Georgetown	J.C. (WI)
345	BGI	BRB	Bridgetown	J.C. (WI)
345	FOZ	MN	Bigfork (AWOS)	W.H. (ON)

* For a complete list of ITU codes, see www.worldq.com/definition/ITU_letter_codes

ARRL News

From *The ARRL Letter*, Vol. 26, No. 47 comes the following news on the 500 KC Experimental Group... 500 kHz Experiment Charting New Territory: The evening of November 13 saw the first transatlantic contact on 500 kHz between amateur experimental stations. US experimental station WE2XGR/2 (Jay Rusgrove, W1VD, in Connecticut) and GI4DPE (Finbar O'Connor, EI0CF, in Northern Ireland) communicated by standard-speed CW for about 15 minutes. On that same night, US experimental stations WD2XSH/12 (Mike Mussler, AI8Z, in Colorado) and WD2XSH/20 (Rudy Severns, N6LF, in Oregon) made the first contact in the western half of the USA.

Two days later, WE2XGR/2 and GI4DPE repeated their feat and WD2XSH/12 had contacts with WD2XSH/6 (Pat Hamel, W5THT, in Mississippi) and WD2XSH/13 (John Oehlenschlager, K0JO, in Minnesota). The ARRL 500 kHz experimental license, WD2XSH, was issued in September 2006 and has 19 active stations. Fritz Raab, W1FR, of Vermont, serves as experimental project manager for The 500 KC Experimental Group for Amateur Radio (www.500kc.com/).

See you next month!



Here's a shot of beacon MS, 400 kHz in Mono-na, Wisconsin (Courtesy Mike Leahan).

East St. Louis Toodle-oo

Direct from the operator we have highly unusual news about the numbers station parody that we listed in prior columns with an apparently incorrect identification of **Oscar Lima**. The correct station name for this pirate, East St. Louis Toodle-oo, comes from the title of their interval signal, which is a rock music song recorded by Steely Dan.

The station claims to use the "Outer Limits" column in *MT* as a "one-time pad" for message encryption. According to a release from the station, the message format is:

"Mike Tango" (which stands for *Monitoring Times*) repeated many times.

Date of the magazine issue being used.

"Papa ___" (the page number of the column).

"Oscar Lima" (which stands for Outer Limits).

The name of the paragraph within the column that is being used for encryption.

"Message follows"

The numbers of the letters within the paragraph in the column that spell out the message.

"End of message"

The message broadcast on October 28 was:

Interval Music "East St. Louis Toodle-oo"

Mike Tango (repeated many times)

August 2007

Papa 59

Oscar Lima

Odd Jammer

Message Follows

5 20 8 28 13 9

8 28 3 20 1

8 74 6 9 65

End of message

Using the paragraph "Odd Jammer" in the August 2007 "Outer Limits" column, the decoded message reads "Pirate Radio Rules." The station operator indicates future plans for additional encoded messages based on the *Outer Limits* column. While unorthodox, this is certainly a novel pirate radio broadcasting format.

Neither your columnist nor Grove Enterprises had anything to do with this unusual pirate radio format. Nor are we sure if it's an honor or not, but it does illustrate how actual coded messages can sometimes be transmitted on the shortwave bands, either by pirates, intelligence agencies, or other entities. Such messages can be very difficult to decode, unless the recipient has access to a valid "one time pad."

❖ ACE Clarifies New Web Site

As most of us are aware, the Association of Clandestine Radio Enthusiasts has returned

via its new web site at www.theaceonline.com/ Their main home page contained a message for *MT* readers for several months that we reprint here for those lacking internet resources.

"Welcome *Monitoring Times* readers! A bit of clarification in regards to the November (*MT Outer Limits*) article is needed. We have an ongoing archive of weekly pirate loggings in *The Free Radio Weekly*. If you want to find out what everyone has been hearing, this is the place.

We do not have archives of *Pirate Week* podcasts, but this excellent resource is available at the Pirate podcast link on (our main web page). I strongly encourage you to check out these great audio shows; they are great!"

The *Pirates week* podcast (<http://piratesweek.info/>) internet page is at

 www.shortwavepirate.info/pw/PWHome.html#

❖ 1181 kHz Carrier

We still are getting reports about a strange carrier that is sometimes evident on 1181 kHz on the North American medium wave band. No station operates on that frequency in North America, but Chuck Sayers is hearing it at night (but not during the daytime) with a loud S9 signal into Central Pennsylvania. The origin of this one remains a mystery so far. Is anybody else hearing this strange signal?

❖ Belfast Zip Code

Some prior issues of *Monitoring Times* inadvertently printed an incorrect zip code for the Belfast, New York, pirate correspondence mail-drop. The US Postal Service has assigned 14711 as the zip code for the local post office. Please correct this zip code in your own records.

❖ We Are Hearing

Monitoring Times readers heard more than forty different pirate radio stations this month in an explosion of pirate activity. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but more than 95% of all North American shortwave pirate broadcasts are heard on 6925 kHz, plus or minus 30 or 40 kHz.

Ann Hoeffler Radio- This one consists of Ann singing over the air. A definitive spelling of the artist's name

is still not known. (None)

Captain Morgan- Audio from the *Twilight Zone* TV show is normally mixed with classic rock music "from the pirate zone," but holiday fare also regularly appears. (None, says to send loggings to the Free Radio Network web site)

Channel Z Radio- This station often relays Europirates, but its own classic rock music shows are advertised as free form music that is not heard on FM radio anymore. They say that they have been on the air for three years now. (Blue Ridge Summit and channelzradio@gmail.com)

East St. Louis Toodle-oo- This one mixes coded numbers messages with depressing philosophical discussions. As we see in the column this month, they claim to code their messages from this column. (None)

Grasscutter Radio- This rock music station is back. It's frequently active around holidays. (grasscutterrado@yahoo.com)

Happy Halloween- Multiple DXers heard this relatively rare one at the end of October. (None)

Ironman Radio- Scruddy Swab reports that he is replying to reception reports sent to his e-mail address. (ironmanradio@hotmail.com)

Kracker Radio- Kracker uses a variety of identifications in his shows, including references to The Bowling League. He still is Commander Bunny's running mate for President of the USA. (krackerradio@pmlol.com)

Liquid Radio- Their format is still variable. Recently they broadcast both jazz and disco music. (None, but has replied via the FRN)

Long Range Radio- Rock music and comedy is their normal format, but around a holiday that format can shift to seasonal material. (None)

MAC Shortwave- Paul Star produces one of the most authentic replicas of top 40 radio formats of the 1960s that has ever graced any frequency. He uses variable frequencies including 3275, 6850, and 6925 kHz. (macshortwave@yahoo.com)

Northwoods Radio- The "loon call" interval signal on Jack Pine Savage's pirate "from the Great Lakes" leads into rock, country and novelty music or discussions of history. (northwoodsradio@yahoo.com)

Old Turkey Radio- This veteran Thanksgiving comedy station with the gravel-voiced male announcer came back this year. (Announced oldturkeyradio@yahoo.com, but e-mails have bounced)

Old Vampire Radio- This classic seasonal station also came back briefly around Halloween. (None)

Possum Hunting Radio- Their heavy metal music is mixed with stories and warnings that people should ignore the broadcast. (None)

Radio 6X- Bucky, their announcer, normally produces an ancient rock oldies format. (None)

Radio Appalachia- This new one has not been widely heard, but it claims to broadcast its novelty and comedy music from the shores of the Ohio River in Beautiful West Virginia. (None)

Radio First Termer- Various pirates replay this documentary from time to time about radio stations that broadcast to USA troops in Vietnam during the war. Some of the stations were actually pirates. (None)

Radio Free Speech- Bill O. Rights is active again. His rock music and comedy are spiced with advocacy for individual freedom and the USA constitution. (Belfast)

Continued on page 69

Do You Know How Much You Know?

I sometimes sit down to write this column in interesting places. For example, this month I am in a hotel where my "real world" job is providing technical support for a conference of over six hundred professionals meeting to receive continuing education in their chosen field of expertise. The downtime between minor electronic crises gives me the chance to type a few thousand words about another area requiring a certain level of technical competence, amateur radio.

This idea of "continuing education" is sticking in my head lately, prompted by a series of e-mails I received, coupled with on air conversations I have had with folks in our hobby. Lately I have heard from a number of folks, all who have been licensed for extended periods of time, asking for what most hams would think of as fairly basic information. While I am honored and somewhat flattered that these folks would turn to Old Uncle Skip to fill in the blanks on their radio knowledge, I am also somewhat concerned.

Back in the "old days" before deregulation of ham testing, the FCC was known to ask folks to stop back into their offices and *retake* the license tests related to the licenses granted to those particular operators. In all my years of playing radio, I never ran across anyone actually subjected to this level of FCC scrutiny. But, still, the threat was there, and it tended to keep folks on their toes.

It begs the question, if "Uncle Charlie" contacted you today and asked you to test out on your privileges, could you make the grade? This made me curious enough to go on line and pull down a couple of sample tests from various Web sites for the Extra Class license. I didn't sweat the code because I was a 20 wpm Extra and still play CW at that speed on the air (although I am happy to cruise along at slower speeds, so don't be afraid to call QRS if you hear me on the air).

The results for the theory tests were more interesting. I routinely scored around 80%, but did notice that I had to scratch my head a few more times than when I sat for the Extra Ticket in the first place. I have always said, if I had good math skills I would have a real job. I hadn't put a lot of those test formulae to work in quite some time. I was rusty around the edges.

Okay, I am reasonably competent, up to the point that I would not have my ticket torn out of my hands by an FCC examiner. But as they say: "What have you done for me lately?" What steps have I taken to advance my skills

and, as our Part 95 mandate expects, what have I done to "Improve the Radio Art?"

And, if I am asking myself these questions, shouldn't you be doing the same ham radio soul searching? We're all in this together! It is our combined skills that make this hobby great, not the efforts of any one individual. Besides, is there anything in the world more energizing and fun than learning something new?

So, with that in mind, let's take a look at some ways to become the best ham any one of us can hope to be. Not out of fear of an FCC reexamination, but in service to each other and the rest of the world.

❖ Back to Basics

Let's start with giving a look at those basic skills needed to pass the exam for the license you currently hold. I would suggest you start at the same place I did. Dig out your old license manual, or go on line and find a self test or two. A good place to try active online tests can be found at www.qrz.com/testing.html. If it has been some years since you sat for your license, challenge yourself by trying to take the current test for your level of privileges.

Now here is where the learning begins. Don't give too much thought to those questions you answered correctly. Instead, take a good hard look at those questions that you got wrong or had trouble answering. My guess is you will see a pattern of sorts. As I mentioned above, my self-described area of weakness is math, and my self-testing supported this thinking all too well.

Armed with this information, I know what I have to do to shape up my ham radio basic skills. I have several books in my collection, and quickly found a few web sites online, that will allow me to brush up on my basic electronics math.

Your areas of concern are likely to be different. We all have our strengths and weaknesses. But we also all have a wealth of resources to help us shore up our weak spots. We have texts, the internet, and we have each other. Don't be afraid or ashamed to seek out your ham brothers and sisters to get your skills into shape.

As I have said many times in this column, I did not come to this hobby out of a technical or engineering background. I started my career path in the "helping professions," so everything that I know about ham radio came



The Amateur Radio Communications Course (ARECC) is a great continuing education opportunity.

to me through instruction given by other hams who were willing to help me along the way. Some of this knowledge was imparted through books written by hams, but a good chunk came from sitting in classes at my local ham club or sitting in the shacks of some really patient people who gave up their air time to help me figure this stuff out.

If you spend a little time patching those weak spots in your body of ham radio knowledge, you will then have the sound foundation in place to advance in your skills and abilities. You will be able to grow as a ham.

The first, and somewhat obvious, result of taking the time to perfect your core competencies related to your license class is solid preparation to take the next higher test. I know of a ham club that gives out General Class theory manuals as graduation presents to students from their Technician Class training course. Why stop when you are on a roll? In other words, the basic "continuing education" requirement for any ham is to proceed to study for the next highest license until you possess the Extra Class ticket.

While volumes have been written over the years about the pros and cons of "incentive" licensing, no one can really argue that it did not provide for a clear course of study for anyone seeking to grow their ham radio skills over time. Take full advantage of the graduated licensing system to develop your body of knowledge in ham radio.

❖ Life after Extra

Now the fun really begins! While some folks may be content to rest on the laurels that the Extra Class ticket provides (such as that neat chunk of 20 meters where all the DX comes out to play), the challenge of ham radio continues. In most martial arts, folks talk about striving to achieve the "black belt," only to find that this rank only really means you are now competent to begin the "real"

studies to become a master of your particular art. The Extra Class ham ticket is no different. The Extra signifies that you have developed a sufficient foundation in amateur radio theory and practice to allow you to now concentrate on improving the radio art.

Think of it as entering graduate school. Up until this point you have been a ham radio generalist. Now, with full Extra Class privileges, you are free to narrow your study to a particular area of ham radio. For some folks it may be contesting, moonbouncing, or design and construction. For others, traffic handling, digital communications, or public safety. For me, obviously, it seems to have become writing about these subjects in the pages of *MT* and other places. The areas of further advancement are entirely up to you.

If you are still interested in some level of formal ongoing training, I can make a couple of suggestions. NOTE: These areas of further study are not exclusive to Extra Class hams. You can pursue these interests regardless of your current amateur radio license class.

Public Service

Amateur radio has always stressed its role in public service and emergency communications. To this end, the American Radio Relay League has developed a formal Amateur Radio Communications Course (ARECC) series. While not a requirement of licensing or a formal expectation for most volunteer service, this three level online training course serves to demonstrate that a ham has mastered a particular body of emergency communications knowledge that will be an asset in those situations where ham radio supports other emergency service professionals. The League offers this course series, as well as a number of other excellent online training opportunities, at www.arrl.org/cce/. These additional courses include such things as antenna modeling, digital communications, and radio frequency interference. Just the kind of course work that can help you advance your understanding of ham radio and electronics in general.

GROL

For many years, the “must have” document to prove you were a true radio professional was the FCC First Class Radiotelephone License. This test was a real toughie, but when you showed it to a radio or television station manager, it usually guaranteed you a good job. Since general deregulation of the radio and TV industry, the “First Phone” has been replaced by the General Radio Operators License (GROL). This license is also the gateway document necessary to get further endorsements that will allow you to work on commercial radar and aircraft equipment.

While you may never seek a job in the commercial radio industry, studying and sitting for the GROL is a rewarding enhancement to any ham’s basic radio skills. The current test is offered in a manner similar to the volunteer examinations system used in the amateur radio community. The test is also question-pool-based so any ham familiar with the amateur radio testing system should feel

fairly comfortable going for the GROL.

A good resource for preparation for this test is the GROL-Plus study guide offered by Gordon West WB6NOA and The W5YI Group. Check this study resource out at www.w5yi.org or by calling 800-669-9594.

Stretch Your Mind

And then there is studying just for the fun of study. Way back in 1975, a full year before I sat for my Novice Class exam, I purchased the Blue Covered 1975 edition of *The ARRL Handbook for Radio Communications*. I would guess that, at best, I understood about a tenth of the information presented between its covers. I have purchased every handbook, every year, since that edition. I would now say I have a good 60% or so of the book figured out at this point. I still have a long way to go. But the most current edition sits on my nightstand as my “light” bedtime reading.

While you may not feel obliged to be that rabid about your amateur radio studies, I would commend *The Handbook* as a great resource to further your ham radio knowledge beyond the basics.

The 2008 ARRL Handbook for Radio Communications (85th Edition)
No. 1026 Hardcover \$59.95 (ISBN 0-87259-102-6)
No. 1018 Softcover \$44.95 (ISBN 0-87259-101-8)
Both versions include the 12th CD ROM Edition of the Handbook
The American Radio Relay League
225 Main St Newington, CT 06111
1-888-277-5289
www.arrl.org/catalog/

If you could only have one text to base a plan of electronics self-study and advancement on, the ever-present League *Handbook* would be my first, last and only choice.

The latest edition is updated with new information on RF safety based upon the latest research and practice. It also contains an updated section on filter theory and design. But, most importantly for advancing my chosen areas of interest are the QRP related projects. The latest edition of the handbook contains an updated circuit for the classic MKII QRP transmitter. It also includes designs for both

UNCLE SKIP'S CONTEST CALENDAR

Vermont QSO Party
Feb 2 0000 UTC - Feb 3 2400 UTC

YL-ISSB QSO Party
Feb 2 0000 UTC - Feb 3 2359 UTC

10-10 International Winter Contest (SSB)
Feb 2 0001 UTC - Feb 3 2359 UTC

Minnesota QSO Party
Feb 2 1400 - 2400 UTC

Delaware QSO Party
Feb 2 1700 UTC - Feb 3 0500 UTC
Feb 3 1300 UTC - Feb 4 0100 UTC

North American Sprint (SSB)
Feb 3 0000 - 0400 UTC

CQ WW RTTY WPX Contest
Feb 9 0000 UTC - Feb 11 02400 UTC

Louisiana QSO Party
Feb 9 1500 UTC - Feb 10 0300 UTC

FISTS Winter Sprint
Feb 9 1700 - 2100 UTC

North American Sprint (CW)
Feb 10 0000 - 0400 UTC

ARRL School Club Roundup
Feb 11 1300 UTC - Feb 15 0100 UTC

ARRL Inter. DX Contest (CW)
Feb 16 0000 UTC - Feb 17 2400 UTC

CQ 160-Meter Contest SSB
Feb 23 0000 UTC - Feb 24 2359 UTC

Mississippi QSO Party
Feb 23 1500 UTC - Feb 24 0300 UTC

North Carolina QSO Party
Feb 24 1700 UTC - Feb 25 0300 UTC

the MicroR2 and MicroT2, a wonderful pair of QRP separates. Of interest to folks who like to play with older tube type gear is a keying adapter circuit – something for everyone and a tool for learning more about amateur radio.

So don't just sit there ragchewing: learn something new. It's fun!

I'll see you on the bottom end of 40 meters.

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Horizontal Antennas vs Vertical Antennas

Most antennas used for radio communication have their elements oriented either vertically or horizontally. Of course, there are the exceptions such as slopers and loops; nevertheless, we find most antennas that we encounter to be either what we can call “vertical antennas” or “horizontal antennas.” The orientation of an antenna’s elements is usually the primary determiner of what we call the antennas “polarization.”

In simple terms, waves launched by vertically-oriented antennas are vertically-polarized waves, and, for reception, vertical antennas respond best to vertically-polarized waves. Likewise, waves launched by horizontally-oriented antennas are horizontally-polarized waves, and, for reception, horizontal antennas respond best to horizontally-polarized waves. Completely crossed polarization – such as using a horizontally-polarized antenna to receive vertically-polarized waves – dramatically reduces received signal strength.

❖ The Importance of Polarization

Obviously the orientation of an antenna’s elements can be important, and if we know the polarity of waves that we want to transmit or receive we can select an antenna with the desired polarization. For instance, when signals leave a transmitting antenna and travel to the receiving antenna with no intervening obstacles, no reflecting, etc., the signals usually arrive at the receiving antenna with the same polarity as that with which they were launched.

However, as signals encounter other than a straight line-of-sight path between transmitting

antenna and receiving antenna, there are various factors that may change their polarization from that which the waves had when launched. For instance, VHF or UHF signals that encounter objects (buildings, hills, billboards, etc.) along their propagation path may arrive at a receiving antenna with their polarization different from that with which they were initially launched. As another example, long-distance, (DX) HF signals may undergo changes in polarization on their path through the ionosphere.

So, although polarity can be an important factor in maximizing signal strength, it is often impossible to predict what the polarity of waves arriving at a receiving antenna will be.

❖ The Importance of Radiation Patterns

The orientation which an antenna has with respect to objects such as the earth or other obstacle which can reflect radio waves is important. The antenna orientation can have a significant effect on the pattern in which waves are launched in different directions or on the pattern of antenna responsiveness to signals received from different directions. For any individual antenna, the patterns for transmitting and for receiving are identical, and so they are each known as the antenna’s “radiation pattern.”

We find that horizontally-polarized antennas have radiation patterns that depend heavily on their height above earth or any other reflector beneath them, such as a counterpoise. With heights above earth of around a quarter wavelength or less, horizontal antennas tend to give abundant high-angle radiation and relatively little low angle radiation.

This patterning can be useful on HF for communication with stations out to a few hundred miles, but poor for DX work.

On the other hand, HF horizontal antennas about a half-wavelength or more above earth tend to have radiation patterns with more low-angle radiation and less high-angle radiation. Low angle radiation gives good coverage out to the horizon and also supports DX work well. Usually there are nulls (directions of low response) in a horizontal antenna’s radiation pattern, making these antennas somewhat directional in performance.

Vertical antennas tend to give more lower-angle radiation. For HF, this also means that much of the signal power is launched at angles conducive to DX work via the ionosphere. However, in contrast to the horizontal antenna’s nulls, vertical antennas are non-directional, responding equally well to all directions of the compass.

On VHF-UHF, antennas typically do not use the earth as a reflector. If they do utilize a reflector, it is likely to be a metal element of the antenna. These antennas are therefore beam antennas and are generally mounted at least a few wavelengths above earth. Their functioning is then less dependent on earth reflections than are antennas fractions of a wavelength above the earth.

❖ At Medium and Lower Frequencies

At MF and lower frequencies wavelengths are very long, ranging from hundreds of feet to many miles. Obviously it’s impractical for most of us to elevate horizontal antennas for these frequencies even a quarter wavelength. However, the low signal-to-noise ratio on these bands is what determines quality of reception, so efficient receiving antennas don’t necessarily give better results than inefficient ones. Consequently, horizontal receiving antennas are often successfully used for reception at these frequencies.

For antennas very close to the earth in terms of wavelengths, their horizontally-launched waves tend to dissipate in the earth and are ineffective for transmitting. Therefore, vertical antennas dominate as transmitting antennas on these bands. However, because it is usually impractical to construct full-length, quarter-wavelength, vertical antennas at these lower frequencies, the antennas used are typically relatively inefficient compromise designs.

❖ Antenna Height in Terms of Wave Lengths

On the lower half of the HF spectrum, few of us have the resources to put our horizontal antennas

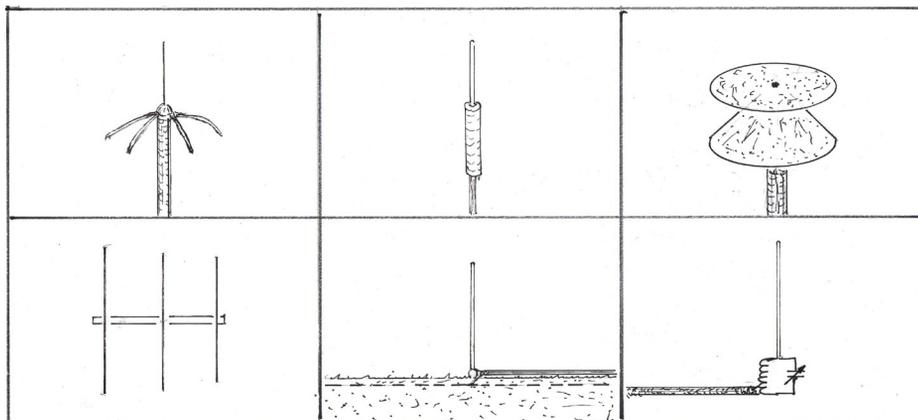


FIG. 1. SOME VERTICALLY-ORIENTED ANTENNAS: GROUND PLANE (A), CENTER-FED, COAXIAL DIPOLE (B), DISCONE (C), YAGI-UDA BEAM (D), MARCONI (E), AND HALF-WAVELENGTH DIPOLE FED FROM A PARALLEL-TUNED CIRCUIT (F).

This Month's Interesting Antenna-Related Web site:

A discussion of vertical antennas:
www.arrl.org/tis/info/multibandvert.html
A good ground system is important for some verticals:
www.arrl.org/tis/info/pdf/7107016.pdf

high enough to support DX work. Although a half-wavelength around the middle of the HF spectrum is only about 30 ft, on the low-frequency end of HF a half-wavelength is over 150 ft. Thus, most of our horizontal HF antennas are mounted low in terms of wavelengths, and they support close-in communications well (out to a few hundred miles), but don't really perform as well as we'd like for DX.

On the other hand, the vertical-antenna height necessary for good performance can be shortened by adding coils and/or capacitor elements to the antenna. This makes erecting vertical antennas for these frequencies more practical. In fact, some hams who are interested in DX contacts favor such vertical antennas in their quest for working distant stations.

❖ **Let's Check Out Some Vertical-Antenna Designs**

At VHF and higher frequencies, the most common vertical antenna is some form of ground-plane antenna (fig. 1A). Center-fed dipoles (fig. 1B), discons (fig. 1C), vertically-oriented log-periodic arrays and vertically-oriented Yagi-Uda beams (fig. 1D), and Marconi grounded quarter-

RADIO RIDDLES

Last Month:

I asked: "Why is a lightning bolt like an antenna? Or maybe a lightning bolt *is* an antenna? Is it?"

Well, a lightning bolt has electrical current of varying intensity flowing in its length. The same is true of an antenna that is transmitting radio waves. Both the antenna and the lightning bolt launch electromagnetic waves. The waves

waves (E) are also useful at these frequencies.

Ground-plane antennas are also used on the upper portion of the HF spectrum, but tend to be too large to be practical at the lower HF frequencies. On HF, the Marconi grounded quarter-wavelength antenna (fig. 1E) is a preferred vertical design. On the downside, the Marconi needs a number of in- or on-the-ground radials to function efficiently. Efficient performance can also be had with a smaller number of radials if they are elevated above ground.

Vertical Antennas without Ground or Radials

Dipole antennas don't require a ground connection. A vertical half-wavelength dipole is a convenient no-ground, no-radial design. Dipoles are typically fed at their center with 75-ohm cable. However, they can be fed anywhere along their

launched from the lightning bolt are naturally-produced radio waves which propagate through space, and are received as static crashes on your AM radio. Sounds like a "yes" to me.

This Month:

How did natural radio waves from lightning bolts figure in the pioneering work of Joseph Henry, Alexander Popov, and Nicola Tesla?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

length. If the feed point is moved toward either end of the antenna its impedance increases and at either end the feed-point impedance is quite high. A workable end-feed match can be had by feeding the end of a dipole with 300-ohm twinlead or 600-ohm open-wire line. A better match is had using an antenna tuner or a parallel-tuned resonant circuit (fig. 1F).

Antenna Designer

New Version 2.1 for Microsoft Windows 95 and 98

Computer program helps you design and build 17 different antennas from common materials. Based on Antenna Handbook by W. Clem Small.

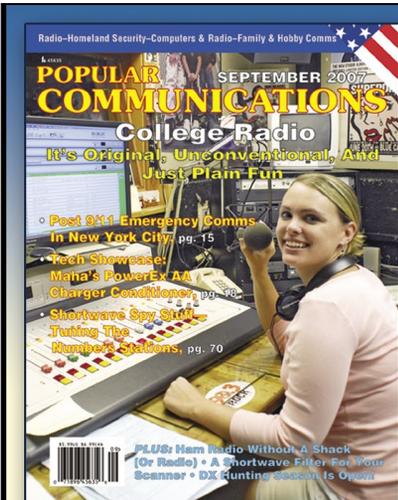
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The BC-348 Awakens - Sort Of

Yes, the BC-348 has awakened – or perhaps *almost* awakened would be a better term – from its long nap in somebody’s storage shed. And its first words were in French.

But before we get into that, I want to mention the e-mails I received from Chuck Cassidy, Michael Allen, and Kirk Ellis. Chuck describes himself as “an aging baby boomer with a genuine love for any pre-solid state gear,” and says that “Radio Restorations” is the first column he turns to on receiving a new issue of *MT*. He particularly liked N3TPM’s solid state dynamotor replacement circuit from the November issue.

Michael, who also noticed the scheme, happens to be working on a solid state design for replacing vibrator power supplies in tube-type auto radios. He’ll notify me when he posts it on the web so I can alert interested readers.

Kirk is using our BC-348 articles to assist him in restoring his own receiver.

❖ Last Month’s Progress

Now on to the awakening of the BC-348. In the previous issue of this column, with a power supply now installed, we began troubleshooting the set at last. But not before installing a fuse in the B plus line from the power supply, as well as a speaker to save my ears from the static crashes that had been coming through the earphones.

As you’ll recall, the radio had been emitting noises that – misleadingly – sounded like atmospheric static. But, actually, signals from the antenna were not getting past the front end of the receiver. Scratching the antenna post with a wire or screwdriver made no sound, nor did changing positions on the bandswitch. Working backwards from the audio output tube, we traced a signal through the various stages and found an interruption in the first i.f.

The tube had no plate voltage because – it turned out – of a freak accident caused by a previous owner. A blob of wire and solder had fallen between the i.f. transformer and the chassis, causing an intermittent short that finally burned out the plate dropping resistor. With that taken care of, the BC-348 came to life – at least to the point where scratching the antenna post or moving the bandswitch would cause lively static in the speaker.

After working for so long with a virtually mute radio, I considered that to be quite a sign of progress! Connecting a short basement antenna, I tuned around a bit. But I heard nothing

except a weak signal that I knew was spurious because it appeared at the same end of the dial on two adjoining bands. There wasn’t even much atmospheric noise to suggest that the set was alive.

❖ The Radio Awakes

At the beginning of this work session, I decided to see if I could squirt a signal from my signal generator all the way through the radio. I set the generator for a 4 MHz modulated tone and draped the output lead around the antenna post of the BC-348. And I was pleased that I could hear that signal in the speaker at close to the proper place on the dial.

Now occurred one of those great breakthrough moments that bring joy and excitement to the heart of a restorer who has labored to revive a long-mute receiver. Desiring to check for pickup on the next band (6-9.5 MHz), I clicked over the bandswitch and reached out to readjust the signal generator. But before I could do that, a man’s a sonorous voice emerged from the speaker! He was almost perfectly tuned in and giving a dramatic reading in elegantly-pronounced French.

I stopped what I was doing and listened, thunderstruck and smiling, for five minutes or more, even though I couldn’t understand a word of what was being said. Really encouraged, I decided it was time to test with an outside antenna and lugged the receiver into my radio room on the second floor of our garden shed.

❖ New Problems Emerge

After the testing was finished, I had uncovered several more interesting problems. On the plus side, I was able to pick up several signals on the 3.5-6 and 6-9.5 MHz bands and a few on the 1.5-3.5 and 9.5-13.5 MHz bands. But there was nothing to be heard on the 200-500 kHz bands. Signals overall were generally weak, and there seemed to be dead spots on whole sections of some bands. The audio was generally fuzzy – always sound-

ing a little out-of-tune – and would sometimes cut out and reappear in a manner too abrupt to be accounted for by ordinary fading.

Although, as evidenced by my earlier signal generator test, the 3.5-6 MHz band seemed to be in reasonable calibration, the 6-9.5 MHz band apparently was not. A wide cluster of 40-meter ham signals appeared well below the 40-meter lower band edge. Finally, loud static heard as the tuning capacitor was turned through certain positions, attested to the need for some cleaning.

None of these problems are exactly surprising in a radio that has been stored for a long time, without cover or cabinet, in a shed with no environmental control. And they certainly do make the job of the restorer more challenging and interesting.

My schedule this past month has given me little time to investigate these problems, but I’ve done some thinking about them and a bit of work. A check on the B plus input to the radio revealed that something had changed

since I originally set up the power supply and it was now 50 volts too low. Luckily, when I ordered the power resistor to be used for dropping the too-large power supply voltage, I had also ordered extras in a variety of sizes. Their box-like configuration made them very easy to stack, so I selected, stacked and paralleled two more units that lowered the resistance enough to bring the voltage up to the specified 220.

As a start on dealing with the apparent insensitivity of the receiver, I’ve done a quick check on the plate and screen voltages of the first r.f., second r.f. and first detector tubes. All seem to be in the proper ballpark. I also disabled an unusual sensitivity compensator circuit that I’ve seen only in the BC-348.

The arrangement consists of rheostat 78 (see Fig. 1) in series with the cathode return of second r.f. tube VT-86 (6K7 in civilian nomenclature). This rheostat is ganged to the shaft of the main tuning capacitor in such a way that it increases in resistance – decreasing the sensitivity of the receiver – as higher frequencies are tuned in.

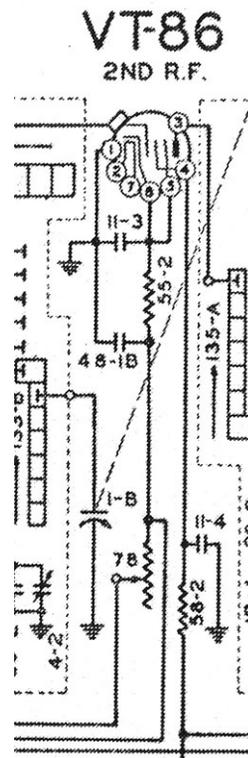


Fig. 1. Sensitivity rheostat, labeled “78,” (see text) can be seen near bottom of the picture.

According to the BC-348 manual, this was done to counteract the tendency for sensitivity to increase at higher frequencies – thus evening out the sensitivity response over the tuning range. I’ve never run into a circuit like this elsewhere – and perhaps one of you readers can enlighten me about why such a sensitivity inhibiting circuit should be necessary.

At any rate – if my experience with the volume/r.f. gain control is any indication – that rheostat is going to be dirty inside, and thus intermittent in operation. It could easily be contributing to the tuning irregularities I’ve mentioned. I disabled it simply by jumpering across the terminals to short it out. If a later owner of the set wishes to reinstate the circuit, he or she can easily do so.

❖ Plans for the Coming Month

None of these fixes have made a noticeable difference in the radio’s performance, so I have more work to do this coming month.

For instance, another obvious suspect for the dead band portions is irregular oscillator operation. Often an oscillator tube (in this case a 6C5 triode) can be temperamental and refuse to oscillate at all frequencies. I plan to order a NOS (new old stock) replacement to see if it makes a difference.

Although the manual does give the tube socket voltages expected for the 6C5, these would be difficult to check without some kind of adapter. The oscillator circuit – including the tube – is installed in a metal compartment in order for it to be completely shielded. Without the shielding, it was felt, enemy combatants with radio direction finder equipment could pick up the signal from the oscillator and triangulate on the position of the radio.

The tube itself is accessible for testing or replacement by removing a metal cover at the top of the compartment. However, without removing the whole oscillator module from the receiver – which would obviously defeat the purpose – there is no easy way to reach the underside of the socket for testing. The Air Force radio technicians had an adapter that could be plugged in between the tube and the socket to feed the socket connection points into a test set. I hope I won’t need to fabricate one!

The general insensitivity and complete lack of response on the 200-500 kHz band could perhaps be an alignment problem – especially if a previous owner had meddled with it without having the necessary know-how. This could also account for all those 40-meter ham conversations appearing below the 40-meter band edge on the dial. And so, next month, we will run through the complete alignment procedure from the i.f. chain back through to the front end.

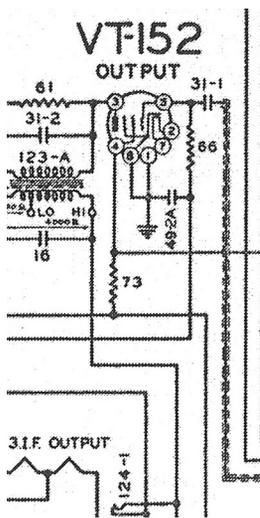


Fig. 2. Mica capacitor 31-1 (top of picture) couples diode plate 1 of second detector tube (not shown) to grid of output tube. Socket voltage measurements suggested capacitor was defective.

measured .34 volts compared to the expected value of 6. These two circuit points are connected (via the last i.f. transformer and the volume control) through coupling capacitor 31-1 (see Fig. 2). A problem with the capacitor could certainly affect both locations.

That capacitor happens to be a mica type, and I usually don’t change out micas on a wholesale basis because they so rarely go bad. However, long-time readers will remember the problem I had with the AVC of the Hallicrafters S-40 I restored some time ago. Turns out that a couple of micas had indeed gone south and were responsible for the difficulty. It took me awhile to make the fix because I felt that these capacitors were above suspicion.

Since capacitor 31-1 was easily accessible, I quickly disconnected one end so I could test it out of the circuit. Sure enough, it threw the leakage meter of my capacitor tester off scale and gave no indication of its rated .0015 ufd value on the capacitance scale. Bingo!

I’ll order a re-

We’ll also blow out the plates of the tuning capacitor, which is fortunately reasonably accessible, and use a little contact cleaner to ensure good connectivity at its bearing points.

❖ A Last-Minute Discovery

The obvious suspects for the erratic audio would be the second detector and audio output stages – although this problem could certainly originate almost anywhere in the receiver. While writing this, I became curious and went back to the bench to check the socket voltages for those two stages against the typical values shown in the manual. And I did uncover a problem.

Diode plate 1 (pin 5) of the VT-93 (6B8) second detector tube read 1.27 volts compared to the expected value of 8. And the control grid (also pin 5) of the VT-152 (6V6) audio output tube



The VT-65 (6C5) oscillator tube in its shielded compartment. The compartment cover (top of picture) is a replica made by a friend.



Sensitivity control rheostat is ganged to shaft of main tuning capacitor. Note jumper shorting its terminals (see text).



Mica capacitor 31-1 (far left) disconnected for testing. It flunked leakage and capacitance tests. Light-colored cylindrical units at right are replacement paper caps installed earlier.

placement for this cap and the four or five other micas that are accessible in the receiver – most of them in the second detector and audio output circuits. As for the scores of micas within the i.f. and c.w. oscillator cans and the antenna, oscillator, r.f. and detector enclosures – I’ll just have to keep my fingers crossed! Changing those out would be a major receiver rebuild job.

I do take comfort in the fact that the bad capacitor is the largest capacity mica in the set – and its size may have had something to do with its failure. There is only one other like it, and it, too, is in the accessible group.

I’m really looking forward to the next work session – which I hope will resolve most of the problems that have been identified without turning up any new ones. Stay tuned for the next issue and find out!

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COAA's Software Gold Mine: OrbcommPlotter & PlanePlotter

By John Catalano

Finding new unique radio software on the Internet these days brings to mind Thomas Edison's 1-99 rule. When asked how easy it was to invent, he replied that the process was 1% inspiration and 99% perspiration. That ratio is about right when I consider how much effort it takes to find and then master unique, new radio programs.

Recently I came upon a website that is a literal treasure trove of novel, yet useful radio software. The site (www.coaa.co.uk/software.htm) is associated with *Centro de Observação Astronómica no Algarve (COAA)* – an observatory in Portugal – which naturally carries some very interesting professional astronomy programs as well. For this article, we will just concentrate on the radio software, of which there are eight applications.

The radio software varies from simple, helpful screens to full-blown radio-interfaced, computational and graphical suites. The latter are found in COAA's "Plotter" series of programs. Let's put a few of these programs through the paces and see what they can do for radio monitors.

❖ ORBCOMM PLOTTER

We are going to start with OrbcommPlotter, which allows decoding communications from a class of LEO satellites.

LEO - Pie in the Sky?

LEO is an acronym for Low Earth Orbit satellites. The 1970s' LEO concept was to have a perpetual swarm of small communications satellites orbiting at a few hundred miles above the Earth. Unlike geosynchronous satellites which appear to stay in one position over the Earth, LEOs are constantly moving around the Earth.

Since LEO satellites did not need to be rocketed into a high geosynchronous Clarke Belt orbit (about 35,000 miles above the Earth), the launch costs were significantly less than normal communications satellites. The 100 times shorter radio path also reduced the satellites' on-board radio requirements, further reducing its costs.

Ironically, the upside of LEO was also its downside – its low orbit. At these low altitudes, atmospheric drag is considerable. This leads to significant orbit decay and, therefore, shorter lifetimes before de-orbit destruction. So, although cheap, the constellation of satellites required regular launches to replace the burned-up ones.

As we noted, LEO satellites do not stay in one position in the sky above the users. This means that as one satellite passes out of range it has to hand-off to the next satellite coming into range. This requires a very complex interactive network of communication between satellites – which bordered on science fiction in the 1970s! But microelectronic technology was advancing computing at an unbelievable pace.

A number of companies took on the challenge of exploiting the LEO concept. However, within a few years most resulted in economic failure. Motorola, with its deep pockets, managed to keep its Iridium series of LEOs going for quite a while. But in the early 1990s, it announced that they would be closed down. The story goes that the US government, the major user of Iridium at the time, stepped in and saved the operation.

Today, with more powerful and cheaper microelectronics, and with the explosion of worldwide communications via cell phones and the Internet, LEOs are once again attractive. In fact, after a shakeout of companies and a rash of Chapter 11 bankruptcies, the LEO communications business is once again growing.

Many weather satellites such as TIROS, as well as amateur radio satellites, qualify for LEO status and are in operation today. Between weather, communications, and ham satellites, LEO satellites now number in the several hundreds.

Where is LEO?

The Orbcomm company (www.orbcomm.com/) currently has 29 LEO satellites in their constellation. Orbcomm provides two-way control, condition, and position communications via their LEO satellites. The "messages" are between six bytes to several kilobytes in size. Ground users have transceivers mounted in trucks, trailers, railcars, containers, heavy equipment, fluid tanks, utility meters, pipelines, marine vessels, and oil wells.

If you live in a populated area of the Earth, there is probably an Orbcomm satellite is passing near you. That's where OrbcommPlotter comes in. According to the program's well-written Help menu: "OrbcommPlotter allows you to monitor and decode the telemetry data from the Orbcomm series of LEO communications satellites." In addition, it will provide us with a graphical satellite tracking of Orbcomm satellites in real-time.

All it takes is a PC with a Pentium proces-

sor running Windows 95/98/ME/2K/XP, and a compatible sound card. So just about any PC will do! We are going to run OrbcommPlotter version 1.3 on a PC with a 2.3 GHz Duo Core CPU and 2 GB of RAM. Departing from the instructions, we are using a Vista Home Basic operating system.

Radio Requirements

To maximize the possibility of reception, I suggest a reasonable quality receiver capable of 137 to 150 MHz in the FM narrow mode, using an outside coaxially fed antenna. I tried everything from a handheld scanner to an ICOM R7000. ICR-1000 and Uniden scanners were also tested with the program.

I found the major factor in my location was the antenna. Some say they can get strong Orbcomm signals indoors using a handheld with a whip. This may be possible in some locations. However, after many hours/days I found that a number of RF noise sources prevented me from achieving good satellite decoding. These RF interference sources included computers, monitors, TV, home security, light dimmers and local FM station image signals. Hence, the recommendation for an outdoor, coaxially fed antenna. One cut for around 139 MHz would help even more.

Clearly, radio requirements are very location dependent. However, in the mountains of New Hampshire, receiving these satellites was a real challenge.

Set-up

The download and installation of OrbcommPlotter's 900kb self-installing program is quick, and within a few minutes you should have the program operational. Before you start the program, it would be a good idea to synchronize your PC's clock to a time standard such as WWV. This will ensure accurate satellite tracking results.

OrbcommPlotter has a very useful Help file, which details all aspects of getting the program up and running. One of these is connecting the receiver to your PC. The blurb on the COAA website states, "The receiver audio output must be connected to the Line-In connector on your PC." However, the Help file recommends that the receiver's discriminator output be connected to the PC, not the audio output. Since I was using radios without discriminator outputs, I was forced to use their audio output.

Hands On

Start by selecting the "Options" menu on the main screen, as seen in Figure 1. Choose "Audio" then "Source" to tell the program to listen to the receiver audio on the soundcard's input jack. Once that is set, go to the "Options" - "Home" menu and enter your longitude and latitude.

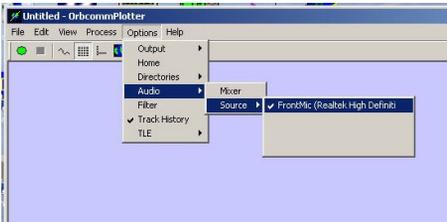


Figure 1 - OrbCommPlotter's main screen - Set-up menus

We'll have one more housekeeping chore to perform later. But now we are ready to try OrbCommPlotter.

Three screens are key to the program's operation. The first is the Chart display, seen in Figure 2. All screens are accessible from either their icon or from the "View" menu. Here the program displays Orbcomm satellite positions in real time as they orbit the earth. Your "Home" location will be displayed at the center of the screen.

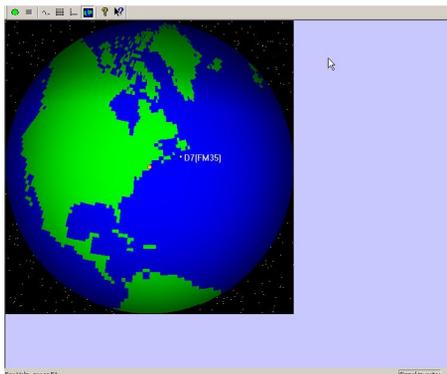


Figure 2 - The chart (map) view showing satellite FM-35's orbital position

Since satellite orbits decay or change, especially in low earth orbit due to atmospheric drag, we must update the satellite parameters often. This bit of housekeeping is made very easy by visiting www.orbcomm.com/downloads/elementSets.htm. Here you will find "ORBCOMM TLEs for" followed by a date. Below this will be a file with a ".tle" extension. TLE stands for Two Line Elements. These define the orbit parameters as of the given date.

Right click on the file hyperlink. Then select "Save Link as." Save this file in OrbcommPlotter's "log files" folder. Look for this folder in C:\Program files\COAA\Orbcommplotter\.

Now back to the "Option" menu and select "TLE," then "Define." The files in the log files folder will be displayed, including the one you just saved. Click on it and then choose OK. Then in the TLE menu select "Enable." This tells the program to use the data in this file to calculate the satellites' orbital positions. Now the Chart screen will display accurate satellite positions

relative to your location.

And NOW we are really ready to use OrbcommPlotter!

Operation

Open the "Messages" screen. When a satellite is about to come in range, the program displays a list of download frequencies for that specific Orbcomm satellite. See the bottom of Figure 3.

Now it's time to furiously tune each of these download frequencies until you hear the signal. Since this is very slow speed data, it will sound more like a dead carrier with very low-level video and periodic "klink," about once a second.

So that you can hear the signal for which you are hunting, COAA has provided us with a wave file of Orbcomm satellite audio. You can find on the MT site at www.monitoringtimes.com/mtsubscriber/Orbcommsat.wav

Once we are tuned to a solid satellite signal, open the "Signal" screen by using the "View" menu or its icon. Adjust the receiver's volume until the signal you see does not have flat tops or bottoms. Then lower it a touch more. Make it quick! Don't forget the satellite is moving at a very high speed.

Due to its velocity and the resulting Doppler effect, you will have to retune the frequency a few kilohertz during the pass.

Congratulations!

You are now monitoring low earth orbit satellite communications!

Go back to the "Message" screen and you will see the efforts of your work ... a steady stream of message data from the satellite, including the latest downlink and uplink frequencies and much more. See the top of Figure 3.

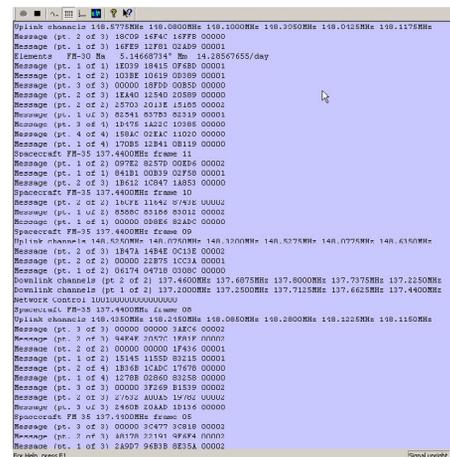


Figure 3 - The message screen. Notice the program-generated download frequencies at the bottom; decoded four groups of alphanumeric characters at the top.

As you can see, these "messages" consist of four groups of five alphanumeric characters, reminiscent of the format of the old shortwave number stations! Hm-m-m. Okay, so we cannot make sense of the message, but it is still a monitoring achievement!

Look closer at the messages and you will see satellite information. For example, we can see

that we are monitoring satellite FM 30 and FM 35. FM-35's downlink frequency is 137.4400 MHz. And FM-30 has given us its two line elements (TLE) orbit corrections.

A Personal Achievement

For me, it took quite a lot of work (days, in fact) to finally be able to get a solid signal. COAA's wav file was a tremendous help.

My newly acquired 2.3 GHz Duo Core PC really puts out some unwanted wideband signals! And then there is the new home wireless network I just installed. So for me, the shielded outside discone antenna was a must. But even taking these precautions, I found that only satellites almost directly overhead yielded reliable messages. (I belatedly remembered all the reception problems I had setting up my DISH satellite TV system.)

For the record, though, my problems had *nothing* to do with OrbcommPlotter. Once presented with even a reasonable signal, the OrbcommPlotter program did a great job of decoding and displaying the messages, and it is easy and enjoyable to use.

Once running, it's real fun watching the screen come alive as a "bird" passes overhead. Give OrbcommPlotter a try and expand your radio monitoring to small LEO satellites.

Getting OrbcommPlotter

You can download a free trial version, good for 21 days, from www.coaa.co.uk/orbcommplotter.htm. The registered version, which costs 25 Euros, was used for this article.

✦ PLANE PLOTTER

Ready for another "Plotter"? In the same mindset is another COAA program, PlanePlotter. The core of this program is a self-contained, software-based ACARS decoder program. But that's not the whole story.

In the usual manner, audio from the receiver is connected to the PC's soundcard input. I found that it did a great job decoding ACARS signals. Its performance seemed especially good decoding weak signals from over 200 air miles away.

It has OrbcommPlotter's very modest PC requirements. Your VHF receiver should be capable of AM reception in the 129 MHz to 137 MHz band. We primarily monitored 131.5500 for this article. Okay. So how do we set up this baby?

Basic ACARS decoding was up and running within a minute of installation. As in OrbcommPlotter, an almost live graphical trace of the audio signal screen is provided. However, for PlanePlotter I found this adjustment to be very non-critical with a wide range of settings resulting perfect ACARS message decoding. See Figure 4.

There is lots of data in the list in Figure 4 and the user can sort it out in a number of ways. The Review command found on the top of the screen does the job. Using it, all of today's ACARS intercepts can be listed by registration numbers or flight numbers as seen by the box in the center of Figure 4. Clicking on a flight number in the list brings up all the information from that flight. However, the information is

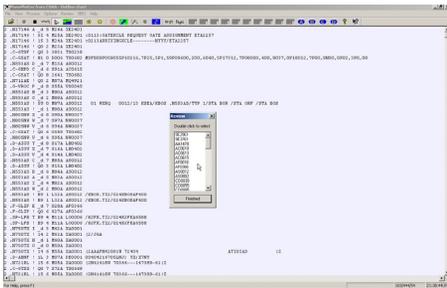


Figure 4 - PlanePlotter - Doing a great job decoding ACARS within minutes of installation. displayed using a very basic format in Notepad. It's all there, but it takes some searching.

Map Display – Almost

Planeplotter does a very good job of decoding each aircraft's position from ACARS. However, although the name of the program is "Plotter," it does not contain any map files! Perhaps this is a copyright issue or other legal situation. It is a shame, because the mapping part of this program has lots of power! Of course, a third possibility is that I missed a step.

If the third possibility is not true, then the user has no recourse but to hunt the web for an "acceptable" map file. Although I tried to follow the instructions, I failed and gave up after an hour or so. Even after ran the calibration routines on a number of locations, only one relatively crude map gave me any meaningful results as displayed in Figure 5.

This is a map of the Boston, Massachusetts, airspace. If you look to the lower right you can discern the outline of Cape Cod, and below that Long Island, New York. Each triangle on the map represents an aircraft whose ACARS signal has been received and decoded. Can you see the line of aircraft west of Boston? This day was pure IFR, instrument flying rules. Heavy snow falling in the area had them stacked up pretty good.

If you left click on a triangle, a data bubble will appear with more flight detail as seen near the top center of Figure 5. Here we have clicked

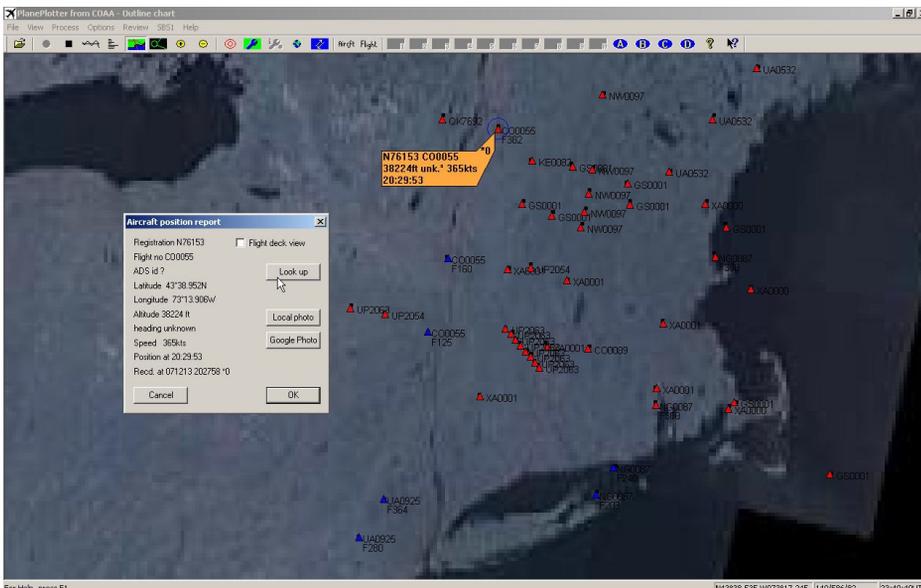


Figure 5 - Plotting aircraft seen as triangles. Left click an aircraft and the small data bubble seen at the top right appears. Right click and the aircraft position report is displayed.

on flight number CO0055. At the lower right of the screen the latitude and longitude of the aircraft's location will be displayed, one of the many nice details that has been included in PlanePlotter.

Right click on a triangle is even more interesting. Here, on the left side of Figure 5, we see the resulting "Aircraft Position Report" windows. There are some very powerful and useful tools in this unassuming looking window.

The "Local Photo" and the "Google Photo" functions really didn't yield much info for the aircraft that were flying on this day. But the "LookUp" button makes the aircraft "real" as opposed to just a triangle symbol on a map.

This button immediately brings you to the airframes.org website. Planeplotter automatically fills in the aircraft's registration number and then, with just one click of the Submit button, you are presented with an entire pedigree of the aircraft. The results usually include a picture, owner info, build date and other details, including the aircraft's selcal code if available. Very nice.

Lots More Customization

Take a look at Figure 6 to see the many ways that users can customize the map information presentation. The top number defines how long an aircraft will be displayed from its last received transmission. Here we have set it to 30 minutes, after which time its "triangle" will disappear. So the line of aircraft we previously observed west of Boston is really a time-lapse shot during a busy thirty minutes of traffic.

All we have done here is to use PlanePlotter's resident ACARS decoder and mapping functions, which worked very well. However, Planeplotter can do so much more. Here is a list of its many additional features:

- Process and display ADS-B position reports captured by the Kinetic SBS1(tm) mode-S receiver.
- Process and display ADS-B position reports captured by AirNav Systems RadarBox(tm) mode-S receiver.

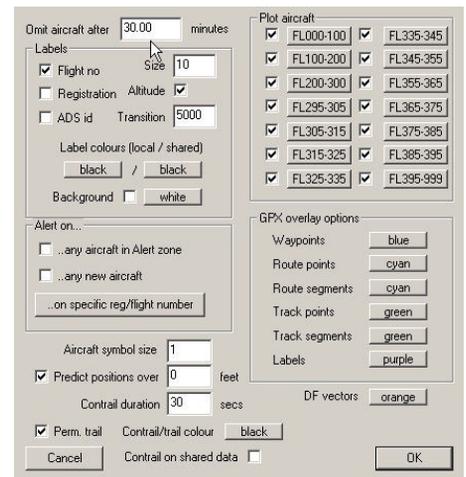


Figure 6 - Just look at all the ways the map displays can be customized!

- Work with PC-HFDL to plot position reports and shows a predicted position between reports.
- Interface to Google Earth to display aircraft positions over the Google Earth base map. Or display a dynamic real-time view from the flight deck of a selected aircraft.
- Generate audible "alerts" on detection of user-defined aircraft.
- Generate audible "alerts" if detected aircraft enter a user defined position "box"
- HF selcal decoding
- Internet exchange of data and audio between users.

Finally, the program claims that it can perform Direction Finding "using a simple passive antenna switch ...allows aircraft to be located even if they are not equipped with ACARS or Mode-S/ADS-B." A detailed tutorial on the theory, construction, and use of the switched antenna array is included in the comprehensive Help file. A Yahoo PlanPlotters user group (<http://groups.yahoo.com/group/planeplotter/>) is active and another source of assistance.

The excellent Help file also contains very useful tutorials. Perhaps I should have used my time studying one of these to help me generate maps! (Alternatively, some maps could be included with the program).

Summary

Although I was up running in minutes, to explore all the features and functions of PlanePlotter could take weeks! It's a movable feast. How much or how little of this powerful program you want to use is up to you.

PlanePlotterI can be downloaded and used free for 21 days, after which it costs 25 Euros for registration.

Plotting Next Month

So, there are our first two COAA programs. I hope you found them as unique and interesting as I did. Next month we'll continue digging at the COAA "goldmine."

CONTACT INFORMATION

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 Poio, 8500 Portimão, Portugal
 Tel: + 351 282 471180 e-mail: info@coaa.co.uk

Isolating one of the modem's 12 tones results in a spectrum such as Figure 4.

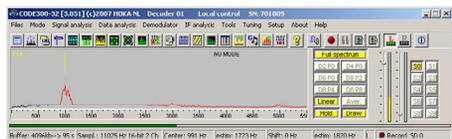


Figure 4: Single modem channel in focus

Switching to the PSK constellation tool and waiting for a little time to pass for the signal to be collected, we can clearly see the telltale signs of a 2PSK signal (see Figure 5). If we simply retune the receiver to check the other 11 channels, we can see that these are also all 2PSK modulated.

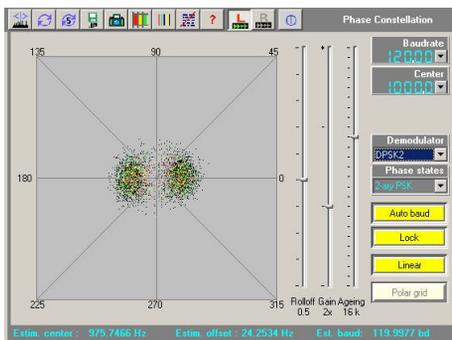


Figure 5: Constellation of a single modem channel

Our final step is to measure the speed of each of the channels. We can do this by using the PSK Spectrum tool. We again tune the receiver to put each channel at the midpoint of our narrow filter. Since we know from our earlier measurement that each channel is 2PSK modulated, we can select the BPSK demodulator. Zooming in a little and selecting the absolute phase difference button, we can clearly see two peaks appear at approximately +/-120Hz. (see Figure 6).

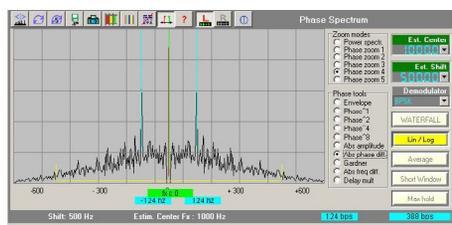


Figure 6: Phase spectrum of one modem channel

With a 2PSK signal, this is indicative of a speed of 120bps. Running through the other channels, we can see that they are all of the same type. So, our final specification for the modem: 12 channels of 120bps 2PSK, spaced at 200Hz with an unmodulated pilot at +3300Hz.

That's all for now. Enjoy your digital DX.

commentary from **WBCQ**. (Unknown; try Belfast)
Radio Nonsense- It is not clear if this one is a re-run of old Joe Mama broadcasts, or if it is a new operation with a rock music and comedy format. (Belfast and radiononsense@yahoo.com)
Radio Paisano- This station emphasizes Italian culture. As we see here this month, their QSL features Christopher Columbus' three ships. (radiopaisano@gmail.com)



Random Radio- Their eclectic format varies between rock, jazz, and other genres of music. (None; asks for reports via the FRN web site)
Robot Radio- The host for rock music on this one is of course a robot. (None)
Special Ed- Their announcer, Special Ed, transmits variable material including rock, bluegrass, and "jug" bands. (None)
Sunshine Radio- The female announcer on this rock music pirate is clearly associated with Grasscutter Radio. Sometimes both stations are on during the same transmission. (grasscutterrado@yahoo.com)
Sycko Radio- Their rock music and comedy are sometimes supplemented by digital SSTV images. (syckoradio@yahoo.com)
The Crystal Ship- The "Voice of the Blue States Republic," comes from The Poet, whose leftist politics is evident in his music and discussions. Frequencies vary widely, including 1710, 3420, 3275, 5385, 6700, 6854, 6899, 6925, 7575, and 9057 kHz. (Belfast and tcshortwave@yahoo.com)
The Voice of Hell- They claim to be the official broadcasting service of Hell, where the national anthem is "Stairway to Heaven" played backward. (None)
Undercover Radio- Dr. Benway still broadcasts rock music and tales about his experiences "from the middle of nowhere." (Merlin and uses undercoverradio@gmail.com)
Voice of Hell- They claim to be the official broadcasting service of Hell, where the national anthem is "Stairway to Heaven" played backward. (None)
WAIR- This veteran pirate has returned with a folk music format and an "All Indie Radio" slogan that matches their call letters. They are among the pirates who have relayed Allan Weiner's **WBCQ** remarks about pirate radio. (Elkhorn; probably not valid)
WBNY- Commander Bunny is still running for President of the USA. He plays rock music, Allan Weiner recordings from **WBCQ**, and he gives advice to monkeys who are listening. (Belfast and has announced rodentrevolutionhq@yahoo.com)
WEMR- Late in 2007, this pirate played a mix of rock music and holiday tunes. (Unknown)
WHYP- James Brownard returned to the air with multiple late 2007 broadcasts from North East, PA. (Belfast and uses whypradio@gmail.com)
WNKR Relay- Western North Kent Radio, the Europirate, has been getting free relays via an unknown North American pirate for their folk music programming. (Announced Elkhorn, likely not valid anymore)
Wolverine Radio- Their rock music and comedy format usually borrows standup routines by famous comics. (None announced)
WDVL- This old one came back from the dead

on Halloween. They identify themselves as the Voice of the Prince of Darkness, and they discuss DXers who died after listening to the show. (WDVLSW@netgate.net)
WMPR- This well known "dance party" station plays techno rock music that is normally played in dance clubs. (None, has QSLed only rarely at the Kulpville Winterfest)
WTCR- Their classic rock music goes over the air with a slogan of "Twentieth Century Radio. (Belfast)
WTPR- This station's single minded focus is a warning that all DXers who listen to "Tire Pressure Radio" will shortly lose all of the air pressure in their tires. (None)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; and PO Box 293, Merlin, Ontario N0P 1W0. Unfortunately, PO Box 69, Elkhorn, NE 68022 is no longer a valid address, although a few pirates announce it, and some claim to still be getting replies through it.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletin for submitting pirate loggings with a hope that pirates might QSL is now the e-mailed Free Radio Weekly newsletter, still free to contributors via freeradioweekly@gmail.com. A few pirates will sometimes QSL reports left on the outstanding Free Radio Network web site, at www.frn.net on the internet. *The ACE*, a formerly widely read print bulletin, does have a loggings section and a valuable archive of *Free Radio Weekly* issues on its web site at the www.theaceonline.com/

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Brian Alexander, Mechanicsburg, PA; John T. Arthur, Belfast, NY; Kirk Baxter, North Canton, OH; Artie Bigley, Columbus, OH; Bob Brown, Lansdale, PA; Commander Bunny, Belfast, NY; Ross Comeau, Andover, MA; Richard Cuff, Allentown, PA; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; Vince Havrilko, Mountain Home, ID; Harry Helms, Smithville, TX; Ed Insinger, Summit, NJ; Fred Kohlbrenner, Philadelphia, PA; Terry L. Kreuger, Clearwater, FL; Ed Kusalik, Coaldale, Alberta; Chris Lobdell, Tewksbury, MA; Greg Majewski, Oakdale, CT; Horacio Nigro, Montevideo, Uruguay; John Poet, Belfast, NY; Chuck Sayers, Harrisburg, PA; Martin Schoech, Eisenach, Germany; Jerry Strawman; Des Moines, IA; Bob Wilkner, Pompano Beach, FL; Joe Wood, Greenbriar, TN; and Dave Zantow, Janesville, WI.

A Simple Shortwave Tuner Project

By Carl Herbert AA2JZ

Using a tuner between your receiver and antenna can be beneficial in that it “tunes” the length of a wire antenna’s impedance to match (or almost match) that of the RF input circuit of the equipment being used. This one is very simple, inexpensive, and a worthy project.

There’s nothing new about this tuner design. It was often used in inexpensive “Citizens Band” (CB) transceivers of the past, though they were called “clarifiers” then. It is a tuned circuit that “matches” the input/output circuit of the equipment to the antenna being used, thus providing better signal quality. A discussion of the operating principles isn’t essential, and so I shall spend time describing the parts used and how to assemble the unit.

❖ Inductor Coil

The most difficult portion of the design is the inductor. I began with a ten inch length of schedule 40 PVC (polyvinylchloride) waste water pipe as a form for the coil. Ten inches is overly long for the turns required, but it allows room for holding the form while winding the inductor. Four inches of the pipe is needed for the coil form.

Remove a one half inch wide by three inch section of the plastic, using the lettering



INDUCTOR DETAIL

Schedule 40 Plastic Pipe
1.5 inches x 4.0 inches

34 turns, approx. 40 uH,
tapped each 4 turns

Pipe is slotted 0.5 inches
by 3.0 inches. Depress
turns slightly between
tap points.

printed on the pipe as a guide (See picture). I drilled the length required, and then used a razor knife and file to complete the removal process. The half inch remaining on each end will be used for mounting and wire attachment. After winding, I trimmed the pipe to appropriate length, and drilled holes for mounting.

Wire used to wind the coil is enamel coated #22 (part of RS-278-1345). Drill a small hole on each end of the coil form, adjacent to the slot created. Carefully, wind 34 turns as evenly spaced as you can, and terminate the end through the other small hole. I placed the “loose” end of the wire in a small vise, stretched the wire taut, and rolled the wire on the form while keeping tension during the process. It took a few tries to achieve an acceptable coil, but persistence is rewarded.

❖ Solder Points

Attach the end of the coil winding to the second hole you created in the coil form. Select solder points at each fourth turn of the winding. Depress the three “in between” wires into the slot you’ve created.

Carefully, scrape the enamel from the coil wire. Depressing the three turns between solder points allows room for better cleaning of the solder point. Tap wires are surface soldered to the tinned locations on the coil. I used recycled “A-B” box wiring. (A-B box is the switch box used between computer and peripheral equipment.)

I created the case from available sheet metal, and it measures 3 inches high, 8 inches wide, by 6-1/2 inches deep. Any metal enclosure you select will be dictated by the size of the coil and capacitor used. Size isn’t critical, but avoid “crowding” parts into a difficult work space.

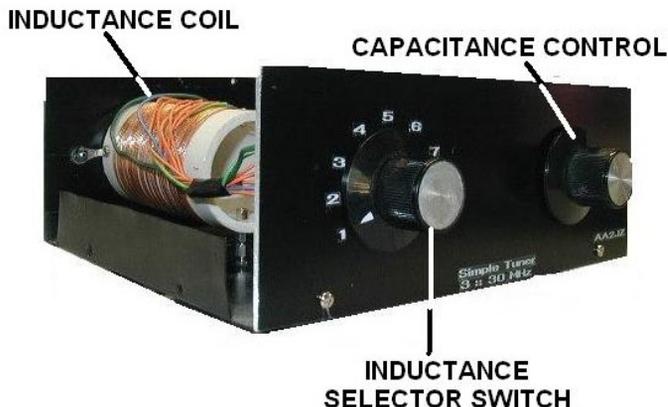
❖ Assembly

Mount the coil on the rear wall of the enclosure. I used ground lugs as securing devices on the rear of the form, and DB-9 hardware (nuts, screws, and washers used to fasten the DB-9 socket to a panel) as a “mounting foot” for the front end. A machine screw, with nuts and washers would have worked equally well.

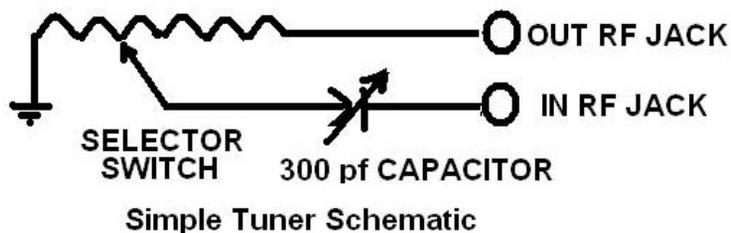
Tap wires are attached to the multi-position switch attached to the front panel. Mine was from my “junk box,” but any multi-switch having enough contacts will suffice.

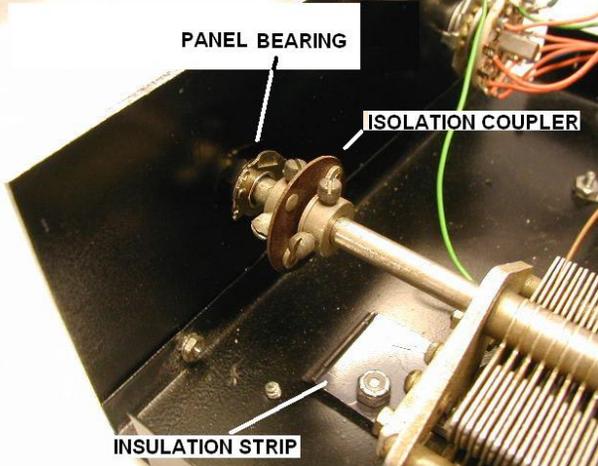
The variable capacitor should be in the 300 pf range. Mine is a hamfest find, and the actual value isn’t critical. Those variables used in older AM (amplitude modulation) radios will work just fine. They are typically 365pf units. The capacitor is insulated from the sheet metal of the cabinet, both the mounting holes underneath and the tuning shaft. To insulate the base of the capacitor, I used plastic mate-

FRONT VIEW--Simple Tuner



INDUCTANCE COIL





the variable control. The piece can then be mounted on the front panel and will accept the quarter inch tuning shaft for the capacitor.

❖ Using the Tuner

When attached to my 120 foot dipole (cut for 3.6 MHz) and fed with RG-8U coaxial cable, the circuit will tune with the following settings. All had an SWR (standing wave ratio) of 3 to 1 or less, as indicated on my Icom IC-7000 transceiver.

Band Selection : Switch Setting

- 80 Meters : 6
- 40 Meters : 6
- 30 Meters : 5
- 20 Meters : 7
- 17 Meters : 7
- 15 Meters : 10
- 12 Meters : 8
- 10 Meters : 2

The capacitor setting wasn't noted. Each frequency section selected was in the lower end of the band where I prefer to operate. Tune the unit for maximum gain (loudest audio) and adjust to meet a lower SWR from there.

RF connections on the rear panel are SO-239 units to meet my equipment needs. The choice of connectors is yours. BNC types would also suffice here, and they wouldn't require drilling additional holes for mounting hardware. The binding post for providing "ground" should also be incorporated.

Some paint can be added if needed,

rial removed from the side cover of a vintage computer. I have also used plastic material from storage containers, sheet window plastic, thin plywood, etc. for this. Any material that is non-conductive will work here. Nylon screws were used to mount the plastic strip to the base of the capacitor. Metal screws and nuts then attach the completed device to the base of the cabinet.

To insulate the shaft of the capacitor, an insulated connection is needed. A coupling from a hamfest find was used in this unit. In previous projects I have also used sections of ball point pens (minus the pen and spring, etc.). Those inexpensive pens providing advertising for chain hotels work well. A dab of super glue or epoxy will hold the pen shaft in place.

The panel bearing in my unit is a recycled volume control section. The panel mounting threaded section with its nut and washer were removed from the nonfunctioning portion of

plastic knobs and some lettering, and your "Simple Tuner" will be ready to "peak" signals between 3 and 30 MHz.

MT READERS ONLY

To access the restricted website for the month of February, go to www.monitoringtimes.com, click on the key, and when prompted, enter "mtreader" under the user name. Your password for February is "radar" – Check in each month for new material!



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!

World QSL Book

From the world-renown QSL expert, Gayle Van Horn

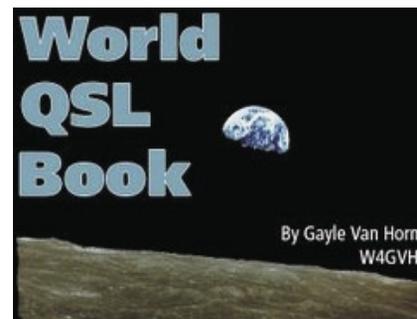
Including:

- Hints, Tricks and Tips of the Trade
- Prepared QSL Cards
- Most Wanted QSL List
- Multilingual Reporting
- Electronic QSLing and Creativity
- AM/FM Broadcast Station QSLing
- Continental/Regional/Country
- Shortwave Stations QSL Profiles
- QSL Non Broadcast Services
- QSLing Amateur Radio Stations
- Utility QSLing
- Shortwave broadcast Section
- Pirate Radio Stations
- HF Utility Stations
- Utility Coastal Stations
- Ships-Platforms-Rigs
- U.S. Coast Guard
- Canadian Coast Guard
- Amateur Radio IARU QSL Bureaus

Shortwave listeners now have a single, exhaustive CD source to identify the call signs and IDs heard in the busy 2-30 MHz global spectrum. More than 500 pages cover every aspect of collecting QSL cards and other acknowledgments from stations heard in the HF spectrum. Guidance on collecting, displaying and preserving QSLs is included.

This self-loading, easy-to-use reference begins with a comprehensive tutorial on how to submit a verification report generally as well as specific details and addresses for querying international broadcasters. Successive chapters cover hams and utilities like military and Coast Guard, clandestine and pirate broadcasters, shipping and cruising industries.

A list of call signs for major communications users makes IDing simple, and a quick-check reference page features a handy table of frequency allocations for the shortwave spectrum.



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Free Help for Explorers of the Internet: SiteAdvisor and Sandboxie

Every month I wander technical/computer magazines and the Internet looking for radio software that you readers will find useful, unique and/or interesting. Tens of hours of trolling go into the process. This search takes me to new and unexplored websites and back to familiar sites to see what's new and updated.

When I find software that may meet the requirements, the next step in the process of producing this column begins. It starts with downloading the new software to my computer. Then it's on to installation. Hardware issues? Sometimes. Software problems? Occasionally.

But if all goes right, the software is now running and then put through its paces. That's the process, which takes place each month. That is, if no other disasters strike, such as (dare I say it?) a virus or worm attack on my computer. And believe me, these nasties hit me a few times per year.

❖ Preventing Attacks

Advice from anti-malware experts suggests having up-to-date anti-virus, spyware, and firewall programs operational on your PC. This approach will provide a large measure of security. The experts differ on which software programs provide the highest level of security, and their assessments change with each new program version. However, one common word of advice from the experts is "do not troll the web to unfamiliar sites." Well, there goes my column!

So, knowing this advice and yet needing to "push the envelope" and explore to all the dark corners of the web for that new and unique radio software, what can I do? The answer, so far, has been to get hit at least every six months. A major malware attack brings my PC to a crawl or stops it completely. Then it takes me days to get it out of my systems and get my PC totally "healed."

However, recently I have begun using an add-on to my browser called McAfee SiteAdvisor. This nifty piece of software sits and watches websites that you are exploring or about to explore. For example, if you query your search engine for sites containing "Radio Software," it may result in a list as seen in Figure 1. But how do we know which are "safe"?

Radio Broadcast Software ✓
Audio broadcasting & streaming. 100 stations. Reliable. Download!
SpacialAudio.com

Traffic & Billing Systems ?
Software Solutions for Broadcasting
Designed for radiostations
www.wedelssoft.com

Your Own Radio Station ✓
Software to broadcast from your computer, \$30 one time fee.
www.pirateradio.com

MegaSeg Radio Software ✓
Stable system for playback,
Powerful system for scheduling.
www.megaseg.com

NeoWinners (for windows) ✓
Contest winners tracking software
for radio and TV stations
www.neogroupe.com

DSP Software Radio Portal ?
News, Demo's, Free Code, Papers
Embedded Systems Portal
www.excerptpi.com

Radio Automation Software ✗
Internet streaming and AM/FM radio.
Professional low-cost broadcasting.
www.StationPlaylist.com

Figure 1 – McAfee's Site Advisor "circles" on a Google search and lets you know how safe a site before you go to it.

"caution." They may be sites which result in "...downloads on this site that some people consider adware, spyware or other potentially unwanted programs." Or they maybe linked to sites that have malware attributes.

This is a great way of bypassing websites



Figure 2 – Hover the cursor for more details.

❖ Look Closer

With the McAfee SiteAdvisor installed, a small circle appears at the top right of each resulting website. In Figure 1 you can see that some have a check (colored green). These are websites that Site Advisor has tested and found safe to use.

Looking down the list in Figure 1, you will also see question marks in some circles. These are sites are ones which web advisor has not tested as yet.

Finally, the circles with "X's" and colored red are the sites which are to be treated with

that may do no good to your PC.

❖ Digging Deeper

Hovering the cursor over a circle displays more detailed information about that specific site. See Figure 2. If you see the red X, look out for trouble.

Whatever website you decide to visit, Site Advisor will provide a quick indication of the safety of the site via a colored tag reading "McAfee SiteAdvisor" at the lower right of the screen. You can see this in Figure 1.

Right clicking on this tag displays lots of detail about the site including contact information, date established, country, popularity, email tests, download tests, links safety, annoyances, and reviewer and web site owner comments.

McAfee's SiteAdvisor gives me a bit more confidence as I dig deep into the web each month. It is available in a free version at www.siteadvisor.com/about/.

❖ Beware of Programs!

OK, now we have protected ourselves from "troublesome" sites. However, our aim is to download, install and run new programs ... and each of these can be an opportunity for bad things to happen to your PC.

Downloads can carry along with them, shall we say, "unwanted guests" in the form of viruses, worms and more. And if the "guests" don't piggyback a ride on the download, they can appear once the program is installed or run.

❖ Honest Mistakes

Malware is not the only thing that can ruin your computer and your whole day. Sometimes, without malicious intent, programs can corrupt the Windows operating system. In some cases, if you install a version of a program designed for Windows Vista 64 when you are actually running Windows XP, you cannot imagine the problems that can result! It can, because I have experienced the mistake and the unfortunate results. Not all programs will result in this PC chaos, but all it takes is one. So how do we protect ourselves from this happening?

Another innocent situation that can cause hours or days of reinstallation – maligning the lineage of the Microsoft management and heartburn – is when a new program overwrites part of an existing program's critical code, your personal files, or, worst, part of the operating

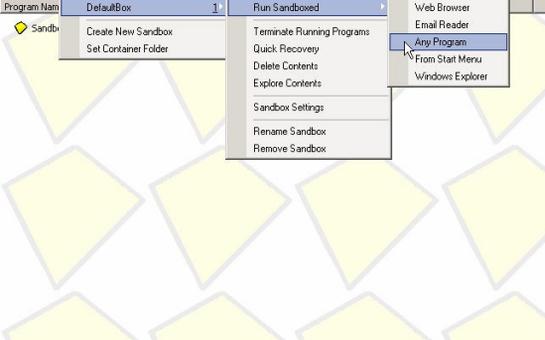


Figure 3 – Sandboxie’s Control Screen: Drop-down menus run the programs.

system drivers. No fun here. So, again I ask, how do we protect ourselves from this happening?

❖ Just Using Windows

You can imagine how many programs I install, run, and test each month. Many don’t meet the standards of this column and are deleted. This parade of programs takes its toll on the system’s registry, resulting in strange and unexpected PC functioning. System slowdown, inability to find existing programs, and loss of operating system functionality can result from registry bloat/corruption. Once these things happen, a Registry cleaner, such as CCleaner www.ccleaner.com/, can get you going again. But, how can you prevent it in the first place?

Recently I found a program that promises to prevent all these PC scourges. It has the unlikely name “Sandboxie”. The concept is simple. Sandboxie cordons off a part of your PC’s memory, which it uses to install and run applications and files.

Applications you run under Sandboxie are segregated from the rest of the PC. Think of them as being installed, run, and saved in virtual, or transient memory. The permanent hard drive resident OS and applications can read from this transient memory. But sandboxed data never flows back to the permanent hard drive. That is, until you decide to use the “Recover” command. Then the recovered application or file is installed on your Windows hard drive. If a program is not recovered, it disappears when Sandboxie is closed.

Therefore, when Sandboxie is terminated, all traces of the programs installed and run under it (and not recovered) disappear as if they never existed. The idea is to provide a safe *sandbox* for new programs to be tested or played in.

Let’s give Sandboxie version 3.20.01a a try. We’ll run it on a PC with a 1.6 GHz Duo Core T2060 CPU, 2.0 GB of RAM with a Vista Home Basic operating system.

❖ Green For Go

Searching for the Sandboxie’s website www.sandboxie.com/ my Site Advisor came up with a nice green check. So I downloaded the free 309K program with much less hesitation than usual for a new program from a new website. The program includes an interactive tutorial, which I highly recommend for Sandboxie newbies (like myself). You can find the tutorial under the Help menu. It goes over starting your web browser in a Sandbox.

The main display is called the Control Screen and has the familiar row of drop-down commands at the top. From here, all programs that we wish to keep isolated in a sandbox must be opened. In fact, this screen is used as the starting point instead of going directly to the Windows Desktop or Start-Programs. From here you can access and open all PC programs or files.

❖ Jumping into the Sandbox

Figure 3 shows the Control Screen where we are about to run a program. Here we have used three menus to get to the Sandboxie command “run any program.” In a similar manner, your web browser can be run from within Sandboxie to isolate the PC from permanent changes from web-based sites and programs. Remember, everything we open or run in this manner are kept safely inside the “box.”

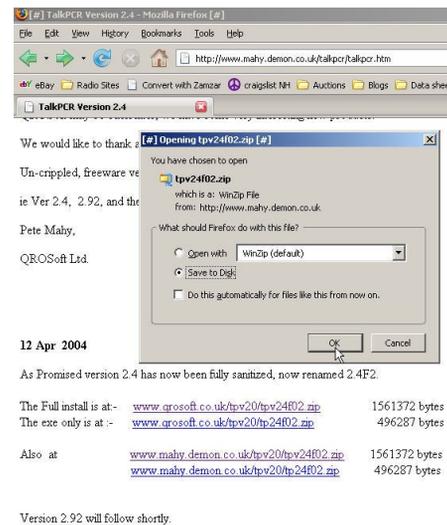


Figure 4 – Firefox Browser running “in the Sandbox” along with the downloading of Talk PCR. Notice the [#] in the title lines.

Let’s try downloading, unzipping, installing, and running an old friend: Talk PCR version 2.4F2 ... and all in an isolated sandbox.

First, we need to start Sandboxie as we would any Windows program. Now, using the Control Screen, seen in Figure 3, we launch our web browser and go to www.mahy.demon.co.uk/talkpcr/talkpcr.htm

Notice in Figure 4 that our Firefox top line has a bracketed number sign [#] at the beginning and end of its title line. Also, if you look at the download box at lower left it reads “[#] Opening tpv24f02.Zip [#]”. The bracketed number signs indicate that the program is being run in a sandbox under Sandboxie.

Selecting the OK in the download window starts the download. There is no operational indication that anything is different from a normal download. Well, almost.

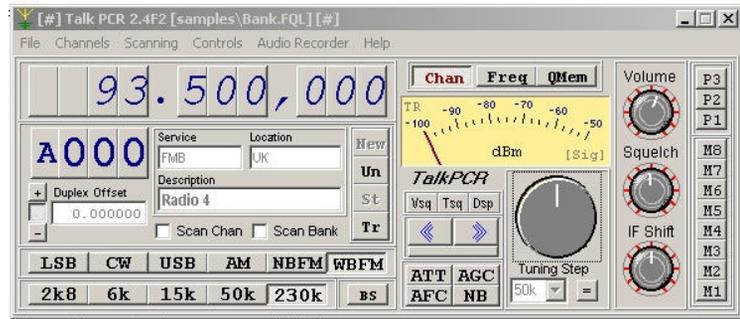


Figure 5 – [#] Talk PCR [#] running in the Sandboxie.

❖ No [#] No File

If you use Windows Explore outside of the sandbox, the newly downloaded file cannot be found! But, start Windows Explorer in the Sandbox and magically the newly downloaded file appears and can be accessed.

Interestingly, even to capture the screen image of the Sandboxed programs seen in Figure 4, I had to run my screen capture program in the sandbox. When I didn’t, nothing was captured. That’s pretty secure!

The remainder of the process of getting Talk PCR up and running is straightforward, as long as everything, including unzipping and installation, is done via the Control Display. The end result, Talk PCR running happily in the “sandbox,” is shown in Figure 5.

❖ One Click Good-bye!

Talk PCR is one of the select radio programs that I keep resident on my PC. But, assume that we wanted to “wash” our computer of everything we had done from when we first opened Sandboxie. We can use the commands found on menus box in Figure 3 to say goodbye to it all. The commands we need to use are “terminate running programs” and “remove sandbox.” Then shut down Sandboxie using Exit in the File menu.

Alternatively, we can choose to return to our work done in the sandbox at a later date. Just choose Exit under the File menu to end Sandboxies without terminating the running program. In either case, your PC is now free of any system clogging.

We have just touched the surface of operating Sandboxie.

❖ Wrapping It Up

So there you have it: Two free applications, Site Advisor and Sandboxie, help you to enjoy new websites and new programs, with a bit more peace of mind. Both apps have Pro versions, which are not free, but which include additional features. Donations are always welcomed at Sandboxie.

With the complexities and multitude of combinations of programming methods and the Windows operating systems’ “hooks,” I would be shocked if Sandboxie works with all radio programs. This is especially true, due to the intimate interaction of radio control programs with PC input/output ports.

Give both programs a try. Share with us how well Sandboxie behaves with your favorite radio applications.

Till next time, stay green and stay clean.

What's NEW

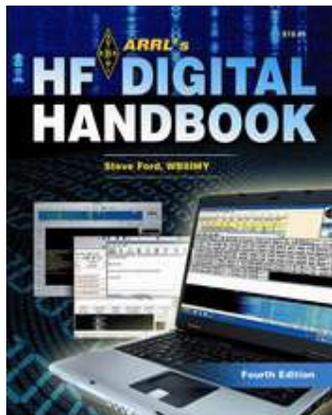
Tell them you saw it in *Monitoring Times*

ARRL's HF Digital Handbook

By Steve Ford, WB8IMY

Amateur radio has entered the 21st Century. Thanks to advanced technology, ham communications have evolved from crude spark gap communications to digital signal processing and software-defined radios. One of the major technology advancements in recent years has been in digital communications. As microprocessor technology became more sophisticated, so did the new digital modes.

This explosive growth in ham radio digital modes has been well chronicled in articles by Steve Ford in the pages of *QST* magazine. Now Ford has recently compiled a new publication covering this rapidly expanding field of communications.



The ARRL's *HF Digital Handbook* is your guide to understanding the most active HF digital communication modes in use today. There is something here for every radio operator – beginners and more advanced operators alike. And, as this technology rapidly advances, your increased understanding of digital communication techniques will make certain that you stay in the race as new modes and methods unfold.

This fourth edition book includes expanded station setup information; discussion of PSKMail and other varieties of PSK; new content on Olivia, DominoEX, HF digital voice and image modes; and Automatic Link Establishment.

If you want to get in on the digital revolution, then this new

ARRL book is just the ticket to get you started. All it takes is your sound-card-equipped computer and your HF transceiver. ARRL's *HF Digital Handbook* will guide you through the rest!

Topics covered include: Assembling Your HF Digital Station, RTTY, PSK31, PACTOR, Winlink 2000, Clover, Hellschreiber modes, MFSK, G-TOR, MT-63, Throb, Olivia and DominoEX modes, HF Digital Contesting, HF Digital Voice and Image, and ALE in the ham bands.

This 4th edition is published by The American Radio Relay League, Inc. Order ISBN 0-87259-103-4 or ARRL book number 1034 for \$19.95.

You can order this new ARRL publication or any other League publication online at www.arrl.org, or via their toll free order line at 1-800-277-5289. The snail mail address is ARRL, 225 Main Street, Newington, CT 06111-1494. Be sure to include shipping and handling.

Sunair / FlexRadio Agreement

Sunair Electronics, LLC., Ocala, Florida, recently announced that they had finalized an agreement with FlexRadio Systems of Austin, Texas, to purchase certain customized state-of-the-art software defined high frequency radios and accessory items for sale to Sunair's government and military customers globally.

"I am very pleased to announce the formalization of our relationship. Sunair and FlexRadio have been working on the relationship for quite sometime. Sunair has chosen a technology solution designed right here in USA, continuing with our 'Made in the USA' philosophy. FlexRadio has been refining their design for more than 4 years. FlexRadio has combined extremely innovative software and graphical interfaces with RF hardware to produce a product which is truly state of the art when it comes to high frequency (HF) radio. This product will help our customers with their critical

national security communications requirements. Sunair foresees this as the beginning of a multi-phased long-term relationship. We enjoy an excellent working relationship with FlexRadio," commented Mark Allen, Sunair's President.

A software defined radio (SDR) is a major departure from traditional designs where all radio frequency functions and processing are accomplished with hardware. In an SDR, many of the processes are accomplished with high speed digital processors, allowing for much simpler hardware designs and allowing maximum flexibility in filtering and user specified functionality. HF radios operate in the frequency range of 2 - 30 MHz and are designed for long range global communications circuits.

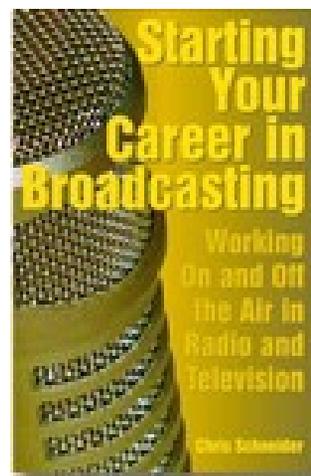
Gerald Youngblood, President of FlexRadio reflected that, "Our strategic partnership with Sunair offers the opportunity to combine Sunair's excellent worldwide marketing, sales, and support network for HF communications with FlexRadio Systems expertise in Software Defined Radio (SDR) technology. SDRs represent the most significant change in communications technology in well over half a century, allowing flexibility and performance not practical with traditional analog approaches. We look forward to a long and productive relationship with Sunair."

You can learn more about radio monitor products from FlexRadio, including the details on their new Flex-5000 HF/6 meter transceiver on their website at www.flex-radio.com/.

Starting Your Career in Broadcasting

By Chris Schneider

For anyone who wants to work in TV or radio, *Starting Your Career in Broadcasting: Working On and Off the Air in Radio and Television* is the bible to starting and building a successful career. In this informative and inspiring guide, today's top broadcasting personalities share how they broke into the business, the often-hilarious mistakes they made along the



way, and how they grew personally and professionally.

Veteran broadcaster Chris Schneider interviews Bob Costas, Chris Berman, Larry King, Jim Lampley, Bob Kingsley, Rene Syler, Troy Aikman, E.D. Hill, station managers, top university and broadcasting school instructors, and others who offer expert advice on making the right choices throughout a career.

Chapters explore:

- Specific on-air and behind-the-scenes jobs
- Academic programs in broadcasting
- How to capitalize on a "big break"
- What news and program directors seek in job candidates
- How an aspiring broadcaster can buy time on the air
- Weathering the ups and downs of a competitive industry
- How professionals of all kinds can host their own talk shows

A special section explains how broadcast ratings are computed and provides tips for dealing with allergies and the common cold in an industry in which the voice is everything. This is the essential book for anyone who has dreams of working in "the biz."

Starting Your Career in Broadcasting is published by Allworth Press (6 x 9-inches, 240 pages; ISBN is 978-1-58115-489-4) and retails for \$19.95. This book is available at the publisher's website: www.allworth.com/Starting-Your-Career-in-Broadcasting_p/1-58115-489-5.htm.

What's NEW

Tell them you saw it in *Monitoring Times*



Yaesu FT-950 HF/50 MHz Transceiver

The Yaesu FT-950, the newest radio in the direct lineage of the FTDX-9000 and FT-2000 series radios, has been developed to fit the needs of both casual and serious DX enthusiasts, as well as new HF licensees eagerly seeking to discover the magic of the HF and 50MHz bands. Prospective owners will find that this radio comes in an appropriately-sized desktop package that provides them with loads of easily located controls and features to ensure they enjoy all of the excitement available on the 160 through 6 meter Amateur Radio bands.

The FT-950 is a 160 to 6 meters transceiver, with an output power adjustable in increments from 5 watts to the full 100 watt output SSB/CW/FM and AM - 5 to 25 watts output. It includes a general coverage receiver that covers the 30 kHz to 56 MHz frequency range (continuous).

The sophisticated receiver section utilizes DSP filtering, incorporating features such as variable bandwidth, IF Shift, and pass-band contour tuning. Digital noise reduction and digital auto-notch filtering are also provided, along with a manually-tuned IF notch filter.

On the transmit side, the Yaesu-exclusive three-band parametric microphone equalizer allows precise and flexible adjustment of the wave-form created by your voice and microphone. The amplitude, center frequency, and bandwidth of equalization may be adjusted independently for the low-frequency, mid-range, and high-audio-frequency spectra, and the transmitted bandwidth may

also be adjusted, as well.

Advanced features include direct keyboard frequency entry and band change, speech processor, IF monitor for voice modes, CW pitch control, CW spot switch, full CW QSK, adjustable IF noise blanker, and all-mode squelch. Two TX/RX antenna ports are provided on the rear panel. Two key jacks are provided (one each on the front and rear panels), and they may be configured independently for paddle input or connection to a straight key or computer-driven keying interface. The CW message memory is provided.

Some of the other key features of the FT-950 include:

- High Speed Automatic Antenna Tuner with 100 memories
- Front Panel Proprietary High-visibility Fluorescent Display (VFD)
- Front Panel Block Diagram Display for Function Status
- Optional External Data Management Unit - DMU-2000
- Optional Fully-automatic External RF μ -Tuning - RF Mu-Tuning Kit
- Triple-conversion super-heterodyne receiver
- Yaesu 32-bit floating point IF DSP
- Robust Receiver Front End
- Digital PLL for strong-signal-handling capabilities in multi-signal environments.
- Three (3) Factory Installed 1st IF Roofing Filters
- Analog-sounding High-quality Digital SSB Modulation
- Dedicated RTTY/PKT connection jack on the rear panel.

The FT-950 requires 13.8 VDC at 22 amps. This radio comes with the MH-31B8 hand microphone, DC cable, spare fuses and plugs. It measures 14.4 x 4.5 x 12.4 inches and weighs in at 28.7 lbs. The Yaesu FT-950 retails for \$1840.00 and is available at amateur radio dealers nationwide.

Bearcat BC-95XLT Scanner

The Bearcat BC-95XLT is an affordable 200 channel scanner with many features. It has Uniden's new Close Call™ RF Capture Technology that instantly tunes to signals from nearby transmitters. (You can even screen-out pager frequencies). Frequency coverage is 25-54, 108-174, 406-512, 806-956 MHz (excluding cellular).

There are ten programmable search ranges to help you find un-



listed frequencies in use in your area. Plus there are six preprogrammed service searches: Public Safety, Railroad (by channel), Air, Marine (by channel), CB (by channel), G M R S / F R S (by channel), Weather, News Media, Ham Radio and Special. The prior-

ity scan frequently scans the channels you have designated as priority channels. The delay feature helps prevent missed replies during 2-way conversations. The BC-95XLT features easy to use controls and a quality keypad.

The backlit LCD display makes for easy night time operation with Uniden's patented backlight-on-squelch feature that illuminates only when there is channel activity. Operation is from two AA cells providing flexibility in choice of batteries: Alkaline for long life, rechargeable for economy (batteries can be charged while in the scanner). Inside the battery compartment there is a switch for using either two AA NiMH cells or two AA Alkaline cells (the AA cells are not supplied).

The BC-95XLT measures 2-3/4 x 4-1/2 x 1-1/4-inches. The BC95XLT is similar to the BC92XLT, but is blue in color and has a USB computer programming port on the right side of the

radio. (PC cable not included).

The BC95XLT comes with: AD1017 AC adapter (6 VDC +), belt clip, flexible BNC antenna, and English/Spanish Owner's Manual.

Frequency Range

- 25-30 MHz Amateur Band (10 Meters)
- 30-50 MHz VHF Low Band
- 50- 54 MHz Ham Band (6 Meters)
- 108-137 MHz Aircraft Band
- 137-144 MHz Federal Government
- 144-148 MHz Amateur Band (2 Meters)
- 148-174 MHz VHF High Band
- 406-420 MHz Federal Government
- 420-450 MHz Amateur Band (70 Cm)
- 450-470 MHz UHF Band
- 470-512 MHz UHF "T" Band
- 806-956 800 MHz Band (less cellular)

This scanner is not a trunk tracker or APO25 digital decoding scanner. It retails for \$149.99 and is available from several *Monitoring Times* advertisers.



ARRL National Exam Weekends

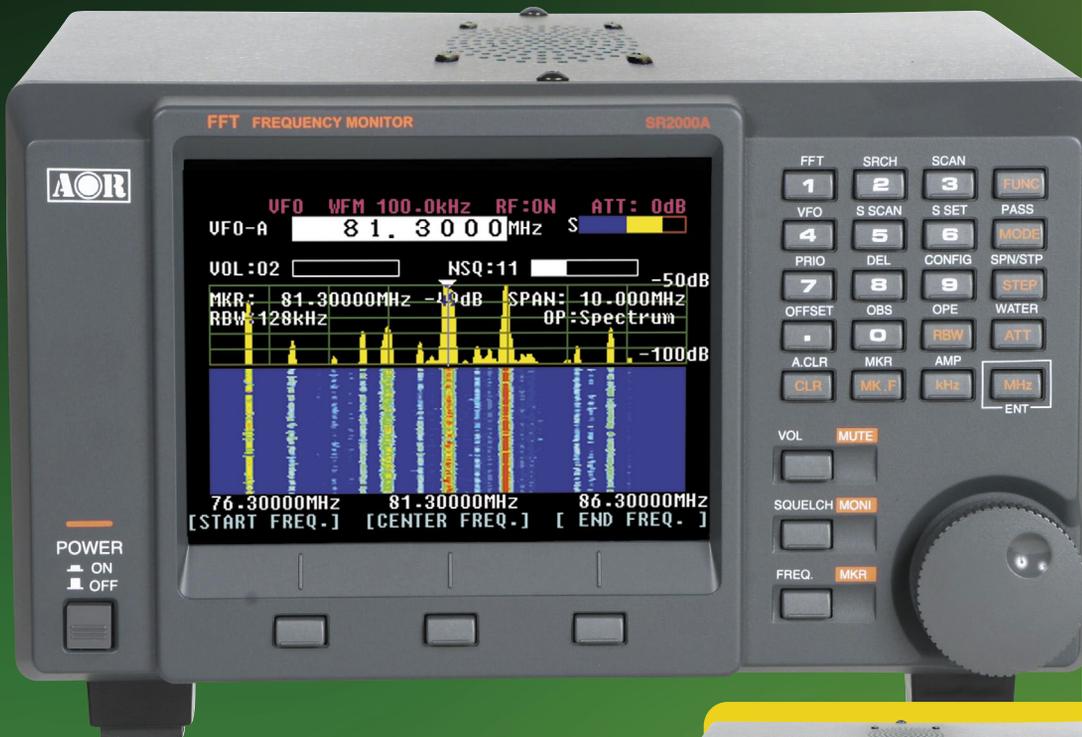
The ARRL has announced the 2008 dates for their National Exam Weekends. The ARRL sponsored national exam day weekends are held annually on the last full weekend of April and September. The Spring weekend is April 26-27 and the Fall dates are September 27-28, 2008. If you are looking for the latest ham radio exam study materials from the W5YI group and Gordon West, WB6NOA check out their website at www.w5yi.com or call toll free at 800-669-9594.

Books and equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to **Larry Van Horn, larryvanhorn@monitoringtimes.com**

Watch What Happens!

The SR2000A is an ultra-fast spectrum display monitor that lets you SEE received signals in FULL COLOR

AOR SR2000A Frequency Monitor



- Frequency coverage: 25MHz ~ 3GHz (no gaps)*
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Using the power of FFT (Fast Fourier Transform) algorithms with a powerful receiver covering 25MHz ~ 3GHz*, the SR2000A features a color monitor that displays up to 40MHz spectrum

bandwidth or video display of NTSC, PAL or SECAM signals.

Ultra-sensitive, incredibly fast, yet easy to use, with a high quality internal speaker for crisp, clean audio signals.

Scans 10MHz in as little as 0.2 seconds! Instantly detects, captures and displays transmitted signals.



- Video display function (NTSC/PAL/SECAM auto select)***
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info@aorusa.com http://www.aorusa.com

*Government version. Cellular blocked for US consumer version.

**No audio is available when the frequency span is set to 20MHz or 40MHz.

***No audio available while displaying video signal on the LCD. If both video and audio need to be monitored simultaneously, an optional (external) TV2000 is required.

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Attention all those wanting to know what's going on with ham radio in the New Orleans area, check out: <http://groups.yahoo.com/group/GNOAmateurRadio/>

WANTED: E.F. JOHNSON C.B. MATCHBOX #250-49, RICHARD: WA0KKC - 913-432-5136

WANTED: A mobile doppler direction finding system similar to the design shown in QST Magazine May & June 1999. ballardn5WV@aol.com

For Sale: Sony ICF77 and ICF2010 in mint condition. Asking \$500 each. Call Ben, 732-238-3438 or cell 646-662-8635.

Blogs offer an opportunity for columnists to share information that does not make their columns. The news might be too timely for deadline, too short, confined to a small geographical area, too far away to be heard in North America, or even off the columnist's regular "beat." Bookmark these blogs for frequent visits!

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- MT: EDITOR'S DESK
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- MT: FED FILES
<http://mt-fedfiles.blogspot.com/> - by Chris Parris
- MT: MILCOM
<http://mt-milcom.blogspot.com/> - by Larry Van Horn
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