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

25th Anniversary

Monitoring Times

A Publication of Grove Enterprises

Volume 26, No. 12
December 2007

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

Everything old is new again

In this issue:

12
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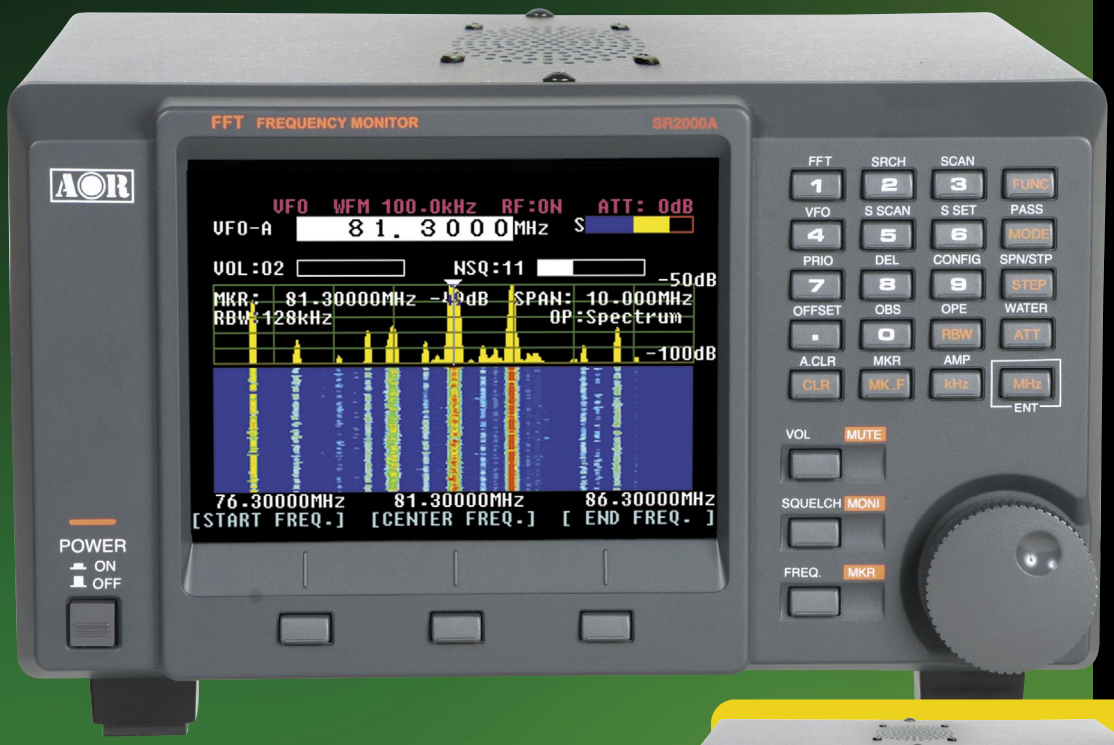
Watch What Happens!

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)*
- Ultra-stable, high-sensitivity triple-conversion receiver
- External video output (composite video)
- AM/NFM/WFM/SFM/TV receive modes
- Displays up to 40MHz of spectrum bandwidth (20MHz or 40MHz selectable)**
- P25 decoding function available with optional P25-8600
- Waterfall (time) display function
- 1000 memory settings (100ch x 10 memory banks)
- Average or peak value readings

simulated video

- Video display function (NTSC/PAL/SECAM auto select)***
- 5 inch TFT color LCD display
- Versatile color display uses state of the art digital signal processing

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.

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- Easy menu-driven operation
- PC control through RS232C serial port or USB interface

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*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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...the future of radio.™

Treat yourself this Christmas!

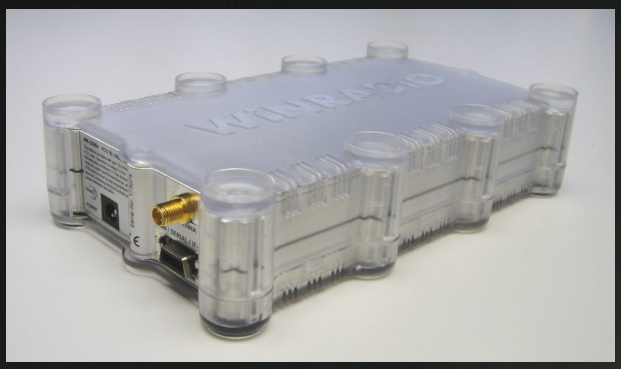
The latest WR-G305e (USB) and WR-G305i (PCI) are the first commercially available VHF/UHF software-defined scanning receivers. Their all-mode digital demodulator works entirely in software, with easy upgradability and high performance level typical of receivers costing many times more.

Designed for demanding applications where it is important to locate even the weakest signals in background noise and extract the cleanest audio possible. Combined with excellent hardware parameters and extensive software support, the WR-G305 series defines a new standard for communications intercept and monitoring tools.

The new optional APCO P25 Decoder makes it possible to receive unencrypted digital APCO P25 channels on your WR-G305 series receiver. See the APCO P25 spectrum in real time, analyze transmission type, determine various embedded digital codes such as NAC, TGID, SID and DID, measure bit error rate, record transmissions and listen to crystal clear decoded speech!

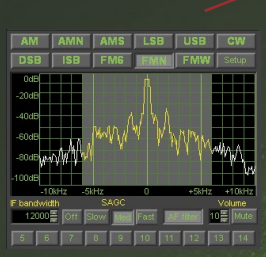
So which one will you choose? The external WR-G305e offering perfect portability with your laptop, or the WR-G305i which hides neatly inside your desktop PC with no extra clutter on your desk? The performance is the same - the choice is yours!

- ***9 kHz-1800 MHz frequency range (except cellular bands where required by law)***
- ***Optional 3500 MHz downconverter***
- ***Tracking front-end filters***
- ***Dual-loop AGC and AFC***
- ***Software-defined demodulation***
- ***Excellent sensitivity***
- ***Fast scanning speed***
- ***Multiple squelch modes***
- ***Real-time spectrum analyzer***
- ***Sweeping spectrum analyzer***
- ***Hit counter***
- ***Accurate S-meter***
- ***Adjustable IF bandwidth***
- ***Adjustable digital audio filter***
- ***Digital communications ready***
- ***Digital Bridge™ compatible***
- ***Standard PCI card or USB box***
- ***Easy "Plug and Play" installation***
- ***Optional professional demodulator***
- ***Optional DRM decoder***
- ***Optional APCO P25 decoder***



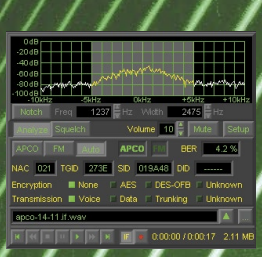
WR-G305e - portable and powerful!

WR-G305i - hides inside your PC!



Professional Demodulator Option

DRM Decoder Option



APCO P25 Decoder Option

For a Merry Christmas with WiNRADiO, visit www.winradio.com.

Monitoring Times

Vol. 26 No. 12 December 2007

Lead Story

CROSLEY RADIO

By Ken Reitz

Crosley, once a household name in radio in the mid 20th Century, was recently given a new life. Powell Crosley would have been proud to see "his" products in a whole new catalog of radio, telephone, and phonograph designs.

Two years ago, entrepreneur Bo LeMastus decided he wanted to do more than just create retro-look radios. For more authenticity, his company acquired rights to the Crosley name and product designs, which they have upgraded to solid state technology ... with a twist.

Though Crosley was ahead of his time (he promoted a small, inexpensive automobile before the American public was ready for it), even he never imagined getting music from a CD, satellite, or MP3 player!

The story starts on page 15.

Cover photo by Rachel Baughn

C O N T E N T S

Thanks to our Readers and Warm Wishes from Monitoring Times

Reviews

In his feature article about the revival of Crosley Radio, Ken Reitz reviews three of the Crosley products: the CROSLEY SOLO, CROSLEY EXPLORER 1, and CROSLEY CR32CD cathedral radio (page 16).

Final in the current series of HD radio reviews is the most recent release: SONY's XDR-S3HD table-top model. True to the Sony reputation, Ken Reitz found the XDR-S3HD to be great-looking, versatile, with excellent audio. (Page 66)

In the battle for remote control, the contest has been between Infrared vs. Radio Frequencies, with Bluetooth and 802.11 systems being the primary contenders for RF. But Lynovation has introduced a new application for Bluetooth: wireless computer control of our radios via BLUELYNC. And what's a BlueSMiRF? Turn to page 72 and find out!

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

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

Subscription Rates: $28.95 in US; $39.50 Canada; and $58.50 foreign elsewhere, US funds. Label indicates number of issues left. Renewal notice is cover sheet 3 months before expiration. *See page 77 for subscription information.*

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

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

Publisher
Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor
Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor
Larry Van Horn, N5FPW

Art Director
Bill Grove

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

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AR5000A+3 Wide Coverage Desktop Communications Receiver

Discover the Choice of Professionals

Available in a professional and consumer version, the AR5000A+3 is a proven performer!

From aircraft and public safety, to broadcast and shortwave, no wonder so many Federal and State law enforcement, military units, surveillance agencies, government users, hospitals, RF labs, news media and monitoring professionals rely on the AR5000A+3 for accuracy, sensitivity and speed!

The AR5000A+3 advances the frontiers of performance with coverage from 10 KHz to 3 GHz!*

This professional grade receiver with tuning accuracy to 1 Hz delivers automatic electronic front end preselection and precision stability from its built-in TCXO. Other features include:

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- Multi-function LCD with 7 character alpha-text comments
- Extensive search & scan facilities
- CyberScan® fast search & scan facilities
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- 2,000 memory channels
- 40 search banks with EEPROM storage
- Computer controllable
- Multiple antenna ports
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- The ARD25 APCO 25 conversion unit
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- DS5000 Analog Voice Descrambler Unit *(for Government Use Only.)*

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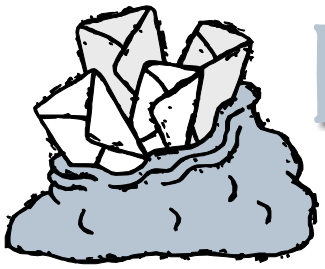
The Serious Choice in Advanced Technology Receivers

The AR5000A+3 is another example of why AOR is the Authority On Radio!

Specifications subject to change without notice or obligation.
**Cellular blocked. Unblocked version available for qualified users. Documentation required.*



LETTERS TO THE EDITOR

Early FM Radio

"Dr. Bruce Elving's article on FM radio in the '50s [June 2007 *MT*] certainly took me back. I was somewhat surprised to see the FM guru is younger than I. Having just passed my 74th birthday, it is something I have not become reconciled to.

"I do remember FM radio even earlier, in the 1940s. A great uncle had the only FM receiver at this time of the whole town. I noticed an unusual outside antenna and wondered about it. At this time, the FM radio band was around 45 MHz which, I understand, was taken and used as TV Channel 1, but being found unusable, became part of the VHF Lo Public Service Band. The FM programming seemed all classical music and opera. I noticed that the signal was very clear and the quality a little better than the experimental AM Hi-Fi stations which were above the regular AM band which stopped at 1500 kHz at this time.

"I began DXing the FM band once the AM/FM portable radios came out in the mid-1960s. Just a few years before, an American manufacturer said that no portable could be made as it took two identical transistors in the circuitry and it was impossible to do such quality. The Japanese soon proved him wrong and it always upset me that these people, just defeated by us, seemed smarter than us.

"Some years ago, I cleaned out an old bureau whose drawers had been lined with newspaper – specifically the Boston (Mass.) *Globe* of December 6, 1947. Included was the radio page which I was able to photocopy despite its crumbling. At this time, Boston and vicinity had eight AM and four FM stations. A couple of these stations still used the old FM band and I remember seeing FM radios for sale that featured both bands: WGTR, Boston, 99.1 and 44.3 megs; WXHR, Cambridge, 96.9 megs, WBZ-FM, Boston, 92.9 and 46.7 megs; and WLAW-FM, Lawrence, 93.7 megs. These stations broadcast only in the afternoon and evening, much as did the early TV stations."

Bob Fraser

VOX

"Reference [John Catalano's] September 2007 article titled "Vox Radio Populi" in *Monitoring Times*, in the telephone industry, the X in vox stands for switch as the symbol for open relay contact is an X."

Jim Thornton, 35 years with General Telephone Company of California Camarillo, California

VBR Prescott

"Thanks, Ron Walsh, for your [October] article on *VBR Prescott Coast Guard Radio*. I have heard the voices many times, here on the inland seas, and now have faces to go with the voices.

"One thing that bothers me with VBR, is that they seem to send alerts to all mariners in their area. Do they ever contact the *Aviation Community*??

"As a one time pilot, Cessna-150, I had to look down at the ground and water from time to time. With many private and commercial aircraft installing GPS in the cockpits, why not transmit the *maydays* to those in the air?

"Frequencies could be: 121.500, 124.975, 122.750, and 123.450. If the USCG bases at Buffalo and Fort Niagara were using these frequencies, it could be a lot sooner that help would be on its way!

"Also, on your article on *Boats* in the Seaway (page 57), lock 3, I believe is in the Welland Canal, although not mentioned. It was also nice to see a Laker still being used, as so many of them have been turned into motor vehicles and buildings. Thank you for the two websites, I will add them to my lists."

Dave Martin, Niagara Falls, NY

The Law and Streaming Audio

MT headquarters recently received this comment and query from Ralph Stallsworth:

"I got my October 2007 *MT* today... and it never takes me long to get to the *Ask Bob* section. The second question this month is in regard to rebroadcasting. Not sure if I understand the question... or the answer!

"I've been live streaming my scanner for over four years from Fort Myers, Florida. My stream is here...
http://pinelakeshome.com/Scanner/radio1.htm

"As you know... there are hundreds of scanner live streams from just about every part of the world. I have many listeners. Lots of controversy on the subject. I just read an Internet thread on Radio Reference that the LA FD and PD in California is trying to shut down streams from their area. Generally... whatever California does this year... the rest of the country does the next year. The thread is here: **www.radioreference.com/forums/showthread.php?t=81717**

"I've always 'hid under the blanket' as far as my live stream goes. Sort of... don't ask... don't tell. I enjoy sharing my scanner online and I know many listeners enjoy the stream on a daily basis. I was a fireman from the Toledo, Ohio, area and retired in Florida. Never in my wildest dreams did I ever believe I could listen to my old fire department radio comms from 1,200 miles away! But... I do most every day.

"We as radio listeners over the years have gotten the 'short end of the stick' many times. ... I'd hate for live stream to be a part of it... "

Ralph Stallsworth, Fort Myers, FL

In Bob's October column, the reply did not directly address rebroadcast of public safety agencies. As we began to research Ralph's enquiry, we discovered that a thorough investigation had just been done by a Radio Reference contributor (see his link above). His information was confirmed at the FCC website, and Bob Grove writes the following to amend his October reply:

Reader Challenge!

Everything Old is New Again...

... Including our cover photo! We have a special prize for anyone who can tell us what item in our cover shot has been used on a previous *Monitoring Times* cover – and, we'll add a 2-month extension to your subscription if you can also name the issue on which it appeared.

December 2007 wraps up our celebration of *MT*'s 25th year of publication. Have you noticed that, throughout the year, as well as in this issue, we have published a larger-than-usual number of articles on radio history: personal reminiscences, *MT* history, and radio retrospectives? By design, *MT* generally keeps its focus on news and information you can put to immediate use, but nostalgic stories help us recapture the original magic of radio that hooked us in the first place.

As we move into Volume 27, *MT* will cover emerging radio and consumer technologies, but we'll continue to carry occasional stories from radio in the World War II era. After all, most of us grew up alongside radio and much of its history is our own!

It is encouraging to see a company like Crosley demonstrate that technology can draw from the past as it moves into the future – Certainly Crosley embodies our cover slogan this month, "Everything old is new again"!

Streaming Scanner Audio - Is It Legal?

With the rapid proliferation of streaming audio sources on the Internet, radio hobbyists are beginning to question the legality of interception and rebroadcast of public safety communications. After all, the original 1934 Communications Act was very clear – while it was lawful to intercept, it was not lawful to divulge the contents or purport of any radio transmission not intended for the interceptor to hear.

Questions still remained: Is real-time relaying of an original message considered divulgence? After all, aren't we hearing it for the first time? But, nightly news programs actually replay law enforcement and emergency messages.

Clearly, advances in technology, society and world events have prompted a new look at the old regulation. Recently, an Internet thread of articulate scanner listeners has brought the issue to light. (See Radio Reference.com)

Ignoring the ethical issues of indiscriminate broadcasting of law enforcement dispatches and investigations, there are two primary statutes that must be considered, FCC regulations under Title 47, and Part 90 of the Code of Federal Regulations Title 18.

The FCC specifically acknowledges exceptions to the privacy law under the CFR Title 18, Chapter 119, and is now releasing this position statement: "FCC rules do not prohibit redistributing over the Internet those communications licensed under FCC rules Part 90, such as the communications of local government, law enforcement, civil defense, private land mobile, or public safety communications, including police, EMS, fire and the like. Licensees under FCC rules Part 90 concerned about the intercept and divulgence of their communications may encrypt or scramble these communications, except for station identification."

Title 18 starts out by closely reiterating the privacy intent of Section 605, but adds these exceptions (abridged as pertinent): "It shall not be unlawful…to intercept or access an electronic communication…that is configured…(in a manner that is)…readily accessible to the general public; to intercept any radio communication which is transmitted by any governmental, law enforcement, civil defense, private land mobile, or public safety communications system, including police and fire; by a station operating…within the bands allocated to the amateur, citizens band, or general mobile radio services; or by any marine or aeronautical communications system;"

It seems clear, therefore, that the streaming of unencrypted public safety messages over the web is lawful, adding one more positive step in a new era for communications monitors who are already enjoying trunking capability and P-25 digital demodulation, all previously unavailable to the listening hobbyist.

Official Confirmation

Bob had no sooner written the above, when Ralph received his own confirmation directly from the FCC in the following email:

"FCC rules do not prohibit redistributing over the Internet those communications licensed under FCC rules Part 90, such as the communications of local government, law enforcement, civil defense, private land mobile, or public safety communications, including police, EMS, fire and the like.

"Licensees under FCC rules Part 90 concerned about the intercept and divulgence of their communications may encrypt or 'scramble' these communications, except for station identification. Part 90.735(d) requires station identification to be transmitted by unencrypted voice. Station ID may also be by digital transmission of the station call sign, including by Morse code. A licensee that identifies its station in this manner must provide the Commission, on request, information (such as digital codes and algorithms) sufficient to decipher the data transmission to ascertain the call sign transmitted.

"Rules are located in Title 47 of the Code of Federal Regulations; Part 90 is available online at **http://wireless.fcc.gov/index.htm?job=rules_and_regulations**

So there you have it: The definitive word on streaming audio from public safety agencies.

Since Part 90 includes the once-prohibited digital paging services, does that mean they are now fair game? Absolutely not: Digital transmissions are still protected by laws which prohibit the sale or possession of hardware or software which can convert digital modes into analog audio if those signals are digitally encrypted for the purpose of privacy.

COMMUNICATIONS

The Once a Year Station

Only once a year, DXers have a chance to log the island of St Helena, one of the most isolated spots in the world and a sought-after DX country. Radio St. Helena is celebrating a double anniversary with a very special Radio St. Helena Day 2007 world-wide shortwave broadcast: the 40th anniversary of broadcasting for Radio St. Helena, and the 10th shortwave transmission anniversary. RSH will be transmitting on 11092.5 kHz in USB with 1000 Watts via a 3-element monoband directional antenna on the following schedule:

Saturday, 15 December 2007

UTC	Target area
1730-1815	New Zealand
1815-1900	India
1900-2015	Japan
2015-2145	Europe
2145-2245	North America East
2245-2330	North America West
2330-0015	South America North
0015-0100	South America Central/South

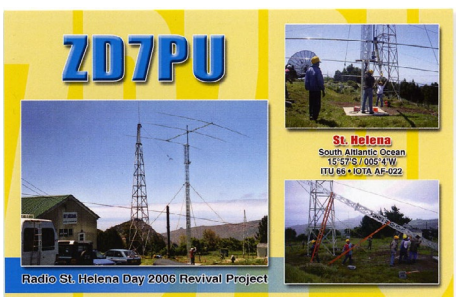
A beautiful full-color QSL card will be issued for this anniversary shortwave transmission. The same procedures apply for QSLing as in 2006: Return postage is absolutely required and is "at least" three IRC's or, in "Greenstamps," 5 US dollars or 5 Euros. Additional funds are gratefully accepted.

Reception reports are to be sent only by regular mail and only to the following address: Radio St. Helena, P.O. Box 24, Jamestown, St. Helena Island STHL 1ZZ, South Atlantic Ocean. Check the website at **www.sthelena.se/radioproject** for more information.

"We Have a Dream"

The Friends of Radio St Helena have a Dream-Project to revive the international, interactive shortwave programs once broadcast on RSH. A technical concept for the Project has been decided upon and resembles a high-powered amateur radio station. After many discussions, specific equipment has been selected and suppliers have been found. Used equipment is being sought, when possible.

Project backers are hoping for the donation of two used amateur radio transceivers such as the Yaesu FT-757GXII or similar. In addition, the project will need a lot of help in the way of donations and sponsorship. If you'd like to hear Radio St Helena more than once a year and you can help, please send an email to Robert Kipp ZD7PU/DJ0PU [*RDC-Roberts-Data@T-Online.de*]. Or, just send your check, cash, or money order (payable in US dollars to Radio St. Helena Fund) to: Richard A. D'Angelo, c/o Radio St. Helena Fund, 2216 Burkey Drive, Wyomissing, PA, 19610 U.S.A.



When these world-wide transmissions stopped in late 1999, the old transmitter and the complete antenna system with towers were scrapped. Kipp's 2006 QSL card shows the construction of the new tower and antenna system for the Radio St. Helena Day Revival Project in October of 2006.

„We are starting with only a dream, but quite often, dreams do become reality... The revival of the shortwave programs would spread the word of this wonderful and historic island and lead to increased commerce, trade, and tourism for St. Helena, especially when the planned airport becomes operable. Together we all can make this dream a reality. Let's do it! Let's put RSH back on the shortwaves!"

Bloated BBC?

According to a Reuters article in late October, "Having angered Queen Elizabeth and the public, Britain's BBC is set to shed staff with sweeping job cuts this week in the biggest crisis to hit the world-renowned broadcaster since a government clash over Iraq."

The long-respected broadcaster has "seemingly stumbled from one crisis to another this year," requiring a series of public apologies for airing promotional footage which wrongly implied that Queen Elizabeth had stormed out of a photo shoot, and admitting to faked competitions on well-known charity specials, radio stations and a popular children's series.

Director General Mark Thompson is expected to cut up to 1,800 "redundant" positions in response to the government's reduction in the BBC's budget. News and factual departments will likely bear the brunt of the cuts. Staff and unions have warned the quality of its output will drop, and morale is plummeting, but some critics believe it's time for the BBC to become leaner and more competitive. In fact, it may be the BBC's lack of experience in competing with other media that led to its clumsy attempts to play the ratings game.

BBC World, its commercially funded, international 24-hour news channel which broadcasts in more than 200 countries, BBC World Service, and World Service radio will not be directly affected by the cuts.

BBC Sputnik Challenge

In honor of the 50th anniversary of the launch of the world's first satellite, BBC's online Magazine issued a challenge for readers to build their own Sputnik, using items lying around the modern-day house. Getting one launched – now that's different matter! **http://news.bbc.co.uk/2/hi/uk_news/magazine/7049002.stm**

News Leak Alerts Al Qaeda

Four days before it was to be aired, excerpts from a speech by Osama bin Laden which Al Qaeda intended for broadcast on September 11, appeared on the ABC News website. The transcript release, no doubt a news coup for ABC network who hailed it as an American intelligence victory, was an intelligence disaster for those who had been using the secret online network as an ear on Al Qaeda.

Several people, inside and outside government circles (such as Nick Grace, a radio hobbyist and founder of the **clandestineradio.com** website) watched Al Qaeda's internet system, dubbed Obelisk, shut down in real time, as it realized its security had been breached. "It was both unprecedented and chilling from the perspective of a Web techie. The discipline and coordination to take the entire system down involving multiple Web servers, hundreds of user names and passwords, is an astounding feat, especially that it was done within minutes."

SITE, one of several small, commercial intelligence firms that specialize in intercepting Al Qaeda's internet communications, shared the video with senior administration officials on Sept. 7 on the condition that it not be distributed or made public before its official release. Soon afterward, the video was downloaded by dozens of computers registered to government agencies. In less than two hours, SITE's copy of the video was leaked to television news networks and broadcast worldwide.

Ben Venzke, who runs the Intel Center in Alexandria, Va., another monitoring company, said his job has become more difficult in recent months as more groups have begun to release material intercepted from Al Qaeda.

"Overall the public release of this material before official release by terrorist groups has caused the work that we do to become much harder," said Venzke, whose group has contracts with U.S. intelligence agencies, law enforcement and the military.

Venzke said he publicizes information he feels does not need to be secret, but he is dismayed by the competition that has sprung up around releasing videos first. He is concerned that premature acknowledgment that he has a video might give away to Islamic militants how or where he obtained it.

"Communications" is compiled by editor Rachel Baughn KE4OPD, from news stories submitted by our readers. Many thanks to this month's fine reporters: Anonymous, David Carberry, Mark Cobbledick, Chanel Cordell, John Figliozzi, Alokesh Gupta, Norman Hill, Sterling Marcher, Robert Nickels, Ken Reitz, Doug Robertson, Brian Rogers, Gregory Smith, Larry Van Horn, Sakthi Vel, Ed Yeary.

Cell Phone Company Buys Surveillance Band

At a recent FCC spectrum auction, wireless telephone provider T-Mobile was the successful bidder, buying exclusive use of the 1710-1755 and 2110-2155 MHz bands. This reassignment will force federal agencies to relocate their surreptitious listening and video surveillance systems currently operating in the 1710 MHz band where they tune in on suspected terrorists and drug kingpins.

Recent spectrum auctions have brought in over $14 billion to the Commission. During the transition interval, which is expected to take some time, T-Mobile is barred from using their newly-acquired spectrum while the surveillance applications continue

Aircraft Encounter Dead Air

Back in September, Air Traffic Controllers at the Memphis ARTCC lost their entire communications system for more than three hours, closing off more than 100,000 square miles of airspace. The Federal Aviation Administration blames the disruption on the failure of a major AT&T phone line, but critics say that the trouble is deeper – that the new communications network being installed lacks sufficient backups.

Ham radio is often touted as an emergency backup for communications when power is out, but in this case, it was the cellphone that came to the rescue. With all back-up phone lines out and planes in the air, controllers used their personal cell phones to call other centers and ask them to keep planes on course.

"It's engineered this way, and it's going to happen again," said Dave Spero, a vice president of the union representing FAA technicians, long critical of the new system.

Members of Congress are investigating whether the Memphis failure was an isolated breakdown or evidence of a design flaw in a $2.4 billion project to upgrade telecommunications at air-control centers and other FAA installations across the country.

California Fires

As we go to press, we are witnessing a repeat of the scene on the cover of the January 2004 *Monitoring Times*. While the fires are being fought is too early to report how communications fared between all the assets brought to battle the worst wildfires in California history. Thousands of people lost power and communications services as wildfires were driven by powerful Santa Ana winds. Many of the wildfires were likely sparked by those same power lines, arcing or even being knocked down in the wind, which gusted as high as 100mph.

Blogger Jim Forbes reports that evacuees honored the request to text by cell phone to friends and relatives, rather than using bandwidth for voice. Forbes said, "The other piece of technology I rely on and carry in my 'go now' bag is a Belkin Skype wireless phone. It's sturdy and small enough to nestle safely in my bright red backpack and it finds Skype and connects automatically wherever there's an 802.11 network. I keep all my portable electronics fully charged and ready to go."

On June 27th and 28th, 2007, dozens of fire department teams and task forces from throughout the greater Bay Area took part in a two-day training drill that tackled progressive hose lays, mobile attacks, direct hand line construction and basic firing evolutions. This was all in preparation in case another event, such as the one that is happening now, should occur. Courtesy of www.cffjac.org.

He also said the Thinkpad had become indispensable, and he noticed most emergency service personnel also carrying and using ThankPads. "Local emergency services gets straight A's for its use of 802.11 mesh networks – a technology launched in 2000 at DemoMobile that's now become pervasive. The presence of 802.11 networks at evacuation shelters is now assumed and is widely used by relief workers and refugees alike."

The January 2004 article by Laura Quarantiello and sidebars outlined the major frequencies used at that time. This time, with 9,000 fighters on the ground and National Guard called in, how well did communications work? *MT* readers would like to hear your stories.

Legendary Mediumwave DXer Dies

Back in the days when I did the paste-up for *Monitoring Times*, Dr. Richard Wood was a name that then-editor Larry Miller uttered with awe. I never knew quite why, since his exploits rarely seemed to appear in *MT*, which was (and still is) the source of most of my knowledge about radio! Then I reviewed Ian McFarland's Radio Canada International Short Wave Club archival CD, which is bundled with Dr. Wood's Foreign Language Recognition course (May 2007 *What's New*), and I began to understand why Wood was so revered.

On the Radio Netherlands Worldwide Media Network Weblog, Andy Sennit wrote, "Dr. Richard Wood was one of the most experienced mediumwave DXers in the world, and his was one of the names I heard most often in my early years as a DXer in the 1960's. He was also a contributor to the *World Radio TV Handbook* and its offshoot, *How to Listen to the World*. A native of Newcastle-on-Tyne, England, Dr. Wood taught at several universities in the United States, as well as in Norway and Saudi Arabia, and was a remarkable linguist, which helped him enormously in his chosen hobby. He later settled in Hawaii, from where he was able to log some very rare mediumwave stations, and remained an active DXer right up to his death."

Richard Wood was only 67 when he died of a heart attack September 25, 2007. He had recently renewed membership in two mediumwave radio clubs. According to the report at **www.naswa.net/badx/wood.htm** by Bruce Conti, Wood had plans to beef up his MW reception with a system of Beverage antennas on the southern edge of Paradise Park, Kea'au, Hawaii, where he was planning to build a house.

Sadly, Dr. Wood apparently had no family or relatives and left no will. The State of Hawaii is believed to have taken possession of his belongings. Fellow DXers are hoping to retrieve his QSL collection for preservation.

Amando Cespedes Marin and Commander Eugene F. McDonald, Jr.
A Unique Radio Friendship

By Harold Cones, PhD, and John Bryant, FAIA

Amando Cespedes Marin is considered the father of Costa Rican radio. His pioneer station TI4NRH first operated in May 1928 and was the fifth regular shortwave broadcast station in the world, the first in Latin America. Born in 1881, Cespedes went to New York City alone at age thirteen and returned to Costa Rica as a salesman when he was twenty.

Successful as a businessman, he went back to the United States, received a degree in photography, and returned to the Costa Rican town of Heredia, on the slope of Barva Volcano just north of San Jose, where he opened a studio. He became interested in radio through reading radio magazines and began building receivers to sell.

By 1928, his interest led him to transmitting with a 7-1/2 watt transmitter as TI4NRH. Although low-powered, the combination of transmitter, antenna and location proved to be optimal and he began receiving reception reports from all of Central, South and North America, and, eventually, Europe and Africa.

Programming, consisting primarily of apolitical small talk and Indian-American folk music, coupled with a universally received signal, combined to develop a loyal world-wide audience and Cespedes quickly became one of the best known radio broadcasters in the world. Cespedes and the station often received as many as 1,000 letters a week, each of which he personally answered, usually with a letter, and either an 11x16 inch "Diploma" or an 8-1/2x11 inch "Certificate of Reception," citing the recipient as an "active member of the NRH Fraternal Order."

So important was his work in promoting international good will, the government of Costa Rica allowed his station free postage to answer the huge volume of mail that he received. Cespedes was the engineer, announcer, and chief entertainer at the station, at times helped by his four children.

A person of some importance in his country, Cespedes served as Commissioner Attaché to the Louisiana Purchase Exposition in 1904 and as the Chief of the Statistical Census Office in Panama. He was serving his government as the Director of the Department of Photography, in charge of 27 employees tasked chiefly with making picture identification cards, when he met Commander Eugene F. McDonald, Jr. in 1938.

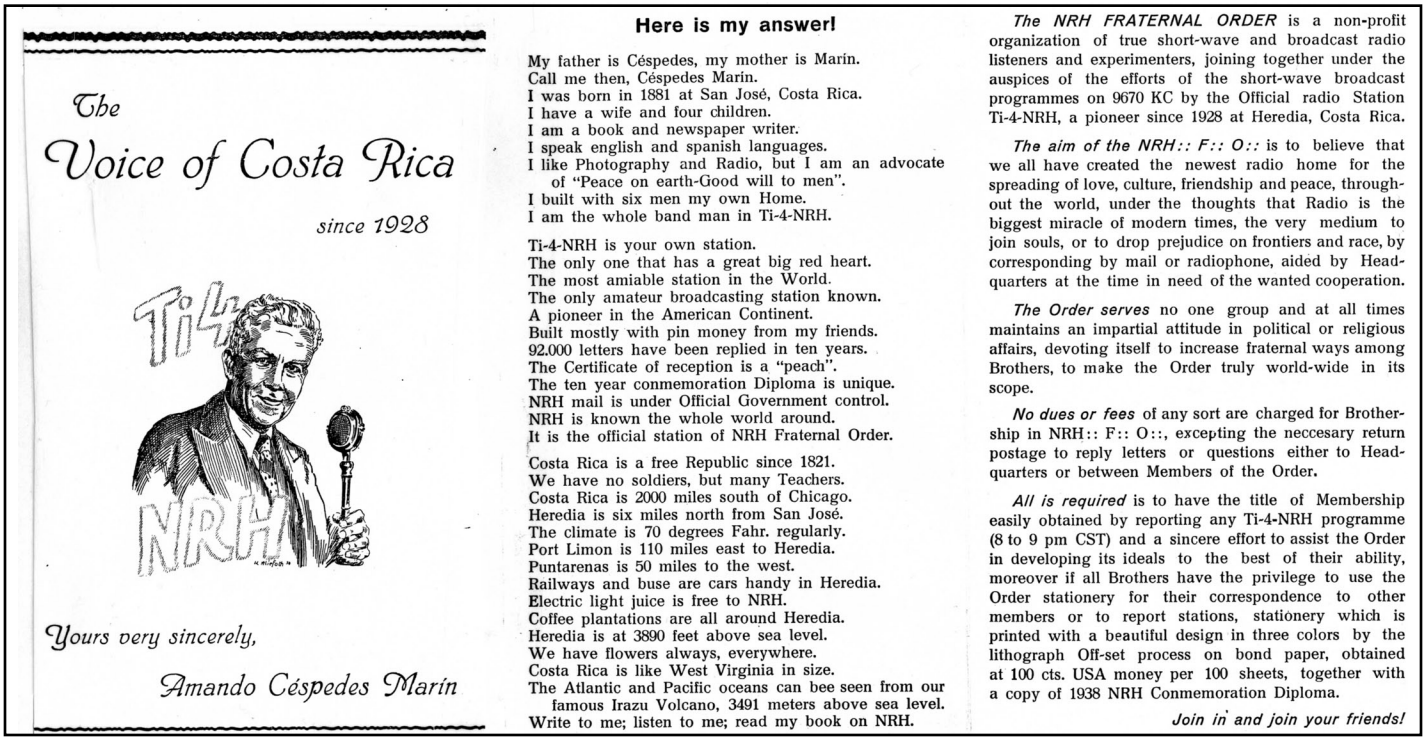
First Meeting

Commander[1] McDonald was the Founder and President of Zenith Radio Corporation. By the mid-1930s, Zenith was a giant of the new radio industry and Commander McDonald was one of America's wealthiest and best-known men[2].

In fall 1938, Amando Cespedes Marin and his family embarked on a 14,000 mile trip to Cuba and the United States to celebrate the 10 year anniversary of shortwave station TI4NRH. As an expression of celebration and gratitude, the trip was at the invitation of radio amateurs and radio listeners in the two countries.[3] Cespedes visited a number of people and radio manufacturers, and as a guest of the Chicago Short Wave Club, [4] toured the city museums and the planetarium. He also toured Zenith Radio Corporation at 6001 Dickens Avenue and that is where he met Commander McDonald.

McDonald entertained Cespedes by boating on Lake Michigan on his yacht, the *Mizpah*, taking him to dinner at his home, and arranging a full escorted tour of the Zenith factory. Cespedes wrote eloquently of his experience in later letters to McDonald. The Zenith employee newsletter, *The Radio Log*, reproduced a portion of his December 2 letter to McDonald, as well as the details of his December 8, 1938, NRH broadcast that was devoted entirely to Zenith.[5]

Said Cespedes in his letter to McDonald, "I marveled at the wonderful tone quality of the Zenith radios that I heard and as I walked through



The Voice of Costa Rica

since 1928

Yours very sincerely,

Amando Céspedes Marín

Here is my answer!

My father is Céspedes, my mother is Marín.
Call me then, Céspedes Marín.
I was born in 1881 at San José, Costa Rica.
I have a wife and four children.
I am a book and newspaper writer.
I speak english and spanish languages.
I like Photography and Radio, but I am an advocate of "Peace on earth-Good will to men".
I built with six men my own Home.
I am the whole band man in Ti-4-NRH.

Ti-4-NRH is your own station.
The only one that has a great big red heart.
The most amiable station in the World.
The only amateur broadcasting station known.
A pioneer in the American Continent.
Built mostly with pin money from my friends.
92.000 letters have been replied in ten years.
The Certificate of reception is a "peach".
The ten year conmemoration Diploma is unique.
NRH mail is under Official Government control.
NRH is known the whole world around.
It is the official station of NRH Fraternal Order.

Costa Rica is a free Republic since 1821.
We have no soldiers, but many Teachers.
Costa Rica is 2000 miles south of Chicago.
Heredia is six miles north from San José.
The climate is 70 degrees Fahr. regularly.
Port Limon is 110 miles east to Heredia.
Puntarenas is 50 miles to the west.
Railways and buse are cars handy in Heredia.
Electric light juice is free to NRH.
Coffee plantations are all around Heredia.
Heredia is at 3890 feet above sea level.
We have flowers always, everywhere.
Costa Rica is like West Virginia in size.
The Atlantic and Pacific oceans can bee seen from our famous Irazu Volcano, 3491 meters above sea level.
Write to me; listen to me; read my book on NRH.

The NRH FRATERNAL ORDER is a non-profit organization of true short-wave and broadcast radio listeners and experimenters, joining together under the auspices of the efforts of the short-wave broadcast programmes on 9670 KC by the Official radio Station Ti-4-NRH, a pioneer since 1928 at Heredia, Costa Rica.

The aim of the NRH:: F:: O:: is to believe that we all have created the newest radio home for the spreading of love, culture, friendship and peace, throughout the world, under the thoughts that Radio is the biggest miracle of modern times, the very medium to join souls, or to drop prejudice on frontiers and race, by corresponding by mail or radiophone, aided by Headquarters at the time in need of the wanted cooperation.

The Order serves no one group and at all times maintains an impartial attitude in political or religious affairs, devoting itself to increase fraternal ways among Brothers, to make the Order truly world-wide in its scope.

No dues or fees of any sort are charged for Brothership in NRH:: F:: O::, excepting the neccesary return postage to reply letters or questions either to Headquarters or between Members of the Order.

All is required is to have the title of Membership easily obtained by reporting any Ti-4-NRH programme (8 to 9 pm CST) and a sincere effort to assist the Order in developing its ideals to the best of their ability, moreover if all Brothers have the privilege to use the Order stationery for their correspondence to other members or to report stations, stationery which is printed with a beautiful design in three colors by the lithograph Off-set process on bond paper, obtained at 100 cts. USA money per 100 sheets, together with a copy of 1938 NRH Conmemoration Diploma.

Join in and join your friends!

your great factory, I was wondering if the thousand girls that make them have anything to do with the beautiful sterling tone quality that comes from your radios, for these lovely girls must add to each set of the Zenith Radio Corporation something of their own voices and touchy ways, a secret of which you publish not a word. – Am I right?"

Cespedes' December 8 broadcast chronicled his visit to Chicago and reported glowingly on Zenith and McDonald. McDonald was so impressed by Cespedes and his efforts for Zenith that on January 5, 1939, he arranged to have a Model 15S372 shipped to Marin,[6] as well as a Wincharger and a 6-volt farm radio. Additionally, McDonald sent a picture of himself and one of the *Mizpah*, as Cespedes had requested. In response, Cespedes sent McDonald eight pictures showing the installation of the Wincharger on the roof of the Cespedes home.

The gestures of the two men during the holiday season of 1938/1939 resulted in a lifelong friendship, ending only when McDonald died in 1958; it also resulted in the rescue of the little Costa Rican radio station.

Hard Times

The disaster that nearly befell TI4NRH was described to McDonald in a January 15, 1939, letter from Cespedes:

…….Excuse me for the abuse of friendship! You know that my station, has been the pride of the World, and that she is a medium of eternal fraternity. I have never wanted it to be a commercial medium, not obstant (sic) that she has had offers; I have wanted it to be the output of friendship and the lover of radio fans. I have got over a hundred thousand letters in the last ten years from all over the World, and no one can believe that she is almost at the door of death. Would you save it?

In accordance with new regulations of the government, the new radio enforcement will take place on Feb. 1st coming and all concessions have been cancelled. Ti-4-NRH had one for being the first radio station in Costa Rica, ever since 16 years ago. In fact they call me the father of radio here. But being no business man, but a real amateur in all kind of progress, I have succeeded in Glory and fame, and I have given through Radio a home education to my children.

During the day time they do broadcast from 11 ½ am to 12 ½ pm., then from 4-6 pm, then from 9 ½ to 10 ½ each day on 980 kilocycles with 500 watts power, which covers a hundred miles, which is the with (sic) of the country were all population is located. My boys collect some advertising, which they use to buy school tuition and dress goods, because I want it so only so that they may learn the fatigues of life themselves, while keeping a home to honor me. But such income is not over 50 dollars per month.

On short waves, I have never accepted any advertisement for its own good will, and my own pleasure, just as you have your wonderful home in your Yatch (sic).

Now, as all stations must pay 100 dollars per year, in advance, beginning Feb. 1st coming, I come to you with my proposition, as either I have to pay or discontinue this fine game of radio which has given me Glory and Fame besides friends in the universe, and fine friends like you.

I am speaking like a man to man, with no interest but to maintain my own creed of happiness, amidst sorrows and envy. Will you save my station Commander McDonald?

Instead of The Voice of Costa Rica, as up to here surnamed I will call it THE VOICE OF ZENITH RADIO… and she will do it on short waves as accostumed (sic) on Tuesdays, Thursdays and Saturdays on 9692 kilocycles, and the whole World will know of the fine culture that you and Zenith have, or I will advertise in my own way all the products, with no other interest than to pay you my good will, and to demonstrate to my people that Commander McDonald did not let glory be drowned. I need not anything else, then the 200 dollars per year, so as to maintain both stations, and to give you credit as you are worth it, for you have conquered my soul and my ways with your exquisiteness of admiration to me.

My 980 KC station will do a great help to your radios in this country, and I will try to push Zenith Radio in all my ways, so to breakdown "the Voice of Victor" who apparently is pushing here some business. NRH on broadcast will also be called in Spanish the "La Voz de la Zenith Radio" yet, its all nothing for all I want to help you, and sure too I will have the Wincharger advertisements included Dailly (sic), in order to push in any sales, besides the showing of it on my home roof.

I know that you will laugh about all this, because it's a different treat. You know radio and our delight, and if you do not accept my proposition, I will close down for ever this station that has been the pride of amateur radio circles in the world. I will not offer to no one else my proposition as I rather close it down and let the World know that my own country has dumped me after prizing me so much during last year with even too as to our own President of the Republic, talk before the mike to give me more enthusiasm, but, Radio rules are laws and of course we must obey. My country has done enough to help me, free official mail for 9 years, free electric juice and free taxes, but now they want to pay the foreing (sic) debt and restrictions are in law.

Therefore, I will be waiting an early air mail from you, so to see if my proposition has the acceptance from a MAN, that understand what I mean, and how reliable I can be. The World will know that The Zenith Radio Corporation has injected life to this glorious station, which is at the very edge of being buried, for no one can broadcast after January 31st, unless the coin is paid.

I hope that you can understand my situation and that you will honor as Romans do, these words which are the cry of my heart, done to you, but to no one else, as my proudness is of the spanish chevalier.

McDonald's response was immediate, sent on January 20:

I have your letter of January and have cabled you as follows: "I will grant request in your Janu-

From the Commander's Files…

As authors Harold Cones and John Bryant completed a book on a Zenith Radio Corporation product in 1992/1993, they became further interested in the early years of the corporation. They were amazed at the general lack of information available. The Zenith "archives," like those of many near-century old companies, were pitifully incomplete, most of the corporate history having been lost or discarded over the years.

In August 1993, however, the authors stumbled into a time capsule of immense value: in an old, soon to be closed television assembly plant, up under the rafters and covered with pigeon droppings, were the personal files of Zenith's Founder, Commander Eugene F. McDonald, Jr., wax-sealed immediately after his death in 1958. The 138 file drawers not only revealed a great deal of information about Zenith Radio Corporation and McDonald's adventures, inventions, and relationships with historical figures, but also provided an intimate view of American society and culture between 1922 and 1958.

The files were transferred to 238 archival storage boxes, stored in a climate controlled area and are currently being prepared by the authors for eventual donation to a scholarly institution so that they will be available for all researchers.

Among the files were a series of annual folders from 1937 to 1957 chronicling the correspondence between Commander McDonald and Amando Cespedes Marin, the internationally known owner and operator of TI4NRH, a small shortwave station in Costa Rica. It is from the original letters and memos in these folders, except where noted, that the following factual information was taken.

ary fifteenth letter. Air mailing draft today with letter. Urge you do not change name or make any announcement until letter arrives. Regards. Commander." I just could not see NRH pass out of the picture. It has contributed too much to the radio fraternity and I am therefore enclosing a draft for $200 as requested.

I appreciate your fine offer to change the name of the station, but I think that this would be a serious mistake. I feel that you should continue the name of the station just as though nothing had happened. If you did change the name of the station, it would immediately identify it as a commercial or semi-commercial station, which is just what you and I do not want. Keep the stations just as they have been in the past—the short wave non- commercial and the standard wave station semi-commercial.

Then you can do us more good than you could by identifying the station as commercial, which would be the case if you changed the name. The publicity that you can give us will do as much more good if it is voluntary on your part and you merely tell of your experience with Zenith Radio and the Wincharger...

I know your character well enough to know that this will be taken care of. Next year, when you want another $200 to pay your fee, it will be there. Just notify me when you want it.

I hope you will see the wisdom of my reasoning and not change the name of the station, and will not indicate in any way that we have contributed directly or indirectly.

I am truly glad that you gave me the opportunity to help you to continue the fine work that you have done in the past.

Cespedes expressed his gratitude in a January 24 letter to McDonald:

It is a fact, that I have no words to reply, after reading your letters of the 20th and 21st inst. I can only pronounce, Thanks, the Lord bless you and your undertakings! We, my wife and the daughter and my sons, commented it last night before NRH broadcast, and we admire your wisdom of reasoning, and your keen intelligence. You are right, all the way right!

Of course you have returned my happiness and you have given life again to all my own, for we at home, were all upset...my home would have been after February IDDLE, just like if my dearest one would have passed away. Oh dear me, I have no words at all to express my gratitude……..you saved NRH, like Jesus did to Peter upon the waters. What a Saviour!.....

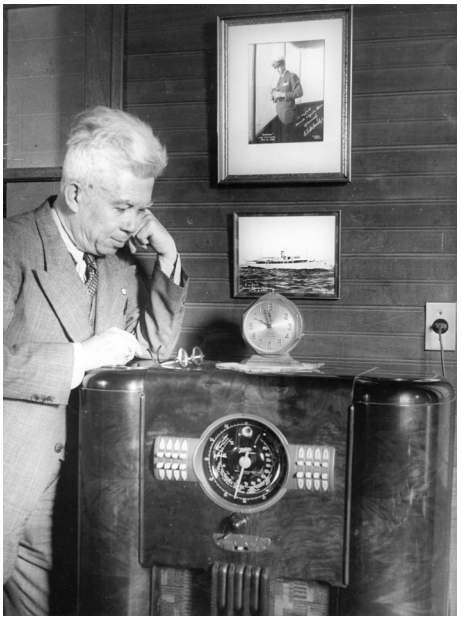
Each letter to McDonald from Cespedes offered thanks, and Cespedes increased the discussions of his trip to Chicago, his interaction with McDonald, and his Zenith products during the regular broadcasts of TI4NRH. For Cespedes, his stations were saved; for McDonald, Zenith products had a world audience, and the $200 (later $400) was sent annually for many years.

Cespedes was so grateful that he erected a shrine to McDonald in his home, near the big Zenith console. He also prayed for him daily, telling him in a March 4 letter, "Yes, Commander, I know of nothing how to repay you, but you can be sure that every morning at 10 minutes to 7 am, I am begging the Lord for you in a little chapel in my way to work, asking him, to give you health and more intelligence to undertake the knowledge in your hands."

Christmas Gift Exchanges

Along with a letter on March 27 to McDonald, Cespedes enclosed a large picture of himself standing over the big Zenith (showing the picture of McDonald and the *Mizpah* on the wall behind the radio), a large picture of his family and one of the station, and smaller pictures of his wife, his daughter Lidylia, and his sons Amandito, Carlitos and Alvarito. McDonald responded with a picture of himself with Marianne, his daughter.

The exchange of letters in 1939 shows the development of a strong friendship between the two men. Cespedes included ever increasing information about Zenith and McDonald in all the broadcasts from NRH and broadcast his second Christmas program, devoted totally to Zenith and McDonald, on December 2, receiving letters from "Mexico to Argentina," as well as from the United States; even Zenith's Frank Smolek sent a reception report and received a NRH certificate.



McDonald sent Cespedes a Zenith Model 9S1429 for Christmas 1939, along with a Radio Nurse and an 80' Wincharger tower for his station. Cespedes' gift was unique: a self designed and constructed "trophy" that he felt represented McDonald's life. As he told McDonald, "I do imagine a complete square block to resemble the never broken qualities of the Commander in all undertakings. The block is a top on the staircase, just as his career has been, in ascendance to Glory. On top that block there is a sphere, not only to resemble the no corners in his mind, but the willing anxiety to please the world with his ideas of labor spreading with the fraternity help to developments……mixing with it full gaety (sic) of the woods from Coast Rica in their natural state, but brilliantly lacquered to shine out from each mural, verily statements under glass, which are the truth on my devotion all around, to Commander E.F. McDonald, Jr."

Upon return from his Florida vacation, McDonald told Cespedes, "I can't tell you what this means to me, but it means most because it is your thought and your design, and it will not have a place in a back corner but on the table right in the middle of my office in front of the fireplace. I want you to know how thoroughly and sincerely I appreciate the thought that you have put on this beautiful thing. I know it will be admired by many of my friends."

Changing Political Tides

Cespedes arranged for the president elect of Costa Rica, Dr. Calderon Guardia, to meet McDonald while he was visiting Chicago in early April, 1940. McDonald gave Dr. Guardia a new Trans-Oceanic shortwave portable (which had not been released to the market) with extra batteries and reported on the visit in a letter to Cespedes on April 5.

Cespedes finished erecting the 80 foot Wincharger tower McDonald had provided for him on May 10 and began flying the flags of Costa Rica and the United States (eventually the tower carried 18 flags, presented by admiring officials worldwide). "The tower," said Cespedes in a letter to McDonald, "will stand there, and every body knows that it has been erected in your honnor (sic), to prize the constancy in my pioneer work under TI4NRH." He formally dedicated the tower (to McDonald) on May 4, the 12th anniversary of the station and placed a new long wave antenna at its top.

Cespedes contacted McDonald on June

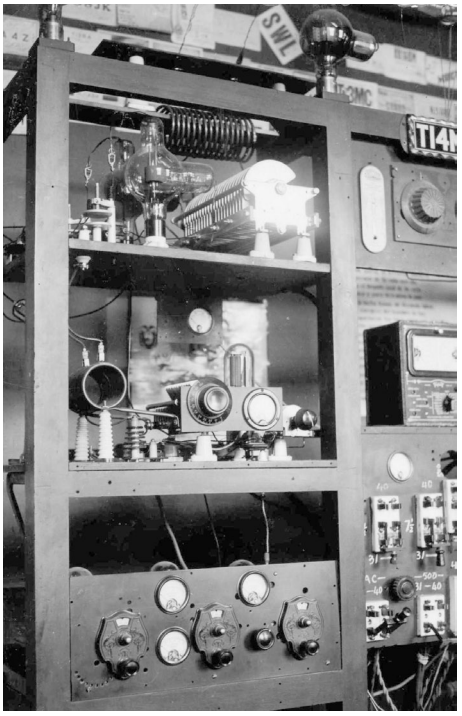
16 to tell him that the new president was not liked ("The whole Costa Rica is under a spell of mistake……") and that he had been relieved of his job as Director of the Department of Photography as part of the new government plan. McDonald encouraged him to wait a few weeks and approach the new President again, but Cespedes found through a friend that Dr. Guardia felt that the radio station would support him and he wanted others to be able to work for the government. Cespedes told McDonald that he would devote more time to "doing a duty towards fraternity" with his radio station.

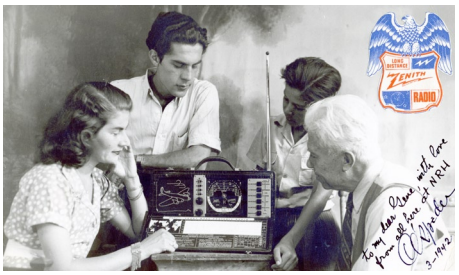
More Gift Exchanges

McDonald sent Cespedes a recording of "Mrs. McDonald's own composition 'Cancion' as played by the Firestone orchestra on the radio a few weeks ago" for broadcast on his station, which he did many times.[7] In mid-October, Cespedes dedicated a special program to the Wincharger Corporation in appreciation for the tower and McDonald began sending him copies of all Zenith and Wincharger brochures so that he would have fresh material for his broadcasts. Cespedes faithfully endorsed Zenith products and Commander McDonald and played Mrs. McDonald's music often. He also read and discussed a number of times (often for as long as thirty minutes), "Silent Wings," McDonald's *Collier's* magazine article on gliding.

McDonald sent Cespedes the new Trans-Oceanic portable for Christmas 1941, one that had been impregnated with materials to make it less sensitive to humidity. He also sent a radio-phonograph combination chassis, with a built in record cutter, which Cespedes built into a control panel for his station, and a pair of T200 tubes to raise the output of TI4NRH.

Cespedes responded by announcing to all Zenith employees and the listeners of his radio station that his March 11, 1942, broadcast (10:00-12:00 PM, 9715 KC) would be dedicated to Commander McDonald to commemorate the Commander's birthday. The broadcast included





a long "talk" about the Trans-Oceanic. Cespedes also sent a wooden carving by a local artist of the Commander that had been fashioned from a photograph. Eugene F. McDonald III was born on January 28, 1942, and McDonald sent Cespedes a picture of Mrs. McDonald and the two children.

In spite of the hectic nature of the war years, McDonald and Cespedes wrote frequently to each other and Cespedes celebrated McDonald's birthday each March 11.[8] Among many things, Cespedes told McDonald all the details of a meeting he had with Nelson Rockefeller, then Coordinator of Inter-American Affairs, who gave him his business card "to send to his friend, the Commander," to prove that he had met Cespedes. On VE day, Cespedes flew all the flags on his 80 foot Wincharger tower and, using the Trenton radio sent him by McDonald, rebroadcast the victory celebration in Chicago.

Cespedes Becomes a Publisher

In July 1945, Cespedes published a 48 page Spanish booklet ("La Voz de Costa Rica Presenta al Comandante Eugene F. McDonald, Jr. Presidente de la Zenith Radio Corporation") that included portions of the 1940 Collier's magazine article "Silent Wings," material from McDonald's 1942 book "Youth Must Fly,"" as well as several articles Cespedes had collected from other sources, plus some of his own writing about McDonald. He sent 100 copies to McDonald (to be sent to Zenith Spanish accounts) and personally sent several hundred more to friends, radio amateurs and officials in central and South America.

McDonald, who had known nothing of the project until it was completed, sent a new turntable and the newly developed Cobra tone arm for use at TI4NRH as a gesture of thanks. He also sent Cespedes a rewired military surplus receiver for use in his amateur station, TI4AC. This station was as well-known worldwide as the shortwave station, and contacts with other amateurs always included a request from Cespedes to send a postcard of greeting to McDonald.

The February 1948 Costa Rican Presidential election resulted in a military junta as a struggle developed between communists and non-communists. Although the National Tribunal certified the election of the non-communist candidate, it was not accepted by the outgoing administration. Eventually victory was granted to the non-communist winner, but in the turmoil, Cespedes was jailed for seven days. Word of the imprisonment reached McDonald through a third party and he at once contacted the American Ambassador in San Jose and requested help in his release.

Upon his release, Cespedes wrote McDonald a three page letter containing the full details of the election and its aftermath. Later in the year, McDonald asked Cespedes to represent Zenith in soliciting a new Zenith distributor in Costa Rica (the previous distributor was on the losing side of the contested election and fled the country) and arrangements were made temporarily with the John M. Keith Company and later with Max Koberg to import Zenith and Wincharger products.

Cespedes sent McDonald hand carved bookends for Christmas 1948 and McDonald sent a new Zenette portable radio.

May 1950 represented a new level of involvement for Cespedes in Zenith matters when Volume 1, Number 1 of *Revista Zenith* was published and sent to interested people in the Spanish and Portuguese speaking world. The 32 page magazine, which chiefly featured articles about Zenith products and the Commander (but also poems, art and general radio articles) was published in a unique color mimeographic process developed by Cespedes and it received instant acclaim. Cespedes published *Revista Zenith* without help and quickly each monthly issue was anticipated and the mailing list grew. The advertising impact was so great in Central and South America that Zenith began subsidizing the magazine and its production became a full time job for Cespedes.[9]

McDonald surprised his friend at Christmas 1950 with a Cobramatic record player, a subscription to Collier's magazine and a diamond 25 year Zenith employee pin. Cespedes, thanking him in a Christmas letter, told McDonald that although the alligator slippers for him and the alligator purse for Marianne were sent, his main present would be a bit delayed.

The present turned out to be an entire book, written by Cespedes, about McDonald's life and adventures, and intended "as a gift to the distributors in the Spanish domain." McDonald was so taken by the project that he insisted on paying for the binding and shipping of the books. The book, "Un Hombre Tesonero" ("An Untiring Man") contained 250 pages and was written at the rate of 32 pages a month, consuming nine months of his time. McDonald wrote Cespedes, "This is truly a marvelous presentation and I can never repay you for the love and thought you have put into this book." McDonald received letters of praise for the book from all over the world, which he sent on to Cespedes. Cespedes had the letters bound and sent the volume to McDonald as a gift.

Pen Pals for Life

Cespedes took a two month long trip to South America in January and February 1957 under the auspices of the International Rotary Club and the exchange of letters between the two spoke of customs and geography in the regions through which Cespedes traveled. Issue 68 of *Revista Zenith* was issued in early March, just three weeks after his return.

In November 1957, McDonald heard from one of Cespedes' sons, through Zenith export Manager J. A. Miguel, that Cespedes had been hospitalized with severe prostate problems. Cespedes stayed in the hospital for 49 days before being sent home; McDonald sent a number of letters to cheer him along and Cespedes received hundreds of letters from his friends worldwide.

The correspondence and the Commander's files for Cespedes end with 1957; on May 15, 1958, McDonald died in Chicago. Over a thousand pages of correspondence between these two unlikely individuals reveal a deep and unique long distance friendship and their letters show an unusual degree of warmth and respect for each other. Cespedes, keeping the promise he made to McDonald in 1939 in gratitude for McDonald saving his stations, never stopped writing of his love for McDonald and Zenith, and never stopped using his radio stations as an outlet for Zenith products.

McDonald likewise kept his word and until his death in 1958 faithfully sent the necessary money to keep Cespedes' radio stations licensed. There is no doubt that the early history of radio in Costa Rica would have been much different had Amando Cespedes Marin not traveled to Chicago in 1938 and met Commander Eugene F. McDonald, Jr.

Endnotes

1. McDonald, already a very wealthy man prior to WW1, served as a Lieutenant, Reserves, in Naval Intelligence at no salary throughout WW1. He remained in the Naval Reserves through most of his career in radio, being promoted to Lieutenant Commander immediately prior to his service in the historic MacMillan Arctic Expedition of 1925. (See *Monitoring Times*, Dec. 2006.) From that time forward, E.F. McDonald, Jr. was known to almost everyone as "The Commander."

2. The Commander was a larger than life figure in the history of radio and in American High Society. His contributions to "radionics" (his own term for radio electronics), are numerous and well documented. His achievements were acknowledged posthumously by his peers when his name was entered in the Broadcast Pioneer's Hall of Fame on April 4, 1967. Accomplishments listed in the citation focused on his role as Founder, President and first Board Chairman of Zenith Radio Corporation, and his dynamic merchandising strategies.
   He "invented" time payments for automobiles and radio receivers, as well as many innovative marketing methods still in use today. His inventions and innovations led to, among many other things, the first all-band shortwave portable radio and the baby monitor, which was inspired by the Lindbergh kidnapping.
   Also noted in the Broadcast Pioneer's citation were his role as explorer, including serving as second-in-command of the 1925 MacMillan Arctic Expedition,[3] and his role as the founder and first President of the National Association of Broadcasters. He was cited also for having established one of the nation's earliest radio stations, WJAZ, built to provide news to the 1923-24 Arctic Expedition of his lifelong friend, Donald B. MacMillan, and for pioneering the development of shortwave radio, international communication, ship-to-shore radio, FM, VHF and UHF television, radar, and subscription television.
   Much more detailed information on the role of McDonald, Zenith Radio Corporation and radio amateurs, as well as running commentary, can be found in:

Cones, Harold and John Bryant. "Zenith Radio, The Early Years: 1919-1935." Atglen, PA: Schiffer Publishing, Ltd., 1993

Bryant, John and Harold Cones. "Dangerous Crossings, The First Modern Polar Expedition, 1925." Annapolis, MD: The Naval Institute Press, 2000.

3. Five years earlier, in 1933, the town of Heredia declared a holiday and festival to celebrate the fifth year of NRH uninterrupted operation. Cespedes Marin, Amando. "How I Operate My Little Station NRH, the World's Tiniest Short-Wave Broadcaster." Short Wave Craft, July, 1933: 136-137, 181.

4. The connection between McDonald and The Chicago Shortwave Club was natural. Starting in February 1935, McDonald and Zenith had tried to convince the Radio Manufacturers Association that it should include a copy of "Short Wave Radio Reception News," the weekly newsletter of the Club, with each shortwave radio sold. When the RMA rejected the proposal in June, 1935, Zenith decided to include an introductory letter and a copy of "Shortwave Reception News" in the manual of each new shortwave radio shipped from the factory, allowing new purchasers to have immediate access to operating shortwave frequencies.
   The exchange of letters between Harold Wright, Chicago Shortwave Radio Club president, and McDonald indicate that the plan, although not continued long, was successful for both concerns. It became too much of a financial burden for the Chicago Shortwave Club to provide the bulletins; to obtain the desirable cost – one cent each – it was necessary to print 150,000, an excessive number, both agreed.

5. Cespedes was a member of a number of radio clubs world-wide (in fact, he was Life Member # 1 of the International DXers Alliance) and would at times devote an entire broadcast to a particular club. One such broadcast for the International DXers Alliance is mentioned in June 1938 *The Globe Circler*, the IDA monthly bulletin. He produced an entire week of dedicated broadcasts to celebrate TI4NRH's tenth anniversary.

6. For many years, Cespedes rebroadcast programs he was receiving on this radio over TI4NRH by setting the microphone in front of the radio. In later years, Zenith provided him with a device that allowed rebroadcast directly from the radio without a microphone.

7. Cespedes played this record so frequently that he wore it out and requested three additional copies from McDonald, which he sent.

8. In addition to celebrating the Commander's birthday with his wife and children, Cespedes sent McDonald a telegram on his birthday each year.

9. Cespedes conceived the idea for *Revista Zenith* in early 1950 as a gesture of respect for Zenith and the Commander, producing the first three issues at his own expense. The Export Division of Zenith had been searching for a house organ in Spanish to reach the Latin American trade but had been discouraged by the cost. *Revista Zenith* solved the problem and beginning with the May 1950 issue, Cespedes was paid $400 per issue to write, publish, translate and do the art work, as well as mail *Revista Zenith*. Zenith provided blank manila envelops and the mailing labels.
   At the start, circulation was 500 copies, confined to a very select mailing list comprising all the distributors, key accounts, dealers, amateur radio operators, broadcast stations and diplomats. By 1953, the circulation was 650, which was the maximum Cespedes could handle in a month. Cespedes produced six issues in 1950, six in 1951, eleven in 1952 and ten per year afterwards.
   Cespedes wrote McDonald in each letter his love for what he was doing for McDonald and Zenith and because of the high world praise for *Revista Zenith*; the company considered it an advertising bargain.

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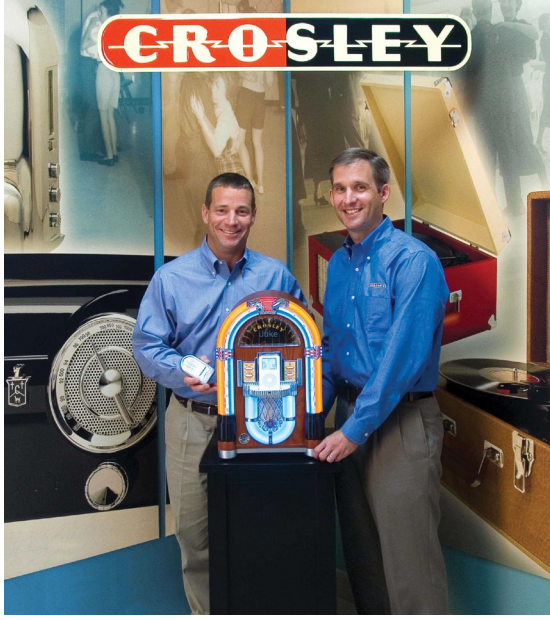
CROSLEY RADIO

How a Venerable Old Radio Name Got a New Life

By Ken Reitz



Crosley founder and president Bo LeMastus and V.P. Keith Starr with their new iJuke, the mini-jukebox with the iPod docking station built-in. (Courtesy: Crosley Radio)

Imagine a time 50 years from now when people might never have heard the name Rupert Murdock, and you can better understand how Powell Crosley has almost entirely disappeared. For decades Crosley was a nationwide, household name. He was an inventor, manufacturing tycoon, broadcast pioneer and a man who realized more than a few of his dreams. His star faded about the time most baby-boomers were born, so most never saw his low-priced, mass-marketed radios or his compact automobiles.

Even so, Crosley continues to touch the lives of many radio enthusiasts through the radio station he founded, WLW, Cincinnati. At one time "The Nation's Station" was the most powerful broadcast station in America. Thanks to special authorization from the FCC, WLW transmitted a thundering 500 kW (10 times the allowable limit for AM stations today) and was heard coast-to-coast and literally around the world.

His dreams weren't confined to the radio industry. He manufactured refrigerators, called Crosley Shelvadors, which were the first to feature shelves inside the door. He snatched the Cincinnati Reds out of bankruptcy, built the team a stadium and, not being a modest man, called it Crosley Field.

He was an early television pioneer as well. He started the Crosley Television Network which was a string of Ohio-based TV stations with the letters w-l-w in their call signs, some of which are still on the air. Crosley also operated a number of shortwave relay stations for the U.S. government from WWII years until the early 1960s.

His last act came in 1952 with the closing of the Crosley Motors plant in Marion, Indiana. (Its Richmond, Indiana, plant had closed 10 years earlier). After having sold his radio and white goods interests and poured millions of dollars of his own money into the auto company, his plan to make cheap, European-styled, small cars failed to pass the mass market test. In the auto industry it was a time of ever-growing tail-fins and ten-cent-a-gallon gasoline. America was in no mood to think small.

iJuke is Crosley's homage to the juke box brought up-to-date to accommodate the iPod crowd. The pint-sized iJuke is 18" high, 12" wide and 9.5" deep and features neon tubing and bubble lights. MSRP: $199.95. (Courtesy: Crosley Radio)

New Fad for Old Styles

Fast-forward 30 years to the mid-1980s. A young entrepreneur operating out of Louisville, KY, just across the Ohio river from Cincinnati, heads a company that manufactures and distributes inexpensive, retro-look radios and turntables under the "Classic" and "Adorn" labels. His name is Bo LeMastus, and he's cashing in on the nostalgia craze creeping across the country for the last 20 years. LeMastus was looking for more authenticity for his products, though, and he lit on the idea of resurrecting the original Crosley radio designs and fitting them with modern solid state technology.

To do so, LeMastus' company entered into an agreement with the Crosley company, which is still manufacturing an extensive line of stoves, refrigerators and microwaves. LeMastus explained, "We basically leased the brand and put it on our replica turntables and radios. But, by 2005 we wanted to own not just the name but the original product designs as well." The result has been the production of a wide ranging line of reproduction items from old telephones to turntables with built-in CD burners.

In some cases they have been able to nearly duplicate the designs. "We try to keep the product line as exact as we can," said LeMastus, "but some of the old radio and turntable cabinets were so big that they're not practical to reproduce. The phones are nearly exact replicas, but have been up-dated to modern TouchTone convenience." All the radios, turntables and jukeboxes have solid state amps, receivers and CD players.

Sales have been extremely strong. In 2002 the company is said to have sold a combined 400,000 turntables, telephones, jukeboxes and radios with expectations that sales would continue to increase. They have, and though LeMastus said the company doesn't release sales figures, he indicated that this year's sales mav

iJuke DeLuxe is a full-sized jukebox: 4 feet tall, 2 feet wide and 15" deep. It has a an iPod docking station, a built-in CD player, AM/FM radio and plays MP3 and WAV files. MSRP is $499.95 and comes with a remote control. (Courtesy: Crosley Radio)

double that 2002 figure.

Keeping up with New Trends

One of the keys to the new Crosley Radio's success is keeping up with current technology. A few years ago the company entered into an agreement with XM satellite radio to add XM reception capability to their product line. The result was a product called the Crosley Explorer 1. "We came up with the Explorer 1 (named for one of the early U.S. satellites from the 1960s) and wanted to reflect the concept of radios from the '60s," LeMastus said. "We kept the retro nature with the wood cabinet design and curved surfaces. We wanted to have something totally different than the sterile plastic cabinets of most table radios that have satellite radio capability." [See sidebar review.]

Asked how he views the possible merger of XM and Sirius, LeMastus said, "The merger in our eyes makes total sense. If you can put the two of them together that will allow the whole product to grow. If consumers can pay on an a la carte basis with the combined channel line-up of both satellite radio companies, the industry will really grow."

LeMastus pointed out that NASCAR's switch from XM to Sirius leaves a lot of XM-listening NASCAR fans out in the cold. He believes the merger would benefit listeners who have interests which span both systems. The 44 year old LeMastus knows something about NASCAR fans and racing. As a hobby he's been involved in weekend auto and motorcycle racing for many years.

Waiting for HD Radio

Crosley Radio has held back from producing a radio with HD Radio capability. Along with other heavyweights, notably Bose, Crosley has not jumped into the first wave of HD Radio receivers. "We're still trying to figure out who buys our products," LeMastus stated, "Most of our customers are in their 50s, 60s and 70s and live in less urban areas."

LeMastus believes that the concentration of multi-casting stations in urban areas leaves the bulk of Crosley customers out of listening range. He added, "While we are looking at a couple of different platforms on HD, we feel there's not enough content to get consumers interested enough to buy HD-equipped radios. It's just not there yet."

LeMastus likes their position as a follower of trends. "The neat thing about being our type of company is that you can afford to wait. You don't have to be the first out there." One trend they're definitely up on is the iPod revolution. "We're attracting a lot of under 40-year-olds with our new products such as the iJuke. We're adding satellite and iPod docking stations to our juke boxes which younger listeners really like. They like the romance of the old juke boxes and the convenience of iPod and satellite radio."

Crosley's Vast Catalog

Crosley himself surely would have been proud of the new Crosley catalog, which is filled with all manner of products representing various phases of America's love of home entertainment

The Crosley Corsair reflects the style of the 1950's clock radio but you can play your favorite CDs in the top-mounted player. It has AM/FM digital tuning, snooze/sleep functions, alarm and is available in real '50's colors. $79.95 for black and $99.95 for colors. (Courtesy: Crosley Radio)

and communications. For example, there are 12 classic telephone reproductions in their catalog including a 1950s style pay-phone ($89.95) with real coin-slots that jingle as you pop in the coins (you get them back by opening the key-operated coin box); a 1920s style candlestick phone ($69.95 for brushed brass finish); 6 retro-look turntables including suit-case styled units with genuine Stack-o-Matic feature that lets you stack up your 45s or 33-1/3 LPs for extra long playing time. The CR245 ($299.95) lets you convert your old records, no matter what the speed, to Compact Disc format.

They also have a line of retro-look juke boxes with AM/FM radio, built-in CD players, iPod docking station and featuring genuine neon tubing and percolating bubble tubes with prices ranging from $499.95 to $2,499.95. There's even an 18" high miniature jukebox with iPod docking station called the iJuke for just $199.95 (see photo).

The Crosley products I've had the chance to use show excellent craftsmanship, offer

good audio quality for the money, and provide a decorative touch to the home of any radio enthusiast. DXing the AM band on the Crosley cathedral replica radio, tuning in CKNX (a 1 kW nighttime station from Ontario), or listening for hours to a live broadcast of the Grand Ole Opry on a Saturday night was a lot of fun. And, when the radio's not on, it stands as a reminder of one of the great forces in broadcasting from another age.

Readers wanting to know more about Powell Crosley should check out the biography and company profile on the Crosley Radio web site: **www.crosleyradio.com.** For those of you without internet connection, you may call 1-866-CROSLEY (276-7539) to order or to request a catalog.

An excellent summary of Crosley Motors and some photos of their cars can be found at the Detroit News: **http://info.detnews.com/joyrides/story/index.cfm?id=411**

New Crosley Products Reflect Old Times

Three Product Reviews

There are dozens of products in the Crosley Radio catalog, but three of their latest models, the Crosley Solo, the Crosley Explorer 1, and the CR32CD are all worth a closer look by radio hobbyists.

GOING SOLO

The Crosley Solo is a standard AM/FM, analog tuned, Hi-Fi sounding, table radio with a wood cabinet and "airplane" dial tuning designed to capture the feel of radio's golden days.

I liked the small footprint this radio has on the desk-top and found that the audio was exceptional for a small, monaural radio. It compares quite favorably with the Tivoli Model One and has the advantage of having an AUX input for computer or MP3 audio. In fact, the Solo appears to have the identical tuning set-up as that of the Tivoli model. There are two LEDs that light up: the green indicates the power is on and the amber one glows brightest when the station (AM or FM) is properly tuned.

I found that AM reception at night with a

Crosley Solo AM/FM radio. The top-firing speaker packs big audio in a small wooden cabinet with retro-look airplane dial and has AUX input for your MP3, CD player or streaming audio. MSRP $129.95. (Courtesy: Crosley Radio)

tunable loop antenna was as good as the Tivoli Model One. The audio also appeared to be equal (both units sport a tuned bass port). While I like the cabinet styling of the Model One better, I found the Solo, with its AUX input and output jacks, to be more versatile. The telescoping whip on the Solo made FM reception easier than the Model One, which uses the 10-foot long power cord as an antenna, though it does have an "F" connector for an external FM antenna.

SPECIFICATIONS:
Tuning Range:
AM 520-1710 kHz
FM 87.5-108 MHz
Antennas:
AM built-in ferrite bar
FM built-in telescoping whip
5:1 ratio analog tuning dial
One 3-inch "Studio Driver" speaker
AUX input
AUX output
Headphone jack
Dimensions: 5.25" H 7.5" W 5.75" D
Power Consumption: 30 Watts
1 Year Warranty

EXPLORING XM RADIO

Crosley's Explorer 1 is an effort to add a little nostalgia to an otherwise boring approach to modern radio design. The wood cabinet, curved surfaces, and deco-styled aluminum front plate offer a real alternative to many of the graphite gray, plastic cabinets on modern table radios. Their unique three-speaker "AroundSound" system, coupled with a bass port in the bottom of the cabinet to enhance bass response, gives many more expensive table radios a run for their audio money.

Crosley Explorer 1 brings the warmth back to the modern table radio. It has AM/FM/XM satellite radio with unique "AroundSound" three speaker audio and blue digital display panel. MSRP is $249.95/$299.95 with XM package. (Courtesy: Crosley Radio)

Crosley has packed a lot of features into this radio. With the XM package, the Explorer 1 makes a great, full-featured desk-top, counter-top, or bed-side audio center. You can listen to the 160 plus XM satellite channels, plug in your iPod or any other MP3 player and listen to your personal favorites, or you can tune the AM and FM bands for local news and weather.

Among the pluses for this radio are the full-function remote control, full-featured blue LCD display panel, 72 hour battery back-up that saves all your settings, external AM and FM antenna connectors, dual alarms that let you wake up to your favorite XM channel or local radio station, and snooze/sleep buttons.

I liked the sound of this radio. It's not as full-bodied as some table radios – the Cambridge SoundWorks series for example – but has far more features. It's not as flexible as the amazing Polk iSonic but it costs less than half the price. It's a great medium-priced, non-HD, table radio. The XM Plug n' Play module may be used with other XM-ready radio products which allows you to have one subscription that can be moved from one radio to another.

SPECIFICATIONS:
Tuning Range:
AM 530-1710 kHz
FM 88.1-107.9 MHz
External antenna connections for AM, FM and XM
Digital tuning display uses XM Plug n' Play module available in the Explorer 1 XM package.
60 Station Presets:
20 AM 20 FM 20 XM
Separate bass and treble controls
Three 3-inch "Studio Driver" speakers with ported bass response
AUX input
Line output
Headphone jack
Compact IR remote control
72 hour battery back-up built-in
Dual independent alarms: music or tone
Dimensions: 6.1" H 11.8" W 8.1" D
Power consumption: 40 Watts
1 Year Warranty

1930S MEETS THE FUTURE

The original Crosley table radio from 1932 was the model 127 cathedral radio. The retro look-alike from the new Crosley is the CR32CD. Years ago, when replica sets were first on the market, they were disappointing in several regards, but the biggest problem was that they barely resembled the radios they were intended to replicate. That's no longer the case with most of the new Crosley sets, and the CR32CD is a prime example.

The cabinet on this radio, a combination wood, plastic and Masonite, is a fairly accurate representation. The dimensions, the warm oak grain finish (I recommend the paprika finish which looks like aged oak), the fabric behind the grill, the old-time dial, and tuning knobs all look close to the real thing. And, when the set is turned on, the glow from the narrow, recessed dial and the analog numbers behind the pointer are a joy to see. This modern version has an FM dial along with the AM and it has an antique brass plate which houses the slide-out CD tray and a host of buttons which operate the CD player that Powell Crosley would have loved to put on his original unit.

Crosley's CR32CD is a fairly faithful reproduction of the original Crosley 127 from 1932. This one features a solid state analog AM/FM tuner with built-in CD player. MSRP is $99.95. (Courtesy: Crosley Radio)

The front speaker grill is just for show. The actual speakers are on the left and right sides of the cabinet. Frankly, I would rather they put one really nice Hi-Fi speaker in the proper speaker position than the two 3-inch speakers on the side. But, that's not possible because there's no room behind the fake speaker grill (I checked).

The 20 track programmable CD player, as expected, works fine. The only problem I had was reading the words above the buttons on the CD player, as they blend in beautifully with the brass front plate. The audio is about what you'd expect from a radio of this price level: long on mid-range and short on bass. But, I found that plugging a set of Bose headphones in the front panel jack revealed an audio potential not realized by the set's small speakers. It sounded particularly good on the AM band.

Tuning the AM band was a pleasant surprise. My expectations were low, because I had use of this radio during the summer when noise levels are high and band conditions are not particularly good. The surprise was that this was one of the best AM receivers I've used recently. It was a much better performer on AM than the Tivoli Model One or any of the expensive table-top HD sets I've reviewed this year.

The analog tuner and dial/pointer are only guesses. You have to get a positive ID to know what it is you've tuned in. It takes the fingers of a safecracker to zero in on target stations and I had to battle a certain about of dial backlash (isn't that the fun of analog tuning?), but I found it to be a sensitive little tuner. From my location in Virginia I tuned in a dozen or more Canadian stations, Cuban stations, and traditional U.S. powerhouses from around the east and midwest, including stations from as far away as Des Moines, Iowa, with fairly strong signals. The location of the built-in ferrite loop antenna is such that it's difficult to position an outside AM tunable loop antenna to improve AM reception, but it could be done and it helped.

FM reception was a bit of a disappointment compared to the AM band. The lack of an FM external antenna connection, the analog dial discrepancies and lack-luster audio made FM listening uninteresting. The AM band was far more fun and, considering that this is supposed to be an AM replica, I suppose it's fitting.

SPECIFICATIONS:
Tuning Range:
AM 520-1710 kHz
FM 87.5-108 MHz
CD Player:
20 track programmable memory
Audio: Two 3-inch 8 Ohm 3 watt speakers
No AUX input
Power consumption: 14 watts
Dimensions: 12.5" H 12" W 7.5" D
90 Day Warranty

Radio Travelogue: Ireland

By John Figliozzi
Photos by Brett Figliozzi

It all goes to show: you just never know.

My wife, Patty, and I have been clear beneficiaries of children who really do believe that "the world is their oyster" and who have traveled accordingly in pursuit of their studies. (I'd like to think that their dad's wanderlust, fed by his shortwave radio hobby, is at least partly the cause.) The third year programs at many colleges and universities really encourage students to go abroad, and actually make it (almost) financially possible for them to do so – at least when comparing such temporary residences abroad with the already high costs of a university education.

So, under the guise of "going to see if the kid is all right," we've had occasion to leave our upstate New York lair and visit faraway places like Canada, Australia, the Netherlands and Luxembourg. Of course, one or two trusty shortwave radios get to go along for the trip and hear what they can't hear in the Empire State. Taking even fuller advantage, I've indulged my already oversized interest in radio by visiting the headquarters of such broadcasters as Radio Canada International, Radio Australia, Radio Netherlands and Radio Luxembourg.

Over 2005 and 2006, one of our sons spent nearly a year in Ireland studying international marketing at Dublin City University and working in a paid cooperative education internship. A year is a long time and – true to form – his mother and I decided we needed to check on things and experience an Irish spring in the process.

Ireland hasn't had a regular shortwave presence for some time, so I resigned myself to not being able to combine my radio pleasures with the pleasure of touring to quite the same extent as those other trips.

Stumbling Upon a Gem

One day while our son was working, we decided to take the new Dublin Area Rapid Transit (DART) light rail system – which conveniently had a station near where we were staying in the shadow of historic Lansdowne Road stadium – to its northern terminus in Howth, a small fishing village/summer resort on the Irish Sea to have a walkabout and perhaps some lunch.

In the process of exploring and quite by accident, I was delighted to come across a sign heralding "Ye Olde Hurdy Gurdy Museum of Vintage Radio"! Peering up the path beyond the sign was a squat, round, windowless cement building which I later learned is a Martello Tower (**http://en.wikipedia.org/wiki/Martello_tower**) erected during the Napoleonic era for defense purposes. It had been recently restored to house the museum.

Sign at the entrance with museum housed in a Martello Tower in the background.

My eureka moment was about to be tempered some, however. During the spring – still a bit off-season – the Hurdy Gurdy was open only on weekends – and this day was Wednesday. Nevertheless, just from walking the grounds we could see that the site had a great vantage point, not to mention being ideal for antennae, both transmitting and receiving. And, sure enough, there were antennae there.

And while I was going to have to forego a tour of the interior, my son later took the very same train trip from Dublin and was able to get these photos for me – and now for you.

So, what's the moral of this story? Never discount the universal popularity of radio. There's likely to be a point of interest showcasing this wonderful medium and hobby just about anywhere your travels take you!

For further information about the Ye Olde Hurdy Gurdy, visit its informative web site at **http://ei5em.110mb.com/museum.html** And, of course, if you're ever in Ireland, by all means stop by!

Howth's Martello Tower, one of several former defense outposts along the Irish coast, this one today housing an antique radio museum and amateur radio station EI0MAR. Over its history, it also has served as a cable station, was used by Lee DeForest to demonstrate his wireless telegraphy system to engineers of the British Post Office in 1903, and in 1905 for ship to shore wireless experiments by the Marconi Company.

The men who made and make the Hurdy Gurdy possible. Much of the museum is from the collection of caretaker Pat Herbert (l). Tony Breathnach (r) operates and maintains the museum's amateur station EI0MAR and is founder of the Howth Martello Radio Group which meets regularly at the museum. Nice job, gents!

Antennae used by the museum's amateur radio station EI0MAR. The station operates primarily on Sundays using Morse code on HF with 25 watts through home made 40 and 17 meter dipoles, as well as 2 meter FM. More info from the web site given at the end of the article.

Looks like the venerable and well-respected Zenith Trans Oceanic made it to Irish shores as well.

The museum overlooks Howth harbor serving commercial fishers and vacationers alike.

How many of these receivers do you recognize?

A turn of the (last) century Morse code key and transmitter with an ad for the BBC Children's Hour program in the background.

Ken Reitz, KS4ZR
kenreitz@monitoringtimes.com

Gift Ideas for Your Favorite Radio Hobbyist (You!)

Over the years I've reviewed a number of radio related products which have struck me as great products worthy of finding a spot in your radio shack or listening post. The trouble is that getting someone else to buy them for you gets tricky. If you just hint around for any one of these things you might not get exactly what you want. So, consider giving *yourself* what you really want. I've listed products here with a wide range of prices and general usefulness.

Under $100

There are actually quite a number of products I really like in the under $100 category. I had trouble paring the number to a manageable size. But, the first thing on my list is the **Kaito 1103** dual conversion, direct entry, SSB-capable portable shortwave radio (see my complete review in the April 2007 issue of *MT*). It's sold in several places, including Grove Enterprises where it retails for $89.95.

Kaito's model 1103 portable shortwave radio is not just a perfect gift to give yourself. It could start a kid on the road to being a SWLer. It sells for well under $100. (Courtesy: Kaito U.S.A.)

This is the best portable shortwave radio I've ever used at any price. It's very sensitive, easy to use, and the best value for the money in shortwave listening. If you're not going to get one for yourself, consider buying one for a friend or, better yet, a young person in your life. A radio this good could easily turn a kid into a life-long SWLer.

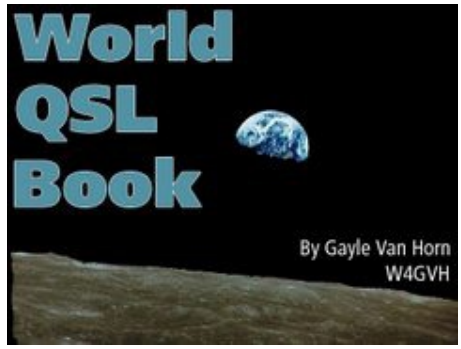
The next most fun you can have for under $100 is the **Tigertronics Signalink SL-1+** which sells for $69.95 directly from Tigertronics. It's an all-mode interface with software that connects between your shortwave radio or ham

Tigertronics Signalink SL-1+ is an inexpensive, all-mode interface that lets you copy CW, RTTY, PSK31, SSTV, MFSK and many other popular digital modes. Now you can see what's you're hearing for just $69.95! (Courtesy: Tigertronics)

transceiver and your computer to allow you to read CW at any speed, RTTY, PSK31, SSTV and many more popular digital modes. Set-up with virtually any shortwave radio is incredibly easy, and with the included CD-ROM of digital software you'll be up and running in no time.

A new version with a built-in USB soundcard is also available for $99.95. It features controls on the front panel of the unit and also works with virtually any transceiver. You can call them toll free from noon to 8 PM ET at 800-822-9722 or visit their web site at **www.tigertronics.com**.

Shortwave listeners and avid DXers will want to have Gayle Van Horn's ***World QSL Book*** handy in their shack or listening post. This CD-ROM based book answers every question you may have had about QSLing in the world of shortwave radio. Extensive lists include the very latest available addresses for the world's shortwave radio stations, along with tips on how to get nearly 100% return on the reception reports you send. It's a resource that avid SWLers can't afford to be without. When it comes to shortwave listening Gayle Van Horn wrote the book. Literally! It's available from Teak Publishing through Grove Enterprises at just $19.95.



MT's own Gayle Van Horn has a lot help for shortwave listeners in her new World QSL Book. This new CD-ROM is available from Grove Enterprises for only $19.95. (Courtesy: Grove Enterprises)

Terk's AM Advantage is the best value in AM DXing available. You can turn virtually any radio into an AM DX machine with this tunable AM loop antenna. Even if the radio doesn't have AM antenna connections, you can place this antenna near the radio and adjust for best signal. By rotating the loop you can tune out interfering signals or increase weak ones. It's my number one tool for AM band DXing. Once you use one you'll wonder how you did without it. This unit is widely available but I found it for $39.95 with free shipping from C. Crane. Call them at 800-522-8863 or visit their web site at **www.ccrane.com**.

Terk's AM Advantage turns almost any AM radio into a DX machine for under $40. Get it at C. Crane and the shipping is free! (Courtesy: C. Crane)

$100-200

Here's something that can really help SWLers get the most out of their listening post and allows them to transition to ham radio when they get their ticket. It's the **MFJ 949E Deluxe Versa Tuner II** antenna tuner, designed to match the transceiver's output to the frequency you're trying to work on your antenna. It's designed for the HF bands and what's neat is that it works for SWLers as an antenna switch, allowing you

MFJ'S 949E Versa Tuner II is a SWLer's antenna switch, allowing you to feed one receiver with three antennas and tune for maximum signal strength and, when you get your ham license, it's a dummy load and antenna matching unit too. (Courtesy: MFJ Enterprises)

to connect up to three antennas and feed one receiver. You can also use it to match the frequency to the antenna for maximum reception.

The way I use it is to have one input handle the three-element beam antenna, one to handle the multi-band wire antenna, and a third input connected to a random wire/balanced line antenna. Later, when you get your ham ticket, the Versa Tuner II is also a dummy load that allows you to match your transceiver to the antenna without doing so on the air. The cross-needle display makes it a breeze to tune. The Versa Tuner II is just $179.95 from MFJ Enterprises. Call 800-647-1800 or visit **www.mfjenterprises.com**.

At just under $200 the **Globecast WorldTV satellite TV** system is an incredible value. You can be watching a vast array of world TV stations in your home just minutes after setting this system up on Galaxy 25. That's where Globecast transmits dozens of TV channels from all over the world. Some are free and some are subscription based. This unit has a built-in subscription card reader that, once you've called their toll-free subscription number, you can watch sports and news from Europe, Africa the mid-East and Asia. There are also dozens of channels which are Free-To-Air (FTA) which means there is no subscription fee. You'll pick up many international radio broadcasters as well including World Radio Network and Radio Netherlands World-wide which are also free.

Installation is easy and can be done by anyone. The only thing you'll need to buy is enough RG/6 coax cable to go from wherever you put the dish to the receiver inside your home. You can call toll free at 888-988-5288 or visit their web site at **www.globecastworldtv.com**.

For less than $200 Globecast WorldTV brings the world to your backyard with this complete satellite TV system. You get the MPEGII satellite receiver, dish and LNBF in one package. Use it to subscribe to Globecast WorldTV channels on Galaxy 25 or MPEGII Free-To-Air channels on any satellite. (Courtesy: Globecast World TV)

The best of the current crop of HD Radio table-top sets is the **Cambridge SoundWorks 820HD** and it squeaks into this category at just $199.95. You can read my full review of this radio in the September 2007 issue of *MT*. As a stand-alone HD Radio the sound is superb, the features are excellent and the price is right. Among the features on this radio is a fiber-optic output which lets you play this radio through your stereo if it is fiber-optic ready. That lets you tune HD Radio FM main channels and multi-cast channels which are popping up all over the country. It means that your home stereo can be up-graded to HD Radio for just under $200.

If you're not in a suburban or urban environment, you'll need to use an external antenna. The 820 HD has a built-in 75 ohm coax connector on the back that lets you add an amplified rooftop FM Yagi for extended reception range. Call CSW at 800-367-4434 or visit their web site at **www.hifi.com** or **www.cambridgesoundworks.com**.

$200-300

Nothing is more frustrating to shortwave listeners than all the noise that's found in between and on top of the signals you're trying to listen to. Now you can do something about all that noise with **MFJ's 784B** tunable, programmable, DSP filter. This unit combines the technology of filters and digital signal processing (DSP) to virtually eliminate all manner of noise found on the shortwave and ham bands. At $279.95 the 784B is an outboard DSP filter that takes the audio output of your shortwave radio or ham transceiver and allows you to tailor the audio to wipe out interference. On frequencies that are just fine, you can cut out the filter altogether with the touch of a button. You can read my full review of this product in the March 2000 issue of *MT.*

MFJ's 784B tunable, programmable, "brick wall" DSP filter lets you get rid of interference on the shortwave bands with the touch of a button. Despite its 9 buttons and 5 knobs it's actually easy to use. (Courtesy: MFJ Enterprise)

I have actually used all the products listed in this round-up. Some for years, others for only weeks, but they have all impressed me as being the best in their class and come with my highest recommendations. I think you'll be impressed, too.

For additional ideas check out the article about Crosley Radio found elsewhere in this issue. I personally liked the **Crosley CathederalCR32CD** which makes a charming addition to any radio enthusiast's listening post. It's an excellent AM radio and has a built-in CD player, too. But, if I had the bucks I'd opt for their full-sized jukebox that would be fun to watch as well as listen to!

ASK BOB

GENERAL QUESTIONS RELATED TO RADIO

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Apartment-Dweller Antennas

In a recent column, we discussed antennas for apartment dwellers. Long-time reader John Mayson recalled how he ran a thin, 30-gauge wire from his Atlanta apartment window 40 feet to a tree. "One day a bird landed on the wire; an apartment worker just stared in wonder at the bird 'floating' in midair!"

John's point is well taken – if you can't see it, you're not likely to complain about it! I've often suggested stranded hookup or bell wire covered in gray insulation; that's nearly invisible as well.

Q. *I need to extend the coax length on my active shortwave antenna by about 20 feet. Should I order RG-58/U 50 ohm coax or RG-6/U 70 ohm, low-loss coax? (Gary Wilson, email)*

A. At shortwave frequencies, coax losses are minimal for nearly any kind of coaxial cable except RG-174/U. While RG-6/U will work just fine, you might as well use RG-58/U since it is more flexible and more correctly matches the 50 ohm design impedance of the system. In actual practice, it is unlikely you would hear any difference.

Q. *How do you ground SW, CB and scanner equipment from the third floor of an apartment building? (Mark A. Simari, Syracuse, NY)*

A. Before World War II, when longwave and medium wave frequencies were the dominant wavelengths for communications, grounding provided an important part of the antenna system. A transmission line went up to an elevated wire antenna, and the ground provided a counterpoise to complete the RF circuit. Some systems employed radial ground elements buried beneath the soil.

As communications frequencies grew higher and higher, and wavelengths became correspondingly shorter, antenna elements grew smaller and the counterpoise systems were raised above the soil for greater efficiency (soil creates a resistive path for the radio waves) and, at the higher frequencies, even became part of the elevated antenna.

Nowadays, with the vast majority of communications in the multi-megahertz range, earth grounds are used primarily for two things: reducing electrical interference during reception, and providing a safety measure against electrical shock. They also provide a path to ground for lightning protection.

If these are important considerations, then by all means install an effective earth ground with two 8-10 foot metal poles in moist soil, separated by several feet, and mutually connect them together with braided strap running to the radio. If these are not important considerations, ignore a ground; it won't affect your received signal strengths one bit.

Q. *I tried to purchase International Reply Coupons (IRCs) from my local Post Office, but the clerk told me they had been discontinued. Where can I find some? (Roger Henderson, Memphis, TN)*

A. They have not been discontinued, although some small Post Offices have discontinued carrying them to lower their financial burden on slow-moving items. Ask the Postmaster if he can order them for you.

Q. *Is there a future for digital shortwave DRM?*

A. DRM is very popular in Europe, and India is also gearing up for DRM, but in the U.S. there aren't any over-the-counter radios yet available. It's pretty new and suffering growing pains, but its future is promising.

Q. *I've always adhered to the rule to keep fresh gasoline for my car and power equipment [and for powering an emergency generator]; is it true that gasoline goes bad after a few months? (Mark Burns, Terre Haute, IN)*

A. Yes, but only in certain cases. The first problem is with "alcohol-oxygenated" gasoline; alcohol readily absorbs water vapor from the air or as an engine contaminant. When enough water is present, the gasoline will separate into a top phase (virtually pure gasoline) and a bottom phase consisting of water and alcohol, making the engine difficult or impossible to start.

In a two-cycle engine (gas/oil mix), the engine may start with just the bottom water/alcohol mix; there won't be any of the lubricating oil that is in the top phase with the gasoline, thus damaging the engine.

To minimize water pickup, keep the tank full and tightly capped.

The second problem is with low-quality gasoline; it can oxidize and form gummy engine deposits and plug filters after several months. Such oxidized fuel may smell foul, and may have darkened with visible gum particles. Buying name-brand gasoline and storing it in a cool, dry environment minimizes that risk.

A third, less serious consideration, is that engine-enhancing additives may evaporate after a time, leaving just basic gasoline (which isn't all that bad).

If there is any concern about storing gas for several months, such as for an emergency power generator, simply add a fuel stabilizer available from auto supply stores, hardware stores, and the automotive sections of department stores.

Q. *What brand and model scanner and antenna do you recommend for picking up distant NOAA weather radio stations 100 miles away? (George Hamer, Brooklyn, NY)*

A. Virtually any scanner on the current market will have the same sensitivity; the trick will be the antenna and your location. Ideally, you would need a high point, unobstructed by hills, buildings or trees. The Grove Scanner Beam and RG-6/U coax should do the trick.

One complication could be strong nearby signals that could desensitize the scanner even though the signals are not on the NOAA frequency. In that case, you would also need a PAR filter for that/those offending signal(s).

Q. *I have read many user reviews of the Icom R8500. How in the heck are people buying these when "sales restricted/export or government sales" only? (Frank Yeckl)*

A. The R8500 was available for several years in two versions, one with deleted cellular frequencies for the general public, the other with uninterrupted frequency coverage for export, government/military agencies, cellular service providers and service shops. After an announced discontinuation of the product, the full-coverage version was brought back for the limited market.

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.)

MT HELP DESK

SPECIFIC FREQUENCY AND EQUIPMENT QUESTIONS

Larry Van Horn, N5FPW
larryvanhorn@monitoringtimes.com

Q. *Hey Larry, I have a question for you. Around 7:30 my time (6:30 Eastern) I was out with some members of my church at a BBQ. The place is not too far from the Halifax International Airport in Fall River, Nova Scotia. Anyway, we looked up and noticed two aircraft at maybe 5000 feet doing inflight refueling. The lead was a KC-10 and the guy in trail was a bigger aircraft, not sure what. I know I hear tankers talking with the regional ATC, Moncton Center, but I've never seen inflight refueling. Is it common they do it so low and over populated areas? Since CFB Shearwater is closed to fixed-winged aircraft, the USAF routinely uses the Halifax International Airport. (Craig MacKinnon - Dartmouth, Nova Scotia Canada via email)*

A. The Department of Defense (DoD), Department of Transportation (DoT), and the Canadian Department of National Defense (DND) have established two aerial refueling routes which happen to go through your area of the country. There is a flight altitude restriction of 15,000-28,000 feet, so maybe they weren't quite as low as you thought. Here are the particulars on both refueling routes and some frequencies to let you eavesdrop on the aerial refueling traffic in your area.

AR-020 NE
Boom frequencies:
Primary/Secondary - 337.4/339.4 MHz
Air Traffic Control Communications:
Boston Air Route Traffic Control Center - 133.45/269.3 MHz
Moncton Center - 123.9/368.5 MHz

AR-020 SW
Boom frequencies:
Primary/Secondary - 337.4/339.4 MHz
Air Traffic Control Communications:
Gander Center - 133.9/294.5 MHz (westbound) - 133.55/247.0 MHz (eastbound)
Moncton Center - 118.6/266.3 MHz

Q. *I want to start doing something besides voice and fax with my receivers. Do you recommend the new ICOM PCR2500? I am running two ICOM PCR1000's using a dipole and an HF vertical here and get fairly good reception in parts of Latin America. Can you recommend a utility software package? (Larry Keiffer - San Antonio, Texas via email)*

A. I like the PCR2500. It is a very nice receiver/software package that I have no problem recommending. As for software, my favorite utility bands digital decoding package is SkySweep. Their packages are really top notch and let me have a window on the world I can get nowhere else. You can learn more about which ones do what and purchase any of them from my old friend Jim Springer at Computer Aided Technologies (**www.scancat.com/**).

Now I do use another nifty package for ham bands digital work: It is my absolute favorite digital software decoding package. It is called Multipsk (I have version 4.4.2) and the best part is the cost – free! Multipsk will decode and/or allow you to transmit in the following modes:
Receive and transmit: PSK10, BPSK31-63-125, QPSK31-63-125, CHIP (64/128), PSKFEC31, PSKAM10-31-50, PSK63F, PSK220F + DIGISSTV, CW, CCW, CCW-FSK, THROB, THROBX, MFSK8, MFSK16 (+ SSTV), MIL-STD-188-141A (+ARQ FAE), OLIVIA, CONTESTIA, RTTYM, VOICE, DominoF DF, DominoEX, MT63, RTTY 45/75, RTTY 50+SYNOP+SHIP, ASCII, AMTOR FEC, PACKET 110-300-1200 + APRS+ DIGISSTV PACTOR 1-FEC, PAX+PAX2 + APRS, FELD HELL, PSK HELL, FM HELL (105-245), HELL 80, HF-FAX, and SSTV.

Receive only: AMTOR ARQ, NAVTEX, RTTY 100/1382, and a new mode in this version GMDSS DSC

This software has DSP filters + CW binaural reception, a PSK panoramic display for the BPSK31, BPSK63 and PSKFEC31 modes which let you receive 23 PSK channels simultaneously. The CW panoramic display will let you receive eight or 23 channels simultaneously, while the RTTY panoramic display will receive eight RTTY QSOs decoded simultaneously on 22 channels.

My one and only caveat is in regard to the computer hardware you use for this project. After a nice chat with the Icom tech support personnel we agree that the computer controlling the receiver and decoding digital signals will require substantial computer hardware. You won't be doing this on an old 386/486 machine loaded with Windows 3.1. I would suggest at least Windows XP with dual core technology and probably two sound cards with lots of memory (but I always recommend lots of memory anyway).

Q. *I recently caught Bumpy-22 working Sigonella on 11175 kHz. They did a phone patch to Peach-3 at DSN 241-2313 = Robins AFB. Any idea who Bumpy-22 is? Last I knew, BUMPYs were USN E-6 TACAMO aircraft. (Dirk via email)*

A. You need to take another look at your intercept for the clues you already have for an answer to your question. Even before I did a Google search for the DSN telephone number, the Peach 3 and Robins AFB caught my eye: definitely not a US Navy aircraft. The Peach callsign is associated with the 116th ANG unit based at Robins. They fly the E-8 Jstars aircraft. No self-respecting E-6 is going to call the 116th Operations and talk to Peach 3. My best guess is an E-8 JStars aircraft from Robins, not an E-6 ABNCP from Stratcom Wing 1 at Tinker (aka VQ-4).

Q. *I got a search-and-store hit on 380.6 MHz. Sounds like jet jocks, but possibly older than the typical student and I'm not sure if they are wearing O2 masks, I don't think they are. Any idea who might be using this freq? (Tom Marcotte - Lafayette, LA via email)*

A. I can think of many possibilities. This is now an air traffic control assignment, but there are some older assignments still around such as the US Navy TAW-4 (NAS Corpus Christi) air-to-air.

Q. *Do you have a piece of equipment that can be attached to a scanner (maybe I'm thinking of the NiteLogger) that will record which frequencies are active? (Mike "Doc" Hardester - North Carolina via email)*

A. The Nitelogger II (Grove #REC2 $49.95) is a device which allows recording sound from an audio source only when an audio signal is present; its main purpose is to avoid recording the silence. With Nitelogger II you can compress a whole day's worth of monitoring onto a single audio tape. In this way you can quickly monitor suspicious channels and have all the "action" into a single tape.

The downside is, it doesn't record the frequency being heard. I believe the best solution to your question is going to be software based. You have many options depending on which scanner you have and what computer platform you use. The best multiplatform software package that I am aware of (supporting 85 radios from 10 manufacturers) is Scancat-Gold, again produced by my old friend Jim Springer at CAT (**www.scancat.com/**). You can also order his software from Grove Enterprises (**www.grove-ent.com**).

Dan Veeneman
danveeneman@monitoringtimes.com
www.signalharbor.com

Scanning Down Memory Lane

As we come to the end of another year, it's worth pausing to take stock of where we've come from. Technology has advanced rapidly for both scanner listeners and radio system operators, and each of your personal experiences probably reflects those changes. I know mine do.

❖ Scanner Memories

The first actual scanning receiver I remember using for any length of time was a General Electric portable unit in the mid-1970s. In addition to AM, FM, and television audio, the unit also had four scanner "channels," each with its own tuning knob, lockout switch, and LED indicator.

I had been spending many happy hours in front of a Realistic DX-150 desktop shortwave receiver, listing to broadcasts from various parts of the world. However, what was missing in my "view of the world" was information about local activity. I was living adjacent to a major expressway and could occasionally see state police cruisers racing to a call or chasing speeders. Although some statewide activity could be heard on high frequency (HF), the cruisers were using very high frequency (VHF) vehicle-mounted radios. My trusty DX-150 couldn't reach that high.

There were, of course, "Public Service Band" radios in common use, some dating back to the vacuum tube era, but these were only single-channel, manually tuned receivers. They were fine for listening to a single agency perhaps, but what if you wanted to monitor more than one at a time? What if you wanted to quickly switch from one frequency to another, then back again?

The GE unit I used could scan four separate VHF frequencies sequentially, stopping only when there was a radio signal present. When the radio signal ended, the unit resumed scanning. This seems trite and obvious now, but at the time it was really neat to have that capability in a single, portable package. Since the unit could work on either AC or batteries, I could carry it with me out to the garage or into the backyard without missing anything.

The unit had a separate tuning knob for each of the four channels, recessed into the side of the radio and protected by a cover (which was eventually misplaced). Unfortunately, the knobs were not really calibrated to any kind of visible scale, so tuning could become a tedious process of trying various settings and hoping for a transmission to confirm the correct knob position. Once they were set, however, the radio worked fine and did not require further adjustment other than volume control.

My use of the GE scanner overlapped with the beginning of the Citizen's Band (CB) craze, with C.W. McCall's "Convoy" on the radio and "Smokey and the Bandit" soon to appear in movie theaters. A CB base station in the kitchen, within arm's reach of the telephone, provided a link for CB-equipped expressway drivers needing assistance to get help.

The scanner provided a window into the other side of the assistance – the responder. After a call for help I could confirm the police cruisers were being directed to the motorist in trouble and could provide updates as the situation progressed. Such was the life of a volunteer CB radio monitor. Channel 9 was the distress channel; however, most of the activity was on channel 19 – the unofficial trucker channel.

Eventually the CB craze faded, channel 19 deteriorated into a noisy mix of irrelevant and profane transmissions, and the GE scanner was packed away during several household moves.

❖ Handheld Scanners

Fast-forward a decade to the 1980s. I bought a mail order Bearcat BC100XL scanner, a handheld unit with sixteen channels covering various parts of the VHF and UHF bands. Each of the channels could be quickly programmed (and reprogrammed) by simply entering the frequency via the numeric keypad. It made things much easier, especially through the use of published frequency lists such as *Police Call*.

By that time I was living in a Chicago suburb and the 100XL allowed me to monitor the local police and fire departments, the county sheriff, the local general aviation airport and several other public safety agencies, as well as the National Weather Service (NWS) broadcasts. The "lockout" function was simple enough to use, letting me hear the NWS broadcast but skipping it during scanning when the "lockout" selection was made.

Technology had advanced quite a bit from the GE portable to the Bearcat, both in size and capability. The electronics in that 1970s unit were all analog, mostly discrete components directly related to filtering and tuning radio frequencies. A decade of development, including the commercialization of digital microprocessors and other integrated circuits, allowed the 100XL and similar receivers to become physically smaller, less power-hungry, and easier to use and enjoy.

I ended up using two strips of adhesive Velcro™ and a metal pamphlet holder on the dashboard of my car to hold the scanner during my daily commute. More than once I was able to avoid a traffic jam after hearing police and ambulance crews working an accident scene. Having individual Scan and Manual operation buttons made it simple to alternate between scanning and listening to a single channel.

It wasn't a single step from analog tuning to digital keypad entry, of course. Many other scanners of that first generation used individual crystals for each frequency, installed into sockets on the receiver printed circuit board (PCB). Crystals were available at Radio Shack stores, some local electronics suppliers, and through the mail. By plugging in the crystals, you could be sure that your receiver was on the correct frequency (unless there was some kind of hardware problem) and you didn't have to worry about manually tuning anything.

About the time I was using the GE scanner, a small company in Oak Ridge, Tennessee, called Tennelec introduced a scanner that used a *frequency synthesizer* to tune to frequencies programmed from the front panel. It was not manually tuned with a knob and did not require the user to purchase or install any crystals. Instead, the user looked up the desired frequency in a small codebook and programmed the corresponding sequence into the scanner using a series of switches on the front panel. This binary programming, similar to entering bootstrap code into a vintage computer, could get tedious, but the scanner (and various models like it) became quite popular and spelled the end of the crystal-controlled scanning receiver.

Eventually the microprocessor became inexpensive enough to incorporate into consumer

equipment, including the scanning receiver. The codebook and tedious switch-by-switch programming was soon replaced by the much more straightforward process of entering the frequency via a keypad, as if you were dialing a telephone or using a calculator. The microprocessor also made possible a number of additional capabilities, as we'll see shortly.

❖ 800 MHz

In 1983 the first cellular telephone service became available in the United States. Although the word "telephone" is used, the service is essentially a two-way radio tied into the public switched telephone network (PSTN). The early analog service operated up in the 800 MHz band, a significant distance both in spectrum and in technology from the more common VHF and UHF bands. Public safety agencies also began moving up to 800 MHz, leaving the older scanners in the dark.

A new crop of scanners began to emerge in the 1980s, capable of scanning frequencies in the 800 MHz range. This meant that in addition to the public safety agencies, scanner listeners could once again hear mobile telephone calls, as they could in previous decades with the older Mobile Telephone Service (MTS) and Improved Mobile Telephone Service (IMTS). Thus began a sad chapter in the history of U.S. lawmaking, as lobbyists from the Cellular Telephone Industry Association (CTIA) descended on technologically-ignorant Members of Congress and managed to make it a crime to even listen to certain radio frequencies.

Up until this time, the law had been eminently practical in scope – basically, anyone could try and listen to anything they wanted, but could not talk about what they heard or use what they heard for personal gain. After the cellular lobbyists succeeded in marking off a swath of the public airwaves for themselves, it became illegal to listen to cellular telephone calls. The Electronic Communications Privacy Act (ECPA) of 1986 remains on the books to this day, having been amended over the years only to add additional prohibited frequencies and services.

Despite their success in Congress, the CTIA was markedly unsuccessful in actually preventing anyone from overhearing cell phone calls, since the law was basically unenforceable. In fact, the cellular industry's utter lack of concern for realistic call privacy led directly to a criminal enterprise known as cellular telephone *cloning*.

❖ Cloning Cell Phones

Scanner listeners were blamed for the ease with which criminals were able to capture legitimate cell phone information and duplicate it into another phone. This allowed the duplicate "clone" to appear to the cell phone network as if it were the legitimate phone, giving the criminal the ability to make unlimited calls for free. These free calls would typically last a billing cycle or two, when the legitimate owner discovered the crime (usually by receiving a bill for thousands of dollars worth of international calls) and terminated the service.

The reason scanner owners were blamed was because the cellular telephone signals, being sent unprotected in the 800 MHz band, could be received by nearly any consumer scanner with the capability of receiving transmissions in the 800 MHz band. The cellular telephone industry, rather than immediately working to protect the signal through encryption or other means, reflexively lashed out at scanner owners. Once again they sent lobbyists to Washington, D.C., and managed to make it technically illegal to sell or purchase a scanner that could receive, or could be made to receive, cellular telephone signals in the 800 MHz band.

The way this law was enforced was through the approval process required by the Federal Communications Commission (FCC). After 1994, the FCC would only approve for sale scanners that demonstrated an inability to tune to any of the prohibited cellular frequencies. Manufacturers complied with this neutering requirement with varying degrees of technical success. Some scanners approved for sale could, in point of fact, be restored to full coverage by the end user through a relatively simple operation (such as clipping a diode or soldering a jumper).

This law also had the side effect of making schematics and other technical data somewhat harder to find, since some scanner manufacturers became reluctant to provide information that might be used to restore cellular reception.

By the way, the epidemic of cellular telephone cloning only came to end when cryptographic authentication (a form of encryption) was introduced into new phones. If the industry had done this in 1983, rather than more than a decade later, things would have better for everyone (except, perhaps, for the lobbyists).

❖ Trunking

Time and technology march onward, and as we moved into the 1990s a new challenge emerged. Existing radio frequencies were filling up, making it more difficult for public safety agencies, as well as some businesses, to get all of the frequencies they needed. They were operating in what we now call *conventional* mode, meaning that a particular radio frequency was dedicated to a specific purpose. For instance, a police department might have one frequency for central dispatch, another for the north patrol zone, another for the south patrol zone, and so on. As these agencies and businesses grew, their need for additional conventional frequencies also grew.

The reality of having all of these channels dedicated to a specific purpose meant that some of them would not be in use all the time. In fact, some frequencies might not be used much at all – like disaster response or special event coordination – but still had to available when needed.

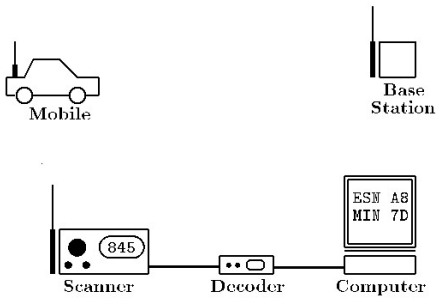
To make more efficient use of the available radio frequencies, equipment manufacturers like Motorola and E.F. Johnson began offering a feature called *trunking*. Instead of devoting a radio frequency to a specific purpose, all of the radio frequencies were put into a pool and assigned to a purpose only when actually needed. If an officer needed to contact a dispatcher, for instance, a *trunking controller* would assign the officer one of the frequencies from the pool only for as long as he or she was talking. When the

officer finished speaking, the controller released the frequency back into the pool for someone else to use.

The Bearcat 200XLT, a 200-channel handheld scanner that I had been using during this time, could scan in the 800 MHz range but couldn't handle these new trunked radio systems. Since all of the coordination and assignment messages were sent on a control channel in digital form, it would take a more capable scanner to be able to follow all of the action.

Other scanner listeners were in the same boat. New trunked systems came on line in the mid-1990s, and yet we couldn't monitor them properly because there wasn't an easy way for our radios to understand the control channel messages.

Some "homebrew" solutions emerged during this time, making use of the now-common personal computer (PC) and a bit of extra electronics. A "bit-slicer," which converted the control channel data stream into an electrical signal that the PC could accept, along with an 800 MHz scanner and some computer software, made it possible for a dedicated and technologically adept hobbyist to track the first generation of trunked radio systems.



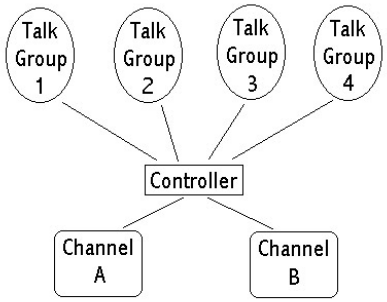
For the more casual hobbyist, the first trunk-tracking scanners came on the market in 1997. Uniden and Radio Shack both began to market scanning receivers which could understand the control channel messages on a Motorola system and automatically follow a conversation from frequency to frequency. This was quite a step up from the hit-or-miss approach I had with my 200XLT, which could hear all of the voice activity but often would alternate between different conversations.

My first trunk-tracking scanner was a Radio Shack PRO-92, and I eventually ended up with three of them, each with a different firmware version. Where I live now there are numerous trunked radio networks, and trunk-tracking capability is a necessity. Other, more rural areas may not need such capability.

❖ The Digital Age

Although trunking provided some relief for large public safety agencies, available radio frequencies were still running out. More efficiency was needed to pack an increasing number of users into smaller and smaller pieces of the spectrum.

Since the beginning of radio, transmissions had been sent in analog form. What that means,



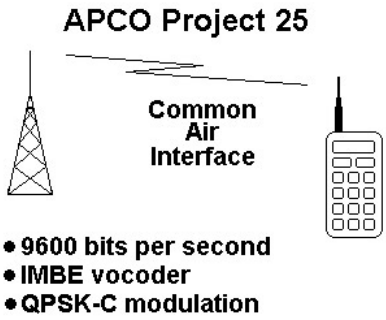
Many users share common channels.

in essence, is that the radio transmission itself varies directly in proportion to the voice it is carrying. All of the receivers I had ever owned or used were able to convert the varying radio signal back into voice form.

These analog radio signals require a certain amount of space, called *bandwidth*, in order to carry an intelligible signal from one radio to another. Normal voice channels for public safety and business operations had traditionally been 25 kilohertz (kHz) wide. Newer analog technology with better transmitters and better filters are able to operate fairly well at 12.5 kHz bandwidth, meaning you could fit two channels with new technology where you could only fit one channel before.

The FCC, responsible for finding enough channels for everyone, would like to eventually move to channels with a bandwidth of 6.25 kHz. How to get there?

The Association of Public Safety Communications Officials (APCO), under a two-decade old program they call Project 25, believes that the way forward is to stop using analog signals and start using digital signals. Through the use of digital signal processing (DSP) techniques, Project 25 radios transmit voice information between radios in digital rather than analog form. The Federal government, along with many states and municipalities, has promoted the use of Project 25 for new public safety radio networks.



Project 25 (P25) is essentially a set of standards that specify in exacting detail what signals a radio must transmit and receive. The baseline standard is called the Common Air Interface (CAI) and describes the method and format of sending digital voice from one radio to another.

As with trunking, the first digital Project 25 networks put into operation created a problem for scanner listeners. Even though their scanners could tune to the proper frequencies, the signals they received were digital and could not be converted back into voice.

Finally, after years of waiting, Uniden introduced the BC250D handheld and BC785D base/mobile scanners, in 2002. Radio Shack followed a year or so later with the PRO-96 handheld.

I purchased a PRO-96 when three local jurisdictions switched from analog to digital operation. The scanner came pre-programmed with "virtual scanner" frequencies for various parts of the United States, including my area of the country. This made it extremely easy to set up and use – I didn't have to enter frequencies into a keypad or even twiddle a series of tuning knobs.

I may never need to use the keypad to program again, since nearly all of the recent scanners come standard with a computer interface port. I am able to upload and download lists of frequencies between the scanner and my computer, where I can make use of Internet resources to locate and incorporate any frequency changes that may occur over time. Since all of these new scanners are controlled by an internal microprocessor, I can also use my computer to upload new programming from the manufacturer's web site into the scanner. This update process, called *reflashing*, makes it possible to add new features and correct problems, increasing the useful life of the scanner.

❖ Reflection

As I look back, I find it interesting that I still have (and use) several Bearcat 200XLTs, despite their age and limitations. Even now it's easier for me to grab the 200XLT to make a quick frequency check or monitor an analog transmitter. In the past I've also loaned one or two out to the local Boy Scout troop to introduce them to police and fire activity, since it's so easy to learn and use. There's quite an advantage to simplicity.

More broadly, even as technology has changed over the decades, the core desire remains the same – to stay aware and informed of what is going on around the local area. Scanners provide an invaluable tool for people to hear and respond appropriately to events that immediately and directly affect their lives.

Have a Merry Christmas and a Happy New Year as you reflect on your own experiences. See you next year.

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Frequency Coverage:

25.0000-512.0000 MHz., 764.0000-775.9875 MHz., 794.0000-823.9875 MHz., 849.0125-868.8765 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

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

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Bearcat 796DGV 1,000 channel Trunktracker III base/mobile	$519.95
Bearcat BCD396T APCO 25 Digital scanner with Fire Tone Out	$519.95
Bearcat 246T up to 2,500 ch. Trunktracker III handheld scanner	$214.95
Bearcat Sportcat 230 alpha display handheld sports scanner	$184.95
Bearcat 278CLT 100 channel AM/FM/SAME WX alert scanner	$129.95
Bearcat 248CLT 50 channel base AM/FM/weather alert scanner	$104.95
Bearcat 92XLT 200 channel handheld scanner	$109.95
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Bearcat BR330T up to 2,500 ch. Trunktracker III with Tone out	$274.95
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Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

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

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAH nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part **#HF24RS** for $29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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The Arctic: HF's New Frontier

Political pundits are fond of predicting that the next oil confrontation will be in the Arctic, not the Middle East. The Arctic is generally the North Polar region above approximately 66 degrees, 33 seconds north latitude. Above this boundary, known as the Arctic Circle, the sun will not rise all the way on the Winter Solstice, and it won't completely set on the summer one.

The Arctic is estimated to contain a quarter of the world's remaining oil and gas reserves. However, most of these are in frozen-over international waters, where offshore drilling has always been considered impractical.

Global warming may be about to change all that. The polar ice cap is receding at a truly alarming rate, greatly surprising climate scientists. This is making much of the area potentially more navigable. Suddenly, the Arctic is being claimed, in various amounts, by the United States, Russia, Canada, Denmark, and Norway.

Much of this contention concerns the Lomonosov Ridge, an oil-rich undersea feature stretching from the North Pole to, well, somewhere. Russia says it comes from their country, and thus they have the mineral rights under a little-known international treaty concerning underwater continental shelves. Denmark, meanwhile, says the ridge starts closer to Greenland, a Danish possession. Last summer, Russia even went so far as to drop its flag from a submarine, right onto the deep sea bottom below the ice of the North Pole.

Obviously, we haven't heard the end of the Arctic story.

❖ Polar HF Radio

Communication, in any mode, has never been easy this far north.

For a start, satellites in geostationary positions over the Equator are too low to be reliable north of about 74-76 degrees. Lower-orbit services, such as Iridium, can often work better, but agencies still recommend HF. For example, the maritime radio service, which has gone to satellites in a big way, still requires terrestrial radio this far north (and south).

Like the Antarctic, the northern polar maritime region is internationally defined as Sea Area A4. Large "compulsory" ships must carry radio equipment with capability on Medium Frequency (MF, 300 to 3000 kilohertz or kHz), High Frequency (HF, 3 to 30 megahertz or MHz), and VHF (30 to 300 MHz). In addition, Canadian regulations require that vessels navigating these waters be able to receive radiofacsimile (FAX) ice charts.

In the aero mobile service, the region is under oceanic air traffic control by the Major World Air Route Area (MWARA) North Atlantic net, family D (NAT-D). This net uses upper sideband (USB) voice on 2971.0, 4675.0, 8891.0, 11279.0, 13291.0, and 17946.0 kHz. Primary ground stations are Arctic Radio (Baffin Island, Canada), Bodo (Norway), Churchill (Canada, emergency only), Gander (Canada), Reykjavik (Iceland), and Shanwick (Ireland).

The HF international calling/ distress/ safety of flight frequency of 5680 kHz USB is also guarded by a number of Canadian VHF aero stations in the region These include Baker Lake, Inuvik, Iqaluit, Resolute Bay, and Yellowknife.

Finally, Aeronautical Radio, Incorporated (ARINC) has added GLOBALink support of the Polar Route flown between Europe and North America. The ground stations are at Barrow, Alaska, and Krasnoyarsk, Russia. Mode used is High-Frequency Data Link (HFDL). Check the current HFDL system table for frequencies.

Of course, these high latitudes aren't the best for HF, either. In the Arctic, radio propagation is often adversely affected by aurora borealis, even when no "Northern Lights" are visible in most ground locations. In the past, such exotic modes as VHF meteor scatter and satellites in highly eccentric "Molniya"orbits have been used as alternatives. However, good old HF utility radio, usually in upper sideband (USB) voice mode, still carries a great share of the traffic.

❖ The Northwest Passage

Much of the historic European exploration of North America was motivated by the search for a shorter route to Asia called the Northwest Passage. Like the polar route taken by airplanes between these two continents, this passage conforms more closely to the great circle distance, always the shortest between two points on the Earth's surface. Had the European navigators been able to use such a route, they would have saved thousands of miles and many months of travel. Further, vessels from Britain and the Netherlands would have been able to circumvent certain European treaty restrictions.

It is now known that such a route really does exist. It skirts Alaska, the northern islands of Canada, and the coast of Greenland. Unfortunately, the ice has always been too thick for any kind of realistic navigation by anything other than nuclear-powered submarines or heavy icebreakers. Too thick, that is, until now.

In 2005, only two vessels completed the 3200-mile passage, and they needed the help of Canadian Coast Guard icebreakers. Others became icebound, most requiring rescue. In 2007, three got through, and reported a near-total absence of ice.

Canada is taking the Northwest Passage seriously enough to fund a network of listening devices on the sea floor. They also intend to beef up their military presence in the region. A large exercise took place last summer.

A Canadian ham, Peter Semotiuk, VY0PS, passes daily weather information to vessels attempting the trip, using the USB maritime simplex callsign XNR 79 on 6224 kHz USB. This net, which resembles the far-better-known "Herb" in a different part of the Atlantic, is active in August and September. A blog, **www.idlewildexpedition.ca**, which describes an eventful passage in 2005, mentions contacting this net daily at "1830," though the time zone is not given.

❖ New Guam LDOC?

LDOC stands for Long-Distance Operational Control. It's an HF radio service maintained by privately contracted ground stations to pass messages and phone patches from aircraft to their company personnel. LDOC can also be used for medical emergencies and information requests. It's great utility listening.

According to the September supplement of the US Department of Defense Flight Information Publications (FLIP), as posted to Internet lists by Michael, DH5FAU, there is a new listing for a station on the island of Guam. This is a US possession in the middle of the Pacific Ocean, fairly near the Date Line. The station is operated by ARINC, and complements other LDOC sites on these frequencies.

The frequencies listed in FLIP are: 3494.0, 6637.0, 6640.0, 11342.0, 11348.0, and 17925.0 kHz, all USB. Like most aero stations, the LDOC will not use all frequencies at all times. It may take a while to figure out the daily time/frequency schedule. All of these are in the ARINC Pacific net, except for 6637, which might be used by Shanghai Radio.

According to Larry Van Horn, our editor and expert on all things military, the public can no longer download FLIP from the World Wide Web. The site has been closed, and there is no new one. And so goes yet another former source of completely unclassified US government information useful to anything that flies.

❖ More on Guam

Richard Dillman, of the Maritime Radio Historical Society, was able to find additional information from a personal contact. There is indeed an ARINC LDOC in Guam, operating as a remote base like others in this network maintained for Pacific Ocean HF aeronautical communications.

Guam, according to this source, has been on for about a year. It has recently gone to full power. Its frequencies, minus the aforementioned 6637, are in the standard ARINC group. Other transmit and receive remotes are at the ARINC sites in Molokai, Hawaii, and Barrow, Alaska.

According to Dillman's source, the Guam remote station is not really used a whole lot. Barrow and Guam are assigned to the Central East Pacific 2 (CEP-2) net, and Barrow is somewhat busier. Also, the South Pacific net handles many of these flights instead of CEP-2. Finally, the LDOC is said to have a lower traffic priority than this net's oceanic air traffic control activities, which are conducted on other CEP-2 frequencies.

❖ Cuban Mode of the Month:

Just when we thought that the Cuban intelligence "numbers" stations were through experimenting with ham radio digital modes, they found some more free software downloads to try. This time, it was a really strange sounding noise generated by a freeware program called DIGTRX, presumably for Digital File Transfer. This can be downloaded, at no charge, from all the usual ham software sites.

The first transmissions in this mode were reported by Tom Sevart in Indiana, on 17478 kHz at 1600 UTC, and 17436 at 1700. The exact mode was RDFT, which stands for Redundant Digital File Transfer.

RDFT isn't heard much, if at all, in the United States, though in other places hams have been using it for the gloriously misnamed "Digital Slow-Scan TV." It's misnamed because it's really just ordinary computer graphic files being exchanged a packet at a time, sort of like a one-way version of the Internet.

In this case, though, the resulting file (named nen12.txt) is apparently dummy text in a modified three-message format. The messages are delimited by long lines of 1's, and the file ends in a line of 2's.

An especially bizarre noise comes at the start of an RDFT transfer. It sounds like the backscatter radar on a bad technical day. This is a feature called a "waterfall picture," using precisely timed audio tones to actually draw little designs on the DIGTRX vertical ("waterfall" mode) spectrum display. The default, which wasn't changed, is a large text banner giving the DIGTRX version sending the file.

One would think that even Cuba couldn't get any more strange than this. One would be wrong. On several occasions, the 1700 sked also tried sending the same text file in DIGTRX's other mode, a pulsed roaring sound known as HamDRM.

HamDRM is a narrowband version of Digital Radio Mondiale, the HF digital broadcasting standard. While extremely slick and fun, HamDRM is not the best amateur mode due to the regulations concerning how transmitter power is measured.

This is because DRM has a peak/average power ratio somewhere around 10 or 12 to one. This means that a US "full-legal-limit" ham radio, with a rated output of 1500 watts peak envelope power, will only measure about 150 watts average output in HamDRM. You can really hear the difference, as the waterfall picture comes in clearly and then DRM starts, dropping the signal straight down into the noise.

Even so, US listeners wanting to hear HamDRM in all its glory can try the amateur frequency of 14227 USB on many weekends. Rich hams with high power and big beam antennas, mostly using a program similar to DIGTRX that I can't get to work on my PC, will be exchanging pictures with a fair degree of success. If you get lucky on one of these, the quality really is quite good. That's a big "if," though.

At press time, the 1600 and 1700 skeds are at least temporarily back to the normal V2a voices. That's right, there are two of them, the "old" and the "new" voice, although the new one isn't all that new. V2a, of course, is the ENIGMA designator for the 3-message format currently in use. It comes from a long list maintained with admirable precision by the dedicated numbers experts at the European Numbers Information Gathering and Monitoring Association (ENIGMA 2000).

But we have one last surprise. At press time, the 1600 and 1700 transmissions often begin early, sending absolutely demented Spanish language mechanical repetitions of the ones ("Uno, uno,uno…") or the twos ("Dos, dos, dos…"). Is nen12.txt, or its format, being sent by mistake? Is this an "Oops, wrong file," or another test?

As usual, we will never know. It'll be like the Radio Havana and Radio Reloj rebroadcasts, and all the other odd things that appear on these transmitters with such entertaining regularity. In any event, the strangeness nearly always cuts off right on the hour, when the "real" message begins right on time. Never a dull moment with this bunch.

While we wait for the Cuban station engineers to try some really reliable weak-signal modes like MT63 or Olivia, we'll see you next month.

UTILITY WORLD

UTILITY LOGS

Hugh Stegman

ABBREVIATIONS USED IN THIS COLUMN

AFB ..... Air Force Base
ALE..... Automatic Link Establishment
AM ..... Amplitude Modulation
ARQ ..... Automatic Repeat Request
CAP..... US Civil Air Patrol
CAMSLANT..... Communication Area Master Station, Atlantic
CAMSPAC..... Communication Area Master Station, Pacific
CW..... On-off keyed "Continuous Wave" Morse telegraphy
E11 ..... Russian "Oblique" station, short English messages
EAM ..... Emergency Action Message
FAX ..... Radiofacsimile
FBI..... US Federal Bureau of Investigation
FEC ..... Forward Error Correction
HamDRM..... Amateur version of Digital Radio Mondiale
HFDL..... High-Frequency Data Link
HF-GCS..... High-Frequency Global Communication System
LSB..... Lower Sideband
M08a ..... Cuban 3-msg CW/MCW, ANDUWRIGMT = 1-0
M42 ..... Russian diplo/intell messages, sometimes with tone call
MARS ..... Military Affiliate Radio System
Meteo..... Meteorological
MCW..... Modulated CW or AM tone Morse telegraphy
PACTOR..... Packet Teleprinting Over Radio
RDFT ..... Redundant Digital File Transfer, 8-tone mode
RTTY ..... Radio Teletype
SITOR-A..... Simplex Telex Over Radio, ARQ mode
SITOR-B..... Simplex Telex Over Radio, FEC mode
Unid..... Unidentified
US..... United States
USCG..... United States Coast Guard
UK..... United Kingdom
V02a ..... "Atencion" Spanish numbers, 3-msg format

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 ().

3292.0 Cuban AM Spanish female voice "numbers" (V02a), bad audio and very little lower sideband, at 0429. (Tom Sevart-KS)
3455.0 New York-Oceanic air route control, NY, working Cubana 400 at 0306. (Sevart-KS)
4149.0 WPE Jacksonville-Crowley Marine, FL, taking formatted status reports from WBN5040 and other seagoing tugs, at 0457. (Allan Stern-FL)
4316.0 NMG-USCG, New Orleans, LA, weather at 0350. (Sevart-KS)
4369.0 WLO-Mobile Radio, AL, automated weather voice, parallel 4396, at 0502. (Sevart-KS)
4585.0 Middle East 15-CAP region net, at 1300. (Jack Metcalfe-KY)
4593.5 AFA1HS-US Air Force MARS net at 1303. (Metcalfe-KY)
4604.0 Red Robin 8-CAP net, at 1300. (Metcalfe-KY)
4765.0 2PBAFA-US Air Force MARS, using the "backwards" ALE callsign format, sounding at 1224. (Metcalfe-KY)
4780.0 Anderson-Indiana Joint Forces Headquarters Emergency Radio Net, with Bedford and New Albany, LSB at 1304. (Metcalfe-KY)
4825.0 NNN0GYW-US Navy/Marine Corps MARS net, at 1305. (Metcalfe-KY)
4991.0 NK1-FBI, Newark, NJ, calling QT1, Quantico, VA, ALE at 1303. (Mark Cleary-SC)
5004.5 NNN0IOF-US Navy/Marine Corps MARS net, at 1307. (Metcalfe-KY)
5116.6 AAA4TN-US Army MARS, PACTOR with AAB4SC at 1754. (Metcalfe-KY)
5117.0 DIAMANTI-Albanian Ministry of Information, working DRINI, ALE at 1955. (Patrice Privat-France)
5696.0 CAMSLANT Chesapeake-USCG, working Coast Guard Rescue 1711 (a C-130), at 1010. (Stern-FL)
5708.0 200203-US Air Force C-17, autodialing a phone patch in ALE, at 1012. (Privat-France)
5732.0 719-US Coast Guard C-130, called LNT in ALE, then voice as Coast Guard 1719, working CAMSLANT, at 1315. (Cleary-SC) CAMSLANT, working C-130 Coast Guard 1711, at 1448. (Stern-FL)
6532.0 RCH812-US Air Force Air Mobility Command, voice call Reach 812, HFDL position at 2007. (Privat-France)
6765.0 NNN0OAR-US Navy/Marine Corps MARS, SHARES (Shared Resources) check-in at 1630. (Metcalfe-KY)
6855.0 V02a, AM messages in 5-figure groups, at 2104. (Sevart-KS)
6910.0 21G15-US Army, ALE and unknown digital mode with 21A30 and others, also using 7718.5 and 12168.0, at 1624. (Metcalfe-KY)
6932.0 Cuban "Cut Number" station (M08a), CW 5-figure messages sent as letters, at 2105. (Sevart-KS)
7527.0 12C-US Drug Enforcement Administration, working Panther, Bahamas, at 2215. (Cleary-SC)
7887.0 V02a, AM callup 02841 15267 85736 and messages, new voice, at 2001. (Cam Castillo-Panama)
7903.5 QT1-FBI, Quantico, calling SF1, San Francisco, CA, ALE at 0201 (Cleary-SC)
8097.0 M08a, callup UDRIG WNTGU UWGDU, in MCW at 1802. M08a, same messages, MCW at 1901. (Castillo-Panama)
8176.0 VMC-Australian meteo, Charleville, Queensland, marine weather at 2047. (Ken Maltz-NY)
8502.0 NMN-USCG, VA, weather at 2159. (Sevart-KS)
8503.9 NMG-USCG, New Orleans, LA, FAX text high seas forecast at 1445. (Sevart-KS)
8682.0 NMC-USCG CAMSPAC Point Reyes, CA, FAX weather charts at 1921. (Sevart-KS)
8912.0 J34-USCG helo raising LNT in ALE, then voice Juliet 09 working CAMSLANT, at 1334. (Cleary-SC) J09-USCG Juliet 09, working LNT (CAMSLANT, VA), ALE at 1925. (Sevart-KS)
8983.0 CAMSLANT Chesapeake-USCG, working Swordfish 14 (helo Coast Guard 6014), at 0035. (Stern-FL) Coast Guard 1708, HC-130 on a search, working CAMSLANT at 1707. (Cleary-SC)
9025.0 280057-US Air Force C-17, ALE sounding at 1911. (Privat-France)
9232.0 PIRUET23-Polish Military, calling TAJGA69, ALE at 1156. (Privat-France)
9339.0 E11, callup "287 Oblique 75," at 0915. (Mike L-West Sussex, UK)
9576.0 Unid-Russian Intelligence (E11), callup "234 Oblique 9," at 0845. (Ary Boender-Netherlands)
10236.8 Unid-"Dasher" pirate CW beacon, weak at 1425. (Chris Smolinski-MD)
10536.0 CFH-Canadian Forces, Halifax, NS, RTTY weather at 1555. (Sevart-KS)
10780.0 Cape Radio-US Air Force, Cape Canaveral, radio checks with Ascension and Antigua, at 1218. (Stern-FL)
10993.6 Dolphin 96-USCG helo, working Sector (USCG) on a marker beacon drop, at 1506. (Cleary-SC)
11175.0 Station Offutt-US Air Force Offutt HF-GCS, NE, EAM for Deer Run, at 1608. (Stern-FL)
11205.0 423-US Joint Task Force, working Smasher (Key West, FL), at 1401. (Cleary-SC)
11226.0 430082-US Air Force KC-10 tanker, ALE sounding at 1833. (Privat-France)
11232.0 Trenton Military-Canadian Forces, ON, patching US Air Force Sentry 07 to Tinker AFB, OK, at 1813. (Stern-FL)
11387.0 CO0037-Continental Airlines flight 37, HFDL with unheard ground station at 2003. (Sevart-KS)
11501.6 KTQ313-US Environmental Protection Agency, ALE at 1705. (Metcalfe-KY)
12153.0 E11, callup "330 Oblique 23," weak at 1940. (Mike L-UK)
12195.0 Unid-Russian Intelligence CW (M42), callup 742 742 742 00000, at 0800. (Boender-Netherlands)
12390.0 GYA-UK Royal Navy, Northwood, FAX Middle East weather chart at 2016. (Sevart-KS)
12397.0 E11, repeating callup "197 Oblique 75," at 0840. (Mike L-UK)
12631.0 KSM-Maritime Radio Historical Society commercial station, Pt. Reyes, CA, SITOR-B maritime union news at 2255. (Sevart-KS)
12750.0 NMC-USCG, Boston, MA, FAX weather chart at 2033. (Sevart-KS)
12788.0 NMG-USCG, New Orleans, FAX satellite image showing hurricane Felix, at 2002. (Privat-France)
13050.0 UDK2-Murmansk Radio, Russia, CW identifier in SITOR-A sync marker, at 1454. (Sevart-KS)
13297.0 Jet Blue 734-Airliner giving position to New York, at 1801. (Sevart-KS)
13354.0 Air France 630-Airliner requesting altitude change from New York, at 1533. (Sevart-KS)
13510.0 CFH-Canadian Forces, NS, RTTY weather at 2044. (Sevart-KS)
13925.5 WUK4113-US Army Corps of Engineers, possibly Southern California, ALE sounding at 2016. (Sevart-KS)
13927.0 AFA1EN-US Air Force MARS, IN, patching Reach 920 (NY Air National Guard C-130) to Stratton ANG Base, NY, at 1807. (Stern-FL)
14418.1 "CO"-Pirate CW hobby beacon, weak at 1415. (Smolinski-MD)
17436.0 V02a, AM carrier and distorted audio at 1657, repeating "uno" and "dos," cut to callup 23607 36184 72752, and messages at 1700. (Sevart-KS)
17436.0 Cuban numbers testing, sent the nen12.txt dummy message file in DIGTRX 3.11 RDFT at 1700, then same file in HamDRM at 1724, then alternating modes until 1750. (Sevart-KS)
17478.0 Cuban numbers testing, with carrier and then RDFT file transfer using DIGTRX 3.11, at 1600. (Sevart-KS) Unid-Cuban numbers, AM carrier and then passing three messages in the nen12.txt file in RDFT, at 1700. (Sevart-KS)

Mike Chace
mikechace@monitoringtimes.com
www.chace-ortiz.org/umc

What Do I Need for Digital Decoding?

Reader John Spence from Tennessee asks a good question: "I read and hear about all these interesting things I can decode on the shortwave bands. What do I really need by way of equipment so that I can join in? And how much will it cost?"

Well, John, it's a great question. We've covered in detail some of the equipment required over past columns, but simply put, here are the ingredients:

- one HF receiver
- one antenna
- one computer, and
- one decoder software program

Let's look briefly at each. First, the radio. Any radio with a general coverage receiver (1-30 MHz without gaps) will do. The radio could be a dedicated HF receiver such as the Icom R75, a scanner with a good HF section like the Icom R8500, or the receive part of an amateur HF transceiver. Here are the most important criteria for the radio itself:

- synthesized with at least 100Hz tuning steps (50Hz or 10Hz is better)
- digital readout to 100Hz
- good filtering (selectable; 3 kHz, 1kHz, 500Hz bandwidths all useful)
- good sensitivity (not a problem for most modern receivers)
- good selectivity (ability to reject interference from adjacent channels)
- single sideband capability

While you CAN get away with a good budget portable shortwave broadcast receiver with SSB like those from Grundig/Eton and Sangean, these machines simply won't cut it for weak signals with narrow bandwidths. Better choices are the Icom R75, AOR7030 and NRD545. Wideband scanner/receivers with a quality HF section like the AOR5000 and Icom R8500 will work, too.

If you want to go all-computer, I've heard that people get wonderful results with the receivers from WinRadio, Icom and RFspace. Budget amateur radios like the Icom 703 and Yaesu FT857 are no problem, either, and because of sales volume usually cost less than a similarly featured dedicated receiver. New, these receivers cost from about $600 to several thousand dollars.

Antenna

With the sensitivity of modern radios, modest antennas will do fine. Choose a reliable multi-band design like a G5RV and make your own for a few bucks.

Computer

Almost daily, it seems I see computers with specs that cost a few thousand dollars a couple of years ago now being offered for a few hundred dollars. The best decoding software is on Windows. If you can't leave Mac OS X or Linux behind, use a dual-boot machine. Nowadays, $500 will get you all you need in a new machine.

Decoding Software

On the other hand, the best software from Hoka or Wavecom will set you back $5,000 to 7,000.

On a budget? Go for SkySweeper.

Nothing left after you bought the new radio and computer? Check the UMC Software page for free stuff to get you going. Just don't expect to be able to decode the complex newer modes.

So, where are we? On a budget, assuming new gear, we're probably somewhere around the $1000 mark. If you're clever with eBay and the like, a few hundred perhaps. Want the best? Have a cool $10k ready!

❖ Brazilian SIVAM on the Air

Conceived in the early 1990s as an answer to a number of weather, environmental, civil air traffic control, law enforcement and defense challenges in Brazil's massive Amazon region, the Brazilian SIVAM (Sistema de Vigilancia da Amazonia, System for Vigilance of the Amazon) system became fully operational in 2004.

SIVAM has cost the country a few billion dollars and has been quite controversial. The system, now fully built-out, can be heard on HF radio, care of the MIL-188-141A ALE equipped stations that make up the network. Covering more than 2 million square miles of land, 19 fixed and 6 mobile radars now spread beyond the Amazon and cover other regions of Brazil.

Built by the Brazilian Air Force, SIVAM includes its own satellite that acquires data from around 900 ground-based sensors, a number of weather radar stations, and is linked to other ground- and air-based surveillance radars. It can monitor air traffic, illegal logging and other eco-smuggling activity, illegal mining, border incursions and of course, drug running.

Its environmental mission includes weather monitoring, mapping, and research on deforestation and other issues affecting the region. In addition to the radar stations, SIVAM also has a considerable presence in the air with a large number of radar-equipped Embraer jets and a squadron of Super Tucano attack aircraft.

The headquarters "coordination" station in Brasilia connects to a number of regional command centers in Manaus, Belem, and Porto Velho. The 10 weather radars are controlled remotely from the CRV (Regional Vigilance Center) in Manaus and four other local stations. Air traffic control functions are also located at the center in Manaus.

Here's a complete list of the stations associated with SIVAM and their ALE identifiers:

	Altamira Telecomms Hub
	Barcelos Telecomms Hub
	Belém Vigilance Radar
	Boa Vista Vigilance Radar
	Brasilia
	Cachimbo Vigilance Radar
RDCAR	Carauari Telecomms Hub
	Conceicao do Araguaia Vigilance Radar
RDCRU	Cruzeiro do Sul Mobile Radar
	Cuiaba
	Eirunepe Mobile Radar
	Guajara-Mirim Mobile Radar
	Imperatriz Vigilance Radar
RDJAC	Jacareacanga Vigilance Radar
	Macapá Vigilance Radar
RDMAN	Manaus Regional Control Center (also Vigilance Radar)
	Manicore
RDMAR	Maraba Telecomms Hub
	Porto Esperidiao Mobile Radar
	Porto Trombetas Telecomms Hub
SFAPV	Porto Velho Vigilance Radar
	Rio Branco Vigilance Radar
	Santarém Vigilance Radar
	Sao Felix do Araguaia Vigilance Radar
	Sao Felix do Xingo Vigilance Radar
RDSGC	São Gabriel da Cachoeira Vigilance Radar
	Sao Luis Vigilance Radar
	Serro do Tepequem
	Sinop Mobile Radar
	Surucucu Telecomms Hub
RDTAB	Tabatinga Vigilance Radar
RDTEF	Tefé Mobile Radar
	Tirios Vigilance Radar
RDVIL	Vilhena Vigilance Radar
RDIAU	UNID probably Iuarete
RDTAR	UNID probably Tarcoles
RDITA	UNID probably Itatuba or Itacoatiara

Frequencies you can hear the SIVAM stations on include 5760, 9497, 13978 and 16355 kHz USB.

So far, only ALE activity has been noted. No voice or modem transfers so far.

That's it for this month. Keep the letters and questions coming and good digital DX.

RESOURCES

UMC's Software Page
www.chace-ortiz.org/umc/software.html
SIVAM Official Site (Portuguese)
www.sivam.gov.br

GLOBAL FORUM

THE WORLD OF SHORTWAVE BROADCASTING

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

DRM Frequency Management

Interviewed on Radio Ukraine International's DX program, *Whole World on the Radio Dial*, at the August HFCC meeting in Birmingham, Oldrich Cip, chairman of HFCC, said this about problems implementing DRM on AM bands:

"Coëxistence, if we can call it that, with AM is a bit difficult, because the DRM signal causes interference; it can even remind us of Cold War jamming. And that discourages some DXers who are not very happy about this kind of interference, and they complain. But we are trying somehow to regulate this problem, recommending to our members that DRM be placed in 13 clusters on the bands that are adjacent to each other and are not dispersed among AM transmissions. But I must admit that the situation is not completed, as we would like to have it."

AFGHANISTAN [non] From mid-Sept to mid-Oct it became painfully obvious that R. Solh, the US-sponsored PsyOp service back to Afghanistan via Rampisham, UK on 17700, was playing exactly the same music in the same order, day after day, because on at least six different randomly checked days, the music CD was sticking/skipping at precisely 1346-1349. A more enjoyable sequence occurred half an hour later. For B07, this 1200-1800 transmission shifts to 15265 at 1200-1500, 9875 at 1500-1800, all 500 kW at 85 degrees, but 15265 is especially reliable back in NAm (Glenn Hauser, OK)

ALASKA Once again KNLS published contradictory info about its own schedule, for B-07. On English and Russian pages, 0800-0900 on 9615 in English, 7355 in Mandarin, while on the Chinese page: 0800-0900 on 7355 in English, 9615 in Mandarin. At least they agreed on the other English broadcasts:

1000-1100 6150
1200-1300 6150 6915
1400-1500 6150

Unfortunately, they overlook the fact that Singapore is on 6150 with 250 kW throughout this period. And TIRWR DGS is also registered on 6150 until 1200. We may be somewhat confident that 6915 will not have any co-channel interference, at least from other broadcasters (gh)

ALBANIA R. Tirana for B-07 has a greater variety of times than expected last month for evening English to NAm, which we thought would be advantageous in different timezones. In our mornings, 1530 is later than we preferred, but it needs to be no earlier than that in order for a new day's programming to be ready, rather than repeating the previous day's as was the case in the A-season. All are 300 or 310 degrees, except non-directional on 6135 (gh):

English to Eu, Mon-Sat: 1945-2000 6135, 7465; 2100-2130 7430. To NAm, Mon-Sat: 1530-1600 13640, 2100-2130 9915; Tue-Sun 0130-0145 6110, 0245-0300 7425, 0330-0400 6110, 0430-0500 7425. Albanian to NAm, daily: 0000-0130 6110, 7425 (via Drita Çiço, R. Tirana) see also CUBA

ANTARCTICA To DX LRA36, R. Nacional Arcángel San Gabriel, persistence pays off. Conditions may be favorable only one day a month in the 1900-2100 period on 15476. We finally heard it well, and also found a website about the station, **www.ejercito.mil.ar/antartico/lra36.htm** It's in a red house looking just like most of the others at the upper left of the aerial view at **www.ejercito.mil.ar/antartico/BAE/vista_aerea_BAE.htm** which also leads to many other photos (gh, OK)

BIAFRA [non] Coördinator of the clandestine Voice of Biafra International, Prof. Edward Okparaji of Howard University in Washington, told the *Nigerian Tribune* that the station would soon begin to broadcast on a daily basis (Andy Sennitt, *Media Network* blog) Has been Friday only at 2000-2100 on WHRI 15665 (gh)

BOLIVIA After brief period of activity until mid-July, new R. Universitaria, Cobija, disappeared from 4732, not heard again until Oct. 10 at 2336 with ID (Lúcio Otávio Bobrowiec, Brasil, HCDX) Barely audible at 2344, local pop music (Raúl Saavedra, Costa Rica, DX LISTENING DIGEST) And at 0040-0120, poor to fair (Brian Alexander, PA, ibid.) Also at 2300 without RTTY QRM (Bob Wilkner, FL, HCDX) Website says they had been remodeling and improving installations (Nicolás Eramo, Argentina, *DXLD*)

BRAZIL Rádio Nacional da Amazônia, de Brasília (DF), has been off the air a lot from 6180 and when it comes back has been very weak; transmitter problem?

Rádio Cultura AM, de São Paulo, returned to the air on 9615 October 4, after having been on 9353 in August and off the air in September. Also active but very weak on 17815.

Rádio Globo, de São Paulo, always turns off its 9585 and 6120 transmitters abruptly at 1955 without warning in midword (Édison Bocorny Júnior, Novo Hamburgo (RS), via Célio Romais, *DXLD*)

All indications are that Rádio Guarujá Paulista, recently renamed Rádio Globo Santos, de Guarujá (SP), has ceased SW, nothing heard on its only remaining frequency 3385 (Rudolf Grimm, SP, *ibid*.)

Rádio Guaíba, Porto Alegre with futebol at 1550 on 11785, and spurs +/- 265 kHz on 11520, 12050 (Adan Mur, Ñemby, Paraguay, *Conexión Digital*)

BURMA [non] Crackdown here in late September prompted doubled broadcasts from RFA and VOA in Burmese, coördinated so they took turns in the morning and evening via three frequencies at once from various sites. It was unclear whether this would be maintained, and the frequencies would have changed for B-07 (gh)

Deutsche Welle also added a frequency in English for Burma at 1600-1700, using a previously unknown fourth backup transmitter in Sri Lanka on 9485 in addition to a broadcast already on that frequency from another SL transmitter, beamed NNW according to a press release (Kai Ludwig, Germany, *DXLD*) Horst Scholz, DW Chief Engineer, confirmed the additional transmitter. Probably 45 degrees covering Burma (Wolfgang Büschel, *ibid*.) There was a split-second echo between them (Jose Jacob, India, *ibid*.) Audio *must* be synchronized in such cases. R. Netherlands also publicized its existing relays in English via Russia as covering Burma (gh)

CANADA Sackville transmitters heard on semi-harmonics: 4877.49, RCI in Spanish at 0205-0220, surprisingly good signal, 0.5 x 9754.98 (Brian Alexander, PA, DXLD) And 4812.48, 0.5 x 9625, CBC Northern in French at 1110-1130 ID as CBC Montréal, very strong, also at 2100 (Dave Valko, PA, HCDX)

CHINA World news was overwhelmed by the uprising in Burma, but CRI's show of top news around the world did not mention Burma once! China has been a supporter of the Myanmar dictators for ages, and CRI did not want to run a program about the populace calling for democracy – which the Chinese communist regime, of course, doesn't have! (Sue Hickey, NL, *CIDX Forum*) Also noted absence of news about Burma on CRI, and much of their other programming has turned into fluff. Give us some programs with some relevance and substance (Roger Chambers, NY, *ODXA yg*) Since China remains a society with controlled media, CRI should be viewed skeptically as a source of unbiased news. Shame on us for expecting anything different (Richard Cuff, PA, *swprograms*)

The new China National Radio, CNR-1 signal on 4750 heard around 0900 has been DF'ed by the Kantou Bureau of Telecommunications to near Hailar in Nei Menggu, 122E14, 48N05 (S. Hasegawa, Japan, *NDXC*) Collides with Makassar, Indonesia, long on 4750, also past 1300 (gh)

[non] Voice of Kuanghua-Voice of Han Broadcasting Network in Taiwan to the mainland, had been 24h on 9745, but reduced to 0855-0103 while increasing MW coverage to seven frequencies including 1053 where Firedrake jamming appeared, although it had not been used on 9745 (S. Aoki via S. Hasegawa, *NDXC*)

COSTA RICA Pastor Melissa Scott talked about her surprise visit to TIRWR, Cahuita. She met with management, talked about some other use for the towers in future than SW, for which it is getting harder and harder to find spare parts (Chaz Lambrusco, *DXLD*) Maybe local FM instead? (gh)

What's the unID broadcast intruder in the ham band, very wobbly carrier, on 18105 at 2044? Gone at 2200 (David Ross, VA3MJR, *DXLD*) I also found the defective signal on 17593.5 matching 18106.5, therefore spurs from REE Cariari relay on 17850. They were also heard, apparently on groundwave, by Raúl Saavedra within Costa Rica. Ironically, the lower one also interfered with REE direct from Spain on 17595 during 19 hours per week, per summer scheduling! Spur frequencies varied slightly, and once, each consisted of two carriers heterodyning each other, and/or cutting on and off. I also could detect much weaker duplicates at twice the offset, 17337 and 18363. This went on for at least three weeks. For B-07, 17850 is replaced by 15125, taking spurs with it? (Glenn Hauser, OK)

CUBA RHC transmitter tests will soon be on the air on 5055 and we may also be testing another lower frequency on 60m (Arnie Coro, RHC *DXers Unlimited*) Nothing heard in next two weeks.

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

Instead of just several spurs on the 13 MHz band as reported last month, on another occasion RHC blew away the whole band with continuous noise through the entire band and beyond, extending down to 12845 and up to 14465 past the 20m ham band; spur peaks were every 49-50 kHz with lower peaks halfway between. This interfered with numerous other broadcasters on the band for more than half an hour from 1305 October 9 when the 13680 transmitter was turned on. It ruined reception from R. Tirana on 13750, but on other occasions, Sundays, RHC actually broadcast at 1300 on 13750, blocking Tirana, even though it was not scheduled to open 13750 until 1400 for *Aló, Presidente*.

RHC mixing product on 6300 was actually better than its source, 6060, since 6300 was in the clear and 6060 had heavy adjacent QRM de Spain 6055, WYFR 6065. At 0126, only Spanish was heard on 6300, though it leapfrogged a strong RHC English transmitter on 6180 to get to 6300 (gh)

Then there's deliberate jamming. A new jammed frequency was 6110, since VOA Spanish moved there temporarily in mid-September including the Cuban show at 0100. VOA was to replace this by 5940 in B-07, we hope pulling the jammer with it and thus clearing 6110 for Radio Tirana as planned.

[non] Radio República canceled transmissions via T-Systems, Germany, weekdays 2300-0400 on 5910 after Sept. 29; funding cuts (Jeff White, RMI, *DXLD*) Good news for Colombia para Cristo – except residual jamming was still audible on 5910 more than two weeks later (gh)

ERITREA [non] WHRA added more clandestine broadcasting: 1800-1830 M-F, Voice of Meselná Deliná, on 17690 in Tigrinya, confirmed from late Sept. This replaced same service via TDP brokerage in Russia at 1700 on 11765, later 7335; and **http://vodm.asmarino.com/** which also has a large audio archive, gave wrong schedule as 1700-1730 on 15705. 17690 is at 75 degrees, missing Eritrea, instead crossing southern Ethiopia, but close enough, they must think. Perhaps on 17650 instead for B-07 (gh)

[and non] V. of Broad Masses of Eritrea [not a clandestine], Program 2 on 7175, was hit by heavy Ethiopian jamming from October, heard at 1600-1700 with pulses; before that there had been music jamming against it (Jari Savolainen, Finland, *DXLD*) Also heard motorboat-type jammer on 7175 at 0402 (Brian Alexander, PA, *ibid*.)

Then VOBME started hopping to different frequencies in cat-and-mouse with jammer on its tail, such as 7215 at 0403 (Martien Groot, Netherlands, *ibid*.) In mid-Oct at 0427 four frequencies were being jammed, 7175, 7180, 7210 and 7215; plus 7170 which had DW Arabic, and 7165, against V. of Peace and Democracy? Then 7160 (Tarek Zeidan, Egypt, *ibid*.) VOBME Program 1 seemed to stay on 7100 and was not jammed (Scott R. Barbour, Jr., NH, *ibid*.) Eritrean Ministry of Info complained that Ethiopia was attempting to block Eritrean broadcasting and web sites (Chris Greenway, UK, *ibid*.)

ETHIOPIA Meanwhile, Ethiopian stations were adding more frequencies. Radio Fana heard on three: best on 5970, also 6109.9 and 7210 from *0257 (Brian Alexander, PA, and Jari Savolainen, Finland, *DXLD*) V. of Tigray Revolution on new 5960, // 5980, 6185 at 1850 (Martien Groot, Netherlands, *ibid*.) Also from *0356 (Alexander, *ibid*.) R. Ethiopia on 5990 at 2013-2100* (Marc Vissers, Belgium, *HCDX*) So Ethiopians heard on 5960, 5970, 5980 and 5990 around 1500-2000* (S. Aoki via S. Hasegawa, Japan, *NDXC*)

[non] Our broadcast of Voice of Oromia Independence, Sat 1700-1730 changed from 15650 to 9820 as of November 3 for B-07 (Jeff White, RMI, *DXLD*) via Wertachtal, Germany, 125 kW, 135 degrees (gh)

FRANCE RFI is to increase English language programming later this year; no further details available yet (Allen Dean, UK, World DX Club *Contact*)

GABON The Afropop music jammer on 17660 at 1130-1531 was last heard Oct 4. This opened 17660 for Saudi Arabia's French at 1400-1600. Meanwhile, Africa 1 on 17630 had a better signal than before (José Miguel Romero, Spain, *DXLD*) Lasted long after its target, Sawt al-Amel vs Libya, had disappeared (gh)

GERMANY [non] DW sent out this B-07 schedule of broadcasts recommended for NAm reception, even though not aimed deliberately here:

English, all via Kigali, Rwanda: 0500-0530 9755; 0600-0630 12045; 2000-2057 9735; 2100-2157/2200 11690 13780. German: 0000-0200 9545 Ascension; 9655 Kigali; 0600-0800 15410 Kigali; 1000-1200 5905 Bonaire; 1800-1957 11725 Kigali (via Chuck Bolland, FL, *DXLD*)

And new relay in German via WHRI 9865, 1000-1100 to LAm (Kai Ludwig, Germany, *ibid*.)

INDIA On Sept 26, All India Radio *Vividh Bharati Service* changed from Delhi 10330 to Bangalore 9870, 500 kW: 0025-0435, 0900-1200, 1245-1740. 10330 remains in use, from Delhi, in Russian at 1615-1715 (Alokesh Gupta, New Delhi, *DXLD*)

9870 at 1300 clear of expected Chinese interference (Steve Lare, MI, *DXLD*) OK here with polar flutter, unlike another AIR service on 9425 (gh, OK) But 9870 blocked in evening by Austria (Ranjan Kumar, eastern USA, *dx_india*) Austria was 0030-0200 (gh) VBS with great signal here at 0050-0230, Austria barely audible in background (Raúl Saavedra, Costa Rica, *DXLD*) 9870 is at 320 degrees (Jose Jacob, India, ibid.) So misses most of India, across Teheran, Brussels – and Costa Rica! (gh) But at 1300 would be long-path? (Saavedra) Probably (gh)

INDONESIA VOI always with some problem or other. On 9525 at 1315 during Korean hour one day, bits of audio cut on and off at the rate of about 132 times per minute; another day at 1356 past 1405, four syllables of music sounding like *''lu-vun-ha-ri''* were repeating over and over in a loop, from lost satellite feed? Next few days at least, off the air (gh, OK)

ITALY As feared, Rai closed all 25 shortwave language services at end of September (gh) For all its quirkiness, I will miss Rai. English always consisted of ten minutes of news, in past decades read by a tired-sounding older lady, then ten minutes of music, no announcements, given nonsensical placeholder names such as "Free Parking." I was on mailing list for Rai shortwave schedule publication, lavishly illustrated in color and as elaborate as the actual broadcast was austere. Most of the evening, RAI was in Italian, and much of that was music. This included many of the old Italian love songs from the 1950s and 1960s (**KimAndrewElliott.com**)

A German report on the closure of RAI International's radio services from **http://funkkorrespondenz.kim-info.de/** says that "the new convention stipulated a reorganization of the foreign service but did not mention a closure of the radio services; thus their cancellation came as a surprise." In fact it did not mention these radio services at all. Quite tricky; it appears that almost everybody outside the SW scene believed that no changes would happen there. Do not announce anything in advance, just pull the plug and have done with it. I wouldn't be surprised if other broadcasters adopt this successful approach (Kai Ludwig, Germany, *DXLD*)

JAPAN R. Nikkei (program 1), 0830-0900, *Let's Read the Nikkei Weekly* with Jeffrey Swiggum, in English and Japanese, segment "key words and phrases," gives vocabulary. This half-hour program is sponsored by Society for Testing English Proficiency. 3925, 6055 & 9595, all fair to good, **www.radionikkei.jp/LR/** (Ron Howard, CA, *DXLD*) I also hear a show with some English learning segments between 1300 and 1330 weekdays on 6055 (gh)

[non] NHK World, R. Japan, has interference problems on its remaining English broadcasts via Canada: at 0500-0530 on 6110, off-frequency Latin Americans, notably CVC Chile; at 1200-1230 on 6120, collision with Singapore; at 1400-1430 on 11705, in A-07 on Saturdays there was BBC Swahili via South Africa, and in B-07 it's IBB daily via Morocco.

Only three programs survived the October cuts to English broadcasts, besides the news, which no longer pauses for frequency info. At 0510 weekdays, *What's Up, Japan*, a feature magazine; Saturdays, *World Interactive*, mailbag, DX, and haiku; Sundays, *Pop Up Japan*, music and comedy. Schedule on website was confusing and contradictory, with many wrong times, but we think each of these just repeats on the same UT day's broadcasts thru 2200 and 2400, which skip the news and contain the features only.

Don't you believe that NHK no longer broadcasts in Japanese to NAm, as their official publicity stated. There is still a 3-hour broadcast via Sackville 5960 at 0200; only difference is a slight beam change of 13 degrees from 240 to 227, with the official targets changed from the 48 USA, to Mexico and CAm, but unavoidably crossing ENAm on the way and no less audible in CNAm either.

European language listeners and broadcasters bade sad farewells, including Italian, Swedish, German, Spanish, although the last continues to Latin America (gh)

KOREA NORTH [non] Starting with FY 2008, VOA and RFA increased their output in Korean, and closely coördinated services so the two would take turns but never compete, straight through from 1200 to 2200 UT, on two, three or four frequencies at once from a variety of sites. Note this means rather strange local times, not starting until 9 pm, and all-night until 7 am in the DPRK, presumably since listeners tune in undercover on illegal radios when they are supposedly sleeping! (gh)

MICRONESIA About six months after it first tested SW for a few days, Pacific Missionary Aviation, ''The Cross,', finally started regular broadcasts on 4755 in early October from Pohnpei (gh) They were hearing it in Japan on 4755.25; I heard it next day and quickly got E-mail verification. They wish to receive as small audio samples as possible due to dial-up connection (Mauno Ritola, Finland, *DXLD*) 1002-1201 with preaching, variety of pop music, even punk, peaking at 1110; next day as early as 0715 (Dave Valko, PA, *HCDX*) Reception report online form: **www.pmapacific.org/ministries/radio/report_reception.php** (Sergei Sosedkin, IL, *DXLD*) A detailed program schedule on website in local time UT +11 then showed 1900-1300 UT including daily sermons by station honcho Nob Kalau himself during the 1100 hour; everything in English, mostly syndicated religion. However, they were still heard past 1300 (gh, OK)

MYANMAR Defense Forces Broadcasting Unit, Taunggyi on 5770 was not heard when the strife broke out in late Sept (Jose Jacob, India, *DXLD*) Had been off for month, but revived on Oct 12 at 1335 with usual programming until 1531*, tentative (Jari Savolainen, Finland, *ibid*.) Also heard until 1532* talking about Myanmar (Ron Howard, CA, *ibid*.) Back on thanks to the crackdown. See also BURMA (gh)

NETHERLANDS B-07 schedules for RNW showed something missing: no more DRM broadcasts via Flevo site in Holland itself, instead via Germany (Kai Ludwig, *DXLD*) Nor analog either from Flevo, shut down after only 22 years (Stephen Luce, TX, *ibid*.) It was too costly. RNW will still use not only Bonaire and Madagascar, but also Sines, Nauen, Skelton, Wertachtal, Dhabbaya, Singapore, Meyerton, Sackville, and even IBB-Tinang, Philippines for an Indonesian broadcast, in exchange for IBB using Madagascar for a Persian broadcast (gh) Also Hörby, Grigoriopol and Russian sites (Kai Ludwig, *DXLD*) Flevo site is not owned by RNW (Bernd Trutenau, Lithuania, *ibid*.) No longer by Nozema either, but KPN Broadcast Services. Possibly will rent time to other broadcasters rather than close (Ludwig, *ibid*.) Although Bonaire has been mainstay of RNW into North America for decades, there was always something special about hearing it direct from the Netherlands. Now Flevo fades into history along with Lopik and Huizen (Stephen Luce, TX, *ibid*.)

NEW ZEALAND RNZI was off the air a lot in Sept and Oct for antenna repairs requiring a huge expensive crane. Work had to be done in local daytime and when weather was good. Shifted early to summer schedule in mid-Oct; AM: 0459 9615, 0759 5950, 1059 9655, 1300 5950, 1751

9615, 1951 17675 to 0458 (Adrian Sainsbury and RNZI) But probably changed again by now

PAKISTAN New 100 kW SW transmitters will be used for external and world services from Islamabad; Karachi chosen as site because of proximity to Gulf, Middle East and East Africa. Expected to be completely installed and operational in 2009 (Aslam Javaid, Lahore, *DXLD*)

PERÚ R. La Hora, Cusco, 4857.5 is operating only on workdays at approx. 2300-2430. R. Ancash, Huaraz, 4990.9, heard at 2235-2325* in Spanish and Quechua; sign-off varies but always before 2400. R. San Nicolás, 5470.9, heard with excellent signal, improved modulation, at 2329-2430; schedule approx. 1100-1230 and 2230-0130v (Rafael Rodríguez, Colombia, *@tividade DX*)

POLAND [non] Polish R. External Service *Multimedia* show announced B-07 English as 13-14 on 5975 and 9450, 18-19 on 6015 and 7130 (Erik Køie, Denmark, *DXLD*) 5975 Nauen, 9450 and 6015 Wertachtal, Germany; 7130 Issoudun, France (Gordon Brown, *NWDXC* via Wolfgang Büschel, *DXLD*) So 9450 will be our best chance in NAm, QRM permitting, i.e. FEBC Philippines beamed west, which could still be a problem in C&WNAm (gh)

RUSSIA In early-mid October, VOR had severe transmitter problems. 15550 for Hindi at 1300 and Urdu at 1400 was way off frequency putting out a huge distorted blob interfering with many other stations, a different range each day, such as 15495-15515, 15605-15660, 15730-15765, 15840-15905. Despite S Asian target, was very loud in C NAm; site believed to be Moscow-Lesnoy. At one point it even interfered with a parallel VOR transmission on 15605! Wolfgang Büschel notified the operators in charge early on, but the problem persisted for a week. He found the distortion extending from 15510 to 15677; and also had spurs from 15660 in Vietnamese at 1200, varying widely around 15064 and 16256. Later in European evening, similar problems occurred on 7 MHz band, perhaps from same transmitter. VOR to Afghanistan at 1200-1400 on 15510 had a big buzz on the signal driving away listeners, but fortunately not spreading (gh)

SAINT HELENA Radio St. Helena Day 2007, Sat. Dec. 15, celebrates a double anniversary, the 40th year of RSH, and the 10th year of SW specials. On 11092.5 USB with 1000 watts and a 3-element monoband antenna rotating to different target areas: 1730 NZ, 1815 India, 1900 Japan, 2015 Eu, 2145 ENAm, 2245 WNAm, 2330 NSAm, 0015-0100 C&SSAm. A very special and beautiful full-colour QSL card will be issued for reports complying with the usual procedures. More info at **www.sthelena.se/radioproject** (Laura Lawrence, RSH manager, and Robert Kipp, Germany, Special Assistant, via Mark Nicholls, *NZ DX Times*)

SERBIA [non] I phoned Belgrade and talked to Mr. Graovac, a technical director of the International Radio Serbia. Said IRS received resources to repair only one transmitter at Bijeljina, Bosnia, which for sure would be reactivated at the beginning of December, only on 6100 with directional 15 dB gain, and non-directional 6 dB gain antennas. IRS also plans to start DRM in 2010 (Dragan Lekic, Serbia, *DXLD*) A bad idea with DRM from Luxembourg on 6095-6100-6105 (Kai Ludwig, Germany, *ibid.*) Maybe with 250 kW, Bijeljina will degrade DRM reception enough to make Lux move? (gh)

SLOVAKIA R. Slovakia International, B-07 English semi-hours: 0100 NAm 7230, SAm 9440; 0700 Au 13715, 15460; 1730 WEu 5915, 6055; 1930 WEu 5915, 7345 (via José Miguel Romero2, Spain, *DXLD*)

RSI announced that funds are secured until March 2008, but nevertheless, listeners' support is solicited for the A-08 season (Rumen Pankov, R. Bulgaria DX program)

SPAIN In mid-Oct, the domestic network Onda Cero Radio was being heard on a SW relay, 4394.5-USB, at all hours of the day and night, including some sports coverage. Speculation was a coastal station doing this for fishing fleets (via Mauricio Molano, Manuel Méndez, José Miguel Romero, Jorge Trinado, Spain, *Noticias DX*; Francesco Cecconi, Italy; Jari Savolainen, Finland; Scott Barbour, NH, *DXLD*)

REE B-07 includes English:

Eu	2000-2100	M-F	9690
	2200-2300	Sat & Sun	6125
CAf	2000-2100	M-F	9605
	2200-2300	Sun	9595 [none on Sat]
NAm	0000-0100	Daily	6055

Sephardic to NAm Tue 0415-0445 on 9690; Catalan/Galician/Basque, M-F 1340-1355 cutting away from numerous frequencies in use then for Castilian. Also adds DRM daily to Europe 0700-0900 on 9775-9780-9785, 100 kW from Noblejas (Antonio Buitrago, REE via José Bueno, Spain, *DXLD*) See also COSTA RICA

SRI LANKA See BURMA [non]

SUDAN [non] Southern Sudan Interactive Radio Instruction, 15650 via South Africa, Tue at 1414 spelling English words, practiced counting numbers from one to ten on fingers. Very elementary. Credits to several agencies in the hierarchy, including EDC and USAID. 1428 cute jingle with girl choir in English extolling Southern Sudan. Scheduled Tue/Thu/Sat 1400-1430 with 250 kW at 5 degrees, brokered by VT/Merlin. Good reception too in Northern Oklahoma. B-07 moved to 15675 (Glenn Hauser, *DXLD*)

TAIWAN For more than an hour, Oct 14 from 1302, WYFR relay on 9280 in Chinese had modulation cutting on and off four times per second. Yet another case of no human oversight to a SW transmission, with 100 kW going to waste; scheduled 11-16 and 21-24 in Mandarin, Cantonese (gh)

THAILAND [and non] Tentative R. Thailand B07 English, Udorn *u.o.s.*, with azimuths:

0000-0030	9680 SAf 256
0030-0100	12095 E&CNAm 6
0030-0100	5890 NAm 190 Greenville
0200-0230	5890 NAm 190 Greenville
0200-0230	15275 W&CNAm 38
0530-0600	11730 Eu 324
1230-1300	9810 As/Au 132
1400-1430	9725 As/Au 132
1900-2000	9805 NEu 329
2030-2045	9535 W&CEu 321

Of note are the new direct-from-Thailand frequencies to NAm, 12095 and 15275, to supplement (or eventually replace?) Greenville and ex-Delano on 5890. A 12095 trans-polar shot to ENAm thru the Arctic night is particularly daring and it will be interesting to see how well it work if implemented (gh)

TURKEY VOT B-07 English: 1330-1425 11735, 12035; 1930-2025 6055; 2130-2225 7180; 2300-2355 5960; 0400-0455 6020, 7240 (Sedef Somaltin, TRT, via Rachel Baughn, George Poppin, also announced as heard by Christopher Lewis, *DXLD*)

5960 and 6020 are to NAm; also check 12035 to WEu which carries on to us. VOT admits that the 2130, 2300 and 0400 broadcasts are repeats of 1930, including the 'news.' *Live from Turkey*, Tue 1950, Thu 1350, often repeats on following transmissions. These broadcasts in Turkish including lots of nice music may be audible in NAm: 1000-1355 15475, 15350, 11955; 2000-2155 5980, 6120, 6165; 0200-0355 7180; 0500-0755 9700, 9820 (gh)

UKRAINE RUI had to suspend its NAm service on 7440 as of Oct 11 when financing ran out. This was the 600-kW Lviv transmitter, unlike 100 kW on all the other frequencies. Hoped to have it back, in B-07 or on alternate 7530 with English at 0100 and 0400 (Olex Yegorov, RUI, *opendx yg*) However, 7530 might collide with Israel at 0430 unless that has changed. BTW, the planned 5820 mentioned last month was not used after all. If the NAm service is still missing, try English to Europe at 2200 on 5830 (gh) RUI has also started program audio on demand in mp3 (*Whole World on the Radio Dial*) See **www.nrcu.gov.ua/index.php?id=780** for a week's worth (Rich Cuff, *swprograms*)

U K [non] In early Oct, BBCWS made an abrupt change for the WHRI relay to Caribbean at 2100-2300, 9525 ex-13640. Greenville relay at 2100-2200 on 11675 often did not start on time, sometimes half an hour late. Apparently the same transmitter was used for Hausa until 2100 weekdays (Stephen Luce, TX, *DXLD*, and gh) Plans to continue 9525 and 11675 in B-07 (gh)

U S A Increased VOA and RFA broadcasts: see BURMA; KOREA NORTH. Save the IBB Delano shortwave transmitting station? Bill introduced by Rep. Betty McCollum (D-Minnesota) would not allow the Broadcasting Board of Governors "to cease, degrade, or in any manner limit the quality or reach of any of its broadcasting activities, including from the Transmitting Station in Delano, California." (**kimandrewelliott.com**) It's the ''Voice of Freedom Act of 2007'', HR 3598 – look it up to see if it got anywhere (gh)

For at least a week in mid-October, Some R. Martí frequencies suffered severe audio breakup, making them unlistenable. This included 13820 after 2000, scheduled as Delano, unlike 11930 Greenville. But then the same happened with 7405 and 11845 at 1400, supposed to be Greenville but with much increased strength in OK, so believed to have been transferred to Delano in its waning days. Why wasn't this fixed in short order? Almost seemed like sabotage, or at best negligence by union engineers about to lose their jobs (gh)

One of the distressed producers of *Buenas Noches, América*, the popular evening VOA news magazine at 0130-0200, let listeners know that the bosses planned to cancel the show (Leônidas dos Santos Nascimento, via Célio Romais, *DXLD*)

WORLD OF RADIO anticipated B-07 scheduling includes recent changes: WBCQ: UT Fri 0030 on 7415, Mon 0400 [maybe] on 9330-CLSB, Mon 0515v on 7415. KAIJ: Thu 1700 on 9480, Fri 1200 on 5755. WWCR: Fri 2130 7465, Sat 1730 12160, Sun 0330 5070, 0730 3215. Also WRMI; see **www.wrmi.net**

When WHRI is using both 7315 and 7490, evenings, it can also produce a mixing product on 7665, heard by Damon Cassell and Brian Alexander, *DXLD*. There could also be a matching spur inside the 40m hamband on 7140 (gh)

FCC dismissed application to experiment with local-range DRM on 26 MHz from WYFR HQ in Oakland CA, saying such experiments had already been done in Europe (Benn Kobb, **www.26mhz.us**)

VENEZUELA [non] Since R. Nacional de Venezuela and Habana relaying it refuse to publish any accurate transmission schedule, it remains for DX listeners to discover additional broadcasts, like this (gh) 1500-1600 on 11680, which in late Sept was colliding with Turkey until 1530, and RNV was actually in English during the first half on a Sat, normally all in Spanish; missing on Sunday (Tom Sliva, NYC, *DXLD*) and back on Monday (gh)

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

0030 UTC on 9845
BONAIRE: Radio Netherlands relay. *Research File* program. SIO 554. (Bob Fraser, Belfast, ME). 17605, 2305 Spanish; 17810, 2108 Dutch. **Radio Japan Bonaire relay** 15265 at 2312. SIO 444. (Stewart Mackenzie WDX6AA, Huntington Beach. CA).

0035 UTC on 9599.27
MEXICO: Radio UNAM. Classical music to Spanish ID and announcements at 0059. Possible radio drama at 0105. Fair signal strength but difficult reception due to Cuba on 9600 kHz. (Brian Alexander, PA) 9599.28, 1355-1400+. (John Wilkins, Wheat Ridge, CO). **XERTA** 4810, 0254-1230 via México City. Moderate to strong CODAR interference. (Brandon Jordan, Memphis, TN). **Radio Educacion** 6185, 0418. (MacKenzie).

0240 UTC on 6025.08
DOMINICAN REP: Radio Amanecer (tentative). Spanish religious programming including segments of music and preaching. Signal mostly poor despite brief episodes of fair reception. Did not observe any sign-off announcements, was anticipating their usual ID and choral anthem at sign-off. Station last heard two years ago. (Ron Howard, Monterrey, CA)

0245 UTC on 15425
RUSSIA: Voice of Russia. Russian interviews for SIO 444. VOR 13635, 0255. ID to jazz music and "this is Moscow." Newscast to Tchaikosky music at 0340, // 13775 (SIO 333) // 9435. (SIO 333). 9435, 0315. (MacKenzie). Russia's **Radiostantsiya Tikhiy Okean** 9765, 0845-0959. (Bolland).

0254 UTC on 4865.01
BOLIVIA: Radio Logos. Suspected Logos here during recording and despite signal drifting +/- 25 Hz, only peaking past 1020-1040. Religious sounding vocals to announcer's unidentified language. Very poor due to interference on both USB/LSB. Bolivia's **Radio Mallku** 4796.35 (tentative) 0954; **Radio La Cruz del Sur** 4875.08 (tentative) *0955. 1029-1035. Logs list them on 4876v, last reported Dec 2006. (Jordan).

0302 UTC on 9690
SPAIN: China Radio International relay. News items and editorial on the new anti-corruption agency in China. SIO 444. Spain's **Radio Exterior Espana** 9630, 0308 Spanish. (MacKenzie).

0312 UTC on 11590
ISRAEL: Kol Israel. Hebrew/English. Interviews to pop music. Time Tips to station identification and English newscast. 11590, 1734 Items on Middle East. SIO 453. (Jordan). Israel's **Galei Zahal** 6971.7 (tentative) 2318-2334+ (Harold Frodge, Midland, MI).

0640 UTC on 4910
AUSTRALIA: ABC NT Service-Tennant Creek. Carrier rising above noise floor at 0640. Threshold audio beginning at 0730 and fair signal by 0815. Live sports broadcast to abrupt 0832.* (Jordan). **Radio Australia** 9580, 1325. *Asia-Pacific* focus on Indonesia fights a viral disease. SIO 454. (Fraser). RA 17785, 2248 *Breakfast Club* program // 15230. (SIO 444) and 12080 (SIO 333). RA 15515, 0240 // 15240. RA 13630, 2150 // 12080. (MacKenzie). **ABC-Alice Springs** 4835, 0755-0830.* (Alexander).

0720 UTC on 4869.93
INDONESIA: RRI-Wamena (tentative). Signal faded up by 0720, with threshold audio by 0830. Unlike other RRI outlets noted, no sunset call to prayer heard around 0845 Wamena sunset. Additional Indo's observed: **RRI-Fak Fak** 4789.98, 0805 better after 1130. (Jordan) **Voice of Indonesia** 9525, 0900. (Chuck Bolland, Clewiston, FL). **RRI-Jambi** (tentative) 4925, 1141; **RRI-Biak** (tentative) 4920, 1149-1221; **RRI-Palangkaraya** 3325, 1227-1300. (Wilkins) **RRI-Pontianak** 3976.06, 1047. (Dave Valko, PA/Cumbre DX) **RRI-Makassar** 4749.96, 1230. Best to monitor in LSB to avoid presumed PBS Quinghai carrier; very slight CODAR interference. (Jordan).

0925 UTC on 6135
BRAZIL: Radio Aparecida. Pleasant pop tunes to Portuguese canned promos and identification. Fairly nice signal but interference via Santa Cruz on 6134.8 // 9629.98 which was clear but weaker. Brazilians monitored: **Radio Novas de Paz** 6080, 0936-0946; **Radio Marumby** 9664.98, 0947-0954; **Radio Bandeirantes** 9645.24 possible // 11925.23, 0951; **Radio Trans Mundial** 9530.03, 0959-1004. Tentative identification on Brazil's **Radio Filadelfia** 6104.96, 1016-1019. (Valko) **Radio Nacional** 11780, 2138. (MacKenzie).

0931 UTC on 3340
HONDURAS: Radio Misiones Internacional (tentative). Spanish religious programming format including music and sermon. Background music amid poor to fair signal. (Howard) 3339.97, 0645-0745+. Religious text at 0734. Poor signal quality. (Alexander).

1006 UTC on 6039.94
CANADA: Radio China International relay. Male/female host to Chinese service at 1008. National weather update for various cities. (Valko)

1102 UTC on 7295
MALAYSIA: RTM. Male announcer's comments at 1102 with a news style format. Interference from 7296 including amateur radio operators. Malaysia's **Asyik FM** via **Kajang** 6049.65, 1158-1220. Two time pips to news, jingles and announcer's talk. **Klasik Nasional FM** via Kajang 5964.94, 1200-1242. Malay vocals to Bahasa Malaysian text at 1235. Generally fair. **Radio Malaysia - Sarawak** - 7270.02, 1157-1215. (Wilkins).

1405 UTC on 11690
JORDAN: Radio Jordan. English station identifications to US pop music variety. Time pips, ID and newscast at 1500. Pop music return to 1600 newscast. Fair signal but minimum co-channel interference. 11690, 1540-1629.* (Alexander).

1605 UTC on 15260
CLANDESTINE: Ethiopian Tewahedo Church. Presumed this station signing on. Horn of Africa and local tribal style music. No announcements or info at 1704 sign-off. Clandestine-**Ethiopian People Patriotic Front (EPPF)** 15260, *1600-1709.* Amharic text at 1600 into opening announcements. Partial ID despite warbler type of interference. Program consists of talks, regional music. **Voice of Biafra** 15665.30, *2000-2040. (Edward Kusalik, Alberta, Canada)

1715 UTC on 15205
SAUDI ARABIA: BSKSA. Arabic. Holy Koran segment during good signal (SINPO 44334). Poor signal on // 17560. 15435, 1725-1735; // 15225 much weaker signal. (Jim Evans, Germantown, TN)

1737 UTC on 15660
LIBYA: Voice of Africa. French identification followed by male's talk and frequent mentions of "Libya." Occasional bridge of traditional local music. Signal poor to moderate with excessive fading. SINPO 34323 at best. (Evans).

2115 UTC on 6295
PIRATE (EURO): Reflections Europe (tentative). English religious programming of talk and religious sermon. Station heard most Sundays but very weak. Euro-Pirate, **Weekend Music Radio** 6400.08, 2115-2155. DJ chatter to pop music. ID as "WMR." Signal poor to fair. (Alexander).

2119 UTC on 13630
MALI: China Radio International relay. *CRI News* and *CRI Reports* segment. SIO 3+33. **RTV du Mali** 4835.6, 2346.+ Afro music variety to possible ID as "Radio Nationale." SIO 443. LSB eliminates minor utility burst; // 5995. SIO 322. (Frodge). RTV du Mali 4835.58, 0554. (Jordan).

2319 UTC on 5030
BURKINA FASO: Radio Burkina. Two announcers' French commentary to drum/flute bumper music. Mentions of "Ouagadougou" and two of "Burkina." ID spot at 2328 and mention of "Radiodifusion." African hi-life music at 2330. SIO 433, best to monitor in LSB. (Frodge). 5030.01, *0559-0610 sign-on with national anthem, French announcements to Afro pops. (Alexander).

Seasons Greetings to our readers! Gayle VH

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

Yuletide and Year's End

December means the year is coming to an end and another one is about to begin. Here in much of the northern hemisphere, it means colder weather and (shudder) snow. Our friends in the southern hemisphere, on the other hand, are heading to the beach and probably enjoying a barbecue.

Whether you are shoveling snow, or shoveling sand to build a sand castle, December is a month for seasonal fare and special programming, surrounding both the Christmas season and the New Year.

This month we'll shine the programming spotlight on some annual holiday programming favorites. Due to the nature of editorial deadlines, much of this report has to be based on past year's observations and listening experiences.

LEADING UP TO CHRISTMAS…

Each year, the European Broadcasting Union presents a day of Christmas music, spanning some 12 hours. It falls on the Sunday before Christmas (Dec 23 this year). Heavy on classical and choral music, the program is in fact 12 one-hour broadcasts from individual EBU members. This program will be broadcast on many stations worldwide, including CBC Radio 2 in Canada, beginning at 6am local. You can hear it via the internet by going to **www.cbc.ca/local**, pick a city and click on that city's Radio 2 stream. It's also available via BBC Radio 3.

BBC Radio 7 online is heavy on comedy and drama. Tune here as Christmas approaches, for classic British comedy with a Christmas theme, featuring The Goons, Tony Hancock, Kenneth Williams, Kenneth Horne and The Clitheroe Kid. No doubt some Dickens will be in the drama segment. **www.bbc.co.uk/radio7**

Much of the programming at this time of year is obviously lighthearted, such as Radio Netherlands' *EuroQuest* "investigation" in 2006 of just where Santa lives, Sweden, Norway or Finland?; or *Living in Germany's* (DW) tour of traditional German Christmas markets. Other programs are more serious, such as *Cool's* (DW) look at the plight of homeless kids at Christmas.

Most radio stations in North America will air seasonal music, and some will even broadcast radio programs from days gone by. It's an opportunity to hear music only heard at this time of the year. Then again, some stations get a jump on the holiday and play Christmas music ad nauseum, as early as October (way too early). Still, I love this time of year, and the musical choices available.

CHRISTMAS EVE

A BBC World Service tradition…

"Our Festival of Nine Lessons and Carols was first held on Christmas Eve 1918. It was planned by Eric Milner-White, who at the age of thirty-four had just been appointed Dean of King's, after experience as an army chaplain which had convinced him that the Church of England needed more imaginative worship. A revision of the Order of Service was made in 1919, involving rearrangement of the lessons, and from that date the service has always begun with the hymn '*Once in royal David's city*'.

"The service was first broadcast in 1928 and, with the exception of 1930, has been broadcast annually, even during the Second World War, when the ancient glass (and also all heat) had been removed from the Chapel and the name of King's could not be broadcast for security reasons. Sometime in the early 1930's the BBC began broadcasting the service on overseas programmes. It is estimated that there are millions of listeners worldwide, including those to Radio Four in the United Kingdom. In recent years it has become the practice to broadcast a digital recording on Christmas Day on Radio Three, and since 1963 a shorter service has been filmed periodically for television." **www.kings.cam.ac.uk/chapel/nineleslessons/index.html**

As well as airing on the World Service it will be repeated on BBC Radio 3 and available on demand at the Radio 3 website. 1502-1630 UTC Live from the Chapel of King's College, Cambridge.

A Canadian tradition…

Live from Toronto and points worldwide: *As It Happens Christmas Eve*. (As Christmas Eve is on a Monday this year, it *might* be heard on Friday evening, Dec 21. It can be heard via CBC Radio One, CBC Northern Quebec Shortwave Service, NPR in the US and Internet Audio)

Greetings are exchanged with units of the Canadian Armed Forces serving worldwide, culminating in a "group carol."

A reading of "The Shepherd" by the late Alan "Fireside Al" Maitland usually follows. It's a very unusual Christmas story about a lost RAF pilot that is not to be missed, and is eagerly anticipated every year. (In fact "Fireside Al" stories are broadcast for a few days before Christmas.

As it Happens can be heard at 6:30pm, local time across Canada.

As mentioned last year at this time, I live within range of radio station CHML 900 in Hamilton, Ontario, which also streams on the net. Almost every night, around 10pm, one can hear a few hours of *Those Old Radio Shows* (unless they get bumped by a baseball or hockey game). There's comedy, drama and suspense by Jack Benny, George Burns, Fibber McGee, Orson Welles, Jack Webb and so many others. "*Only the Shadow knows*" which program might turn up on any given evening. Still, it's a wonderful way to spend a few hours. Theater of the Mind is a beautiful thing.

CHML carries a stunning program called *A Paul Reid Christmas* hosted by broadcasting

legend, the late Paul Reid. Two hours of stories and music. It airs at 2300 UTC on Christmas Eve. Then throughout the evening, one can hear many hours of Christmas episodes of the old radio shows. Also tune in New Years Eve from 9pm-3am.

Can't hear CHML? They stream at **www.900chml.com/** One can also try **www.wmkvfm.org/** a nostalgia broadcaster out of Cincinnati.

CHRISTMAS DAY

BBC World Service – The Queen's Christmas Message

"'And a Merry Christmas to you all!' Those of us who can remember no other monarch than Elizabeth II have come to hear those words as an indelible part of Christmas Day – that 3pm moment when the racket of Top of the Pops was hushed, and the family paid dutiful attention (more or less) to Her Majesty's Christmas address to the Commonwealth.

"It was in 1932 that the Queen's grandfather, George V, made the first Christmas broadcast from Sandringham. Many families now owned a radio set, and they clustered around it eagerly to hear the King speak his seasonal greetings in the stilted tones of the natural amateur. For a while, George VI abandoned the broadcast, feeling it was associated too strongly in people's minds with his father, but the tradition was revived in wartime." **www.icons.org.uk/nom/nominations/the-queen-speech**

"'To men and women so cut off by the snows, the desert, or the sea, that only voices out of the air can reach them: to those cut off from fuller life by blindness, sickness, or infirmity; and to those who are celebrating this day with their children and grand-children. To all - to each - I wish a Happy Christmas. God Bless You!'" (From the first "Royal Christmas Message") **www.royal.gov.uk/output/page385.asp**

Queen Elizabeth II has made a broadcast in every year of her reign. It was live until 1960 when the policy was to record it in advance so it could be shown in many countries at an appropriate time. It then moved to the internet in 1999 as well. To this day it remains the one time of the year that the Queen speaks to all the people of the British Commonwealth. It's one of the longer lived broadcasts on the BBC World Service.

Other nations

Deutsche Welle's German Service has traditionally suspended regular programming on Christmas Eve and Christmas Day to devote that time to holiday oriented programming.

In many ways, Radio Prague can be called your "Christmas Station" of the international bands. Of all the stations on the world band, our friends in the Czech Republic bring you stories of Christmas in Prague, contests, and spirited renditions of carols sung by the staff. I could probably do without the traditional Czech Christmas dinner of fried carp and potatoes, but that's just my bias. Radio Prague seems to embrace the season like no other station.

If anyone could entice me to eat carp, it's the people at Radio Prague.

Other radio stations, especially in countries with a Christian tradition, are also bound to have a variety of interesting programs, highlighting the celebration of Christmas in their particular country. You might hear a Maori choir sing *Silent Night* via Radio New Zealand International, or a report from Germany about the traditional "Dresdener Stollen" cakes, popular at this time of year.

The United States has been largely left out of this survey. Most private shortwave stations in the United States, although nominally Christian, either ignore the event completely, or as in the case of the late Dr Gene Scott or Pastor Jacob Meyer of WMLK, actually rant against the celebration of Christmas.

Mother Angelica's WEWN, in Birmingham, AL, usually carries the Pope's Christmas Eve Mass on the 24th around 2300, then a Mass from the Basilica in Washington, DC, at 0300. Christmas Day Mass from Washington and the Vatican as well as the Pope's Christmas Message can be heard on the 25th. In past years, WEWN has aired a 3-hour performance of *The Messiah*. You can also count on Vatican Radio itself to bring you news of the Christmas events in Vatican City, and the activities of Pope Benedict.

Even countries that aren't Christian will probably make note of the holiday.

Between Christmas and New Years, many stations will run year-end retrospectives, looking back at the events of 2007 and looking forward to 2008. These can often be quite interesting. You may also hear a fascinating documentary, such as the one about 80 years of radio in Germany, broadcast last year by DW.

NEW YEARS EVE/DAY

If you are interested in chasing the New Year around the world on the 31st, check out my *Monitoring Times* article from January 2006 on the subject at **www.monitoringtimes.com/Around-in-24-hrs.pdf**

Here are a couple of neat websites for keeping track of time around the world. Check out **http://world.honda.com/link/** and **www.timeanddate.com**

If you love radio as much as I do, I have a relatively obscure program that I consider a "must hear." For the second year in a row, The SOWNY Show will do a marathon "net cast" on New Year's Eve. The audio should be available at **www.sowny.ca** or at **www.donandrews.ca** . SOWNY stands for the Southern Ontario Western NY Radio Board. They plan to do 5 hours of programming, talking to longtime broadcasters, radio personalities and listeners in Canada and the United States. It's worth it just for the "inside" stories. Check these websites close to December 31 for exact times (in 2006 it was at 0300 UTC, Jan 1).

Another annual tradition is the New Year's Day Concert from Vienna, traditionally heard via Radio Austria International, BBC Radio 3 and PBS in the US. Try around 1015 UTC. In past years, it has been televised on PBS in the afternoon.

Russ Horton's *Mr. Aircheck Radio* is the place to go for air checks from days gone by. On New Year's Eve 2006 he played New Year countdowns from WOR in 1970 and CKLW in 1973. **www.live365.com/stations/doggone01** (Russ informs me that there will be lots of Christmas air checks as well).

And don't forget that Orthodox Christmas takes place in January (the 6th). Some of these stations will celebrate Christmas with "us" in December, then do it all again in January. The Orthodox hymns from Russia, Kiev, Bulgaria, Serbia and others are breathtakingly beautiful.

Finally, may I recommend a number of resources, which you may or may not have considered, and not just for seasonal programming information?

Firstly, consult Glenn Hauser's *DX Listening Digest* online, or his *World of Radio* program. Glenn often has news of upcoming holiday programs. Subscribe to CBC "*Hotsheets*" at the Canadian Broadcasting Corporation website for email updates of upcoming CBC shows. BBC, ABC and Deutsche Welle are international broadcasters who also offer this e-mail service.

And finally in my own humble way, I'll try to post as much advance information as I can on my website at **www.doghousecharlie.com/christmas-programming/**

Have a great holiday season, and let us know what you hear. See you in 2008!

THE QSL REPORT

VERIFICATIONS RECEIVED BY OUR READERS

Gayle Van Horn, W4GVH
gaylevanhorn@monitoringtimes.com

Holiday Listening

With December here, chances are you will soon be in the midst of the holiday crunch of endless errands and holiday festivities. Don't forget to make some receiver time for band scanning and special holiday radio programs.

There are endless hours of specials from across the globe leading up to Christmas. In Central and South America, the *Posadas* religious commemorations begin on December 14. During the ensuing evenings many Spanish stations air extended programming – some may broadcast all night, while a few networks have been known to activate relays for the holiday season.

On Christmas Eve, the BBC World Service revives an annual tradition of broadcasting live from the Chapel of King's College, Cambridge. On Christmas Day, special programming continues from Radio Canada International and BBC World Service airs the Queen's Christmas Message.

Others to tune in include Germany's Deutsche Welle, Radio Netherlands, Vatican Radio, Radio Sweden, HCJB and many others. Israeli stations have different programs for Jewish holidays, and Hanukkah begins the *Festival of Lights* on December 5.

December programming is an excellent time to correspond (and verify) your favorite holiday specials. Refer to *Programming Spotlight* and the *SW Guide* to complement your listening. Take some time to enjoy the sounds of this special time of the year.

ALBANIA

Radio Tirana 7425 kHz. Full data QSL signed by Drita Cico-Head of Monitoring Center, plus Albanian postcards. Received in 37 days for an email report and audio clips to dcico@abcom. Station address: External Service, Rruga Ismail, Qemali Nr 11, Tirana, Albania. Website: **www.rtsh.com.al.** (Nicholas Eranmo, Buenos Aires, Argentina).

AMATEUR RADIO

Asiatic Russia UA9MA, 10 meters SSB. Full data two-color QSL card. Received in five months via ARRL bureau. Website: **www.arrl.org** (L. Van Horn, NC)

Colombia HK3JJH, 12 meters SSB. Full data black/white card. Received in 462 via ARRL bureau. (Van Horn).

Poland SN7Q, 15/40 meters SSB. Full data two color card. Received in 462 days via ARRL bureau. (Van Horn)

AUSTRIA

AWR/Adventist World Radio via Moosbrunn 6045 kHz. Full data AWR map card signed by Adrian Peterson, plus brochure and schedule. Received in 50 days. Station address: (for listeners in the Americas, Africa and Europe) P.O. Box 29235, Indianapolis, IN 46229 USA. Website: **www.awr.org.** (J.M. Perry, IN)

CLANDESTINE

Radio Furusato no Kaze (*Winds of Hometown*) via Taiwan 9780 kHz. Thank you response letter signed by Toshiyuki Mizutano, and notice they do not have QSL cards. My prepared QSL card returned with booklets on abductees, plus Canadian postal money remittance. Letter received in 54 days for report and mp3 CD recording. (Ed Kusalik, Alberta, Canada) Correspondence address via *World QSL Book;* Headquarters for the Abduction Issue, 1-6-1 Nagata-cho, chiyoda-ku, Tokyo 100-8968, Japan.

GUAM

American Forces Radio/AFRTS via Barrigada 5765 USB. Full data AFRTS logo card signed by Robert Winkler. Received in nine days for an English report, souvenir postcard and applause card. QSL address: Department of Defense, NMC DET AFRTS-DMC, 23755 Z Street, Bldg. 2730, Riverside, CA 92518-2017. Website: **http://myafn.dodmedia.osd.mil/** (Joe Wood, Greenback, TN).

KAZAKHSTAN

Family Radio Worldwide/WYFR via Alma Ata (Almaty) 7535 kHz. Full data (with site) *Faithful Service* card plus religious material. Received in eight months after email followup to *info@familyradio.com* . Address: (non technical) Family Stations Inc., 290 Hegenberger, Road, Oakland, CA 94621-1436 USA. Website: **www.famiyradio.com** (Kusalik)

MEDIUM WAVE

KKEE 1230 kHz AM Astoria, Oregon. Friendly electronic verification from Tom Freel at *tom.freel@nnbproduction.com*. Verified years ago as KVAS. AM QSL # 2961. Website: **www.kkee1230.com/** (Patrick Martin, Seaside, OR)

KTRO 910 kHz AM. *Talk Radio Oregon*. Prepared QSL card returned and signed by Justin Mansfield-Program Director. Station address: 6400 Lake Drive, Portland, OR 97222 USA. Website: **www.am910ktro.com/** (Martin).

KUTR 820 kHz AM Taylorsville, Utah. QSL card signed by John Dehnel-Chief Engineer. Received in ten days for followup of 2005 report. Station address: 55 North, 300 West, Salt Lake City, UT 84180. Website: **www.utaham820.com/** (Martin)

MONGOLIA

Radio Free Asia via Ulaanbaatar 7460 kHz. Full data QSL card unsigned. Received in 35 days for an English email report to *qsl@rfa.org.* Station address: 2025 M Street NW, Suite 300, Washington, DC 20036 USA. Website: **www.rfa.org** (Henry Tidenberg, Salida, CO)

SRI LANKA

IBB/Deewa Radio via Iranawila 11510 kHz. Full data IBB/Deewa Radio via Sri Lanka on transmitter/sunset card signed by George O Miller-Station Manager. Received in 11 months and 37 days after no response from Washington, D.C. address. Station address: IBB/Sri Lanka Transmitting Station, c/o U.S. Embassy, 210 Galle Road, Colombo 2, Sri Lanka. (Kusalik)

STANDARD TIME & FREQUENCY STATION

CHU 7335 kHz. No data QSL card and newsletter. Received in 37 days for an email report to *chu@nrc.gc.ca.* Correspondence address and web information via *World QSL Book;* Institute for National Measurement Standards (INMS), National Research Council of Canada, 1200 Montreal Road, Bld. M-36, Ottawa, Ontario K1A 0RA Canada. Website: **www.eecis.udel.edu/~mills/ntp/chu.html** (Eramo).

RWM 4995 kHz. Full data color card with illegible signature. Received in 214 days for an English report and US$3.00. Station address: Russian State Time and Frequency Service, Institute of Metrology for Time and Space (IMVP), FGUP, VNIIFTRI, Moscow Region, Mendeleevo 141570 Russia. (Richard W. Parker KB2DMD, Gerryville, PA)

TAJIKISTAN

Radio Free Asia via Dushanbe 7540 kHz. Full data QSL card unsigned. Received in 42 days for an English email report to *qsl@rfa.org* Station address: (see Mongolia). (Tidenberg).

UNITED ARAB EMIRATES

Deutsche Welle Dhabayya relay 9715, 15420 kHz. Full data *Ukrainisches Programm* map card and *Schwerin Church* card. Received both in two weeks. Station address: Customer Service, Deutsche Welle, D-53110, Bonn, Germany. Website: **www.dw-world.de** Deutsche Welle transmitters verified # 35. (Wendel Craighead, Prairie Village, KS).

USA

Radio Hoa Mai via KWHR via Naalehu, Hawaii 12130 kHz. Full data personal letter (except for frequency) but included transmitter site. Programming details I listed in report were included in reply in Vietnamese. Received in one month from Nguyen Congbang-Executive Director. There was an additional letter from Mr. Nguyen and my dollar was returned. QSL address: Radio Hoa Mai, P.O. Box 842064, Houston, TX 77284 USA. (Craighead).

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:

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

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

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

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

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

Target Areas

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

MT Monitoring Team

Gayle Van Horn
Frequency Manager
gaylevanhorn@monitoringtimes.com

Larry Van Horn, MT Asst. Editor
larryvanhorn@monitoringtimes.com

Thank You …

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo/NASWA Flash Sheet; Rachel Baughn/MT; Wolfgang Büeschel, Germany;Drita Cico/Radio Tirana; Alokesh Gupta, New Delhi, India; Erick Krie, Copenhangen, Denmark; Anker Petersen/DSWCI-DX Window; Sakthivel, Chennai, India; Daniel Sampson, WI; Harold Sellers/ODXA/DX Ontario; Tom Taylor, UK; Andreas Volk, Germany; Jeff White/WRMI; BCL News; Cumbre DX; BDX Club; DX Mix News, Bulgaria; Hard Core DX; NASWA Journal/NASWA Flashsheet; World Wide DX Club-Top News.

Shortwave Broadcast Bands

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

Notes

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

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

Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007

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

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

0000	0020		Japan, NHK World/Radio Japan			5960eu
			6145na	13650as	17810as	
0000	0030		Australia, HCJB Global		15525va	
0000	0030		Australia, Radio Australia		9660as	12080as
			13690as	15240pa	17715as	17750va
			17775va	17795va		
0000	0030		Burma, Dem Voice of Burma		5955eu	
0000	0030		Egypt, Radio Cairo		9460na	
0000	0030		Thailand, Radio 9680af			
0000	0030		UK, BBC World Service		3915as	5970as
			17615as			
0000	0030		USA, Voice of America		7555as	
0000	0045		India, All India Radio		9690as	9705as
			11620as	11645as	13605as	
0000	0045		USA, WYFR/Family Radio FL		17805am	
0000	0056		Romania, Radio Romania Intl		9775na	11790na
0000	0057		Canada, Radio Canada Intl		11700as	
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		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		6020na	6075as
			7180as	9570as	9725as	11885as
			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	DRM	New Zealand, Radio NZ Intl		13730pa	
0000	0100	vl	Papua New Guinea, Wantok R. Light			7325va
0000	0100		Russia, Voice of 7250na		9665na	12755na
0000	0100		Singapore, MediaCorp Radio		6150do	
0000	0100		Spain, Radio Exterior Espana		6055na	
0000	0100		UK, BBC World Service		6195as	9580as
			9740as	11955as	15335as	15360as
0000	0100	f	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	twhfas	USA, WBCQ Monticello ME		9330am	
0000	0100		USA, WBOH Newport NC		5920am	
0000	0100		USA, WEWN Vandiver AL		5810na	
0000	0100		USA, WHRA Greenbush ME		7520na	
0000	0100		USA, WHRI Cypress Creek SC			7315am
			7520am			
0000	0100	mtwhfa	USA, WHRI Cypress Creek SC			9515am
0000	0100	Sun	USA, WHRI Cypress Creek SC			7490am
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		5070na	7465na
			13845na			
0000	0100	mtwhfa	USA, WWRB Manchester TN		5745am	
0000	0100		USA, WWRB Manchester TN		3185va	5050va
			6890na			
0000	0100		USA, WYFR/Family Radio FL		6065am	9595am
			11835am			
0005	0100		Canada, Radio Canada Intl		6100na	
0030	0045	Sun	Germany, Pan American BC		6165as	
0030	0100		Australia, Radio Australia		9660as	12080as
			13690as	15240pa	15415as	17715as
			17750va	17775va	17795va	
0030	0100		Lithuania, Radio Vilnius		11690na	
0030	0100		Thailand, Radio 5890na		12095na	
0030	0100	fas	UK, Bible Voice BC		9620as	
0030	0100		USA, Voice of America		9715va	9780va
			11725va	15185va	15205va	15290va
			15560va	17820va		
0030	0100	Fri-Sun	USA, WYFR/Family Radio FL		9620as	
0035	0058	Sun/Mon	Austria, Radio Austria Intl		9870am	
0043	0058	twhfa	Austria, Radio Austria Intl		9870am	

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

0100	0104		Canada, Radio Canada Intl		6100na	
0100	0115	vl	Pakistan, Radio 7445eu		9350al	
0100	0127		Czech Rep, Radio Prague		6200na	7345na
0100	0130		Australia, Radio Australia		9660as	12080as
			13690as	15240pa	15415as	17715as
			17775va	17795va		
0100	0130		Slovakia, Radio Slovakia Int		7230na	9440sa
0100	0157		Netherlands, Radio		6165na	
0100	0200		Anguilla, University Network		6090am	
0100	0200		Australia, ABC NT Katherine		5025do	
0100	0200		Australia, ABC NT Tennant Creek			4910do
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		6020na	9470eu
			9535as	9570na	9580na	9725eu
			9790na	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		9525as	11785pa
			15150al			
0100	0200		Malaysia, RTM/Trax FM		7295as	
0100	0200		New Zealand, Radio NZ Intl		15720pa	
0100	0200	DRM	New Zealand, Radio NZ Intl		13730pa	
0100	0200		North Korea, Voice of Korea		7140as	9345as
			9730as	11735ca	13760ca	15180ca
0100	0200	vl	Papua New Guinea, Wantok R. Light			7325va
0100	0200		Russia, Voice of 7250na		9665na	12775na
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	9410as
			9580as	11750as	11955as	15310as
			15335as	15360as		
0100	0200	f	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		17655as	
0100	0200		USA, Voice of America		7430va	9780va
			11705va			
0100	0200	Sun	USA, WBCQ Monticello ME		9330am	
0100	0200		USA, WBCQ Monticello ME		5110am	7415na
			9330na			
0100	0200		USA, WBOH Newport NC		5920am	
0100	0200		USA, WEWN Vandiver AL		5810na	
0100	0200		USA, WHRA Greenbush ME		5890na	
0100	0200		USA, WHRI Cypress Creek SC			5850am
			7315am	7490am		
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	5070na
			7465na	13845na		
0100	0200	mtwhfa	USA, WWRB Manchester TN		5745am	
0100	0200		USA, WWRB Manchester TN		3185va	5050va
			6890na			
0100	0200		USA, WYFR/Family Radio FL		6065am	9595am
0100	0200		Uzbekistan, CVC International			11790as
0105	0128	Sun/Mon	Austria, Radio Austria Intl		9870am	
0113	0128	twhfa	Austria, Radio Austria Intl		9870am	
0115	0130	Sat	Australia, HCJB Global		15405va	
0130	0145	twhfas	Albania, Radio Tirana		6110na	
0130	0200		Australia, Radio Australia		9660as	12080as
			13690as	15240pa	15415as	17715as
			17795va			
0130	0200		Iran, Voice of the Islamic Rep		7235na	9495na
0130	0200		Sweden, Radio 6010na		11675va	
0130	0200	twhfa	USA, Voice of America		6040am	13740am
0140	0200		Vatican City, Vatican Radio		5915va	7335va
0143	0158	twhfa	Austria, Radio Austria Intl		9870am	

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

0200	0215		Croatia, Croatian Radio		6165na	9925eu
0200	0227		Czech Rep, Radio Prague		6200na	7345na
0200	0230		Iran, Voice of the Islamic Rep		7235na	9495na
0200	0230		South Korea, KBS World Radio			15575sa
0200	0245		USA, WYFR/Family Radio FL		11835na	
0200	0258	DRM	New Zealand, Radio NZ Intl		13730pa	
0200	0300		Anguilla, University Network		6090am	
0200	0300	twhfa	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
			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		North Korea, Voice of Korea	13650as		15100as
0200	0300	vl	Papua New Guinea, Wantok R. Light			7325va
0200	0300		Philippines, Radio Pilipinas	12025va		15285va
			17770va			
0200	0300		Russia, Voice of 9665na	9860na		13635na
			13775na			
0200	0300		Singapore, MediaCorp Radio	6150do		
0200	0300		Sri Lanka, SLBC 6005as	9770as		15745as
0200	0300		Taiwan, Radio Taiwan Intl	5950na		9680na
0200	0300		Thailand, Radio 5890na	15275na		
0200	0300		UK, BBC World Service	6030af		6195as
			11750as	11955as	15310as	15335as
			15360as	17790as		
0200	0300		USA, American Forces Radio	4319usb		5446usb
			5765usb	6350usb	7811usb	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, KTBN Salt Lake City UT	7505na		
0200	0300		USA, KWHR Naalehu HI	17655as		
0200	0300		USA, WBCQ Monticello ME	5110am		7415na
			9330na			
0200	0300	Sun	USA, WBCQ Monticello ME	9330am		
0200	0300		USA, WBOH Newport NC	5920am		
0200	0300		USA, WEWN Vandiver AL	5810na		
0200	0300		USA, WHRA Greenbush ME	5890na		
0200	0300		USA, WHRI Cypress Creek SC			5850am
			7315am			
0200	0300		USA, WINB Red Lion PA	9265am		
0200	0300	Sun/Mon	USA, WRMI Miami FL	9955am		
0200	0300	twhfa	USA, WRMI Miami FL	7385na		
0200	0300		USA, WTJC Newport NC	9370na		
0200	0300		USA, WWCR Nashville TN	3215na		5070na
			5935na			
0200	0300	mtwhfa	USA, WWRB Manchester TN	5745am		
0200	0300		USA, WWRB Manchester TN	3185va		5050va
			6890na			
0200	0300		USA, WYFR/Family Radio FL	5985am		11855am
0200	0300		Uzbekistan, CVC International			11790as
0215	0230		Nepal, Radio 3230as	5005as		6100as
			7165as			
0230	0300		South Korea, KBS World Radio			9560na
0230	0300		Sweden, Radio 6010na			
0245	0300	twhfas	Albania, Radio Tirana	7425na		
0245	0300		India, All India Radio	7420as		
0245	0300		Myanmar, Radio 9730do			
0250	0300		Vatican City, Vatican Radio	6040va		7305va
0255	0300	vl	Rwanda, Radio 6055do			
0259	0300	DRM	New Zealand, Radio NZ Intl	11675pa		

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

0300	0320		Vatican City, Vatican Radio	6040va		7305va
			15560va			
0300	0330		Egypt, Radio Cairo	7270na		
0300	0330		Myanmar, Radio 9730do			
0300	0330		Philippines, Radio Pilipinas	12025va		15285va
			17770va			
0300	0330		USA, KJES Vado NM	7555na		
0300	0330		USA, Voice of America	4930af		6080af
			7340af	9885af	12080af	15580af
0300	0330	Sun	USA, WBCQ Monticello ME	9330am		
0300	0330		Vatican City, Vatican Radio	9660af		
0300	0355		South Africa, Channel Africa	5960af		
0300	0356		Romania, Radio Romania Intl	6150va		9645na
			11895va	15220va		
0300	0359		South Africa, Channel Africa	3345af		
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	15515as
			21725va			
0300	0400		Bulgaria, Radio 7400na	9400na		
0300	0400	twhfas	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	15110as	15120as	15785as
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		Guyana, Voice of 3291do			
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	DRM	New Zealand, Radio NZ Intl	11675pa		
0300	0400		North Korea, Voice of Korea	7140as		9345as
			9730as			
0300	0400		Oman, Radio Oman	15355as		
0300	0400	vl	Papua New Guinea, Wantok R. Light			7325va
0300	0400		Russia, Voice of 5990na	9435na		9515na
			9665na	9860na	12065na	13635na
0300	0400	vl	Rwanda, Radio 6055do			
0300	0400		Singapore, MediaCorp Radio	6150do		
0300	0400		Sri Lanka, SLBC 6005as	9770as		15745as
0300	0400		Taiwan, Radio Taiwan Intl	5950na		15215sa
			15320as			
0300	0400	Sun	UK, BBC World Service	11760as		
0300	0400		UK, BBC World Service	3255af		6005af
			6030af	6190af	6195as	9750af
			12035af	15310as	15360as	15575as
			17760as	21660as		
0300	0400		USA, American Forces Radio	4319usb		5446usb
			5765usb	6350usb	7811usb	10320usb
			12133usb	13362usb		
0300	0400		USA, KAIJ Dallas TX	5755va		
0300	0400		USA, KTBN Salt Lake City UT	7505na		
0300	0400		USA, KWHR Naalehu HI	17655as		
0300	0400		USA, WBCQ Monticello ME	5110am		7415na
0300	0400		USA, WBOH Newport NC	5920am		
0300	0400		USA, WEWN Vandiver AL	5810na		
0300	0400		USA, WHRA Greenbush ME	5890na		
0300	0400	mtwhf	USA, WHRI Cypress Creek SC			5835am
0300	0400		USA, WHRI Cypress Creek SC			5850am
			7490am			
0300	0400	Sat/Sun	USA, WHRI Cypress Creek SC			7315am
0300	0400		USA, WINB Red Lion PA	9265am		
0300	0400	Sun/Mon	USA, WRMI Miami FL	9955am		
0300	0400	twhfa	USA, WRMI Miami FL	7385na		
0300	0400		USA, WTJC Newport NC	9370na		
0300	0400		USA, WWCR Nashville TN	3215na		5070na
			5935na	7465na		
0300	0400		USA, WWRB Manchester TN	3185va		5050va
0300	0400		USA, WYFR/Family Radio FL	6065na		9505na
			11740na	15255na		
0300	0400		Uzbekistan, CVC International			13680as
0330	0335		Bahrain, Radio Bahrain	6010as		
0330	0355		Vietnam, Voice of 6175na			
0330	0400	twhfas	Albania, Radio Tirana	6110na		
0330	0400		UK, BBC World Service	15420af		
0330	0400		USA, Voice of America	4930af		6080af
			9885af	12080af	15580af	
0330	0400	twhfas	USA, WBCQ Monticello ME	9330am		

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

0400	0427		Czech Rep, Radio Prague	5990na		6200na
			7345na			
0400	0430		Australia, Radio Australia	9660as		12080as
			13690as	15240pa	15515as	21725va
0400	0430	mtwhf	France, Radio France Intl	9805af		11995af
0400	0430		Sri Lanka, SLBC 6005as	9770as		15745as
0400	0430	Sat/Sun	USA, WWRB Manchester TN	5745am		
0400	0445		USA, WYFR/Family Radio FL	6065na		9505na
0400	0455		Turkey, Voice of 6020va	7240va		
0400	0458		New Zealand, Radio NZ Intl	15720pa		
0400	0458	DRM	New Zealand, Radio NZ Intl	11675pa		
0400	0500		Anguilla, University Network	6090am		
0400	0500		Armenia, CVC International	15515as		
0400	0500		Australia, ABC NT Alice Springs			2310do
			4835do			
0400	0500		Australia, ABC NT Katherine	5025do		
0400	0500		Australia, ABC NT Tennant Creek			4910do
0400	0500	twhfas	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	9435na	9515na	9860na
			9880na	13635na	13775na	
0400	0500	DRM	Russia, Voice of	9435as		
0400	0500	vl	Rwanda, Radio	6055do		
0400	0500		Singapore, MediaCorp Radio	6150do		
0400	0500	vl	Uganda, Radio	4976do	5026do	
0400	0500	DRM	UK, BBC World Service	7440eu		
0400	0500		UK, BBC World Service	3255af		6005af
			6190af	7120af	7160af	9410eu
			11760as	12035af	12095eu	15310as
			15360as	15460af	15565eu	15575as
			17760as	17790as	21660as	
0400	0500		Ukraine, Radio Ukraine Intl	7530na		
0400	0500		USA, American Forces Radio	4319usb		5446usb
			5765usb	6350usb	7811usb	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	17655as		
0400	0500		USA, Voice of America	4930af		4960af
			6080af	9575af	11835af	12080af
			15580af			
0400	0500		USA, WBCQ Monticello ME	5110am		7415na
0400	0500		USA, WBOH Newport NC	5920am		
0400	0500		USA, WEWN Vandiver AL	5810na		
0400	0500		USA, WHRA Greenbush ME	5890na		
0400	0500	mtwhf	USA, WHRI Cypress Creek SC			5835am
0400	0500	Sat/Sun	USA, WHRI Cypress Creek SC			7315am
0400	0500		USA, WHRI Cypress Creek SC			7490am
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		5070na
			5890na	5935na		
0400	0500		USA, WWRB Manchester TN	3185va		5050va
			6890na			
0400	0500		USA, WYFR/Family Radio FL	6855na		7780va
			9715am			
0400	0500		Uzbekistan, CVC International			13680as
0430	0445		Israel, Kol Israel	7530eu	9345va	17600va
0430	0457		Czech Rep, Radio Prague	9890va		
0430	0500	twhfas	Albania, Radio Tirana	7425na		
0430	0500		Australia, Radio Australia	9660as		12080as
			13690as	15240pa	15415as	15515va
			21725va			
0430	0500		Nigeria, Radio/Kaduna	6090do		
0430	0500		Swaziland, TWR	3200af	4775af	
0430	0500	Sat	USA, WWRB Manchester TN	5745am		
0459	0500	DRM	New Zealand, Radio NZ Intl	9890pa		

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

0500	0507	twhfas	Canada, CBC NQ SW Service	9625na		
0500	0515	Sun	Sri Lanka, SLBC	6005as	9770as	15745as
0500	0530		Australia, Radio Australia	9660as		12080as
			13690as	15240pa	15515as	
0500	0530	mtwhf	France, Radio France Intl	11995af		13680af
0500	0530		Germany, Deutsche Welle	7285af		9755af
			12045af	15410af		
0500	0530		Japan, NHK World/Radio Japan			5975eu
			6110na	9725af	15325as	17810as
0500	0530		Vatican City, Vatican Radio	4005eu		7250eu
			9660af	11625af	13765af	
0500	0555		South Africa, Channel Africa	9685af		
0500	0559		South Africa, Channel Africa	7240af		
0500	0600		Anguilla, University Network	6090am		
0500	0600		Armenia, CVC International	15515as		
0500	0600		Australia, ABC NT Alice Springs			2310do
			4835do			
0500	0600		Australia, ABC NT Katherine	5025do		
0500	0600		Australia, ABC NT Tennant Creek			4910do
0500	0600		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	6020na		6190na
			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	9550va	9600va	11760va
0500	0600		Germany, CVC Intl/Voice Africa			9430af
0500	0600		Guyana, Voice of	3291do		
0500	0600		Kuwait, Radio Kuwait	15110as		
0500	0600		Malaysia, RTM/Trax FM	7295as		
0500	0600		Malaysia, RTM/Voice of Malaysia			6175as
			9750as	15295as		
0500	0600		New Zealand, Radio NZ Intl	9615pa		
0500	0600	DRM	New Zealand, Radio NZ Intl	9890pa		
0500	0600		Nigeria, Radio/Kaduna	4770do		6090al
0500	0600	vl	Papua New Guinea, Wantok R. Light			7325va
0500	0600		Russia, Voice of	17635pa	21790pa	
0500	0600	DRM	Russia, Voice of	12005as		
0500	0600		Singapore, MediaCorp Radio	6150do		
0500	0600		Swaziland, TWR	3200af	4775af	9500af
0500	0600	vl	Uganda, Radio	4976do	5026do	
0500	0600	DRM	UK, BBC World Service	7440eu		
0500	0600		UK, BBC World Service	3255af		6005af
			6190af	6195af	7160af	9410eu
			11695af	11760as	11765af	11955as
			12095eu	15310as	15360as	15420af
			15565eu	17640af	17760as	17790as
			17885af	21660as		
0500	0600		USA, American Forces Radio	4319usb		5446usb
			5765usb	6350usb	7811usb	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	13650as		
0500	0600		USA, Voice of America	4930af		6080af
			6180af	12080af	15580af	
0500	0600		USA, WBCQ Monticello ME	5110am		7415na
0500	0600		USA, WBOH Newport NC	5920am		
0500	0600		USA, WEWN Vandiver AL	5850na		
0500	0600		USA, WHRA Greenbush ME	6145na		
0500	0600	Sat/Sun	USA, WHRI Cypress Creek SC			7315am
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		5070na
			5890na	5935na		
0500	0600		USA, WWRB Manchester TN	3185va		
0500	0600		USA, WYFR/Family Radio FL	6855na		9355va
0500	0600		Uzbekistan, CVC International			13680as
0500	0600		Zambia, CVC International	9430af		
0505	0520	m	Austria, Radio Austria Intl	17870me		
0505	0530	Sat/Sun	Austria, Radio Austria Intl	17870me		
0515	0530	vl	Rwanda, Radio	6055do		
0530	0556		Romania, Radio Romania Intl	9655va		11830va
			15435va	17770va		
0530	0600		Australia, Radio Australia	9660as		12080as
			13690as	15240pa	15415as	15515va
0530	0600	vl	Rwanda, Radio	6055do		
0530	0600		Thailand, Radio	11730eu		
0535	0600	Sat/Sun	Austria, Radio Austria Intl	17870me		
0545	0600	twhf	Austria, Radio Austria Intl	17870me		

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

0600	0603		Croatia, Croatian Radio	6165eu		9470eu
			11610eu			
0600	0615	Sat/Sun	South Africa, TWR	11640af		
0600	0630		Australia, Radio Australia	9660as		12080as
			13690as	15240pa		
0600	0630	Sat/Sun	Australia, Radio Australia	15290va		15415va
			15515va			
0600	0630	mtwhf	France, Radio France Intl	9765af		11725af
0600	0630		Germany, Deutsche Welle	5945af		7240af
			12045af			
0600	0630		Nigeria, Radio, Natl Svc/Abuja			7275do
0600	0630	mtwhf	UK, Sudan Radio Service	15440af		15505af
0600	0645	mtwhf	South Africa, TWR	11640af		
0600	0655		South Africa, Channel Africa	15255af		
0600	0658		New Zealand, Radio NZ Intl	9615pa		
0600	0658	DRM	New Zealand, Radio NZ Intl	9890pa		
0600	0700		Anguilla, University Network	6090am		
0600	0700		Armenia, CVC International	15515as		
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	15335as		
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	11710af		11870as
			11880as	13660as	15140as	15350as
			15465as	17505as	17505as	17540as
			17710as			
0600	0700		Costa Rica, University Network			5030va
			6150va	7375va	9725va	11870va
0600	0700		Cuba, Radio Havana	6000va		6060va
			6180na	9550va	9600va	11760va
0600	0700		Germany, CVC Intl/Voice Africa			15640af
0600	0700		Guyana, Voice of	3291do		
0600	0700		Kuwait, Radio Kuwait	15110as		
0600	0700	vl	Liberia, ELWA	4760do		
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	17635pa		21790pa
0600	0700		Singapore, MediaCorp Radio	6150do		
0600	0700	vl	Solomon Islands, SIBC	5020do		9545al
0600	0700		Swaziland, TWR	3200af	4775af	9500af
0600	0700	Sat/Sun	UK, BBC World Service	17885af		
0600	0700		UK, BBC World Service	3255af		6005af
			6190af	7475eu	7475eu	9410va
			9860as	11695as	11760af	11765as
			11955af	12095as	15310as	15360af
			15400af	17640as	11760as	17790af
			21660af			
0600	0700	DRM	UK, BBC World Service	7440eu		
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	13650as		
0600	0700		USA, Voice of America	6080af		6180af
			12080af	15580af		
0600	0700		USA, WBCQ Monticello ME	5110am		7415na
0600	0700		USA, WBOH Newport NC	5920am		
0600	0700		USA, WEWN Vandiver AL	5850na		7570eu
0600	0700		USA, WHRA Greenbush ME	7490na		
0600	0700		USA, WHRI Cypress Creek SC			7335am
			7365am	7490am		
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	6000am		7780va
			9680na	11530af	11580va	
0600	0700	vl	Vanuatu, Radio	4960do		
0600	0700		Yemen, Rep of Yemen Radio	9780me		
0600	0700		Zambia, CVC International	13650af		
0630	0645	mtwhfa	Vatican City, Vatican Radio	4005va		6185eu
			7250eu	9645eu	11625eu	11740eu
			13765eu	15570af	15595af	
0630	0700		Australia, Radio Australia	9660as		12080as
			13690as	15240pa	15415as	15515as
0630	0700		UK, BBC World Service	11990af		
0630	0700	mtwhf	UK, Sudan Radio Service	11945af		
0630	0700	mwf	UK, Sudan Radio Service	15445af		
0659	0700	DRM	New Zealand, Radio NZ Intl	7145pa		

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

0700	0705		UK, BBC World Service	6005af		
0700	0730		France, Radio France Intl	13675af		
0700	0730		Slovakia, Radio Slovakia Int	13715pa		15460pa
0700	0745		USA, WYFR/Family Radio FL	7780va		
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	15335as		
0700	0800		Australia, Radio Australia	9660as		9710as
			12080as	13630as	15240pa	15415as
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	11880as		13660as
			13710as	15450as	15465eu	17490eu
			17540as	17710as		
0700	0800		Costa Rica, University Network			5030va
			6150va	7375va	9725va	11870va
0700	0800		Germany, CVC Intl/Voice Africa			15640af
0700	0800		Greece, Voice of	12105eu		
0700	0800		Guyana, Voice of	3291do	5950do	
0700	0800		Kuwait, Radio Kuwait	15110as		
0700	0800	vl	Liberia, ELWA	4760do		
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, Radio	9730do		
0700	0800		New Zealand, Radio NZ Intl	6095pa		
0700	0800		New Zealand, Radio NZ Intl	6095pa		
0700	0800	DRM	New Zealand, Radio NZ Intl	7145pa		
0700	0800		Nigeria, Radio/Kaduna	4770do		6090al
0700	0800	vl	Papua New Guinea, Wantok R. Light			7325va
0700	0800		Russia, Voice of	17495pa	17635pa	21790pa
0700	0800		Singapore, MediaCorp Radio	6150do		
0700	0800	vl	Solomon Islands, SIBC	5020do		9545al
0700	0800		Swaziland, TWR	4775af	6120af	9500af
0700	0800		Taiwan, Radio Taiwan Intl	5950na		
0700	0800	DRM	UK, BBC World Service	9470eu		
0700	0800		UK, BBC World Service	6190af		7320eu
			9470eu	9860af	11695as	11760me
			11765af	11955as	12095af	15310as
			15360as	15400af	15575as	17760as
			17830af	21660as		
0700	0800	Sat/Sun	UK, BBC World Service	17885af		
0700	0800	fas	UK, Bible Voice BC	5945eu		
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	13650as		
0700	0800		USA, WBCQ Monticello ME	5110am		7415na
0700	0800		USA, WBOH Newport NC	5920am		
0700	0800		USA, WEWN Vandiver AL	5850na		7570eu
0700	0800		USA, WHRI Cypress Creek SC			7335am
			7365am			
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	5985na		6855na
			9505am	9715am	9930af	
0700	0800	vl	Vanuatu, Radio	4960do		
0700	0800		Zambia, CVC International	13650af		
0730	0800		Australia, HCJB Global	11750pa		
0730	0800		Bulgaria, Radio	7400eu	9400eu	
0730	0800		Pakistan, Radio	15100eu	17835eu	
0745	0800	Sun	Monaco, TWR Europe	9800eu		

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

0800	0815	Sat	UK, Bible Voice BC	5945eu		
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, Radio	9730do		
0800	0830		Pakistan, Radio	15100eu	17835eu	
0800	0845	Sat	Guam, TWR/KTWR	11840pa		
0800	0845	Sun	UK, Bible Voice BC	5945eu		
0800	0845		USA, WYFR/Family Radio FL	9930af		
0800	0850	mtwhf	Monaco, TWR Europe	9800eu		
0800	0900		Anguilla, University Network	6090am		
0800	0900		Australia, ABC NT Alice Springs			2310do
			4835do			
0800	0900		Australia, CVC International	15335as		
0800	0900		Australia, HCJB Global	11750pa		
0800	0900		Australia, Radio Australia	9580va		9590va
			9710as	12080va	13630as	15415as
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
			13710eu	15350as	15465as	17490eu
			17540as			
0800	0900		Costa Rica, University Network			5030va
			6150va	7375va	9725va	11870va
0800	0900		Germany, CVC Intl/Voice Africa			15640af
0800	0900	DRM	Germany, Deutsche Welle	12005as		
0800	0900	mtwhf	Guam, TWR/KTWR	11840pa		

0800	0900		Guyana, Voice of	3291do	5950do	
0800	0900		Indonesia, Voice of	9525as	11785pa	
			15150al			
0800	0900	Sat	Latvia, Radio SWH	9290eu		
0800	0900	vl	Liberia, ELWA	4760do		
0800	0900		Malaysia, RTM/Trax FM	7295as		
0800	0900		New Zealand, Radio NZ Intl	6095pa		
0800	0900	DRM	New Zealand, Radio NZ Intl	7145pa		
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	17495pa	17635pa	21790pa
0800	0900	DRM	Russia, Voice of	12070as	15780eu	
0800	0900		Singapore, MediaCorp Radio	6150do		
0800	0900	vl	Solomon Islands, SIBC	5020do	9545al	
0800	0900		South Africa, Channel Africa	9620af		
0800	0900	Sun	South Africa, DX Amateur League		17590af	
0800	0900		South Korea, KBS World Radio		9570as	
0800	0900		Swaziland, TWR	4775af	6120af	9500af
0800	0900	DRM	UK, BBC World Service	9480eu		
0800	0900		UK, BBC World Service	6190af	7320eu	
			9470eu	9740as	9860af	11760me
			15310as	15360as	15400af	15485af
			17760as	17790as	17830af	17885af
			21470af	21660as		
0800	0900	Sat/Sun	UK, BBC World Service	6195as	15575as	
0800	0900		Ukraine, Radio Ukraine Intl	7440eu		
0800	0900		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7811usb	10320usb
			12133usb	13362usb		
0800	0900		USA, KAIJ Dallas TX	5755va		
0800	0900		USA, KNLS Anchor Point AK	9615as		
0800	0900		USA, KTBN Salt Lake City UT	7505na		
0800	0900		USA, KWHR Naalehu HI	9930as		
0800	0900		USA, WBOH Newport NC	5920am		
0800	0900		USA, WEWN Vandiver AL	5850na	7570eu	
0800	0900		USA, WHRI Cypress Creek SC		7315am	
			7335am			
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	
			5890na	5935na		
0800	0900		USA, WWRB Manchester TN	3185va		
0800	0900		USA, WYFR/Family Radio FL	5985na	6855na	
0800	0900	vl	Vanuatu, Radio	4960do		
0800	0900		Zambia, CVC International	13650af		
0805	0900	mtwhf	Guam, TWR/KTWR	15170as		
0815	0845	Sat	UK, Bible Voice BC	9655eu		
0815	0850	Sat	Monaco, TWR Europe	9800eu		
0830	0900		Australia, ABC NT Katherine	2485do		
0830	0900		Australia, ABC NT Tennant Creek		2325do	
0830	0900		Lithuania, Radio Vilnius	9710eu		

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

0900	0900		USA, WBCQ Monticello ME	5110am	7415na	
0900	0920	mtwhfs	Monaco, TWR Europe	9800eu		
0900	0930		Australia, HCJB Global	11750pa		
0900	0930		Japan, NHK World/Radio Japan		9825as	
			11890pa	15590as		
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	11955as		
0900	1000		Australia, Radio Australia	9580va	9590va	
			11880as	15415as		
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	
			15350as	17490eu	17690pa	17750as
0900	1000		Costa Rica, University Network		5030va	
			6150va	7375va	9725va	11870va
			13750va			
0900	1000		Germany, Deutsche Welle	17710as	21840as	
0900	1000		Guyana, Voice of	3291do	5950do	
0900	1000	vl	Liberia, ELWA	4760do		
0900	1000		Malaysia, RTM/Trax FM	7295as		
0900	1000		New Zealand, Radio NZ Intl	6095pa		
0900	1000	DRM	New Zealand, Radio NZ Intl	7145pa		
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		Saudi Arabia, BSKSA	15250af		
0900	1000		Singapore, MediaCorp Radio	6150do		
0900	1000	vl	Solomon Islands, SIBC	5020do	9545al	
0900	1000		South Africa, Channel Africa	9620af		
0900	1000	DRM	UK, BBC World Service	9480eu		
0900	1000	smtwhf	UK, BBC World Service	9605as		
0900	1000		UK, BBC World Service	6190af	6195as	
			7320eu	9470eu	9740eu	9860af
			11760me	15310as	15360as	15400af
			15575as	17760as	17830af	17885af
			21470af			
0900	1000		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7811usb	10320usb
			12133usb	13362usb		
0900	1000		USA, KAIJ Dallas TX	5755va		
0900	1000		USA, KTBN Salt Lake City UT	7505na		
0900	1000		USA, KWHR Naalehu HI	9930as		
0900	1000		USA, WBCQ Monticello ME	5110am	7415na	
0900	1000		USA, WBOH Newport NC	5920am		
0900	1000		USA, WEWN Vandiver AL	5850na		
0900	1000		USA, WHRI Cypress Creek SC		7315am	
			7335am			
0900	1000		USA, WRMI Miami FL	9955am		
0900	1000		USA, WTJC Newport NC	9370na		
0900	1000		USA, WWCR Nashville TN	5070na	5890na	
			5935na	9985na		
0900	1000		USA, WWRB Manchester TN	3185va		
0900	1000		USA, WYFR/Family Radio FL	5985na	6885na	
			9450va	9755am		
0900	1000	vl	Vanuatu, Radio	4960do		
0900	1000		Zambia, CVC International	13650af		
0930	1000	Sun	Italy, IRRS	9510eu		

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

1000	1003	mtwhf	Croatia, Croatian Radio	9830pa		
1000	1027		Czech Rep, Radio Prague	9955na	15710as	
			21745af			
1000	1030		Mongolia, Voice of	12085va		
1000	1030		UK, BBC World Service	9605as	21660as	
1000	1057		Netherlands, Radio	6040as	9795as	
			12065as			
1000	1058		New Zealand, Radio NZ Intl	6095pa		
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	11955as		
1000	1100	DRM	Australia, CVC International	9760eu		
1000	1100		Australia, HCJB Global	15540va		
1000	1100		Australia, Radio Australia	9580va	9590va	
			11880as	12080va	15415as	
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	6040as	11610as	
			11635as	13590as	13620as	13720as
			15190as	15210as	15350eu	17490as
			17690as			
1000	1100		Costa Rica, University Network		5030va	
			6150va	7375va	9725va	11870va
			13750va			
1000	1100		Guyana, Voice of	3291do	5950do	
1000	1100		India, All India Radio	7270as	13695va	
			15020as	15260as	15410as	17510pa
			17800as	17895pa		
1000	1100	Sun	Italy, IRRS	9510eu		
1000	1100	vl	Liberia, ELWA	4760do		
1000	1100		Malaysia, RTM/Trax FM	7295as		
1000	1100	DRM	New Zealand, Radio NZ Intl	7145pa		
1000	1100		Nigeria, Radio/Kaduna	4770do	6090al	
1000	1100		Nigeria, Voice of/ Ext. Svc Lagos		9690af	
1000	1100		North Korea, Voice of Korea	11710am	11735as	
			13650as			
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	vl	Solomon Islands, SIBC	5020do	9545al	
1000	1100		South Africa, Channel Africa	9620af		
1000	1100		UK, BBC World Service	6190af	6195as	
			7320eu	9470eu	9740as	9860af
			11760me	15310as	15575as	17760as
			17790as	17885af	21470af	
1000	1100	Sat/Sun	UK, BBC World Service	15400af		
1000	1100		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7811usb	10320usb

			12133usb	13362usb		
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		
1000	1100		USA, WBCQ Monticello ME	5110am	7415na	
1000	1100		USA, WBOH Newport NC	5920am		
1000	1100		USA, WEWN Vandiver AL	5850na		
1000	1100		USA, WHRI Cypress Creek SC			7315am
			7335am			
1000	1100		USA, WRMI Miami FL	9955am		
1000	1100		USA, WTJC Newport NC	9370na		
1000	1100		USA, WWCR Nashville TN	5070na	5890na	
			9985na	15825na		
1000	1100		USA, WWRB Manchester TN	3185va		
1000	1100		USA, WYFR/Family Radio FL	5950na	5985na	
			6855na	7855am	9450va	9755am
1000	1100		Zambia, CVC International	13590af		
1015	1045	Sun	UK, Bible Voice BC	5910as		
1030	1045		Israel, Kol Israel	13855eu	15760eu	
1030	1058		Vietnam, Voice of 7285as			
1030	1100		Iran, Voice of the Islamic Rep	15600as	17660as	
1030	1100		UK, BBC World Service	9605as	11945as	
			15285as	15360as	21660as	
1059	1100		New Zealand, Radio NZ Intl	9870pa		

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

1100	1105		Pakistan, Radio	15100eu	17835eu	
1100	1115	Sun	UK, Bible Voice BC	5945as		
1100	1128		Vietnam, Voice of 9840as	7220as	7285as	
1100	1130		Australia, HCJB Global	15540va		
1100	1130		Iran, Voice of the Islamic Rep	15600as	17600as	
1100	1145		USA, WYFR/Family Radio FL	9550am	9755am	
1100	1158	DRM	New Zealand, Radio NZ Intl	7145pa		
1100	1200		Anguilla, University Network	11775am		
1100	1200		Australia, ABC NT Alice Springs			2310do
			4835do			
1100	1200		Australia, ABC NT Katherine	2485do		
1100	1200		Australia, ABC NT Tennant Creek			2325do
1100	1200		Australia, CVC International	13635as		
1100	1200	DRM	Australia, Radio Australia	12080va		
1100	1200		Australia, Radio Australia	5995va	6020va	
			9475as	9560pa	9580va	9590va
			11880va			
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	5955as	6040na	
			11650as	11750na	11795as	13590as
			13645as	13650eu	13720as	17490eu
1100	1200		Costa Rica, University Network			5030va
			6150va	7375va	9725va	11870va
			13750va			
1100	1200	Sun	Italy, IRRS	9510eu		
1100	1200	vl	Liberia, ELWA	4760do		
1100	1200		Malaysia, RTM/Trax FM	7295as		
1100	1200		New Zealand, Radio NZ Intl	9870pa		
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			6080as
			6150as			
1100	1200		South Africa, Channel Africa	9620af		
1100	1200		Taiwan, Radio Taiwan Intl	7445as		
1100	1200	Sat/Sun	UK, BBC World Service	9660am	15400af	
			15575as			
1100	1200		UK, BBC World Service	6190af	6195as	
			7320eu	9465sa	9470eu	9660am
			9740as	9860va	11675va	11760me
			15310as	17760as	17790as	17885af
			21470af			
1100	1200	mtwhf	UK, BBC World Service	15575as	17830af	
1100	1200	Sat	UK, Bible Voice BC	5945as		
1100	1200		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7811usb	10320usb
			12133usb	13362usb		
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, WEWN Vandiver AL	5850na		
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, WWCR Nashville TN	5070na	5890na	
			9985na	15825na		
1100	1200		USA, WWRB Manchester TN	3185va		
1100	1200		USA, WYFR/Family Radio FL	5985na	7780am	
			9625am			
1100	1200	DRM	Vatican City, Vatican Radio	11630na		
1100	1200		Zambia, CVC International	13590af		
1115	1130	twhf	UK, Bible Voice BC	5945as		
1115	1200	m	UK, Bible Voice BC	5945as		
1120	1157		Czech Rep, Radio Prague	11640eu		
			175451euva			
1130	1145		UK, BBC World Service	7135as	11920as	
1130	1200		Australia, HCJB Global	15400va		
1130	1200	mtwhfa	Australia, HCJB Global	15425va		
1130	1200		Guam, AWR/KSDA	15260as		
1130	1200	mtwhf	UK, BBC World Service	9660am		
1130	1200		Vatican City, Vatican Radio	15595va	17765va	

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

1200	1215	vl	UK, Bible Voice BC	5945as		
1200	1230	Sun	Australia, HCJB Global	15425va		
1200	1230		France, Radio France Intl	21620af		
1200	1230		Germany, AWR Europe	15495as		
1200	1230		Japan, NHK World/Radio Japan			6120na
			9625pa	13660as	17600eu	
1200	1230	DRM	UK, Bible Voice BC	5945eu		
1200	1245		USA, WYFR/Family Radio FL	5950na	5985na	
1200	1256		Romania, Radio Romania Intl	11875eu	15220eu	
1200	1258		New Zealand, Radio NZ Intl	9870pa		
1200	1259		Canada, Radio Canada Intl	9660as	15170as	
1200	1300		Anguilla, University Network	11775am		
1200	1300		Australia, ABC NT Alice Springs			2310do
			4835do			
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	5995va	6020va	
			9475as	9560pa	9580va	9590va
			11880va			
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	5955as	9460as	
			9730as	9760pa	11650as	11660as
			11690as	11760pa	11980as	13645as
			13650eu	13790eu	17490eu	
1200	1300		Costa Rica, University Network			9725va
			11870va	13750va		
1200	1300		Malaysia, RTM/Trax FM	7295as		
1200	1300	DRM	New Zealand, Radio NZ Intl	7145pa		
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		Singapore, Radio Singapore Intl			6080as
			6150as			
1200	1300		South Korea, KBS World Radio			9650na
1200	1300	Fri/DRM	Taiwan, Radio Taiwan Intl	9750eu		
1200	1300		UAE, AWR Africa	15140as		
1200	1300		UK, BBC World Service	6190af	6195as	
			7320eu	9465sa	9470eu	9660am
			9740as	9860af	11675va	11750as
			11760me	15310as	15575as	17790af
			17885af	21470af		
1200	1300	mtwhf	UK, BBC World Service	17830af		
1200	1300		Ukraine, Radio Ukraine Intl	9950eu		
1200	1300		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	6140va	9645va	
			9760va	11860as	12075va	
1200	1300		USA, WBOH Newport NC	5920am		
1200	1300		USA, WEWN Vandiver AL	5850na		
1200	1300		USA, WHRA Greenbush ME	17650na		
1200	1300		USA, WHRI Cypress Creek SC			9495am
			17650am			
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	5890na	9985na	
			13845na	15825na		
1200	1300		USA, WWRB Manchester TN	3185va		
1200	1300		USA, WYFR/Family Radio FL	17555am	17750am	
1200	1300		Zambia, CVC International	13590af		

1205	1220	m	Austria, Radio Austria Intl 17715va	6155va	13730va	
1205	1230	Sat/Sun	Austria, Radio Austria Intl 17715va	6155va	13730va	
1215	1230	twhf	Austria, Radio Austria Intl	17715va		
1215	1300		Egypt, Radio Cairo	17835as		
1230	1258		Vietnam, Voice of 9840as	12020as		
1230	1300		Bangladesh, Bangla Betar	7185as		
1230	1300		Bulgaria, Radio 11700eu	15700eu		
1230	1300		Sweden, Radio 13580va	15240na	15735va	
1230	1300		Thailand, Radio 9810va			
1235	1300	Sat/Sun	Austria, Radio Austria Intl 17715va	6155va	13730va	
1245	1300	Sat	Australia, HCJB Global	15425va		
1245	1300	twhf	Austria, Radio Austria Intl 17715va	6155va	13730va	
1245	1300	m	Austria, Radio Austria Intl	17715va		

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

1300	1328		Serbia, International Radio Serbia		7240eu	
1300	1330		Egypt, Radio Cairo	17835as		
1300	1330		Germany, Universal Life	15750as		
1300	1330	Sun	Italy, IRRS 15750as			
1300	1400		Anguilla, University Network	11775am		
1300	1400		Armenia, CVC International	15615as		
1300	1400		Australia, CVC International	13635as		
1300	1400		Australia, Radio Australia 9580va 9590va	6020va	9560as	
1300	1400	DRM	Australia, Radio Australia	5995va		
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 5955as 9650as 9730as 9760pa 9765as 9870as 11660as 11760pa 11980as 13610eu 13755as 13790eu 15260na 17625sa			
1300	1400		Costa Rica, University Network 11870va 13750va		9725va	
1300	1400		Germany, Overcomer Ministries		6110na	
1300	1400	Sun	Latvia, Radio SWH	9290eu		
1300	1400		Malaysia, RTM/Trax FM	7295as		
1300	1400		New Zealand, Radio NZ Intl	6095pa		
1300	1400		Nigeria, Radio/Kaduna	4770do	6090al	
1300	1400		Nigeria, Voice of/ Ext. Svc Lagos		9690af	
1300	1400		North Korea, Voice of Korea 13650as 15180ca	9335na	11710na	
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 6150as		6080as	
1300	1400		South Korea, KBS World Radio 9770as		9570na	
1300	1400		UK, BBC World Service 7320eu 9740as 11760me 15310as 17885af 21470af	6190af 9860af 15420af	6195as 11750as 17790as	
1300	1400	Sat/Sun	UK, BBC World Service	15575as		
1300	1400	mtwhf	UK, BBC World Service	17830af		
1300	1400		USA, American Forces Radio 5765usb 6350usb 12133usb 13362usb	4319usb 7811usb	5446usb 10320usb	
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	9645va	9760va	
1300	1400	w f	USA, WBCQ Monticello ME	9330am		
1300	1400		USA, WBOH Newport NC	5920am		
1300	1400		USA, WEWN Vandiver AL	5850na		
1300	1400		USA, WHRA Greenbush ME	17650na		
1300	1400	mtwhf	USA, WHRI Cypress Creek SC		9495am	
1300	1400		USA, WHRI Cypress Creek SC		17650am	
1300	1400		USA, WINB Red Lion PA	13570am		
1300	1400		USA, WRMI Miami FL	9955am		
1300	1400		USA, WTJC Newport NC	9370na		
1300	1400		USA, WWCR Nashville TN 13845na 15825na	5890na	9985na	
1300	1400		USA, WWRB Manchester TN	9385na		
1300	1400		USA, WYFR/Family Radio FL 11895na 17750na	11830na 11910na	11865na 13810as 15670na	
1300	1400		Zambia, CVC International	13590af		
1310	1340		Japan, NHK World/Radio Japan		11985as	
1330	1357	Fri-Sat/DRM	Czech Rep, Radio Prague	9750eu		
1330	1400	DRM	Canada, Radio Canada Intl	7240eu		
1330	1400	mtwhfa	Guam, AWR/KSDA	15660as		
1330	1400		India, All India Radio 13710as	9690as	11620as	
1330	1400		Laos, National Radio	7145as		
1330	1400		Sweden, Radio 15240na	15735va		
1330	1400		Turkey, Voice of 11735va	12035eu		
1330	1400		UK, BBC World Service	7465eu		
1345	1400		Guam, TWR/KTWR	9975as		

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

1400	1415	t h	Germany, Pan American BC	13645me		
1400	1415	twf	Russia, FEBA 9500eu			
1400	1425		Turkey, Voice of 11735va	12035eu		
1400	1429		Czech Rep, Radio Prague	11600as	13580na	
1400	1430		Australia, Radio Australia 9590va 9625va	5995va	6080va	
1400	1430	fa	Guam, TWR/KTWR	9975as		
1400	1430	`	Japan, NHK World/Radio Japan 11705as 11985as		7200as 13630eu 17580af	
1400	1430	DRM	Romania, Radio Romania Intl	9600eu		
1400	1430		Thailand, Radio 9725va			
1400	1430	tha	UK, Sudan Radio Service	15470af		
1400	1457		Netherlands, Radio 15595as	9345as	12080as	
1400	1500		Anguilla, University Network	11775am		
1400	1500		Armenia, CVC International	15615as		
1400	1500		Australia, CVC International	13635as		
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 9765as 11775as 13790eu	5955as 9870eu 13610eu	9560as 11675as 11765as 13710eu 13740na	
1400	1500		Costa Rica, University Network 11870va 13750va		9725va	
1400	1500	Sat	Germany, Overcomer Ministries		17810eu	
1400	1500		Germany, Overcomer Ministries 13810va		6110eu	
1400	1500	mtw	Guam, TWR/KTWR	9975as		
1400	1500		India, All India Radio 13710as	9690as	11620as	
1400	1500	Sun	Italy, IRRS 6125eu			
1400	1500		Jordan, Radio 11690na			
1400	1500		Libya, Voice of Africa	17725af	21625af	
1400	1500		Malaysia, RTM/Trax FM	7295as		
1400	1500		New Zealand, Radio NZ Intl	6095pa		
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		Russia, Voice of 11755as	6045as 15695as	7165as 15660as	9745as
1400	1500	DRM	Russia, Voice of 9450eu			
1400	1500		Singapore, MediaCorp Radio	6150do		
1400	1500		South Africa, Channel Africa	9620af		
1400	1500	Sat	UK, BBC World Service	12095af		
1400	1500	mtwhf	UK, BBC World Service	17830af		
1400	1500		UK, BBC World Service 6195as 11750as 21470af	3255af 7320eu 11920as 21660af	6190af 9740as 15310as	9860af 15575as
1400	1500	Sat/Sun	UK, Bible Voice BC	15680as		
1400	1500		USA, American Forces Radio 5765usb 6350usb 12133usb 13362usb	4319usb 7811usb	5446usb 10320usb	
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 7125va 15530va	4930af 9760va 17740va	6080af 13570af 17895va	15185va
1400	1500		USA, WBCQ Monticello ME	9330am		
1400	1500		USA, WBOH Newport NC	5920am		
1400	1500		USA, WEWN Vandiver AL	9955na		
1400	1500		USA, WHRA Greenbush ME	17650na		
1400	1500		USA, WHRI Cypress Creek SC 11785am	17650am		9840am
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 13845na 15825na	9985na	12160na	

1400	1500		USA, WWRB Manchester TN	9385na		
1400	1500	Sat/Sun	USA, WYFR/Family Radio FL	15680as		
1400	1500		USA, WYFR/Family Radio FL	7320va	9865eu	
			11830na	11910na	12150am	13695am
			13810as	17750am		
1400	1500		Zambia, CVC International	13590af		
1415	1430		Nepal, Radio	3230as	5005as	6100as
			7165as			
1415	1445	m	UAE, FEBA	12025eu		
1430	1445	Sun	Germany, Pan American BC	13645as	13820as	
1430	1445	twf	UAE, FEBA	12025eu		
1430	1500		Australia, Radio Australia	5995va	6080va	
			9475as	9590va	9625va	11660pa
1430	1500		Ethiopia, Radio	5990af	7110af	9704af
1430	1500		Myanmar, Radio	5986as		
1430	1500	DRM	South Korea, KBS World Radio			9770eu

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	vl	Eritrea, Bana Radio	5100do		
1500	1530		Guam, AWR/KSDA	12105as		
1500	1530		Nigeria, Radio, Natl Svc/Abuja			7275do
1500	1530		UK, BBC World Service	9695af	11860af	
			15420af			
1500	1530	ta	UK, Bible Voice BC	13840as		
1500	1545		Sweden, IBRA Radio	7340as		
1500	1545		USA, WYFR/Family Radio FL	15770am		
1500	1550		New Zealand, Radio NZ Intl	6095pa		
1500	1555		South Africa, Channel Africa	17770af		
1500	1557		Canada, Radio Canada Intl	11675as	17720as	
1500	1557		Netherlands, Radio	9345af	12080as	
			15595as			
1500	1559		Germany, Overcomer Ministries			17815na
1500	1559		South Africa, Channel Africa	9620af		
1500	1600		Anguilla, University Network	11775am		
1500	1600		Armenia, CVC International	15615as		
1500	1600		Australia, CVC International	13635as		
1500	1600		Australia, Radio Australia	5995va	6080va	
			9475as	9590va	9625va	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	6100as	
			7160as	7325eu	9785as	9870as
			11775as	11965eu	13640eu	13685af
			13740na	17630af		
1500	1600		Costa Rica, University Network			9725va
			11870va	13750va		
1500	1600		Germany, CVC Intl/Voice Africa			15715af
1500	1600		Jordan, Radio	11690na		
1500	1600		Libya, Voice of Africa	17725af	21625af	
1500	1600		Malaysia, RTM/Trax FM	7295as		
1500	1600		Nigeria, Radio/Kaduna	4770do	6090al	
1500	1600		Nigeria, Voice of/ Ext. Svc Lagos			9690af
1500	1600		North Korea, Voice of Korea	9335na	11710na	
			13760eu	15245eu		
1500	1600	vl	Papua New Guinea, Wantok R. Light			7325va
1500	1600		Russia, Voice of	4965me	4975me	7370eu
			9625as	9660as	11985me	12040eu
1500	1600		Singapore, MediaCorp Radio	6150do		
1500	1600		UAE, AWR Africa	11670as		
1500	1600	Sat	UK, BBC World Service	12095af		
1500	1600	mtwhf	UK, BBC World Service	17830af		
1500	1600		UK, BBC World Service	3255af	5975as	
			6190af	6195as	7320af	9740as
			9860af	11750as	11760as	11920as
			15310as	15400af	15485af	21470af
			21660af			
1500	1600		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	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	
			7125va	9590va	9760va	12080va
			13735va	15105va	15445va	15580va
			17895af			
1500	1600		USA, WBCQ Monticello ME	9330am		
1500	1600		USA, WBOH Newport NC	5920am		
1500	1600		USA, WEWN Vandiver AL	9955na		
1500	1600		USA, WHRA Greenbush ME	17650na		
1500	1600		USA, WHRI Cypress Creek SC			9840am
			11785am			
1500	1600	Sun	USA, WHRI Cypress Creek SC			15355am
1500	1600	mtwhfa	USA, WHRI Cypress Creek SC			17650am
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	9385na		
1500	1600		USA, WYFR/Family Radio FL	7320va	11830na	
			11910na	15750na	17750am	
1500	1600		Zambia, CVC International	15715af		
1505	1520	m	Austria, Radio Austria Intl	13775ca		
1505	1530	Sat/Sun	Austria, Radio Austria Intl	13775ca		
1505	1600	DRM	Canada, Radio Canada Intl	9800na		
1505	1600		Canada, Radio Canada Intl	9515na		
1510	1545		Swaziland, TWR	4760af		
1515	1530	twhf	Austria, Radio Austria Intl	13775ca		
1515	1600	Sat	UK, Bible Voice BC	15680as		
1515	1600	ha	USA, WYFR/Family Radio FL	15680as		
1515	1600	Wed/ vl	USA, WYFR/Family Radio FL	15680as		
1530	1545		India, All India Radio	7255as	9910as	
1530	1550		Vatican City, Vatican Radio	12065va	13765va	
			15235va			
1530	1600	mtwhfa	Albania, Radio Tirana	13640na		
1530	1600		Germany, AWR Europe	11675as		
1530	1600		Iran, Voice of the Islamic Rep	7370as	9635as	
1530	1600	Sun	UK, Bible Voice BC	13590me		
1530	1600	m	UK, Bible Voice BC	15680as		
1530	1600	Sun	USA, WYFR/Family Radio FL	13590af		
1530	1600	Mon	USA, WYFR/Family Radio FL	15680as		
1535	1600	Sat/Sun	Austria, Radio Austria Intl	13775ca		
1540	1600	mtwhf	UK, Bible Voice BC	13590me		
1540	1600	mtwhf	USA, WYFR/Family Radio FL	13590af		
1545	1600	m	Austria, Radio Austria Intl	13775ca		
1545	1600	twhfa	Austria, Radio Austria Intl	13775ca		
1545	1600	Sun	Germany, Pan American BC	13820me		
1545	1600	Sat	UK, Bible Voice BC	13590me		
1545	1600	Sat	USA, WYFR/Family Radio FL	13590af		
1551	1600		New Zealand, Radio NZ Intl	7145pa		
1551	1600	DRM	New Zealand, Radio NZ Intl	6095pa		

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

1600	1605	DRM	Canada, Radio Canada Intl	9800na		
1600	1605	Sun	Croatia, Croatian Radio	6165eu		
1600	1615	mtwhfa	Croatia, Croatian Radio	6165eu		
1600	1615		Pakistan, Radio	9365eu	9380as	11550af
			11895as	15105as		
1600	1615	twhf	UK, Bible Voice BC	13590me		
1600	1620	mtwh	Moldova, Radio DMR Pridnestrovye			5965eu
1600	1630	vl	Eritrea, Bana Radio	5100do		
1600	1630	h	Germany, Pan American BC	13820me		
1600	1630		Guam, AWR/KSDA	9585as	11690as	
1600	1630		Iran, Voice of the Islamic Rep	7370as	7330as	
1600	1630		Myanmar, Radio	9730do		
1600	1630		Nigeria, Voice of/ Ext. Svc Lagos			9690af
1600	1630	Sat/Sun	Swaziland, TWR	4760af		
1600	1630		UK, Bible Voice BC	13590me		
1600	1640	f	Moldova, Radio DMR Pridnestrovye			5965eu
1600	1645	mtwhf	USA, WYFR/Family Radio FL	13590af		
1600	1645		USA, WYFR/Family Radio FL	11830na	11865na	
			17750am			
1600	1700		Anguilla, University Network	11775am		
1600	1700		Australia, CVC International	13635as		
1600	1700		Australia, Radio Australia	5995va	6080va	
			9475as	9710va	11660pa	
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		Canada, Radio Canada Intl	9515na		
1600	1700		China, China Radio Intl	6100af	9570af	
			11900eu	11940eu	11965eu	13760eu
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	15160af	15605af	
			17605af			
1600	1700		Germany, CVC Intl/Voice Africa			15715af
1600	1700		Germany, Deutsche Welle	5965as	9795as	
1600	1700	Sun	Germany, Overcomer Ministries			17815na
1600	1700		Germany, Universal Life	7285va		
1600	1700	fs	Italy, IRRS	7285eu		
1600	1700		Jordan, Radio	11690na		
1600	1700		Malaysia, RTM/Trax FM	7295as		
1600	1700	DRM	New Zealand, Radio NZ Intl	6095pa		
1600	1700		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	6070as	7350as	7370eu
			9405as	9890eu	11985va	12055va
			12115va			
1600	1700	vl	Rwanda, Radio	6055do		
1600	1700		South Korea, KBS World Radio			9515eu
1600	1700		Taiwan, Radio Taiwan Intl	9785as	11550as	
1600	1700		UK, BBC World Service	3915af	5975as	
			6190af	6195as	7320eu	9510as
			11760as	11920as	15400af	15485af
			17840af	21470af	21660af	
1600	1700	DRM	UK, BBC World Service	7465eu		
1600	1700	mtwhf	UK, BBC World Service	17830af		
1600	1700	Sat/Sun	UK, BBC World Service	9695af	11860af	
			12095af			
1600	1700	Sun	UK, Bible Voice BC	13590me		
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	
			12080va	13600va	15580af	17895va
1600	1700		USA, WBCQ Monticello ME	9330am		
1600	1700		USA, WBOH Newport NC	5920am		
1600	1700		USA, WEWN Vandiver AL	9450na		
1600	1700		USA, WHRA Greenbush ME	17640na		
1600	1700		USA, WHRI Cypress Creek SC			9840am
			11960am	17640am		
1600	1700		USA, WINB Red Lion PA	13570am		
1600	1700	smtwhf	USA, WMLK Bethel PA	9265va	17495va	
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		USA, WWRB Manchester TN	9385na		
1600	1700	Sun	USA, WYFR/Family Radio FL	13590af		
1600	1700		USA, WYFR/Family Radio FL	6085am	13630af	
			13695na	15650af	15705af	18980va
			21455va	21525af		
1600	1700		Zambia, CVC International	15715af		
1615	1630		Vatican City, Vatican Radio	4005va	7250va	
			9645va	15595va		
1615	1645	mtwhf	Swaziland, TWR	6130af		
1615	1700		UK, Bible Voice BC	13590me		
1630	1645	Sun	Germany, Pan American BC	11655as		
1630	1645		UK, Bible Voice BC	13590me		
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	13590me		
1640	1650	mtwhfa	Turkmenistan, Turkmen Radio	4930eu		
1645	1700	f	Sweden, IBRA Radio	9830as		
1645	1700		Tajikistan, Tajik Radio	7245as		
1645	1700	t/ vl	USA, WYFR/Family Radio FL	13590af		

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

1700	1704		Canada, Radio Canada Intl	9515na		
1700	1715		Swaziland, TWR	3200af		
1700	1715	vl	UK, Bible Voice BC	13590me		
1700	1715	t/ vl	USA, WYFR/Family Radio FL	13590af		
1700	1725		Vietnam, Voice of	7280va	9550va	9725eu
			11630va	13860va		
1700	1727		Czech Rep, Radio Prague	5930eu	15710af	
1700	1730		Jordan, Radio	11690na		
1700	1730	Sun	UK, Bible Voice BC	13590me		
1700	1730		UK, Bible Voice BC	13590me		
1700	1730	Sat/Sun	USA, Voice of America	4930af		
1700	1730		USA, Voice of America	6080af	15580af	
1700	1730	Sun	USA, WYFR/Family Radio FL	13590af		
1700	1745		UK, BBC World Service	9630af		
1700	1755		South Africa, Channel Africa	15235af		
1700	1756		Romania, Radio Romania Intl	9535eu	11735eu	
1700	1800		Anguilla, University Network	11775am		
1700	1800		Australia, CVC International	13635as		
1700	1800		Australia, Radio Australia	5995va	6080va	
			9475as	9580va	9710as	11880va
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		China, China Radio Intl	6100af	9570af	
			9695eu	11900af	11940eu	13760eu
1700	1800		Costa Rica, University Network			11870va
			13750va			
1700	1800		Egypt, Radio Cairo	11740af		
1700	1800		Eqt. Guinea, Radio Africa	15190af		
1700	1800		Germany, CVC Intl/Voice Africa			15715af
1700	1800		Germany, Universal Life	7285va		
1700	1800	fs	Italy, IRRS	7285eu		
1700	1800		Malaysia, RTM/Trax FM	7295as		
1700	1800		New Zealand, Radio NZ Intl	7145pa		
1700	1800	DRM	New Zealand, Radio NZ Intl	6095pa		
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	7350as	9405as	9850af
			11510af	11985af		
1700	1800	Sat/Sun	Russia, Voice of	9820eu	9890eu	
1700	1800	vl	Rwanda, Radio	6055do		
1700	1800		Taiwan, Radio Taiwan Intl	11850af		
1700	1800	mtwhf	UK, BBC World Service	17830af		
1700	1800	DRM	UK, BBC World Service	1296eu	7465eu	
1700	1800		UK, BBC World Service	3915as	5975as	
			6190af	6195eu	7320eu	7380af
			9410va	9510as	11955as	12095af
			15400af	15485af	17840af	21470af
1700	1800	Sat	UK, Bible Voice BC	9430me		
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, WBCQ Monticello ME	9330am	17495am	
1700	1800		USA, WBOH Newport NC	5920am		
1700	1800		USA, WEWN Vandiver AL	9450na	15390eu	
1700	1800		USA, WHRA Greenbush ME	15705na		
1700	1800		USA, WHRI Cypress Creek SC			9840am
			11960am	15705am		
1700	1800		USA, WINB Red Lion PA	13570am		
1700	1800	smtwhf	USA, WMLK Bethel PA	9265va	17495va	
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		USA, WWRB Manchester TN	9385na	12180na	
			15250va			
1700	1800	Sat/ vl	USA, WYFR/Family Radio FL	13590af		
1700	1800		USA, WYFR/Family Radio FL	9890af	13630af	
			13690na	15650af	17795am	18980va
			21455va			
1700	1800		Zambia, CVC International	15715af		
1700	1750		North Korea, Voice of Korea	9335na	11710na	
			12014na	15245na		
1705	1800	DRM	Canada, Radio Canada Intl	9800na		
1730	1800		Guam, AWR/KSDA	9980me		
1730	1800	vl	Liberia, ELWA	4760do		
1730	1800		Slovakia, Radio Slovakia Int	5915eu	6055eu	
1730	1800		Swaziland, TWR	9500af		
1730	1800	DRM	Sweden, Radio	5955eu		
1730	1800		Sweden, Radio	6065va		
1730	1800		UK, Bible Voice BC	9430me	13590me	
1730	1800	Sat/Sun	USA, Voice of America	4930af		
1730	1800		USA, Voice of America	6080af	15410af	
			15580af			
1730	1800	mtwhf	USA, Voice of America	4930af	13755af	
			15775af			
1730	1800		Vatican City, Vatican Radio	11625af	13765af	
			15570af			
1745	1800		Bangladesh, Bangla Betar	7185as		
1745	1800		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	

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

1800	1815	Sat	UK, Bible Voice BC	11875as		
1800	1827		Czech Rep, Radio Prague	5930eu	9400va	
1800	1828		Vietnam, Voice of	5955eu	7280va	9730va
1800	1830	w	Austria, AWR Europe	15315af		
1800	1830	f	Italy, IRRS	7285eu		
1800	1830		Nigeria, Radio, Natl Svc/Abuja			7275do
1800	1830		South Africa, AWR Africa	3215af	3345af	
			11830af			
1800	1830		UK, BBC World Service	5975as	11955as	
1800	1830	Sun	UK, Bible Voice BC	6060eu		
1800	1830		UK, Bible Voice BC	13590me		
1800	1830	Sat/Sun	USA, Voice of America	4930af		
1800	1830		USA, Voice of America	6080af	15410af	
			15580af	17895af		
1800	1830	Sat/ vl	USA, WYFR/Family Radio FL	13590af		

1800	1845	Sat	UK, Bible Voice BC	6060eu		
1800	1845		USA, WYFR/Family Radio FL	17535af		
1800	1850		New Zealand, Radio NZ Intl	7145pa		
1800	1850	DRM	New Zealand, Radio NZ Intl	9870pa		
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	9475as	
			9580va	9710va	11880va	
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	9530af	11765af	
			15235af	17810af		
1800	1900	DRM	Canada, Radio Canada Intl	9800na		
1800	1900		China, China Radio Intl	9600eu	11940eu	
			13760eu			
1800	1900		Costa Rica, University Network		11870va	
			13750va			
1800	1900		Eqt. Guinea, Radio Africa	15190af		
1800	1900		Germany, CVC Intl/Voice Africa		13820af	
1800	1900		Germany, Universal Life	7285va		
1800	1900		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	
1800	1900	Sun	Italy, IRRS	7285eu		
1800	1900		Kuwait, Radio Kuwait	11990na		
1800	1900	vl	Liberia, ELWA	4760do		
1800	1900		Malaysia, RTM/Trax FM	7295as		
1800	1900		Nigeria, Radio/Kaduna	4770do	6090al	
1800	1900		Nigeria, Voice of/ Ext. Svc Lagos		15120af	
1800	1900		North Korea, Voice of Korea	13760eu	15245eu	
1800	1900	vl	Papua New Guinea, Wantok R. Light		7325va	
1800	1900		Poland, Polish Radio	6015eu	7130eu	
1800	1900		Russia, Voice of	7370eu	9480eu	9745af
			9580af	9890eu	11510af	
1800	1900	vl	Rwanda, Radio	6055do		
1800	1900		South Korea, KBS World Radio		7275eu	
1800	1900		Swaziland, TWR	3200af	9500af	
1800	1900		Taiwan, Radio Taiwan Intl	3965eu		
1800	1900	DRM	UK, BBC World Service	7420eu		
1800	1900		UK, BBC World Service	5975as	5995as	
			6190af	6195eu	7380af	9410va
			12095eu	15400af	17795af	21470af
1800	1900	mtwhf	UK, BBC World Service	17830af		
1800	1900	Sat/Sun	UK, Bible Voice BC	9430me		
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	smtwhf	USA, WBCQ Monticello ME	7415am		
1800	1900		USA, WBCQ Monticello ME	9330am	17495am	
1800	1900		USA, WBOH Newport NC	5920am		
1800	1900		USA, WEWN Vandiver AL	9450na	15390eu	
1800	1900		USA, WHRA Greenbush ME	15705na		
1800	1900		USA, WHRI Cypress Creek SC		9840am	
			11960am	15705am		
1800	1900		USA, WINB Red Lion PA	13570am		
1800	1900	smtwhf	USA, WMLK Bethel PA	9265va	17495va	
1800	1900		USA, WRMI Miami FL	9955am		
1800	1900		USA, WTJC Newport NC	9370na		
1800	1900		USA, WWCR Nashville TN	9975na	12160na	
			13845na	15825na		
1800	1900		USA, WWRB Manchester TN	9385va	12180na	
			15250va			
1800	1900		USA, WYFR/Family Radio FL	9845af	9860af	
			13630af	13690af	13730af	13800na
			15650af	15750va	17795va	18980va
1800	1900		Yemen, Rep of Yemen Radio	9780me		
1800	1900		Zambia, CVC International	5940af		
1805	1810	Sat	Croatia, Croatian Radio	6165eu		
1805	1815	mtwhf	Croatia, Croatian Radio	6165eu		
1830	1858		Serbia, International Radio Serbia		7240eu	
1830	1900		Bulgaria, Radio	7400eu	9400eu	
1830	1900		UK, BBC World Service	6005af	9485as	
			9630af			
1830	1900	f	UK, Bible Voice BC	9430me		
1830	1900		USA, Voice of America	4930af	6080af	
			15410af	15580af	17895af	
1845	1900		Congo, RTV Congolaise	4765af	5985af	
1845	1900	Sun	UK, Bible Voice BC	9775af		
1851	1900	DRM	New Zealand, Radio NZ Intl	9890pa		
1851	1900		New Zealand, Radio NZ Intl	9615pa		

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

1900	1903		Bahrain, Radio Bahrain	6010as		
1900	1905	DRM	Canada, Radio Canada Intl	9800na		
1900	1915		Congo, RTV Congolaise	4765af	5985af	
1900	1928		Vietnam, Voice of 7280va	9730va		
1900	1930		Germany, Deutsche Welle	9735af	11690af	
			13780af	15275af		
1900	1930	Sat	UK, Bible Voice BC	9775af		
1900	1930		UK, Bible Voice BC	6060eu		
1900	1945		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	
1900	1945		USA, WYFR/Family Radio FL	6085am		
1900	1957		Netherlands, Radio	7120af	11655af	
			11675na	11805af	12050af	17810af
1900	1957	Sat/Sun	Netherlands, Radio	15315na	15525na	
1900	2000		Anguilla, University Network	11775am		
1900	2000		Australia, Radio Australia	6080va	9500as	
			9580va	9710va	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		China, China Radio Intl	7295va	9435va	
			9440va	11940eu		
1900	2000		Costa Rica, University Network		11870va	
			13750va			
1900	2000		Egypt, Radio Cairo	15375af		
1900	2000		Eqt Guinea, Radio Africa	15190af		
1900	2000		Germany, CVC Intl/Voice Africa		13820af	
1900	2000	vl	Liberia, ELWA	4760do		
1900	2000		Malaysia, RTM/Trax FM	7295as		
1900	2000		New Zealand, Radio NZ Intl	9615pa		
1900	2000	DRM	New Zealand, Radio NZ Intl	9890pa		
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	
			11535va	11910af		
1900	2000		Papua New Guinea, NBC	4890do		
1900	2000	vl	Papua New Guinea, Wantok R. Light		7325va	
1900	2000		Russia, Voice of	7195eu	7310eu	9890eu
			12070eu			
1900	2000	vl	Rwanda, Radio	6055do		
1900	2000	vl	Solomon Islands, SIBC	5020do	9545al	
1900	2000		Swaziland, TWR	3200af		
1900	2000		Thailand, Radio	9805eu		
1900	2000	vl	Uganda, Radio	4976do	5026do	
1900	2000	DRM	UK, BBC World Service	7420eu		
1900	2000		UK, BBC World Service	5995as	6005as	
			6190af	9410af	9455af	9485af
			9630as	15400af	17795as	
1900	2000	mtwhf	UK, BBC World Service	17830af		
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	4940af	
			6080af	7480va	9670va	15410af
			15445af	15580af	17895af	
1900	2000		USA, WBCQ Monticello ME	7415am	9330am	
			17495am			
1900	2000		USA, WBOH Newport NC	5920am		
1900	2000		USA, WEWN Vandiver AL	9450na	15390eu	
1900	2000		USA, WHRA Greenbush ME	13710na		
1900	2000		USA, WHRI Cypress Creek SC		9840am	
			13710am	17650am		
1900	2000		USA, WINB Red Lion PA	13570am		
1900	2000	smtwhf	USA, WMLK Bethel PA	9265va	17495va	
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		USA, WWRB Manchester TN	9385va	12180na	
			15250va			
1900	2000		USA, WYFR/Family Radio FL	7240va	9520eu	
			9610af	9860af	13690na	13800na
			17795am	17845af	18930eu	
1900	2000		Zambia, CVC International	5940af		
1900	02000		Kuwait, Radio Kuwait	11990na		
1930	2000	Sat/Sun	Germany, Pan American BC	5850me		
1930	2000		Iran, Voice of the Islamic Rep	6205eu	6255eu	
			7205af	9800af	9925af	
1930	2000		Lithuania, Radio Vilnius	6255eu		
1930	2000		Slovakia, Radio Slovakia Int	5915eu	7345eu	
1930	2000		Sweden, Radio	6065va		
1930	2000		Turkey, Voice of	6055eu		

1930	2000	Sun	UK, Bible Voice BC	9775af	
1945	2000	mtwhfa	Albania, Radio Tirana	6135eu	7465eu
1945	2000	DRM	Vatican City, Vatican Radio	9800na	
1950	2000		Vatican City, Vatican Radio 9645eu	4005eu	5885eu

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

2000	2015	Sun	Germany, Pan American BC	5850me		
2000	2020		Vatican City, Vatican Radio 9645af	4005af	5885af	
2000	2025		Turkey, Voice of	6055eu		
2000	2027		Lithuania, Radio Vilnius	6255eu		
2000	2030		Egypt, Radio Cairo	15375af		
2000	2030	f	Germany, Pan American BC	5850me		
2000	2030		Iran, Voice of the Islamic Rep 7205af	6205eu 9800af	6255eu 9925af	
2000	2030		South Africa, AWR Africa	9655af		
2000	2030		Swaziland, TWR	3200af		
2000	2030		USA, Voice of America 6080af	4930af 15455af	4940af 15580af	
2000	2030		Vatican City, Vatican Radio 11625af	7365af	9755af	
2000	2030	DRM	Vatican City, Vatican Radio	9800na		
2000	2045		USA, WYFR/Family Radio FL	17750eu		
2000	2050		New Zealand, Radio NZ Intl	9615pa		
2000	2050	DRM	New Zealand, Radio NZ Intl	9890pa		
2000	2057		Netherlands, Radio 17810af	11675na	11655af	
2000	2059		Canada, Radio Canada Intl 15325eu	5850eu	7235eu	
2000	2100		Anguilla, University Network	11775am		
2000	2100		Australia, ABC NT Alice Springs 4835do		2310do	
2000	2100		Australia, ABC NT Katherine	2485do		
2000	2100		Australia, ABC NT Tennant Creek		2325do	
2000	2100		Australia, Radio Australia 11660pa	9500as 11880as	11650pa 12080va	
2000	2100	Sat/Sun	Australia, Radio Australia	6080va		
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	DRM	Canada, Radio Canada Intl	9800na		
2000	2100		China, China Radio Intl 7265eu 9800eu	5960eu 7295af 11640af	7190eu 9440af 13630af	9600eu
2000	2100		Costa Rica, University Network		13750va	
2000	2100		Eqt Guinea, Radio Africa	15190af		
2000	2100		Germany, CVC Intl/Voice Africa		13820af	
2000	2100		Germany, Deutsche Welle 12780af	9735af	9880af	
2000	2100		Indonesia, Voice of 15150al	9525eu	11785eu	
2000	2100		Kuwait, Radio Kuwait	11990na		
2000	2100	vl	Liberia, ELWA	4760do		
2000	2100		Malaysia, RTM/Trax FM	7295as		
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	9890eu	12070eu	
2000	2100	vl	Rwanda, Radio	6055do		
2000	2100	vl	Solomon Islands, SIBC	5020do	9545al	
2000	2100		South Africa, Channel Africa	3345af		
2000	2100	mtwhf	Spain, Radio Exterior Espana	9605af	9690eu	
2000	2100	vl	Uganda, Radio	4976do	5026do	
2000	2100		UK, BBC World Service 9410af	6005af 9455af	6190af 9630af	15400af
2000	2100	mtwhf	UK, BBC World Service	17830af		
2000	2100	DRM	UK, BBC World Service	5875eu		
2000	2100		Ukraine, Radio Ukraine Intl	5840eu		
2000	2100		USA, American Forces Radio 5765usb 12133usb	4319usb 6350usb 13362usb	5446usb 7811usb	10320usb
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 17495am	7415am	9330am	
2000	2100		USA, WBOH Newport NC	5920am		
2000	2100		USA, WEWN Vandiver AL	9450na	15220af	
2000	2100	mtwhf	USA, WHRA Greenbush ME	7400na		
2000	2100	Sat/Sun	USA, WHRA Greenbush ME	11885na		
2000	2100		USA, WHRI Cypress Creek SC		17650am	
2000	2100	Sat/Sun	USA, WHRI Cypress Creek SC 11885am		9840am	
2000	2100	mtwhf	USA, WHRI Cypress Creek SC 13670am		7400am	
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100	smtwhf	USA, WMLK Bethel PA	9265va	17495va	
2000	2100		USA, WRMI Miami FL	9955am		
2000	2100		USA, WTJC Newport NC	9370na		
2000	2100		USA, WWCR Nashville TN 13845na	9975na	12160na	
2000	2100		USA, WWRB Manchester TN 15250va	9385va	12180na	
2000	2100		USA, WYFR/Family Radio FL 9520eu	3230af 17725am	7430eu 17845af	18980va
2000	2100		Zambia, CVC International	5940af		
2005	2100		Syria, Radio Damascus	9330eu	12085eu	
2020	2100		Belarus, Radio 7440al	7105eu	7390eu	7420eu
2030	2045		Thailand, Radio	9535eu		
2030	2056		Romania, Radio Romania Intl 11940va	9515va 15465va	11810va	
2030	2058		Vietnam, Voice of 13860va	7280va	9550va	9730va
2030	2100		Cuba, Radio Havana	9505va	11760va	
2030	2100		USA, Voice of America 7555as	4930af 15445af	6080af 15580af	
2030	2100	Sat/Sun	USA, Voice of America	4940af		
2045	2100		India, All India Radio 9910pa	7410eu 11620va	9445eu 11715pa	
2051	2100		New Zealand, Radio NZ Intl	15720pa		

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	11955af		
2100	2130	Sat	Canada, CBC NQ SW Service	9625na		
2100	2130		China, China Radio Intl 7285eu 13630af	5960eu 9490eu	7190eu 9600eu	11640af
2100	2130		Cuba, Radio Havana	9505va	11760va	
2100	2130		Nigeria, Radio, Natl Svc/Abuja		7275do	
2100	2130		South Africa, AWR Africa	9830af		
2100	2130		South Korea, KBS World Radio		3955eu	
2100	2145		USA, WYFR/Family Radio FL 18980va	13800na	17795am	
2100	2150	DRM	New Zealand, Radio NZ Intl	11675pa		
2100	2159	smtwhf	Germany, Overcomer Ministries		7310eu	
2100	2200		Anguilla, University Network	11775am		
2100	2200		Australia, ABC NT Alice Springs 4835do		2310do	
2100	2200		Australia, Radio Australia 11650pa 13630as	9500as 11660pa 15515as	9660as 11695as	12080as
2100	2200		Canada, CFRX Toronto ON	6070na		
2100	2200		Canada, CFVP Calgary AB	6030na		
2100	2200		Canada, CKZN St John's NF	6160na		
2100	2200		Canada, CKZU Vancouver BC		6160na	
2100	2200		Costa Rica, University Network		13750va	
2100	2200		Eqt Guinea, Radio Africa	15190af		
2100	2200		Germany, Deutsche Welle 11690af	7280af 13780af	9545af	
2100	2200		Guyana, Voice of	3291do	5950do	
2100	2200		India, All India Radio 9910pa	7410eu 11620va	9445eu 11715pa	
2100	2200	vl	Liberia, ELWA	4760do		
2100	2200		Malaysia, RTM/Trax FM	7295as		
2100	2200		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	13760eu	15245eu	
2100	2200		Papua New Guinea, NBC	4890do		
2100	2200	vl	Papua New Guinea, Wantok R. Light		7325va	
2100	2200		South Africa, Channel Africa	3345af		
2100	2200		Syria, Radio Damascus	9330eu	12085eu	
2100	2200		UK, BBC World Service 6005af 11945as	3915as 6190af 12095am	5975as 6195af 13640af	11675am 15400af
2100	2200	DRM	UK, BBC World Service	5875eu		
2100	2200		USA, American Forces Radio 5765usb 12133usb	4319usb 6350usb 13362usb	5446usb 7811usb	10320usb
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 17495am	7415am	9330am	
2100	2200		USA, WBOH Newport NC	5920am		
2100	2200		USA, WEWN Vandiver AL	9450na	15220af	
2100	2200	mtwhf	USA, WHRA Greenbush ME	7400na		
2100	2200	Sat/Sun	USA, WHRA Greenbush ME	11885na		

2100	2200	mtwhf	USA, WHRI Cypress Creek SC 13670am			7400am
2100	2200	Sat/Sun	USA, WHRI Cypress Creek SC			11885am
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 13845na	9975na		12160na
2100	2200		USA, WWRB Manchester TN 15250va	9385va		12180na
2100	2200		USA, WYFR/Family Radio FL 9610af	3230af 11565eu		7430eu 17845af
2115	2200		Egypt, Radio Cairo	9990eu		
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		Sweden, Radio 6065va	7420va		
2130	2200		Turkey, Voice of 7180va			
2151	2200	DRM	New Zealand, Radio NZ Intl	13730pa		

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

2200	2210		Syria, Radio Damascus	9330eu		12085eu
2200	2220		Japan, NHK World/Radio Japan			13640pa
2200	2230		India, All India Radio 9910pa	7410eu 11620va	11715pa	9445eu
2200	2230	vl	Liberia, ELWA 4760do			
2200	2230		Papua New Guinea, NBC	4890do		
2200	2230		Turkey, Voice of 7180va			
2200	2245		Egypt, Radio Cairo	9990eu		
2200	2245		USA, WYFR/Family Radio FL	15770af		
2200	2256		Romania, Radio Romania Intl 9790va	7185va 11940va		9675va
2200	2300		Anguilla, University Network	6090am		
2200	2300		Australia, ABC NT Alice Springs 4835do			2310do
2200	2300		Australia, ABC NT Katherine	5025do		
2200	2300		Australia, ABC NT Tennant Creek			4910do
2200	2300		Australia, Radio Australia 15230va	11840va 15240pa	15515as	13630va 17785va
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	DRM	Canada, Radio Canada Intl	9800na		
2200	2300		China, China Radio Intl	7175eu		9590as
2200	2300		Costa Rica, University Network			13750va
2200	2300		Eqt Guinea, Radio Africa	15190af		
2200	2300		Guyana, Voice of 3291do			
2200	2300		Malaysia, RTM/Trax FM	7295as		
2200	2300	DRM	New Zealand, Radio NZ Intl	13730pa		
2200	2300		New Zealand, Radio NZ Intl	15720pa		
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 5975am	5955as 6195as	7105as	5965as 9740as
			12095af	13640am	15400af	
2200	2300		Ukraine, Radio Ukraine Intl	5830eu		
2200	2300		USA, American Forces Radio 5765usb	4319usb 6350usb	7811usb	5446usb 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 11725va	7120va 15185va		9415as
2200	2300	mtwhf	USA, WBCQ Monticello ME	5110am		17495am
2200	2300		USA, WBCQ Monticello ME	7415am		9330na
2200	2300		USA, WBOH Newport NC	5920am		
2200	2300		USA, WEWN Vandiver AL	9975na		15745eu
2200	2300		USA, WHRA Greenbush ME	11885na		
2200	2300	mtwhfa	USA, WHRI Cypress Creek SC			9515am
2200	2300		USA, WHRI Cypress Creek SC			11885am
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, WWCR Nashville TN 12160na	7465na 13845na		9985na
2200	2300		USA, WWRB Manchester TN 12180na	6890va 15250va		9385va
2200	2300	Sat/Sun	USA, WWRB Manchester TN 15250va	3185na		15250va
2200	2300		USA, WYFR/Family Radio FL	9620af		11740na
2215	2230		Croatia, Croatian Radio	6165eu		9925eu
2230	2257		Czech Rep, Radio Prague	5930na		9435af
2230	2300		Guam, AWR/KSDA	15320as		
2230	2300		Papua New Guinea, NBC	9675do		
2230	2300		USA, Voice of America 15145va	9570va		11705va
2245	2300		India, All India Radio 11620as	9705as 11645as		9950as 13605as

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

2300	0000		Anguilla, University Network	6090am		
2300	0000		Australia, ABC NT Alice Springs 4835do			2310do
2300	0000		Australia, ABC NT Katherine	5025do		
2300	0000		Australia, ABC NT Tennant Creek			4910do
2300	0000	smtwhf	Canada, CBC NQ SW Service	9625na		
2300	0000		Canada, CFRX Toronto ON	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 6145na	5915as 7180as	11685as	5990va 11840na
2300	0000		Costa Rica, University Network			13750va
2300	0000		Cuba, Radio Havana	9550va		
2300	0000		Egypt, Radio Cairo	9460na		
2300	0000		Guyana, Voice of 3291do			
2300	0000		India, All India Radio 11620as	9705as 11645as		9950as 13605as
2300	0000		Malaysia, RTM/Trax FM	7295as		
2300	0000	DRM	New Zealand, Radio NZ Intl	13730pa		
2300	0000		New Zealand, Radio NZ Intl	15720pa		
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 6195as 12010as	3915as 9740as	11945as	5965as 11955as
2300	0000		USA, American Forces Radio 5765usb 12133usb	4319usb 6350usb 13362usb	7811usb	5446usb 10320usb
2300	0000		USA, KAIJ Dallas TX	9480va		
2300	0000		USA, KTBN Salt Lake City UT	15590na		
2300	0000		USA, Voice of America 11725va	7120va 15185va		9415va
2300	0000		USA, WBCQ Monticello ME 9330am	5110na 17495am		7415am
2300	0000		USA, WBOH Newport NC	5920am		
2300	0000		USA, WEWN Vandiver AL	9975na		15745eu
2300	0000		USA, WHRA Greenbush ME	7520na		
2300	0000	Sun	USA, WHRI Cypress Creek SC			7490am
2300	0000		USA, WHRI Cypress Creek SC 7520am			7315am
2300	0000	mtwhfa	USA, WHRI Cypress Creek SC			9515am
2300	0000	Sun	USA, WHRI Cypress Creek SC			7490am
2300	0000		USA, WINB Red Lion PA	9265am		
2300	0000		USA, WRMI Miami FL	9955am		
2300	0000		USA, WTJC Newport NC	9370na		
2300	0000		USA, WWCR Nashville TN 9985na	5070na 13845na		7465na
2300	0000		USA, WWRB Manchester TN 6890na	3185na 15250va		5050na
2300	0000		USA, WYFR/Family Radio FL	15255am		17750am
2300	2315		Nigeria, Radio/Kaduna	4770do		6090al
2300	2330		Australia, Radio Australia 13690pa	9660as 15230pa	15240pa	11840va 17785va
			17795va			
2300	2330		USA, Voice of America 15145va	9570va		13755va
2300	2345		USA, WYFR/Family Radio FL	11740na		
2300	2345	DRM	Vatican City, Vatican Radio	9755na		
2300	2355		Turkey, Voice of 5960va			
2305	0000		Canada, Radio Canada Intl	6100na		
2330	0000		Australia, Radio Australia 12080va	9660as 13690va	15230pa	11840va 15415va
			17750va	17785va	17795va	
2330	0000		Burma, Dem Voice of Burma	5955eu		
2330	0000		Lithuania, Radio Vilnius	9875na		
2330	0000		UK, BBC World Service	9580as		
2330	0000		USA, Voice of America 13755va	7350va 15145va		9570va
2330	2357		Czech Rep, Radio Prague	5930na		7345na
2330	2358		Vietnam, Voice of 9840as	12020as		
2330	2359	DRM	Sweden, Radio 9800na			

SHORTWAVE GUIDE

Larry Van Horn, N5FPW
larryvanhorn@monitoringtimes.com
http://mt-milcom.blogspot.com

The Hidden Military Band

For years the military has officially denied it: Military use of a civilian portion of the radio spectrum has long been quietly debated among hobbyists in the radio community. But here at the end of 2007, *Milcom* can finally confirm that some of the U.S. military services *are* using a portion of the VHF-Low spectrum that has been well hidden from all – including the licensed users of these frequencies.

And where is this hidden military frequency band located in the RF spectrum? Try the frequencies from 50 to 88 MHz (VHF-Low)!

Yes, the amateur six meter band, broadcast TV channels 2-6, a radio astronomy band, and several fixed and mobile LMR services use this range, but several services under the Department of Defense (DoD) umbrella also quietly use it as well. I have spent several years compiling frequencies in this portion of the spectrum from many sources, including official DoD instructions, publications, and actual over the air intercepts. This month I will present some of the research I have uncovered.

One of the major systems that uses this portion of the spectrum is SINCGARS (Single Channel Ground and Airborne Radio System). SINCGARS is a Combat Net Radio (CNR) currently used by U.S. and allied military forces. The radios are designed to be reliable, secure, and easily maintained, and can handle both voice and data. Vehicle-mount, backpack, airborne, and handheld units are available.

The SINCGARS radios use 25 kHz channels in the VHF FM band, from 30 to 88 MHz. It has both single-frequency and frequency-hopping modes. The frequency-hopping mode has a slow hop rate (on the order of 100 Hz), which is well within the Electronic Countermeasures (ECM) capabilities of modern follow-on jammers, so it no longer provides anti-jam security against technologically advanced adversaries.

To operate in frequency hop mode, a SINCGARS radio requires a transmission security key (TSK), a pre-generated frequency list (Hopset), and accurate time of day. Keys and hopsets are loaded using an external fill device. The time of day is usually supplied from a Global Positioning System receiver.

SINCGARS users maintain communications security (COMSEC) through the VINSON family of encryption. Early SINCGARS radios required an external encryptor such as the KY-57, but more modern versions in use today have embedded COMSEC. Secure audio transmitted by SINCGARS radios is digitized and compressed with 16 Kbit/s CVSD. A separate traffic encryption key (TEK) is required for encryption. Over the air rekeying (OTAR) is available; however, a master key encryption key (KEK) must be manually loaded beforehand. Two radios can be connected together to serve as a communications relay.

Over 250,000 SINCGARS radios have been procured. There have been several system improvement programs, including an ICOM

company version, which has integrated voice encryption, and the ASIP version which is less than half the size and weight of the ICOM-SIP radio.

In 1992, the Air Force awarded a contract to replace the AN/ARC-188 for communications between Air Force aircraft and Army units. SINCGARS is expected to be replaced starting

TABLE 1: VHF-LOW MILCOMS "UNCOVERED"

50.700	Southeast US	US Army OH-58D aircraft air-to-air
51.000	Camp Frank D. Merrill GA	US Army 6th Ranger Training Battalion Camp Rudder "Noble Hamlet"
	Willow Grove NAS/JRB PA	USMC CH-53 Air-to-Air
51.050	Fort Stewart/Wright AAF GA	US Army Flight Following Advisories Air-Air Fox "Marne Radio"
51.235	Southeast US	US Army Helicopter Air-to-Air
51.500	Southeast US	US Army Helicopter Air-to-Air
	Willow Grove NAS/JRB PA	USMC CH-53 Air-to-Air
51.650	Camp Frank D. Merrill GA	US Army CSAREX
51.750	Southeast US	US Army Helicopter Air-to-Air
52.050	Otis ANGB MA	National Guard Operations "Yankee Ops"
54.000	Tennessee National Guard	JTF A VHF FM Emergency Net
55.000	Tennessee National Guard	JTF B VHF FM Emergency Net
55.800	McGregor Range NM	US Army Range Control (R-5103)
55.900	Southeast US	US Army OH-58D aircraft
56.000	Tennessee National Guard	JTF C VHF FM Emergency Net
57.000	Tennessee National Guard	JTF D VHF FM Emergency Net
57.700	Cane Cholla NM	US Army Tower
58.000	Tennessee National Guard	JTF A VHF FM Emergency Net Alternate 1
58.500	Hunter AAF GA	US Army 224th MI (AE) RC-12 Operations "Sunny Ops"
59.000	Tennessee National Guard	JTF B VHF FM Emergency Net Alternate 1
60.000	Tennessee National Guard	JTF C VHF FM Emergency Net Alternate 1
64.200	Camp Shelby MS	US Army Command Communications Net
64.350	Fort Hood TX	Air Traffic Control
64.700	Fort Richardson AK	Army Airfield Support Facility Operations
66.000	Tennessee National Guard	JTF D VHF FM Emergency Net Alternate 1
66.450	Fort Hood TX	US Army 21st Cavalry Discrete Alternate
67.000	Tennessee National Guard	JTF A VHF FM Emergency Net Alternate 2
68.000	Tennessee National Guard	JTF B VHF FM Emergency Net Alternate 2
69.000	Tennessee National Guard	JTF C VHF FM Emergency Net Alternate 2
70.000	Tennessee National Guard	JTF D VHF FM Emergency Net Alternate 2
71.025	Southeast US	US Army Helicopter Air-to-Air
71.300	Fort Drum NY Area	US Army RW Air-to-Air for R-5201/Fort Drim Cantonment
73.000	Camp Frank D. Merrill GA	US Army Weather Briefings "Mountain Ranger 08"
77.100	Southeast US	US Army Helicopter Air-to-Air
80.025	US DoD	Unknown user/usage
82.100	Hunter AAF GA	US Army 224th MI Battalion Operations "Sunny Ops"

in 2008 with the Joint Tactical Radio System (JTRS), a software-defined radio that will be backwards compatible with SINCGARS, HAVE QUICK, and a host of other radio systems. You can read more about JTRS on my Internet blog at **http://mt-milcom.blogspot.com/**

I have verified through official sources that the Marine Corps uses two segments of the VHF-Low band above 50 MHz for their frequency hopping SINCGARS radio system. The Marine SINCGARS radios use a portion of the spectrum above the amateur six meter band, 60.0 to 66.0 MHz, and 82.0 to 87.900 MHz. I have not confirmed if the other services also use these two 6-MHz segments.

SINCGARS is only one aspect of the DoD using frequencies in the 50-88 MHz range. The more interesting cases are the US Army tactical and discrete frequencies sprinkled throughout this spectrum.

For instance, the Virginia National Guard uses a frequency in the six meter ham band – 52.750 MHz (FM) from Fort Belvoir/Davison AAF. The Massachusetts National Guard Operations at Otis ANGB base has a frequency assignment on 51.150 MHz (FM).

Fort Drum/Wheeler-Sack AAF has a Metro assignment on 63.300 MHz. Los Alamitos Joint Forces Training Base has an Army Aviation Support Facility (AASF) frequency assignment on 65.050 MHz. All of these frequencies are published in the current editions of the DoD US IFR Supplement.

For several years now, monitors in the Northeast US have reported that the Marines of HMH-772 based at Willow Grove NAS/JRB have used 52.500 MHz (FM), another ham six meter band frequency.

To give our readers an idea of who is using this "hidden" band, Table One is a list of some of the known activity that has been uncovered. Mode is FM and the frequencies are in MHz unless indicated.

One final piece of radio intelligence. The Russians have a constellation of satellites that uses this portion of the spectrum. Russian government store-dump communications satellites of the Cosmos series have been reported on 51.200 and 51.220 MHz transmitting a CW radio beacon.

So, time to put those scanners in the search mode and see if you can uncover some military comms in this hidden military communications band. And be sure to drop us a note and let us know what you have heard.

❖ U.S. Army Trunk Systems

This month we will present part 1 of the U.S. Army trunk radio systems. All the systems listed at the bases below are Motorola trunk radio systems unless otherwise noted.

Aberdeen Proving Ground/Edgewood Arsenal, Maryland
Site 1 406.3500 406.7000 407.2750 407.4750 408.5500 409.0250 [Aberdeen]
Site 2 406.2250 407.2500 409.5000 410.1500 [Edgewood]
Other possible trunk frequencies for this system: 407.3500 407.5500 408.7750 408.8000 409.9250 409.9500 411.5000 412.9000 412.9750 413.2250 413.4750 415.4250 416.1000 416.6500 416.9500 417.9500 419.8250

Anniston Army Depot, Alabama
Site 1 409.3500/418.3500c
Site 2 406.9500/415.9500c 407.5750/416.5750c 407.9625/416.9625 408.1625/417.1625 408.3625/417.3625 408.5500/417.5500c 409.5625/418.5625 409.7625/418.7625c
Site 3 406.1625/415.1625 407.1625/416.1625 407.3625/416.3625c 408.5625/417.5625c 409.9625/418.9625
Other reported frequencies include: 407.5625/416.5625

Bluegrass Army Depot, Kentucky
406.1625c 406.5625c 406.9625c 410.3625c 410.7625

Camp Frank D. Merrill, Georgia (System: EDACS Standard)
407.225 (LCN1) 407.525 (LCN2) 408.050 (LCN3) [Black Mountain]
407.250 (LCN1) 407.375 (LCN2) 407.575 (LCN3) [Brawley Mountain]

Camp Gruber, Oklahoma
406.5500 407.3500 408.1500 408.9500 409.7500 415.3500 416.1500 416.9500 417.7500 418.5500

Camp Shelby Joint Forces Training Center, Mississippi
407.3000 407.4250 407.5750 407.9625 408.1625 408.5625 408.7500 409.9500 410.1625 410.5625

Defense Distribution Region East, New Cumberland, Pennsylvania
407.2500/416.3500 407.3000/412.9750 407.5000/419.1500

Defense Supply Center, Richmond, Virginia
406.1625 406.5625 406.9625 407.5625c 408.5625c
Other possible system frequencies: 406.9500 407.3250 409.5500

Dugway Proving Grounds/Michael AAF, Utah
406.5000 406.5500 406.9500 407.0000 407.2000 408.3500 409.7500

Fort Belvoir Area, Virginia
System 1 406.1125 406.3625 406.5250 406.7750 406.9250 407.0875 407.2375 407.4125 407.5625 407.7125 407.8875 408.0875 408.2625 408.4250 408.5750 408.7375 408.9125 409.1125 409.2750 409.4750 409.6375 409.9125 410.5625 410.7625
System 2 409.9125 410.5625 410.7625

Fort Benning, Georgia (System: EDACS Standard)
406.5500c (LCN1) 407.3500 (LCN2) 408.1500c (LCN3) 408.9500 (LCN4) 409.7500 (LCN5) 406.2250 (LCN6) 406.7500 (LCN7) 408.3500 (LCN8) 409.0500 (LCN9) 409.1500 (LCN10)

Fort Bliss, Texas
406.6000c 406.7500c 407.5625 408.2250 408.3250 408.4250 409.4500 409.4750 409.5500 409.9000 409.9500 410.0000 413.1000 414.9125 417.4250
Other possible frequencies: 407.0750c

Fort Bragg/Pope AFB, North Carolina
Site 1 407.0750 407.4750 407.5500 407.5625 407.8625 407.8875 408.0875 408.1250 408.5750 409.0250 409.1250 409.5625 410.1500 410.5500 410.7000 410.9000 [Honeycutt]
Site 2 407.2500 408.0500 408.4250 408.6250 409.5125 409.7000 410.3625 [Sandstone]

Fort Campbell, Kentucky
Site 0 407.3000 407.9500 408.1500 408.3500 408.5500 408.7500 408.9500 409.1500 409.5500 [East Zone]
Site 1 406.3500 406.7500 407.1500 407.2500 409.9500 [West Zone]

Fort Carson, Colorado
407.1750c 407.2750 407.3250 407.5500 407.5750c 408.0000 409.1250c 409.4750 409.7125
Note: Fort Carson is reported to be a 2-site SmartZone digital narrowband trunk system.

Fort Chaffee, Arkansas (Arkansas National Guard)
406.7875c 407.3875c 408.7625c

Fort Detrick, Maryland
406.3500 407.0750 408.5500 409.1500 409.7500*
Note: This has been reported as a four channel trunk system. *indicates a frequency not reported.

Fort Dix Army Garrison/McGuire AFB, New Jersey
Site 1 406.7500 406.9500c 407.3625 407.5625c 408.1625 408.3500c 408.5625 408.9500 409.5625 410.0000 413.2000
Site 2 406.3625 407.4750
Site 3 410.5625 410.7625
Other frequencies: 409.0125 409.3500c

Fort Gordon (Augusta GA)/Fort Jackson (Columbia SC)
Site 1 406.1125c 406.5000 406.7625 407.0750 407.5000 407.7625 407.8875 408.0500 408.3625 409.7000c [Fort Gordon]
Site 2 406.1625c 407.9625c 408.1250c [Fort Gordon]
Site 3 407.8125c 410.5500c 410.7625c [Fort Gordon]
Site 4 407.5500 408.8875 410.5625 [Fort Gordon]
Site 5 408.0875c 409.3625c 410.9000c [Fort Gordon]
Site 6 406.3625c 406.7625c 407.7625c 408.1625 408.3625c 409.3625 410.1625 410.5625 [Fort Jackson]
Site 7 406.5625 407.1625c 407.3625c 410.7625c [Fort Jackson]

If you have any updates, additions or corrections to our list above or to the US Air Force list in the October or November Milcom columns, please contact me at the email address in the masthead.

Until next month, 73 and good hunting.

Doug Smith, W9WI
dougsmith@monitoringtimes.com
http://americanbandscan.blogspot.com

Everything Old is New Again

You might note a bit of a nostalgia kick in this month's *MT*... I've been on my own nostalgia kick lately, reading Randall Davidson's excellent history of WHA-970, *"9XM Talking: WHA Radio and the Wisconsin Idea."* While the book is specifically about the history of Wisconsin's public radio stations, it provides plenty of technical detail applicable to all early broadcasting.

Broadcast DX is not the oldest of the radio hobbies (that title must go to amateur radio: Marconi considered himself a ham), but it's probably got a solid claim on second place. The National Radio Club dates back to 1933, and there were AM DXers long before the NRC was formed.

In the early days, DX was not just a hobby: it was a means of receiving programming. By 1923, the radio boom was in full force. However, many people weren't served by local stations. Take, for example, Wausau, in Central Wisconsin. In 1923, Wausau had 20,000 citizens, more or less, but no radio station. The nearest station, WPAH, was located about 30 miles away in Waupaca – and didn't operate every night. Evening programs on WPAH were broadcast only three nights a week. On the other four nights, listeners either left their radios off or searched for DX. Most searched for DX.

And not only in Wausau. Cities across North America found themselves full of radio listeners but devoid of stations. You might not be surprised to know that when WPAH did broadcast at night, the station had listeners as far away as California – and England. Further south in Madison, WHA broadcasts of University of Wisconsin basketball games resulted in correspondence from a majority of states, Puerto Rico, and Canada.

A lot has changed on the AM dial since 1923. When WPAH was heard in England, there were fewer than 600 radio stations in the United States. No station operated 24 hours a day; most didn't operate at all on some days. Many of the 500+ stations that were operating shared time on the same frequency. Two New Orleans stations split the use of 1120 kHz. On 1050, three Columbus, Ohio, stations shared time. No fewer than eight Minneapolis stations shared use of the crowded 830 kHz (360m) frequency. (WCCO, which uses 830 today, didn't exist yet!)

Powers have increased markedly. There were no 50,000-watt stations in 1923. Davidson's book says WPAH may have been the second most powerful station in existence, but it had no more than 5,000 watts. I would guess the DXer of 1923 couldn't even imagine the concept of a 500,000-watt station, which would come into being ten years later in Cincinnati.

Fewer stations, shorter hours, and less power did lead to less interference in the 1920s, but interference was by no means non-existent. The band was narrower – it only extended to 1350 kHz. Radios weren't as selective – couldn't do as well at separating stations on nearby frequencies. Stations weren't as good at staying on frequency. Looking on the list on Jeff Miller's website (see Resources), there are no stations between WGY on 790 and KYW on 870, except for hundreds of "Class A" stations on 830, better known as 360 meters. Presumably the Commerce Department didn't trust these less-well-run stations to stay any closer than 30 kHz to their assigned frequency. Stations able to meet tougher technical standards could earn a "Class B" license which allowed use of less-crowded channels.

Last month I mentioned "cheating," the practice of stations operating illegally at night with daytime facilities. This was considerably worse in the 1920s. Davidson's book cites two cases where WHA was pushed off its channel by Chicago stations extending their hours in violation of time-sharing agreements. WIBO pushed them off 570 kHz, and KYW off 560. WHA is hardly the only station to suffer from interference from "cheaters" in the 1920s. The massive interference is what led to the creation of what would become the Federal Communications Commission, in 1927!

Another practice we mistakenly associate with modern times is the extremely low-powered station. Looking at 1310 kHz in the NRC AM Radio Log, we see nighttime powers as low as 25 watts. Nighttime powers of only one watt are not unusual on some of the clear channels. I can't find any one-watt stations in the 1920s, but there were a number of five-watt outlets licensed. By 1934 most of them had either disappeared or increased power. The 1934 list on Jeff Miller's website does show a 15-watt station in Greenville, Texas. It should be noted that this was 15 watts both nighttime and daytime – today's stations using less than 250 watts at night almost always have a much higher daytime power.

So, overall, there have been dramatic changes to the DX landscape in the last 80 years. At the same time, many things haven't changed. Today's DXers have lamented stations that broadcast every night; stations that broadcast 24 hours a day; stations that broadcast 24 hours a day every day; FM; TV; and now HD.

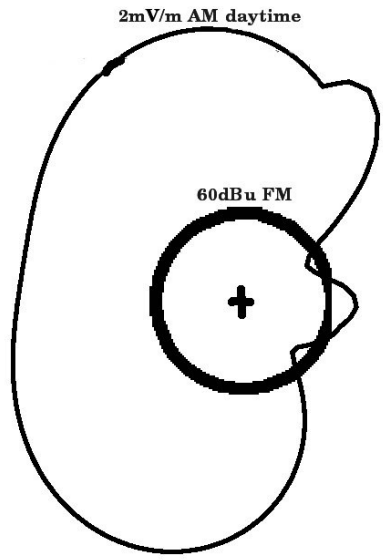
Yet DX survives.

❖ Nighttime IBOC

Nighttime AM IBOC is now on the air. The effect on DX? Not as dramatic as many predicted. It sounds like things may be difficult on the East Coast, but there has been relatively little effect here in Tennessee. The regional and local channels seem almost completely unaffected.

A number of DXers have been chasing the new nighttime digital signals. I've managed four distant HD loggings: WLS-890, WHO-1040, WTAM-1100, and KMOX-1120. WHO is a relog; I heard their HD audio earlier this year early in the morning, before the rising sun had time to kill distant AM signals. See screen captures of the "text IDs" of three of these loggings on my blog (see URL in my byline).

It takes about 8 seconds for the HD Radio encoder circuits to process the incoming



The proposed coverage area of WHIT-940, Hudsonville, MI, and of a hypothetical FM translator.

audio for digital transmission. HD receivers are wired to switch to the analog audio if the digital cannot be decoded. To keep the digital and analog "in sync," an intentional 8-second delay is provided for the analog audio. When I heard WTAM-HD, their analog delay wasn't in the circuit. This meant that every time the digital signal faded in, I heard what they'd said on the analog 8 seconds ago!

On a vaguely related subject, DXers are reporting that WCBS-880 and WFAN-660 in New York were turning off the HD during home games of the Yankees and Mets respectively. Rumor has it this was done to accommodate fans trying to listen to the radio play-by-play in the stadium. Of course, it would be rather distracting to see the ball fly over the outfield wall – and then hear the crack of the bat eight seconds later! I might expect the same thing to happen now with home football games.

I was lucky to log WLS-HD when I did. A report on radio-info.com says that ABC/Citadel has turned off the nighttime IBOC on their stations. DXers have confirmed that WLS, among other stations, is no longer running a digital signal at night. The rumor is that mutual interference among their stations is to blame – maybe between WABC-770 and WJR-760? I've not yet heard any indication that this HD outage is permanent, though.

❖ FM relays of AM

A number of AM stations have recently been granted Special Temporary Authority to use FM translators to relay their signals. The FCC has now proposed regular rules for this service.

FM translators relaying AM stations would have to confine their "60dBu signal" to within the "2mV/m daytime contour" of the associated AM station, or a 25-mile radius of the AM transmitter, whichever is less. The "60dBu signal" of a maximum-power FM translator extends roughly 13km/8 miles. Most are somewhat less powerful. The "2mV/m daytime contour" of an AM station varies wildly with power, ground conductivity, and frequency.

See the attached coverage map. It shows the "2mV/m daytime contour" of WHIT-940's permit to move from South Haven, Michigan, to Hudsonville. Superimposed on the daytime coverage area is the 8-mile coverage area of a hypothetical FM translator relaying WHIT. The FM coverage extends to the east slightly beyond the AM coverage. If WHIT were to actually implement a FM translator, they would have to limit power to less than 250 watts and/or use a tower shorter than 100m.

FM translators are normally required to go off the air if the station they're authorized to relay is off. This proposal would allow FM translators of daytime-only AM stations to remain on the air after the associated AM station signs off for the night, or if it's a "Class D" station that doesn't use its very low nighttime AM power. The Commission is also considering whether certain AM stations should get "first shot" at translators; whether a given station should be limited to some maximum number of translators; whether translator owners should be allowed to lease their facilities to AM stations; and whether FM translators operating in the 88-92 MHz band should be limited to non-commercial operation.

Have you logged any HD DX? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

URLs in This Month's Column:

http://americanbandscan.blogspot.com My AM DX blog

www.rwonline.com/leslie_report/index.cgi The Leslie Report, Radio World Online

http://fjallfoss.fcc.gov/edocs_public/openAttachment.do?link=FCC-07-144A1.txt FCC proposal to allow FM translators of AM stations

http://members.aol.com/jeff560/jeff.html Jeff Miller's radio history site

http://earlyradiohistory.us/ Thomas White's radio history site

www.radio-info.com Radio-Info.com

www.wisc.edu/wisconsinpress/books/3835.htm 9XM Talking, a history of WHA Radio

AM BANDSCAN STATION REPORT

NEW

New station permits granted:

San Luis Obispo, Calif.	1580	1,000/1,300 DA-2
Carbondale, Colo.	1240	1,000/1,000 ND
Escanaba, Mich.	820	2,500/750 DA-2
Sauk Rapids, Minn.	540	250/250 DA-2
Las Vegas, Nev.	670	10,000/600 DA-2, calls KBTB granted

New station applications dismissed:

Sahuarita, Arizona	670	(settlement with KBTB)
Spring Creek, Nevada	1490	
Manor, Texas	1120	
Mantua, Utah	1530	

Applications for new stations:

Kenai, Alas.	980	5,000/1,000 ND
Heflin, Ala.	1370	250/250 DA-N
Prescott, Ariz.	1300	1,500/300 DA-2
Stanfield, Ariz.	1460	2,000/2,000 DA-2
Crescent City, Calif.	1420	1,000/250 DA-N
Redding, Calif.	600	800/1,000 DA-2
Ridgecrest, Calif.	1400	1,000/500 ND reinstated
Santee, Calif.	1400	500/500 ND, 2-site
Susanville, Calif.	1490	1,000/970 ND
Kirk, Colo.	1490	250/250 ND
Billings, Mont.	1530	50,000/750 DA-N, already granted - and then rescinded.
Masonboro, N.C.	820	50,000/3,300 DA-2
Silver City, N.M.	1340	1,000/850 ND
Vanderwagen, N.M.	1490	250/250 ND
Middletown, N.Y.	1400	1,000/1,000 DA-D
Junction City, Ore.	960	50,000/3,500 DA-2
La Grande, Ore.	1030	1,000/600 DA-N
Geistown, Penna.	1350	1,500/890 DA-2, already granted
Dalhart, Tex.	1600	3,000/250 DA-N
Wink, Tex.	1480	1,000/250 DA-N, already granted
Bon Air, Va.	1200	50,000/20,000 DA-2
Quantico, Va.	920	2,000/970 DA-2, already granted
Waterville, Wash.	1450	1,000/500 ND
Mills, Wyo.	1560	10,000/500 DA-N

CHANGES

Stations requesting moves to new cities:

Daphne, Ala.	550	WASG	from Atmore; 5,000/157 ND
Aurora, Ind.	1030	WGYV	from 1380 in Greenville, Ala; 250 DA-D
Wixom, Mich.	1160	WCXI	from Fenton; 15,000/1,000 DA-2
University City, Mo.	1190	KRFT	from DeSoto; 10,000/6,500 DA-2. Already granted - and rescinded.

Stations requesting frequency changes:

Brookfield, Mo.	1210	KFMZ	from 1470KHz; 5,000/50 DA-2

Frequency changes granted:

Agana, Guam	630	KUAM	from 612KHz
Plum Springs, Ky.	1450	WCDS	from 1440 in Glasgow; 1,000/1,000 ND
Montrose, Penna.	800	WPEL	from 1250; 1,000/135 ND

Stations deleted:

Duffield, Va.	1120	WDUF	surrendered license to FCC for cancellation

Call letters assigned to new stations:

Gibsonia, Fla.	700	WJWB	
Hilo, Hawaii	1590	KILE	
Sauk Rapids, Minn.	540	WXYG	
Las Vegas, Nev.	670	KBTB	
Ruidoso, N.M.	1450	KWES	

ND: non-directional
DA-N: directional at night only
DA-D: directional during daytime only
DA-2: directional all hours, two different patterns

Ernest Robl
ernestrobl@monitoringtimes.com

Traveling with a Scanner

"I wonder why we're stopped here," the passenger next to me said.

"There's a freight train ahead of us that has engine problems and that can't move at full speed. It should be able to get to the next siding in a few minutes, after which we can proceed," I explained.

Though, as a journalist, I've visited a range of railroad facilities and traveled on engines of both freight and passenger trains, many of my insights into railroad operations have come from just traveling on passenger trains, when I was not "working." Of course, I had a scanner along that provided many of these insights.

Anyone can do the same. And, as noted above, having a scanner and insights into operations is a great conversation starter with fellow passengers.

What makes having a scanner on board a quite different experience from just listening at trackside is that, particularly on long-distance trains, you hear how a particular train fits into operations on a given line. You also hear transmissions from a variety of other trains that your train passes or meets along the way. And, being on board shows you what operating a passenger train is like in today's railroad climate.

I've been on passenger trains where the conductor radioed the dispatcher to arrange for police meet the train at the next station to remove a disruptive passenger. I've also heard conductors summon medical assistance to meet a train when a passenger fell ill.

But, most of all, when you travel by train, you can devote your entire attention to your surroundings, without having to worry about driving from location to location. And, even with a relatively low-powered scanner with a small antenna, you are always in range of transmissions from somewhere.

❖ Adventure on the Empire Builder

On a memorable trip on the Amtrak Empire Builder from Essex, Montana, to the Minneapolis-St. Paul area, I received a good demonstration of both the value and limitations of railroad radio.

I had interrupted a cross-country rail trip from Portland, Oregon, at the Izaak Walton Inn in Essex, one of the great trackside railfan accommodations. The inn, originally built by the Great Northern to attract visitors to Glacier National Park, still has a strong railroad theme. And, of course, trains of both successor BNSF (Burlington Northern Santa Fe) and Amtrak operate past the front door.

Sunset on the rails behind the eastbound Amtrak Empire Builder on the Great Plains.

Essex has a small BNSF yard, which is the base for helpers assisting trains over nearby Marias Pass and for work trains doing maintenance in this mountainous terrain. In fact, the Izaak Walton Inn has its own platform where both the eastbound and westbound Empire Builder's stop – on request of detraining or boarding passengers only.

Despite cloudy days that obscured the higher mountains, I enjoyed several days in the Essex area. Now it was time to continue the eastward journey.

So, early in the morning, I boarded the eastbound Empire Builder. After cresting Marias Pass, we were soon on the Great Plains, which despite sometimes appearing as "The Big Empty" from the air, were not at all monotonous from the train.

After watching from the rear of the train – I had a sleeper accommodation in the last car of the train – as the sun set on the rails behind us, we began to encounter some of the legendary Great Plains thunderstorms. Lighting flashed, first in the distance then often close to the train. The storms were moving eastward, just as we were, and stayed with us most of the night.

Stretched out on my berth, with the lights off, but the window shade up, I watched the light show – and listened to my scanner.

The engineer and conductor exchanged frequent comments about the weather. And the engineer and dispatcher updated each other about the weather conditions from time to time. The dispatcher had access to regional forecasts and severe weather warnings. The engineer reported the real conditions in the field, which the dispatcher relayed to other trains in the area.

Somewhere in eastern North Dakota or western Minnesota, as we were departing a station stop, the dispatcher came on the radio again, asking our train to copy a track warrant for another train – a very rare occurrence, and the only time I have heard this myself.

The dispatcher reported that we were to meet a freight train many miles ahead – but that lightning had apparently taken out the remote base station closest to that train and he was no longer able to talk to it. Out in sparsely populated territory, the crew of the freight train would be stranded if it could not get authority to continue on. Even when the crew reached the limit of their hours of service, they would probably have to wait a long time for a crew van to reach them as the storms had made driving treacherous.

The dispatcher assured our train that the freight was to be in the siding at the end of its track authority. But, as soon as we were within reasonable radio range, our train began calling the freight to verify its location and to make sure the freight was indeed in the clear.

The freight's crew confirmed that it was indeed in the siding and that the switches were lined for the main. When our crew informed them that our train had a track warrant for them and to be ready to copy, the feeling of relief from

View from the lounge car of the westbound Amtrak California Zephyr in central Colorado. As I'm watching the passing landscape, I'm also following the progress of the train on my scanner.

Eastbound California Zephyr entering Gore Canyon in Colorado in this 1999 view.

the freight crew came across strongly through the radio.

With authority to proceed, the crew would make the next terminal before reaching the 12-hour work limit. Once the freight crew indicated they were ready to copy, the reading back and forth of track warrant was extremely business-like, much as it had been between our train and the dispatcher.

A short time later, we met the freight. And, a few minutes after that, the freight reported it was rolling onto the main. The crews had one final exchange wishing each other a safe journey.

After that, I fell asleep for the final time, waking up before our nearly on-time morning arrival in St. Paul. I had booked an afternoon flight from Minneapolis-St. Paul onward to Chicago and then home to North Carolina – with the expectation that the train's arrival in the Twin Cities might be late.

Ironically, the slow eastward-moving storms reached the Twin Cities just in time to delay my air departure for several hours. And, when I finally reached Chicago, the storm front was now south of Chicago, on my route to North Carolina, so there were several more hours of delays before departing O'Hare.

❖ Another dark and stormy night

Years later, on another western trip, I had chosen Provo, Utah, as a base for exploration and photography in the area. I had booked a motel room and reserved a rental car in Provo, with plans to drive north to both Salt Lake City to see its light rail system and to the Golden Spike National Historic site, where the First Transcontinental Railroad was completed. I also planned to drive back east to the scenic sections around Soldier Summit.

But, most of all, I had long wanted to ride the Moffat route (described in my previous column), parts of which I had seen and photographed while traveling by car. So, I had booked a round trip on the California Zephyr (CZ) between Denver and Provo, with several days in Utah.

I knew I would be getting into Provo late in the evening – the current CZ schedule gets the westbound train into Provo around 9:30 – but the train was running substantially late, as is often the case on this high-traffic route. I assumed I would be able to get a taxi to the motel, only a few blocks away.

The conductor, with whom I had talked a little previously about railroad operations, informed me that the Provo "station" was a simple unstaffed bus shelter type and that taxi service might have shut down for the night. And, as we approached Provo, we were in the midst of a strong thunderstorm.

So, as soon as we came within radio range of Provo, the conductor called the Union Pacific yard office at Provo and asked the UP clerk there to call my motel to see if they could pick me up. The UP clerk reported back that the motel would indeed pick me up. And, after detraining, I spent only a few minutes at the Amtrak shelter – I understand that the facility has since been substantially improved by the town of Provo – before the motel's night clerk showed up to get me. The car rental people picked me up at the motel the next morning, and, after that, I was off on my exploration of Utah.

Needless to say, I was eternally grateful to the Amtrak conductor for his efforts and wrote a letter of commendation to Amtrak after I returned home. And, by coincidence, I had the same crew a few days later on my return trip to Denver, where the conductor remembered me and asked if the trip to the motel had worked out okay.

❖ On-board essentials

When traveling by train, be sure to bring along either an AC adapter or charger for your scanner. Or, if the scanner uses plain batteries, bring several sets of spare batteries.

Amtrak cars, both coaches and sleeping cars, have 120 volt electrical outlets, so, if your scanner can work off AC, you can get in many hours of listening. But, the outlets may not always be exactly where you are sitting. So, include at least a short extension cord in your on-board bag.

Also, bring along earphones. Yes, if you are in a sleeping compartment, you can use the scanner's speaker. But in other parts of the train (you will undoubtedly spend time in either the lounge car or diner on long-distance trains) you need to have earphones. Amtrak requires these for all personal "entertainment devices."

A "rubber ducky" antenna on a portable scanner will work fine for most nearby transmissions. But, if you are in your own compartment, you may also want to bring along an extendable antenna for a little more range.

Radio Shack carried – and may still have – two items that will help. One is an extendable antenna that fits the BNC connector on most scanners; the other consists of a short length of coax cable, with BNC connectors on both ends. The end of the cable away from the scanner is equipped with two suction cups that allow it to mount on a window or any other smooth surface.

The lounge car with its large windows on a westbound Amtrak California Zephyr affords travelers a good view of the stark landscape of Gore Canyon in Colorado.

The extendable antenna goes on the end of the cable and is suction-cup mounted on the window. I've used the same set-up to mount the antenna on an interior rear window of a rental car, substantially increasing the range of my portable scanner.

Next time, another look at evolving railroad terminology.

MT READERS ONLY

To access the restricted website beginning November 30, go to www.monitoringtimes.com, click on the key, and when prompted, enter "mtreader" under the user name. Your password for December is "crosley" – Check in each month for new material!

BELOW 500 kHz

DXING THE BASEMENT BAND

Kevin Carey, WB2QMY
kevincarey@monitoringtimes.com

"Our" Season is Here!

What is it about winter? For some reason it always seems to bring heightened interest in Longwave DXing. Perhaps it's because there's very little static on the band, or that the long nights promote DX from greater distances, or that there's no yard work to do. Whatever the reason, it is a welcome situation for the longwave monitor, and it certainly beats shoveling snow from your driveway!

❖ Chasing Euro-Broadcasters

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

Below are listed some reliable stations you may want to try for. There are many others, but these are the ones most frequently reported to the column. Note the high Effective Radiated Power (ERP) used by these stations.

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

❖ Beacons

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

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

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

When hunting beacons, don't neglect the band during the daytime. Although you won't hear stations from as far away during the day, you're likely to hear some beacons that are covered up by DX at night. In fact, some DXers enjoy the challenge of daytime monitoring. An intercept of 400 miles or more during the day would be a prized catch indeed.

"Snowy Beacon" AS/359 kHz near Amherst, NH, is typical of many aviation beacons in North America. V-shaped antenna to the right is for a separate 75 MHz marker signal.

❖ Lowfers

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

Limited by regulation to 1 watt and a 50 foot/15 meter antenna, these experimenters operate their stations in an effort to "push the envelope" of low power communication. Take a slow spin through this band and you might be rewarded with a Lowfer intercept. For an online list of active stations, check out the listings available at **www.lwca.org**. QRSS (super-slow CW) is a predominant mode these days, and you'll need a piece of free software to decode it. Perhaps the most popular program for QRSS is Argo, and it is available for download at: **www.weaksignals.com**.

A little further down the band at 136 kHz, you may find more experimental activity. In many countries, governments permit amateur access to this frequency with much higher power limits than those imposed on the traditional "Lowfer" band. In fact, even in the United States and Canada there are a few stations operating here with temporary permits.

Jumping up the band for a moment, there's another group of U.S. experimenters operating near 505 kHz under a special FCC license (callsign WD2XSH). For more information on their activities, visit **www.500kc.com**. You can even submit a reception report at this web site.

❖ Going Even Lower

Below 136 kHz, the main signals you'll hear are military RTTY stations sending encrypted data. These powerhouses are at various locations in the U.S. and can frequently be heard around the clock. At 60 kHz, you should be able to hear the pulsating carrier of WWVB in Fort Collins, CO. (This signal is sometimes confused with slow Morse Code.)

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

At 17.2 kHz, you may be lucky enough to hear the last working example of an Alexanderson Alternator. This electro-mechanical transmitter (no tubes or transistors) takes to the air from a museum in Grimeton, Sweden. It is fired up for special occasions. You can view the operating schedule and learn more about this historic transmitter at **www.alexander.n.se**. Listeners in Europe and the East Coast of North America would have the best shot at hearing this rare station.

Best wishes for wintertime DX! See you next month.

George Zeller
georgezeller@monitoringtimes.com

Commander Bunny's Presidential Bid

Commander Bunny's campaign for President of the United States from his pirate radio station **WBNY** has been generating some interest outside the shortwave radio hobby. Of course, this is a tongue-in-cheek campaign, but it has the advantage of free radio publicity on the pirate radio station.

The normal **WBNY** format is a parody of political clandestine radio broadcasters. Amid his Easter music, Commander Bunny transmits propaganda and coded messages from the Rodent Revolution. But, his decision to run for President of the United States has expanded the field of candidates. Perennial also-rans such as Alfred E. Newman will watch their poll ratings fall.

Newman's campaign slogan has always been, "You could do worse, and always have." Commander Bunny's slogan is more obscure. He requests that you stick a very large carrot into the floppy drive of your computer to obtain the slogan. In the meantime, he promises to eliminate all Monkey Boys from the halls of government in Washington.

As we see here this month, Commander Bunny offers campaign t-shirts, bumper stickers, and other campaign paraphernalia for sale on e-bay. The use of e-bay as a campaign finance mechanism breaks new ground in United States presidential campaign strategies. His running mate is Kracker from **Kracker Radio**.

❖ Christmas is Biggest Pirate Holiday

As we note every month, shortwave pirate radio activity always increases significantly around major holidays. Christmas is by far the biggest holiday of the year for pirate radio purposes. The second most important holiday is normally New Years Eve and New Years Day. So, this month we enter the most active period of the year for radio broadcasting on the pirate bands. Perhaps Santa will bring you a new receiver so that you can take advantage of this annual extravaganza of holiday radio programming. The activity not only takes place on Christmas and Christmas Eve, but it also extends to surrounding weekends.

Your columnist's most memorable pirate radio reception during the Christmas holiday involved legendary superpowered medium wave pirate station **WJDI**. It was broadcasting on 1610 kHz in the days prior to the expanded medium wave band. I was driving down the road and listening to this powerful signal on my car radio with a crystal clear signal. I knew that Cleveland Hopkins International Airport operated a traveler's information station on 1610 kHz. Since I was driving in the vicinity, I decided to take a side trip to the Cleveland airport.

I pulled right up next to the transmitter of the Hopkins Travelers Information Station on 1610 kHz. I parked my car at the side of the road next to the airport transmitter. At a distance of 30 feet from the transmitter, I could not hear the airport station. It was totally swamped by the multi-kilowatt **WJDI** signal being transmitted from parts unknown. Amazing!

Reception of this quality is never guaranteed in pirate radio DXing. But, there is no better time of year to check out the pirate bands. Good luck to everyone this year!

❖ Mysterious Carrier

Harry Helms and numerous other medium wave DXers have reported a very strange and loud dead carrier on 1181 kHz that has been heard on a widespread basis. Your columnist has not heard it himself, given a loud signal on **WHAM** in Rochester, NY at 1180 kHz. But, there are reports of this strange signal from most areas of North America. Have you been hearing this odd signal?

❖ Odd Alabama Signal

MT reader Brian Turner sends in a log of a local FM signal that he has been hearing in Alabama. It's on 107.1 MHz, and it carries no local identifications. Their programming consists of a relay of CSN, a Christian radio network. He says that the signal is strongest in Athens, AL. He also hears the same programming on a licensed FM translator on 102.5 MHz, so he presumes that the 107.1 MHz signal is a transmitter spur. Although odd, this one is clearly not a pirate.

❖ What We Are Hearing

Monitoring Times readers heard two dozen different pirate radio stations this month. 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.

Captain Morgan- The Captain still mixes audio from the Twilight Zone TV show with classic rock music. (None; send loggings to Free Radio Network)

Ground Zero Radio- Burt the Turtle's old civil defense propaganda film "duck and cover" and other items related to nuclear weapons spice up the rock music on this station. (Announces defunct Elkhorn; also uses *gzrsw@yahoo.com*)

Liquid Radio- They reappeared for a second month in a row with a mix of techno rock and world music. (None; has replied via FRN)

Long Range Radio- They broadcast a format that is widespread in the history of pirate radio, namely rock music mixed with comedy material. (None)

MAC Shortwave- Paul Star's authentic replica of top 40 radio formats of the 1960s still operates on variable pirate frequencies such as 3275, 6850, and 6925 kHz. He has endorsed Commander Bunny for President. (*macshortwave@yahoo.com*)

Maple Leaf Radio- Canadian content predominates on this one. They have been known to operate on Hockey Night. (*radio.mapleleaf@gmail.com*)

Moonshine Radio- This apparently new pirate features classic rock music selections. (None announced)

Northwoods Radio- Their distinctive "loon call" interval signal "from the Great Lakes" normally precedes generally precedes a program of rock music. (*northwoodsradio@yahoo.com*)

Mystery Science Radio- Their latest broadcast was odd, with classical music and a ukulele rendition of Chopsticks. (None known; announced Elkhorn maildrop is closed)

Radio 6X- Bucky, their announcer, normally programs very old rock oldies tunes. (None)

Radio Mosiach & Redemption- Sometimes misidentified as Lubivitcher Radio, this ultraconservative Jewish religious pirate shows up fairly regularly on 1710 kHz. Their web site **www.radiomoshiach.org/** announces future plans for shortwave, FM, and "other broadcast methods." (None announced, but the web site accepts financial donations)

Radio Paisano- They play Italian music and they sign off with the Italian national anthem. They often show up around Columbus Day, but they are sometimes active at other times as well. (*radiopaisano@gmail.com*)

Random Radio- Recent shows have largely been comedy sketches, but their format varies to include

Continued on page 61

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

Ham Radio's Holiday Gifts

Well, here we are at the end of another year. We are still starting the slow climb back up the Solar Cycle, but hams can always find some operating fun regardless of conditions. In past issues I have made it a point to use the December column to give folks some ideas about great ham radio holiday gifts. I planned to go down the same road again this year. There are a lot of great new radios on the market, all well worth talking about.

But then, I was putting together this month's Contest Corner sidebar and the big old light went on over my head. How about this December I write about the gifts that hams give to each other all year round?… QSOs and Contests!

December has always been one of my favorite months for both competitive and non-competitive operating. Even at the bottom of the cycle, some great contest challenges are out there. The season also brings along a few contests that are just plain fun and games. And let's not forget the great Special Event stations that show up this time of year.

So my holiday gift to you all is to unpack the Contest Corner entries a bit and also look at a few other fun Special Events that sure to make the start of winter loads of fun.

ARRL 160-Meter Contest
Nov 30, 2200 UTC to Dec 2, 1600 UTC
www.arrl.org/contests

160 Meters is always a challenge. Getting a signal through the noise floor on this band is a feat at the best of times. December usually presents the best of conditions for working the "Top" band in ham radio.

The American Radio Relay League always runs this contest on the first weekend of December. There are three power classes in this contest: QRP (5 Watts or less), Low (5 to 150 Watts) and High power (150 Watts to Full Legal Limit). You can operate Single Op or Multi-Op using a single transmitter (one band, duh!). The exchange is callsign, signal report and ARRL/RAC Section. DX just needs to send a signal report. Maritime Mobile stations should include ITU region. To facilitate working DX stations, the 1.830 to 1.835 MHz section of the band is reserved for intercontinental QSOs.

If you are not familiar with the wonders of 160 Meters, this annual contest is a great place to get your feet wet.

Contest scoring, forms and other information can be found at the ARRL website listed above.

ARS Spartan Sprint
Dec 3, 0200 UTC to 0400 UTC
www.arsqrp.com/

The Adventure Radio Society operates monthly Spartan Sprint contests to promote their goal of encouraging light weight, low power operating from interesting locations. Most Sprint contesters operate from their home station, abiding by the 5 Watt or less power rule, but the real fun is to take your station out into the field.

Scoring in this contest is rather unique. There is a "Skinny" and "Tubby" division.

Skinny operators compute their score as a ratio of contacts to overall station weight. This means the *entire* station including power, antenna and accessories. So you can see where ultra-portable stations can be very competitive. Tubby stations just report their contacts.

You can cram a lot of radio into an Altoids™ Mint Tin, powered by a 9 volt battery into a 1/4-wave wire, with a small home brew hand key. You're well under half a pound with such a set-up. Folks put together some amazing systems where they even calculate their weight in 100ths of a pound. Many of these set-ups can be viewed at the Adventure Radio Society website listed above, where you will also find more detailed rules and regulations. You may even get motivated to load that little rig into a pocket of your backpack and go try some great winter camping.

❖ Pearl Harbor Day Remembrances

December 7th is the "Date that will live in infamy." Many hams, especially those who served in Naval Operations during World War II work to keep the memory of the attack on Pearl Harbor in the front of our minds by setting up a number of special event stations on or about that date. Here are a few of the stations you can try to work at this special time in December.

W2W Dec 1-Dec 9, 1500 -2000 UTC
W3HEM/W3GR Historical Electronics Museum ARC, Baltimore, MD

Operating frequencies will be 14.271, 14.071, 7.271, and 7.071 MHz.

A certificate commemorating your QSO is available by writing to The Historical Electronics Museum, PO Box 1693 MS 4015, Baltimore, MD 21203. Ops are asked to submit $1.00 with an 8-1/2 x 11 SASE to help defray costs.

More information about this Special Event Station can be found at **www.qsl.net/w3hem**

W5KID Dec 7, 1500-2230 UTC
USS Kidd Amateur Radio Club,
Baton Rouge, LA

Operating frequencies will be 14.250 to 14.320 MHz SSB, 28.060 21.060 14.060 10.106 7.040 MHz CW.

A certificate commemorating your QSO is available by writing to W5KID, c/o USS Kidd Museum, 305 South River Rd, Baton Rouge, LA 70802.

More information about this Special Event Station can be found at **www.lsu.edu/brarc/USS_Kidd.htm**

NI6IW Dec 8, 1600-2300 UTC
USS Midway CV-41 COMEDTRA, NI6IW,
San Diego, CA

Operating frequencies will be 7, 1941. 14.325 7.260 MHz.

A certificate commemorating your QSO is available by writing to USS Midway CV-41 Museum, 910 North Harbor Dr, San Diego, CA 92101.

More information about this Special Event Station can be found at **w9bq@aol.com**

And before we get back to looking at the December contests, let's add one really fun Special Event Station that I never miss.

WX3MAS Dec 8-Dec 10, 1400-0200 UTC
Christmas City and Delaware-Lehigh AR Clubs, Nazareth-Bethlehem, PA.

Annual Christmas greetings from the Twin Christmas Cities.

Operating frequencies will be 28.465 21.365 14.265 7.270 3.970 MHz. A certificate commemorating your QSO is available by writing to CCARC/DLARC WX3MAS, Greystone Building, Gracedale Complex, RR 2, Nazareth, PA 18064.

More information about this Special Event Station can be found at **www.dlarc.org**

ARRL 10-Meter Contest
Dec 8, 0000 UTC to Dec 9, 2400 UTC
www.arrl.org/contests

The annual League 10 Meter Contest has always been one of my favorite contests, regardless of the quality of conditions. After all, the sunspot cycle is in the same place for everyone. As with the 160 Meter Contest, there are three power classes in this contest: QRP, Low and High power. Also, in each of the power classes you have the option of operating Phone, CW or Mixed Mode (Phone and CW).

The exchange is callsign, signal report, and State or Province. DX sends a signal report and sequential serial number starting with 001. Maritime Mobile stations should include ITU region and ITU Region.

Contest scoring, forms and other information can be found at the ARRL website listed above.

I usually operate this contest QRP Phone and I have even won my section in this class. No matter what class you enter, 10 meters in December is the place to be.

NAQCC Straight Key/Bug Sprint
Dec 12, 0130 UTC -0330 UTC
www.arm-tek.net/~yoel/index.html

December always brings out the best QRP contests, even at the bottom of the solar cycle. The North American QRP CW Club's name says it all. They encourage operating at low power in the CW mode. Their contests also encourage using simple wire antennas, a class of operation I have thought should be part of every contest. Many folks can't put up big gain antennas.

This particular contest also emphasizes "manual" operation. Operators using either a Straight Key or Semiautomatic Bug for the duration of the Sprint will receive point mulitpliers. If you haven't tried QRP CW, the NAQCC sprints are a friendly place to get your feet wet in the most exciting, challenging and fun ways to play ham radio. Sure, things are tough right now, but conditions will be steadily improving through the coming years, so build your skill set now to take full advantage of the next top of the cycle.

MDXA PSK Death Match
Dec 15, 0000 UTC to Dec 16, 2400 UTC
www.mdxa1.org/deathmatch.html

Speaking of getting your feet wet, if you have yet to give digital operation a try, PSK the place to start. The Michigan DX Association offers a great December contest centered around PSK31 and PSK64 operation. These folks have a really fun attitude toward contesting. From their website: "This is a DeathMatch, it is not designed to be a walk in the park and it is held only once a year! Only the strong will survive. You may take all the breaks you want but your totals will suffer. Just do your best within the 48 hours and see if you have the right stuff! Good luck and fire up those interfaces. The PSK DeathMatch Sword and Daggers wait for you if you are up to our world wide digital duel challenge!"

How many contests do you know of that give a SWORD to the winner? There are three operating classes: Class 1 – 50 Watts DX, Class 2 – 50 Watts domestic and Class 3 – QRP 5 Watts. More information can be found at the MCXA Web site listed above.

QRP ARCI Holiday Homebrew Sprint
Dec 16, 2000 UTC - 2400 UTC
www.qrparci.org

Another QRP contest with another great twist. Homebrew is defined as: if you built it, it is homebrew (kits, too)! Significant points are awarded for putting your home made equipment on the air for this operating event. They also offer another chunk of points if you operate fully portable using battery power and a temporary antenna.

Operating categories are: All-Band, Single Band, High Bands (10m-15m-20m) or Low Bands (40m-80m-160m). There are point multipliers for members and power multipliers all the way down to a whopping x20 for operating 55 mW or less. I have a wide choice of homebrew gear I can bring to the table for this contest, but I always make a point of putting my classic Heathkit HW7, HW8 and HW9 on the air during this event. One of my favorite holiday traditions.

Stew Perry Topband Distance Challenge
Dec 29, 1500 UTC to Dec 30, 1500 UTC
http://jzap.com/k7rat/stew.html

Here is another great 160 meter contest. It is held each December in honor and memory of the true master of 160 meters, Stew Perry W1BB (SK). Unlike the League event earlier in the month, this contest uses grid squares for the exchange and a QSO point system which awards points in proportion to the distance between the stations making the QSO. There are also power multipliers (x2 for 100 Watts and x5 for 5 Watts).

Unique to this contest is a multiplier for *working* QRP stations. If you take the time and effort to dig a low power operator's signal out of the noise floor, you are rewarded with a x4 multiplier for that QSO. This is another great opportunity to try out the Top Band.

Straight Key Night
Jan 1, 2008, 0000-2400 UTC
www.arrl.org/contests

Since this event actually begins on Dec. 31st local time for most folks, I couldn't resist including it. First of all, SKN is NOT a contest in the traditional sense of the word. It is truly an operating event. Emphasis is on good old fashioned rag chewing using the most basic skills in amateur radio. I have an old J-38 I dust off for part of this event each year. I also take down my Vibroplex Bug given to me by "Bubby" Jobes WA2YOB a few years before he went Silent Key. SKN is a time for fun, traditions and memories. What a great way to ring in the New Year.

There you have it. Ham radio's Holiday Gift to hams everywhere – great December operating fun. From N2EI, my XYL, my harmonics and our house full of DX dogs and cats, we wish you a peaceful Holiday Season and a Prosperous New Year full of great QSOs. I'll be looking for you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CALENDAR

ARRL 160-Meter Contest
Nov 30 2200 UTC - Dec 2 1600 UTC

ARS Spartan Sprint
Dec 3 0200 UTC - 0400 UTC

ARRL 10-Meter Contest
Dec 8 0000 UTC - Dec 9 2400 UTC

NAQCC Straight Key/Bug Sprint
Dec 12 0130 UTC - 0330 UTC

MDXA PSK Death Match
Dec 15 0000 UTC - Dec 16 2400 UTC

QRP ARCI Holiday Homebrew Sprint
Dec 16 2000 UTC - 2400 UTC

Stew Perry Topband Challenge (160 Meters)
Dec 29 1500 UTC - Dec 30 1500 UTC

Straight Key Night
Jan 1, 2008 0000 - 2400 UTC

Outer Limits continued from Page 59

rock and country music. (None; asks for reports via the FRN web site)

Sycko Radio- This now veteran pirate sometimes IDs as **WSKO**. Recent broadcasts had a parody of the "war" between **WBCQ** and hobby pirates. (*syckoradio@yahoo.com*)

The Crystal Ship- The "Voice of the Blue States Republic" features veteran pirate "The Poet." He programs leftist political discussions and rock music. Frequencies are variable, including 1710, 3346, 3275, 5386, 6875, 6925, 7576, and 9057 kHz. (Belfast and *tcsshortwave@yahoo.com*)

Theramin Radio- Apparently a new station, they have been mainly transmitting psychedelic instrumental music so far. There is some speculation that their shows may be recycled from other pirates in some cases. But, little is known about them. (None known)

Uncle Bob Radio- Little is known about this new station, which discusses tire pressures and other inside jokes among pirate stations. (None known)

Undercover Radio- Dr. Benway continues to broadcast "from the middle of nowhere," with rock music and adventure stories. (Merlin and *undercoverradio@mail.com*)

WBNY- Commander Bunny's clandestine parody and political campaign remains among the most active pirates in North America. He says that he has been on the air for 42 years. (Belfast and announces *rodentrevolutionhq@yahoo.com*)

WMPR- "Micro Power Radio"still regularly transmits techno rock dance music. (None, QSLs only rarely at the Kulpsville Winter Shortwave Listeners Festival).

WMSR- A slogan of "Mondays suck" may have inspired their call letters. They feature oldies rock tunes about the days of the week. (None announced)

Wolverine Radio- Here's another pirate that uses the classic pirate radio formula of rock music and comedy. (None announced)

❖ 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.

Addresses, identified above in parentheses:

- PO Box 1, Belfast, NY 14895
- PO Box 109, Blue Ridge Summit, PA 17214
- PO Box 146, Stoneham, MA 02180
- Casilla 159, Santiago 14, Chile
- PO Box 293, Merlin, Ontario N0P 1W0
  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.
- Free Radio Weekly newsletter *EInsinge@vrxus.JNJ.com*
- Free Radio Networkt **www.frn.net**

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column.

We thank this month's valuable contributors**:** Brian Alexander, Mechanicsburg, PA; Kirk Baxter, North Canton, OH; Jerry Berg, Lexington, MA; Artie Bigley, Columbus, OH; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Smithville, TX; Bill Hensel, no QTH; Eric Hopkins, Ayer, MA; Ed Insinger, Summit, NJ; Ed Kusalik, Coaldale, Alberta; Chris Lobdell, Tewksbury, MA; Greg Majewski, Oakdale, CT; A. J. Michaels, Blue Ridge Summit, PA; John Poet, Belfast, NY; Martin Schoech, Eisenach, Germany; Brian Turner, Athens, AL; Bob Wilkner, Pompano Beach, FL; and Bob Zanotti, Langnau, Switzerland.

Clem Small, KR6A
clemsmall@monitoringtimes.com

Diversity Reception, Smart Antennas, and Reliable Communication

An antenna system is composed of an antenna, or antennas, and all the associated components that function with the antennas to capture a desired signal and route it to a receiver, or to launch a signal from a transmitter toward a distant receiving antenna. Space diversity and polarization diversity are useful antenna systems that utilize two or more antennas connected to one specialized receiver. Due to the circuitry involved, this can often reduce the fading of received signals.

❖ Space Diversity

A shortwave radio signal may produce multiple rays which reflect from different layers of the ionosphere. As the state of the ionosphere varies, the phase of these rays can vary. Changes in the ionosphere can also cause modest changes in the point of arrival at the receiving antenna for these rays. As groups of these rays combine at the receiving antenna, their changing phase relationships often cause fading of the signal.

Let's say that the two antennas of a diversity receiver are separated by a wavelength or more. Then, although rays arriving within the capture area of one antenna might produce fading, a different group of rays arriving within the capture area of the other antenna might be of satisfactory strength: so when one antenna cannot produce usable output, the other antenna may. If space diversity is used the likelihood of fading is thus reduced.

❖ Polarization Diversity

The "polarization" of an incoming radio wave is determined by the orientation of its electrical field. If this field is vertically oriented, we say that the wave is vertically polarized; if the field is horizontally oriented, we say the wave is horizontally oriented, and so forth.

Antennas also have polarity, and, in general, a vertically-oriented antenna is vertically polarized, a horizontally-oriented antenna will be horizontally polarized, and so on. Antennas produce more received signal strength when the polarity of the incoming wave is similar to the polarity of the receiving antenna than if their polarizations are very different.

If the two antennas of the diversity receiver have different polarity – say, one mounted vertically and one horizontally – then when ionospheric turbulence varies the incoming signal's polarity, one of the antennas is likely to respond more to that signal than the other. When one antenna produces little usable signal, the other antenna may be producing a receivable signal. With polarization diversity, the likelihood of fading is also reduced.

❖ Did You Notice?

By now you may have noticed the similarity between the increased reliability of communications provided by a dual-diversity receiver and the increased reliability provided by the use of today's "smart antenna systems." However, the similarity stops there: the two devices function quite differently. Whereas dual-diversity receiving depends on analog circuits, smart antennas depend heavily on digital-logic circuits. Whereas a diversity receiver combines the output of both its antennas simultaneously, smart antennas analyze the output of multiple antennas. They then use the results to make logical decisions as to how to modify the overall antenna system to maximize the reliability of communications for both receiving and transmitting.

Let's take a look at the basics of how this is accomplished.

Ears as Antennas:

For a moment let's imagine that our own two ears are the antennas of a smart antenna system, and that the signal those antennas are to receive is a weak sound that you just noticed. Imagine also that your brain is the logic circuitry that makes decisions on how to utilize those ears (antennas) for best reception of that signal.

Because we have two ears, our brain can tell us to some degree the direction from which the sound comes. So, as we first detect the sound, we will automatically turn our head toward the source of that sound to maximize reception of that signal. If there is interfering noise, we may cover the ear that is receiving more of the interference in order to improve the ratio of desired signal strength to the strength of the interfering noise. Or, in order to increase the level of desired signal strength, we may cup our hands behind our ears to focus more of the desired signal to our ears.

Antenna as Ears:

The smart-antenna system includes multiple antennas and a means to determine the relative strength of the desired signal produced by each antenna. And just as our brain sends signals to orient our head and ears toward a desired sound, the smart-antenna system orients its antennas (electrically or mechanically) to maximize reception of the desired radio signal.

Continuing the analogy, we find that just as we can take action to reject interfering sounds (covering one ear), the smart-antenna system can manipulate the radiation-reception pattern of its combined antennas to reject interference. And just as we can focus with our cupped hands to increase the level of the desired sound that our ears receive, the

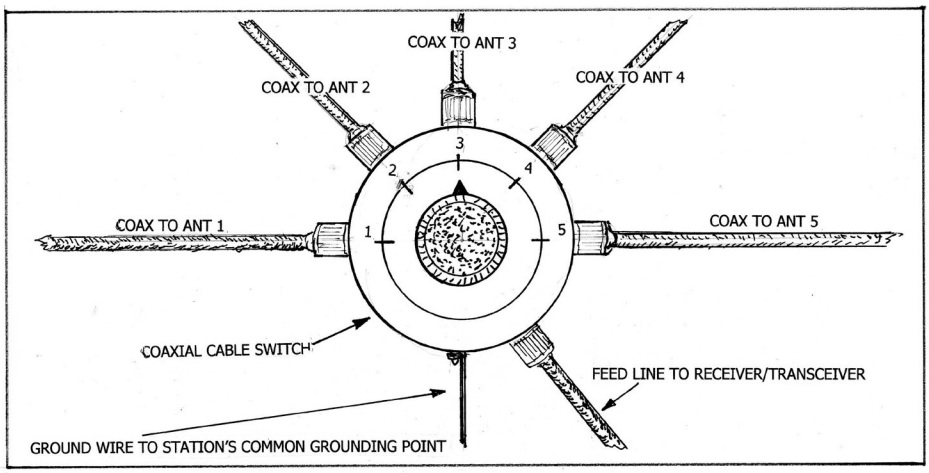


Fig. 1. A coaxial switch with multiple antennas set up for the "Poor Man's Smart Antenna System."

This Month's Interesting Antenna-Related Web site:

An extensive and good discussion of smart antennas:
www.iec.org/online/tutorials/smart_ant/
A history of diversity reception:
www.radioblvd.com/DiversityDD1.html
Info on sloper beams:
www.hamfesters.org/chiAnt1.htm

smart-antenna system can manipulate its radiation-reception pattern to form a beam that focuses its responsiveness to the desired radio signal.

In sum, both diversity antenna systems and smart antenna systems can be useful for increasing the reliability of communications.

❖ Let's Make a "Poor Man's Smart Antenna System"

Few of us have the finances to purchase our own smart antenna system. On the other hand, there is a less-expensive kind we'll call "The Poor Man's Smart Antenna System" (fig. 1). You save a lot of money by using your own "smarts" as the logical decision maker, and the muscles of your hand replace the mechanical and electrical adjustments done by a real smart-antenna system.

What we need for the Poor Man's Model is a shortwave receiver or transceiver, two or more antennas that are likely to receive different rays of a signal (as explained above), and a way to switch easily and quickly between them. When the signal you are listening to begins to fade, you can quickly scan through the antennas by rotating the antenna switch knob, and, if luck is with you, one or more other antennas will be receiving the signal at a useful level. And happily, due to antenna reciprocity, the source you hear well should be able to hear you well, so this system is useful for transmitting as well as receiving.

For the antennas, you can use two antennas separated by a wavelength or more (if you don't have that much land, do what you can), or you can use two antennas: one vertically polarized and one horizontally polarized. If you can put up more than two antennas, you might try a vertically-polarized and a horizontally-polarized antenna at one location and a second pair of the same spaced a wavelength or more away.

You can also change transmit-receive directions with this system using only fixed-direction beams. For example, I once used this system with a set of four half-sloper beams spaced equally around one central mast. It was relatively easy to make, and the results were fairly impressive.

RADIO RIDDLES

Last Month:

I asked: "OK, now you know what an active antenna is. Are there any inactive or lazy antennas?"

Well, this is kind of a trick question. I wouldn't say that the lazy-H antenna is inactive: it's a good antenna by all reports. But it is shaped like the letter "H" lying on its side, so it's called "lazy." And I've seen references to a "lazy U" antenna, also. So, yes, we do have "lazy" antennas.

This Month:

Antenna reciprocity was mentioned above. What is it?

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.

Marc Ellis
marcellis@monitoringtimes.com

A Permanent Power Supply for the BC-348

Back in June, when I first began to talk about our BC-348, I speculated on the meaning of an interesting asset tag attached to the upper-right-hand corner of the panel. It was marked "CAATC No. 1092," and indicated that it was issued to Pan American Airways.

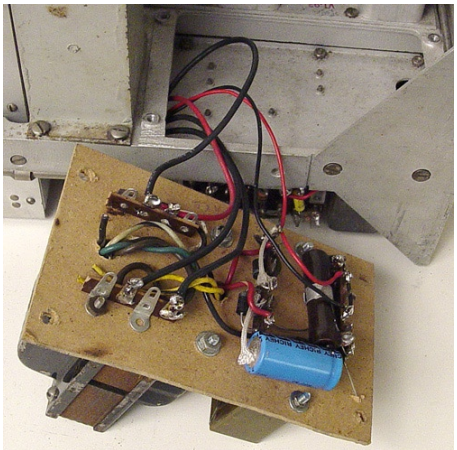
I had guessed that the "TC" in the designation perhaps stood for "traffic control," one of the Civilian Aeronautics Authority's major functions. And I speculated that the radio might have been placed in one of PAA's fleet of Boeing B-314 flying boats (or "Clippers") that had been pressed into service to carry war materiel across the Atlantic during World War II.

Well, maybe this BC-348 was indeed used in a Pan American Clipper, but that is about the only part of my guess that hasn't been disproved. In response to my request for reader input on this matter, I recently received a note from Whitham D. Reeve of Reeve Engineers in Anchorage, Alaska. He writes:

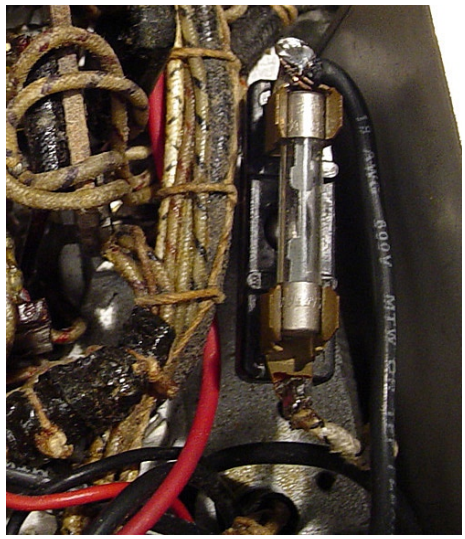
The CAATC designation on your BC-348 stands for CIVIL AERONAUTICS AUTHORITY TYPE CERTIFICATE. This was a government certification that indicated radio equipment was suitable for use on airplanes used in the civil air traffic control system. A lot of military radio equipment was certified under CAATC after the war, usually by very minor modifications to improve reliability or accuracy.

❖ Completing the BC-348 Power Supply

Last month, I made up a composition board "chassis" to use for an a.c. supply that would fit over the dynamotor well of our BC-348. The supply was put together using a power transformer contributed by a friend and a choke I picked up at last August's Antique Wireless Association Annual Conference. With this transformer, the B plus voltage turned out to be about 50 volts too high.



Power supply connected to the newly installed wiring for testing.



A replacement fuse block was installed at the original fuse location, but raised on a spacer for easier access.

After putting in a dropping resistor of some 625 ohms, temporarily made up of four 2500-ohm power resistors in parallel, the B plus dropped to a level near enough to proper so that I could test the supply with the radio. And I found that the radio was working as well (or as badly, as I put it last month) as it had with the temporary supply I haywired together for the test I had made the previous month.

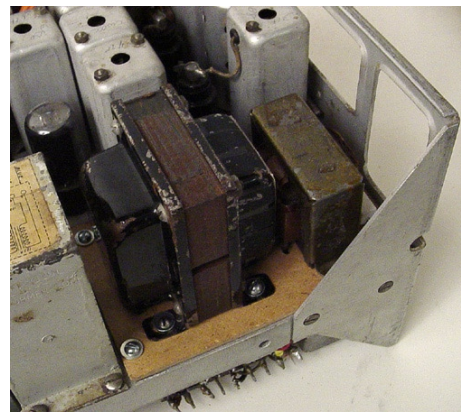
It would have been messy to use the four 2500-ohm resistors even if I had room for them – which I didn't. So I ordered a few 10-watt power resistors with various values around 625 ohms, and these were on hand at the start of this month's work session. I tested a few of the new resistors by clip-leading them in series with the power transformer's center tap (essentially putting them in series with the power supply's negative bus).

It turned out that a 680-ohm resistor gave a power supply output close to the 220-volt B plus that the BC-348 expected to see. However, I was concerned about the loud hum I had heard in the headphones during both this month's and last month's tests.

This could simply have been a symptom of whatever is wrong with the receiver. (Remember, the set isn't working yet!) But I wondered if the problem might have something to do with the location of my dropping resistor and the fact that, in the BC-348, the power supply's negative lead is not connected to receiver ground.

Acting on this hunch, I reconnected the high-voltage center tap directly to the negative bus and placed my dropping resistor in series with the B plus lead to the radio. I was gratified to find that the hum had now dropped considerably, and was at a level that was quite acceptable. However, for some reason, the B plus at the set had increased to about 260 volts. This was of some concern because a group of metal-cased paper capacitors that I have not replaced in the set carry 250-volt ratings.

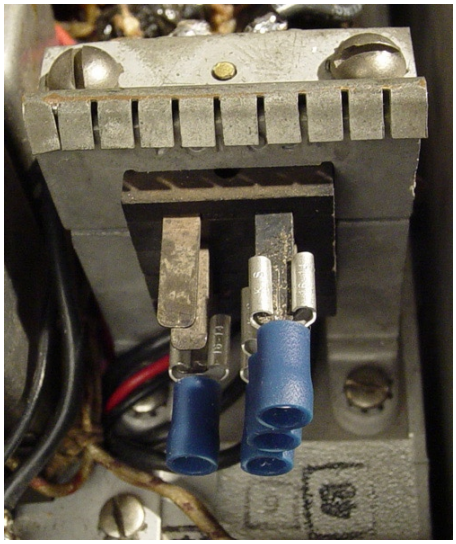
Since I didn't have a higher-value dropping resistor on hand, I decided to try reconfiguring the power supply filter from capacitor input to choke input. This was accomplished simply by removing the filter capacitor from the transformer side of the choke – leaving just the capacitor on the far side. The B plus voltage now dropped to an acceptable level, and I was interested to see that the receiver hum level had not noticeably increased. I now mounted my dropping resistor on top of the power supply board, where it would have more ventilation for heat dissipation, and wired it in permanently.



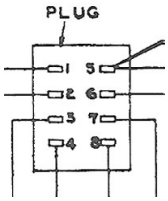
The power supply chassis fits snugly over the dynamotor well–which is deep enough to allow clearance for parts and wiring. I admit, the transformer and choke are not exactly pretty–but they do their job!

❖ Getting Power In

The supply was ready for connection to the radio, but there were some housekeeping issues that needed to be dealt with first. Up to this point, I had been powering the supply via a temporary line cord wired directly to the transformer primary. Now I needed to find a way to get the a.c. line into the radio through the cabinet and arrange



The power/control connector is here shown upside down to show the fit of the slide-on terminals. See the accompanying diagram, which is shown right side up, for numbering of locations.



for both a front panel switch to turn the set on and off and a fuse for the transformer primary circuit.

Back when I was considering powering the BC-348 with an external supply, I came upon a way of running the necessary six leads from the supply into the radio without drilling any holes. It involved removing the shield around the cabinet opening for the power and control connector. This uncovered an opening through which the wires could be snaked into the set. In case some future owner might want to reverse this modification, I had intended to store the shield and its mounting screws in the empty dynamotor well.

But now, with an internal supply, only the a.c. supply leads had to pass through the cabinet. Not only that, but the dynamotor well would no longer be empty and available to store the shield and its screws.

At this point, I made a useful discovery involving the power/control connector at the back of the set. This connector is often ignored by restorers because plugs for it are virtually impossible to obtain. However, the flat male "tongues" on the connector were just a little narrower than those used to accept standard female slide-on terminals as used in appliance and automobile wiring.

As shown in the accompanying picture, these terminals install very well on the connector tongues even though the latter are not quite wide enough to completely fill the space between the contact springs. So I could use them for their original purpose of getting power into the set.

The terminals I used are Buchanan #70072 crimp-on female disconnects sized for #15-#14 AWG conductors. I had to tin, and then double over, the ends of the smaller gauge wire in my a.c. zipcord so that they would occupy enough space to be properly crimped into the connector barrels. Perhaps similar connectors are available for smaller sized wires.

I've photographed the power/control connector upside down to give you a better view of the terminal attachments, but am also including a right-side-up drawing of the connector for your reference. The pair of side-by-side terminals in the picture (2 and 6 on the drawing) are for receiver muting. They will be shorted by a jumper in our project, but can be connected to a pair of relay or switch contacts to silence the receiver during transmission. Terminals 1 and 5 on the drawing (below 2 and 6, and not visible in the picture) provide receiver output for the aircraft interphone system. They are not used in our project.

The two terminals stacked at the top of the picture (3 and 4 on the drawing) will be used to bring the a.c. line into the set. They are on tongues that were originally wired together at the back of the connector and used to input plus 24 volts to the receiver. A lead went from the tongues to a fuse block under the chassis, and then from the block to a switch segment on the "avc-off-mvc" control. The 24-volt power was applied to the tube heaters and the motor circuit of the dynamotor whenever the switch was placed in the "avc" or "mvc" position.

A previous owner of this radio had rewired the tube heaters to operate from 6 volts and separated their circuitry from the "avc-off-mvc" control. The dynamotor had also been disconnected and removed so that the switch segment that had been used to control 24-volt power was now isolated from all other circuitry and could be used to control the 115-volt input to an a.c. power supply. For some reason, this owner had also removed the fuse block from under the chassis and transferred the wiring to a new fuse holder, for which he had drilled a hole at the upper left of the panel.

❖ New Power Wiring

I thought it would be a really poor idea to run 115-volt a.c. through 60-year-old switch contacts and wiring that had been designed for 24-volt d.c. There was the possibility of insulation breakdown, not to mention hum that might be induced by wires never intended to carry alternating current and tightly cabled with sensitive tube input wiring.

Then, too, I wanted to avoid an odd feature built into the "avc-off-mvc" control. Perhaps the World War II airborne radio operator didn't have need to switch between mvc and avc often. But whenever he did make such a switch, he would have to move the control through the "off" position, which would cut power to the radio. The resulting thermal jarring couldn't have been good for the heater filaments or the stability of the receiver, and the frequent stopping and starting could certainly have shortened the life of the dynamotor.

I decided to bypass the original power control switch segments entirely, substituting a separate, independent, toggle switch mounted in the hole that had been made for the panel mounted fuse holder. Not only was the hole convenient for the purpose, but its upper left position on the panel seems to make intuitive good sense for an "on-off" switch.

Thanks to the remarkable detail built into the superb pictorial diagram of the radio provided in the manual, I was easily able to determine the location of the original fuse block. And I happened to have on hand a similar one, though it was designed for one-hole mounting rather than two. I used one of the two threaded holes provided for the original holder to mount the replacement.

Disconnecting the wiring from the back of terminals 3 and 4, I connected a lead to one of them, leaving it long enough for the free end to reach comfortably into the nearby dynamotor well. The other terminal received a lead that was connected to the fuse block – which, in turn was connected to one side of the new power switch. The other side of the switch received a new lead which was neatly routed through the set to the location of the dynamotor well.

I now had six leads to be run into the well – the B plus, B minus, and heater leads installed in a previous work session as well as the two new a.c. power control leads. These were threaded into the well through a convenient slot at one end.

Now it was the work of just a few minutes to solder the leads onto the lugs provided on the power supply chassis – making sure to leave them long enough so that the chassis could later be maneuvered onto its mounting position in the radio. Connecting the shorting jumper across terminals 2 and 6 of the power/control connector and the a.c. line cord to terminals 3 and 4, I plugged in the receiver for the first time using the new wiring and turned it on.

Everything worked as planned so, at last, I was able to place the power supply over the dynamotor well and screw it down. This means that, in the next work session, serious diagnostic work can begin.

Sony's XDR-S3HD Table-Top HD Radio

By Ken Reitz

It took Sony a while to enter the HD Radio race and it has done so in typical Sony fashion. Their XDR-S3HD table-top HD Radio is fashionably designed, solidly built, and it sounds great, too!

❖ Design Simplicity

Right out of the box I liked the clean design and the simplicity of the controls of this radio. With its wood-look, heavy plastic case and fabric covered speaker grill, this radio sits handsomely on your desk, bookshelf, bedside table or kitchen counter-top. All of the main functions (tuning, volume, etc.) can be done directly via buttons on top of the radio or by using the fairly small IR remote control.

The XDR-S3HD has many of the features I've come to expect on the current crop of HD-capable table radios: station presets (20 AM and 20 FM), sleep timer (up to 60 minutes in 15 minute increments), alarm (lets you wake up to your choice of radio station or AUX input), scan (allows you to scan for all stations or only HD-Radio stations), and more, including LCD display brightness and audio tone controls.

The remote control has good range away from the set and can access the station presets as you've set them, but it can't input the frequency directly through the remote. The remote also lacks a mute button. You have to press and hold the volume button to reduce the volume.

❖ Clean Audio

This radio delivers excellent audio at a decent volume and compares favorably to other similarly priced HD table-top sets previously reviewed. The user can tailor the audio to inject a little more bass or treble by using the menu and the remote control. I found the best listening was when the "surround" audio was set. The virtual sound separation made the speakers seem considerably farther apart and HD-Radio broadcasts really seemed to come alive.

Audio from external sources fed to the radio via the 3.5 mm input jack was excellent. Whether using an MP3 player, CD player or listening to streaming audio from the computer, the audio fidelity was very nice and capable of filling a large room without distortion. I also found that the audio output from the radio's 3.5mm output jack could be fed into a large stereo input using a 3.5mm-to-dual RCA stereo patch cord which can be found at Radio Shack. This effectively upgrades your current analog stereo into an HD-capable set.

It's a great looking, versatile, desktop radio that delivers excellent audio.

❖ Tuning the Bands

The XDR-S3HD lets you tune for all stations or only stations broadcasting HD Radio signals. If you're in an urban area you'll really enjoy the growing range of channels being multi-cast. But, for those in the country, HD-Radio reception is less fun. There are fewer FM stations operating HD transmitters and fewer still are multi-casting. There are only a few hundred AM stations broadcasting in HD-Radio nationwide and AM stations are not allowed to multi-cast.

The set includes a wire antenna and a folded dipole for FM reception. But, I have

Sony XDR-S3HD is the first Sony product with HD-Radio reception capability, but it won't be the last. Retailing between $200-250, it compares favorably with the competition. (Courtesy: Sony)

found that even using a large, roof-top mounted, amplified FM Yagi antenna, the range of reliably tuning and keeping HD Radio signals is about 75 miles.

Of course, this depends on terrain and the power output of the station you're trying to listen to, but in general, if you're 80-100 miles from some of your current favorite analog stations, you're going to be disappointed with this or any other HD Radio receiver. Once, while I had this radio there was a good opening on the FM band and I was tuning in HD multi-cast stations from 150+ miles away perfectly. It lasted a few hours and then it was back to reality.

Tuning the AM band with this radio was a bit of a disappointment. AM reception was minimal even using a tunable AM loop antenna. The passive loop that comes with the unit is of negligible value. There was a certain amount of distinctive digital processing audible on the AM band in between AM stations. Once a station was tuned in, the processing sound was not heard. No such audio artifact was found on the FM band. AM reception was adequate, but I could not tune in the only HD AM signal 60 miles away on this set using a tunable AM loop antenna.

❖ Bottom Line

Sony makes an adaptor for their line of auto stereos to add HD-Radio capability to Sony brand car stereos and they will begin introducing HD-capable stereo receiver/amplifiers very soon. For now, the Sony XDR-S3HD is where it all starts. It's a great looking, versatile, desktop radio that delivers excellent audio. I found this radio widely available from $200 to $250 from national outlets such as Crutchfield (888-955-6000) and Best Buy (888-BESTBUY).

MANUFACTURER'S SPECIFICATIONS

LCD 4 line display
Frequency Range:
  FM 87.5-108 MHz
  AM 530-1710 kHz
Station Presets:
  20 each for AM and FM bands
Speaker: Two 5/8" diameter 4
Audio output: 2.8 watts x 2
Output: 3.5 mm stereo headphone jack
Input: 3.5 mm Line input jack
Antenna Connections:
  AM: spring terminals
  FM: 75 coax connector
Weight: 8 pounds
Size: 4-3/4" H 12" W 6-3/4" D
Accessories included:
  IR remote control (2 AAA batteries not included)
  FM wire antenna with coax connector attached
  FM folded dipole antenna
  AM loop antenna
  Audio connecting cable with two 3.5 mm plugs attached for your MP3, CD or Computer audio
Power: 120 v. AC

Unleashing the ICOM PCR 1000 with a PDA

By Jerry Reed

Until recently, I was the proud owner of a sadly under-utilized ICOM PCR 1000 receiver and I'll bet other readers may also have had difficulty really getting the most out of this versatile but complex radio.

The ability to control the receiver by computer is at once the best and the worst feature of the PCR 1000 and its cousin, the PCR 100. While I am always enamored of the flexibility and programmability that using computer control allows, I end up disappointed by the necessity of either dedicating a computer to the radio, or constantly switching the ICOM between my shack and office computers.

And, let's face it, the brick-like form factor of the PCR 1000 is compact and appealing, but once it is attached with a serial cable to the sort of boat anchor laptop one is likely to be willing to dedicate solely to radio control, a lot of the appeal is lost. (I think ICOM realized this, and it may be the reason the replacement for the PCR 1000, the IC-R1500, has an option for a dedicated remote control head.

❖ A Smooth Solution

I'm currently very happy with a mobile installation that uses an ICOM PCR 1000 computer-controlled receiver together with a Palm-type PDA using the IP1kC software from **www.geocities.com/jjintokyo**. (The author's name doesn't appear on the web page, but he goes by his initials – JJ.)

This combination plays to the strengths of the PCR 1000, such as its excellent sensitivity and wide frequency range, while avoiding the problems that led me largely to abandon the radio. Installing the PCR 1000 and the Palm in my vehicle has enabled me to get back into mobile HF reception, which has proven to be a boon as drive times continue to increase. The IP1kC software should work just fine with the more common and less expensive PCR 100. Of course, no software can make the PCR 100 work for SSB reception.

The Palm, in conjunction with JJ's excellent software, neatly solves the mobility problem on the PCR 1000. The PDA, while much smaller even than the radio itself, supports a good subset of the possible PCR 1000 functions in a compact and convenient package. Used Palm or equivalent IBM WorkPad PDAs are readily available for reasonable prices on E-bay, making the combination very attractive to those whose PCR 1000s may be gathering more dust than they would like.

Figure 1 shows a screen shot of the IP1Kc software running on the PDA simulator used for development. (The real screen looks exactly like this, but is much more difficult to photograph.)

Table 1 - IP1kC ICOM PCR 1000 Pre-programmed Bands

Frequency bands programmed into IP1kC. These are selected using the B+ and B- buttons on the main screen.

Band Name	Start Frequency
Start Frequency	100,000
LW	150,000
MW	531,000
SW - 120 Meters	2,300,000
SW - 90 Meters	3,200,000
SW - 75 Meters	3,850,000
SW - 60 Meters	4,750,000
SW - 49 Meters	5,900,000
SW - 41 Meters	7,100,000
SW - 31 Meters	9,400,000
SW - 25 Meters	11,600,000
SW - 22 Meters	13,570,000
SW - 19 Meters	15,030,000
SW - 16 Meters	17,480,000
SW - 15 Meters	18,900,000
SW - 13 Meters	21,450,000
SW - 11 Meters	25,670,000
CB	27,000,000
HAM VHF Low	51,000,000
FM - Japan	76,000,000
FM - World	88,000,000
Air Band	108,000,000
HAM VHF High	144,000,000
Cordless Handset	253,000,000
Cordless Base	380,000,000
HAM UHF Low	430,000,000
450 MHz Band	450,000,000
850 MHz Band	850,000,000
900 MHz Band	900,000,000
HAM UHF High	1,240,000,000
Stop Frequency	1,300,000,000

Pairing the PCR 1000 with the PDA and the IPC1kC software yields a receiver that is not only very flexible, but also easy to install (and conceal), thanks in part to the PCR 1000s small size and the removable "control head" formed by the PDA.

continued on page 70

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PSR-600	Pending FCC Approval	

UNIDEN

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BC898T	SCN44	$199.95
BCT8	SCN08	$169.95
BC246T	SCN46	$209.95
BCD996T	SCN48	$499.95
BCT15	SCN15	$229.95

ICOM

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DJ-X2000T	SCN10	$499.95
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AOR

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RAMSEY

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800 MHz base w/ right-angle conn.	ANT 23	$34.95
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PAR NOAA Weather Filter 162 MHz	FTR 162DS	$69.95
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GRE Superamplifier	PRE 1	$59.95
VS6 Mobile Speaker	SPK 7	$14.95
Speco DMS-3P Extention Speaker	SPK 3	$49.95

The IP1kC program packs a lot of functionality in a small footprint. Almost all the options you'd want to set are arrayed on a single screen.

❖ Setting Up

First, acquire a PDA. Relevant models known to work with the PCR 1000 and IP1kC are the Palm 3C, and the IBM WorkPad C3. Functionally, the IBM WorkPad C3 is almost exactly the same as the Palm V, and the used ones I picked up work fine. You might already have an under-utilized Palm PDA or, if not, you can likely pick one up for around $30 on E-bay or at a garage sale.

You'll also need the charging cradle. This not only charges the PDA battery, but provides an RS-232 serial cable to connect the Palm to the PCR 1000. If it makes mounting easier, you can still find Palm serial cables from vendors on the Internet. These cables don't charge the PDA battery, but they do provide a serial connection to the PCR 1000. You can also make your own cable, and details are on the IP1kC site. I haven't tried this, because the PDAs I acquired had working cradles and cables included.

If you don't have it already, you'll need the Palm Desktop software to download IP1kC onto your PDA. You can get it (with free registration) here: **www.palm.com/us/support/downloads/windesk414.html**.

Second, download the executable version of IP1kC from **www.geocities.com/jjintokyo/IP1kC-executable_prc_only.zip**.

Unzip the software into a convenient folder on your PC. Put the PDA in the cradle, plug the serial cable from the cradle into your PC, and fire up the Palm Desktop software.

There's no direct "download" function in the Palm software. Instead, you drag the IP1kC.prc file from where you unzipped it and drop it in the window that pops up when you click "Quick Install" in the Palm Desktop application. Then press the HotSync button on the cradle, and you should see a series of messages letting you know that IPC1Kc has been transferred to the Palm.

Check that the icon for IPC1Kc appears on the main Palm screen. At this point you should be good to connect to the PCR 1000 and try out the software.

Figure 1 shows a screen shot of IP1kC running for HF reception on a PCR 1000.

❖ Operation

JJ has a very good, brief guide to program operation on his website. It's a series of screen shots with descriptions of each program function. The visual interface is so nicely set up, that many functions are pretty obvious, so I'll only go over a few subtleties here.

The PCR 1000 has a hardware on/off switch on the front panel. Make sure this is on before using the soft on/off in the program. When you switch the PCR 1000 off in software, you may want to turn it off with the front-panel switch as well to save battery power during standby.

❖ Basics

To change frequency, just tap the stylus on the small "123" icon in the lower right hand corner of the writing area at the bottom of the screen. The numeric keyboard application will pop up and you can tap in the desired frequency with the stylus. Frequencies are in Hertz, in the form MMMM.KKK.FFF where MMMM is MHz (up to 1300), KKK is kHz and FFF is Hz. So, to enter 6640 kHz, you would tap out 6.640.000.

You can also step up or down to the desired frequency using the Tuning Step drop down list and the Up and Down buttons in the right corner of the screen. To move from 6640 kHz to say, 8983 kHz, you could select 1 MHz from the Tuning Step list, tap twice on Up, then select 100 kHz from Tuning Step and tap three times on Up. Lastly select, for example, 1 kHz from the drop down and tap Up until you reach 8983. (It's a lot quicker to do, with practice, than to explain.) Better yet, you can pre-program popular frequencies into memories and just step through them, as described below.

❖ Bands

Although the PCR 1000 is capable of any frequency between 100 kHz and 1300 MHz, exclusive of cellular blocks, IP1kC breaks this huge range up into 31 "bands" for convenience. These are hard-coded in the program, so while they're useful, they're not user configurable. The bands are shown in Table 1.

Tapping the B+ and B- buttons on IP1kC steps between bands. The mode for each band (AM, FM) is also preset in the program. The default on the shortwave bands is AM with 6 kHz bandwidth. Since I often like to listen to Utility stations, I built a modified version of the program that defaults to USB, 2.8 kHz bandwidth, for frequencies between 1620 kHz and 30 MHz. This also helps when scanning, as explained below.

❖ Memory Channels

As an example of how cleverly JJ has integrated IP1kC with the look and feel of the Palm-style PDA, consider this simple but elegant approach to programming memory channels. To create a set of frequencies that can be loaded and scanned together, just create a new document using the Palm's Memo application. When IP1kC starts up, it checks the Palm for Memo documents that have been saved with a name beginning Ip1kC.cMemory—

I've created two memos so far, one named "IP1KC.cMemory-sw-bank" and another named "IP1kC.cMemoC.cMemory-sw-utility1".

In each memo, put each frequency you want on its own line, in Hertz. After a space, but before the end of the line, you can place a brief channel name that will appear on the IP1kC panel when the channel is selected. So, for example, the "IP1kC.cMemoC.cMemory-sw-utility1" memo file is shown in Table 2.

The first line creates a channel named "nyldoc1" (New York ARINC Long Distance Operational Control) with a frequency of 6640 kHz. The mode for this channel defaults to USB and the bandwidth for the channel defaults to 2.8 kHz, based on my modification to JJ's software, as described below.

All memory files with the correct naming convention are loaded sequentially into IP1kC's memory when you launch the application, up to a maximum of 99 channels. To step through the loaded channels, just tap the M+ or M- buttons or use the scroll button in the center of the Palm's lower edge.

Table 2 - Example Memo file for IP1kC Memory Scanning

Example Memo file for the memory scan feature in IP1kC. Frequencies are in Hertz. This file looks a bit ugly, but it's pretty easy to create on the PDA, or create it on your PC and download it into the PDA with HotSync.

File: IP1kC.c.Memory-sw-utility1

```
6640000     nyldoc1-USB
8933000     nyldoc2
11342000    nyldoc3
13348000    nyldoc4
3494000     nyldoc5
11175000    mainsail-primary
8983000     camslant-day
5696000     camslant-night
8992000     mainsail-night
10075000    nyldoc6
17925000    nyldoc7
8971000     navy1
10780000    cape radio1
11104000    cape radio2
24240000    cape radio3
13200000    mainsail
```

❖ Scanning

Memory channels are useful in and of themselves for quick frequency selection. But they really come into their own when you use them in conjunction with IP1kC's scanning functions.

To configure scanning, click on the IP1kC-ICOMPCR1000 legend at the top of the application. This brings up several menus. Select Scan

Some of the scanning options in IP1kC. Among the options are scanning memories or scanning frequency ranges, how long to pause on each frequency, and whether scanning should loop back to the lowest frequency each time the upper limit is reached.

and the Setup Scan. Configure your screen to look like Figure 2 and click the Ok button.

To start memory scanning, just tap on the small PCR1000 icon just above the B+ and M+ button icons. The image of the radio will be replaced with an icon for a pair of binoculars ("searching") briefly, and then will change to an hourglass ("waiting").

When you hear a transmission of interest, just tap on the hourglass icon. Scanning will stop on that channel and the hourglass will be replaced with the radio icon once again. If you're too slow and the scan has already advanced to the next channel, just tap M- after you stop scanning, and you'll go back to the previous channel.

If you've created more than one set of memory channels by creating more than one memo, IP1kC will only scan the frequencies in the set where scanning began. This is handy, since it means that, while all your frequencies from all your files are available for selection, scanning is restricted to the channels in each individual file. This means that I don't scan into my shortwave broadcast channels while scanning through the utility channels. The mode and bandwidth used for each channel is fixed to the defaults in the program, however. It would have been nice if a bandwidth and mode could be specified in the memo file.

IP1kC can also scan frequency ranges, sort of like the "search" function built into many scanners. I haven't experimented with that feature, but I think it will be of particular interest to VHF/UHF enthusiasts.

❖ Links

The IPC1Kc software from "JJ" is here: **www.geocities.com/jjintokyo**.

JJ also makes the source code available for the adventurous and software-fluent techie. His original source is here: **www.geocities.com/jjintokyo/IP1kC-includes_ALL_sources.zip**

I did get this to build under a newer development environment and made a couple of small hacks to change some defaults. My "hack" to IPC1Kc changes the default to SSB mode, rather than AM between 1620 kHz and 30 MHz. This may be of interest if you're using the scanning capabilities of IPC1Kc for utility monitoring, rather than SW broadcasts. Other than being rebuilt with a newer version of the Palm (now Access) SDK, and this mode modification, it is otherwise unchanged from JJ's source.

My modified executable and source are here: **http://home.earthlink.net/~greed3270/IP1kC**

Tips on Palm software development are here, if you're feeling ambitious. **www.poplarware.com/palmdev.html**

One of the nice things about the PCR 1000 is that there is really a ton of information about the radio on the web. Here's a starting place: **http://geophysics.ou.edu/ahern/home/pcr1000/.**

John Catalano, PhD
johncatalano@monitoringtimes.com

Lynovation's Wireless Bluetooth Radio Interfaces

Will you be the last one to use a radio link?

If you are reading this column, no one has to tell you the value of radio or wireless communications. However, it was only a little over a decade ago since the common consumer discovered the value of wireless communication. Yes, car telephones had been available since the 1960s running in the 150 MHz VHF range. But they were big, expensive, and relatively few people had them.

❖ A Revolution Brewing

By the late 1980s, cellular telephones using higher UHF frequencies started to take hold around the world. This technology had been first introduced in Europe in the early '80s. The '90s saw an explosion of the technology, which started to challenge wired phone service by the end of the decade. Changes included the replacement of analogue modulation with digital systems using even higher frequencies.

What many people are not aware of are the wireless data communications networks that were being developed and used during these time periods. First, it was data communication using 200 to 400 MHz UHF radio frequencies. These were widely used by companies for data links between closely located offices and factories.

Another use was/is the remote monitoring and control of natural resources, such as dams and other isolated resources located in hard to access settings. The popularity of private data links continued to increase, and so did allocated frequencies into the gigahertz range to accommodate the higher demand and data rates. Of course, telephone companies and governments had used microwave links for years.

❖ "Lighting" the Way

At the same time, another consumer technology was also exploding in popularity: the personal computer. Few realized that these two technologies were on rapidly converging courses. Surprisingly, the first standardized wireless data communication for PCs was not via radio. Instead, modulated infrared light, IR, was exploited. This may have been due to the relative low parts cost of IR transceivers. Another factor was that, unlike radio systems that required costly product approval by government agencies, IR did not.

In any case, the first standardized wireless PC data links utilized infrared light. If you looked at the back of most laptops manufactured between 1995 and 2002 you would see a red lens. This was the home of an IrDA (Infrared Data Association) transceiver. The technology was basically a TV remote control on steroids. Instead of a simple short data burst to say "Channel 5," an IrDA transceiver sends a continuous serial data stream, not much different from the data sent over a wired serial port. For the most part, light travels in straight lines, so IrDA's published range was up to an unobstructed distance of 30 feet. As a CEO of a company who developed and manufactured IrDA devices, I can tell you first hand that the development of this technology proceeded at breakneck speed, going from concept to product in under 45 days!

❖ An RF Link?

By 1998, many IrDA devices had made their way into consumer products such as Laptops, PDAs (Palm Pilots and Pocket PCs), wireless PC printers, wireless mice and keyboards, and many others. But a new word was being heard in the PC industry: Bluetooth. The concept promised a low-power, inexpensive radio transceiver that could provide short range (30 feet) for voice, data, and audio connections between devices.

A main selling point of Bluetooth was the concept of "connecting" without the need of an "un-obstructive view" or, for that matter, any view. Ah, the beauty of radio waves. The technology was there, but as for the "inexpensive" part …well. Without a high volume market demand the price goals were unrealistic.

Half a decade went by and Bluetooth was still a high-priced technology with little impact on the consumer market. Only when the Bluetooth application became tied to the huge cellular telephone market did the Bluetooth technology become an affordable product reality. Today, small battery-operated Bluetooth, hands-free, ear/microphone units are ubiquitous mobile phone accessories. They operate in the 2.4 GHz band and use a frequency hopping spread spectrum signaling method (FHSS). See **www.bluetooth.com** for more details.

Yet, when we think of personal computers and wireless data communication systems, the 802.11b/g/n standards come to mind, not Bluetooth. The 802.11 systems are a standard for our home wireless data networks. Like Bluetooth, they also operate in the 2.4 MHz. However, they utilize the direct sequence spread spectrum signaling method (DSSS). The "n" version is also active in the less crowded 5 GHz band. Using these 802.11 devices, we connect to a high speed Internet cable modems, DSL modems, remote printers and other PCs in our wireless network.

Today, the IrDA receivers have disappeared from laptops and PDAs, replaced with 802.11and, more recently, with Bluetooth transceivers as well. Many wireless mice, keyboards and other accessories utilize Bluetooth. Also Bluetooth capable laptops can connect to cellular telephone networks. But, is there another use for Bluetooth capable PCs in our world of radio monitoring? Of course. That's why I asked the question!

❖ BlueLync is Here!

Lynovation, **http://ctr-remote.home.att.net/products.htm**, produces Bluetooth interfaces that enable us to wirelessly control Yaesu and ICOM receivers and transceivers via a PC or Pocket PC. This month we'll concentrate on one of their PC based products, the CTR-BlueLync Icom PCR1000 interface, which is designed for the ICOM IC-PCR1000 receiver. Let's start by defining the needed parts of a Lynovation "product."

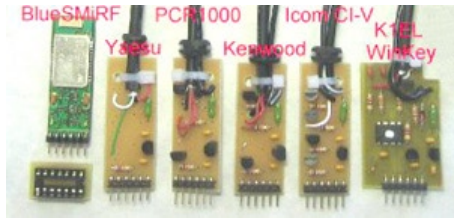

Figure 1- Line-up of CTR-BlueLync Printed Circuit Boards. The BlueSMiRF transceiver is seen at the left. The next five are interfaces.

The Hardware

Lynovation products are built on a module concept, which is composed of two components. See Figure 1. The first component, common to all interfaces, is the BlueSMiRF Bluetooth transceiver, seen at the left of Figure 1. This tiny PCB contains a complete 2.4 GHz+ bluetooth transceiver including ceramic antenna technology. See **www.sparkfun.com** for complete details. Notice below the BlueSMiRF in Figure 1 is a dual-in-line socket. The BlueSMiRF is plugged into this socket in order to connect to the second component of the product.

The second component is an interface board, which connects to the BlueSMiRF transceiver via the socket. However, each interface must be tailored to a specific manufacturer's radio. Yaesu, Icom (CI-V), Kenwood, Elecraft (K2) radios are supported by Lynovation products. In addition an interface is available for the Icom PCR-1000.

Hence, the five radio interface boards pictured in Figure 1 to the right of the BlueSMiRF. Each contains the correct circuitry for interfacing with the specific manufacturer's radio.

One side of the interface board is plugged into the socket connecting it to the BlueSMiRF. The other end of the interface has the correct cable to attach it to the specific manufacturer's interface socket. This tiny sandwich of the interconnected BlueSMiRF and the interface PCBs are mounted in a small 2.5 x 1.5 x 0.75 inch plastic box. Now we have a completed hardware package.

For the PCR1000 product, a 9-pin Din plug, a sub-miniature socket and a sub-miniature power plug come out of the box. In practice, the 9-pin din is connected to the PCR1000's serial data port. The plug goes into the Power "DC In" on the PCR. Finally, the PCR's power adapter plug is connected to the interface's sub-miniature socket.

This method allows the both Lynovation product and the PCR1000 to be powered by the single PCR1000 adapter. Once the adapter is energized, an LED on the interface box will begin to blink green.

The Software

Now that we have the complete bluetooth/radio interface hardware, we must download driver software from the Lynovation website. The PCR1000 interface can work with a PC or a Pocket PC using CTR-PCRcvr or CTR-Rcvr programs, respectively.

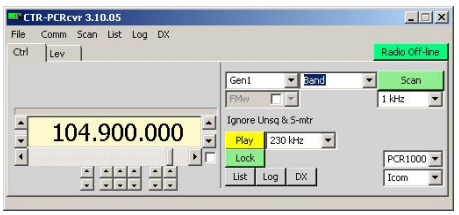

Figure 2 - Welcome to CTR-PCRcvr! This simple screen is where it all starts.

Since we are using a PC, CTR-PCRcvr version 31005 was downloaded from **http://ctr-remote.home.att.net/download_ctr-pcrcvr.htm** This 1.36 Meg zip file opened and installed quickly and without a problem. Demo versions of CTR software products can be downloaded so you can try them on your hardware. Unregistered versions are fully functional. However, they are limited to three Log and List entries, three DX Spots, and five sessions with 5 minutes of connection time per session. You can download a full version of the software for $14.95.

Make sure that your laptop's bluetooth interface is "on line" and active. Since my laptop had no built-in Bluetooth transceiver, I used a Belkin USB Bluetooth adapter. Check the status of your PC's Bluetooth via the Windows Control Panel. If your PC Bluetooth is "on-the-air," it's time to run the installed CTR-PCRcvr program. The result is a screen similar to Figure 2.

Playing Nice

Under the "Comm" menu you must set these parameters as follows: BlueLync passcode to "default," Com port to your system's allocated "outgoing" Com Port number, and baud rate to 9600.

Make sure you carefully read the full instructions of Bluetooth installation. Curiously it is only found in the CTR-BlueLync assembly manual at

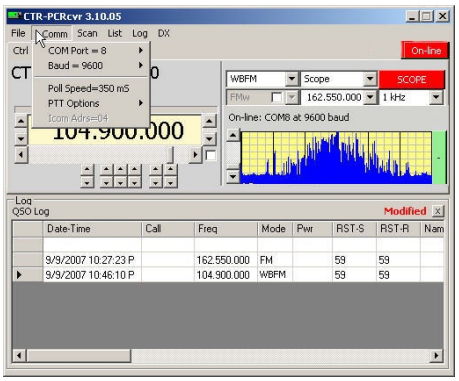

Figure 3 - The control screen of CTR-PCRcvr in contact with an Icom PCR1000 via a Bluetooth Wireless Link. Notice the bandscope at the right.

http://ctr-remote.home.att.net/manuals.htm.

Once the Bluetooth link is established between the PC and the BlueLync, the red led will light on the BlueLync box.

Sinking Our Teeth

Finally, we are ready to use it. Click the "Radio Off-line" box at the top right of Figure 2 to enable the software. The box will now display "On-Line."

In Figure 3 we see a PCR1000 being controlled via the Bluetooth link. Basic functions such as frequency, mode, scan start/stop and scan step are easily controlled from this screen. Over four different ways of setting the frequency are possible. Using this software operation of the PCR1000 is straightforward and intuitive.

Notice the familiar Bandscope on right, the signal strength bar above the frequency display and the memory keys below the display. These displays seem to react as rapidly as if the interface was hardwired to the PC. A very impressive data rate is at work here!

Setting Levels

Selecting the "Lev" tab at the upper left brings up the Level screen as seen in Figure 4. Here control of the volume, squelch, IF shift, DSP functions (if installed) and a few others are accessible. Little to no discernable lag time was noticed when setting the volume, again indicative of the high speed of the data transfer rate. In fact, all functions that I tried worked as if the PC was hardwired to the radio.

Other BlueLyncs

CTR-Remote and CTR-PC are corresponding programs for the other radio interfaces. Software operation for each of these using other radio interfaces is similar to what we covered for the PCR1000 interface. Remember, a BlueSMiRF is

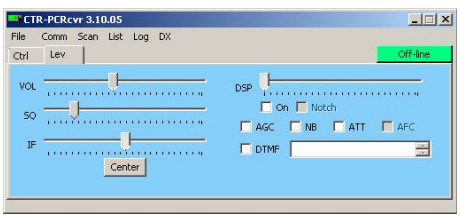

Figure 4 - The level screen with additional important control functions.

required for each interface. However, if you don't use the different interfaces simultaneously, the "plug-in" module system allows the BlueSMiRF to easily be taken out of one interface and plugged into another.

The Cost of Wireless Control?

The expensive part of this product is the BlueSMiRF transceiver, which costs $67.75 assembled and ready to be paired with a radio interface. The interfaces come either assembled or in kit form. The PCR1000 interface is the highest priced at $29.95 assembled or $19.95 in kit form. Shipping to North America is included. BlueLync Interfaces for Elecraft, ICOM CI-V, Kenwood, and Yaesu radios are available from Lynovation.

Software registration of either CTR-Rcvr or CTR-Remote is $14.95. CTR-PCRcvr and CTR-Server are included free with CTR-Rcvr registration. CTR-Server, which allows CTR programs to control your radio using your TCP/IP or Wi-Fi network, is another interesting "wireless" program that may be the subject of a future article.

❖ What Do I Think?

Once you get the Bluetooth "playing nicely" with the BlueLync interface, all aspects of this product work great. Remote operation is smooth. It's a pity that BlueLync cannot transmit the radio's audio back to the PC's speakers. An alternative is to use an FM transmitter (you can easily find one designed for MP3 player use) with an FM radio near your PC. Not elegant, but it will work.

With all the available PCR1000 control programs, it's too bad that you can only use the Lynovation software.

Overall, BlueLync is an excellent method of controlling, and in some cases, listening to our radios. The cost of a full product is a bit high at around $120. The majority of the cost is not Lynovation's doing, but the cost of the BluSMiRF transceiver. However, if you want to control your radio via Bluetooth it may be the only game in town.

❖ Join the Masses

Using a radio to control/monitor a radio... Hmmm. Just look around. Everybody with a Bluetooth earpiece is doing a similar thing with his or her cell phone. Maybe it's time we "radio types" joined them.

What's NEW

Tell them you saw it in Monitoring Times

Collector's Guide to Antique Radios

Seventh Edition by John Slusser

This great compendium of tube-type radios continues to grow with the seventh edition (2008) compiled by John Slusser and his staff of *Radio Daze*. Newly expanded and updated, the guide provides descriptions and current market values for some 10,000 antique radio models, many with full-color photographs.

In-depth information provides backgrounds of manufacturers and a glossary of familiar and unfamiliar radio terms likely to confront the enthusiast. The greatest emphasis is placed on the Golden Age of Radio (the 1920s - 1950s), as these are the most likely to be encountered in the collecting hobby.

For anyone interested in the history of radio and its related hobbies, this book is a must for the library.

Order #7365 for $24.95 plus $5 shipping from Collector Books, P.O. Box 3009, Paducah, KY 42002-3009, or phone (800) 626-5420. Visit their website at **collectorbooks.com**.

Key to Christmas

For the seventh year in a row, Morse Express has commissioned its annual Christmas Key. The 2007 Christmas Key is a miniature Marconi style key, taking you back to the Victorian era when Christmas telegrams were more common than Christmas cards.

The miniature Marconi features three terminals (front and rear contacts for make-break keying), and gold-plated brass mechanical parts on a hand-finished ebony base. Though it can be hung on the tree, the Morse Express Christmas Key is fully operational. The mechanical parts are hand machined from solid brass, under-plated with nickel and finished in 18 carat gold. The 2007 key measures 2" by 1" at the base and weighs 3-1/4 ounces.

The base of each key is engraved with the Morse Express "Speedy Key" logo and "Christmas 2007." This is a limited edition of 200 keys, and each key bears an engraved serial number on the base. The Morse Express 2007 Christmas Key is $79.95 (plus s/h). A few keys from previous years are still available at reduced rates. Order on line at **www.MorseX.com** or by phone at 800-238-8205 or by mail to Milestone Technologies Inc, 10691 E Bethany Drive, Suite 800, Aurora, CO 80014-2670 (call for shipping/handling).

Lite Light!

Pak-Lite is a small, 1.5 oz., pocket size flashlight that can last up to 5 years on one battery! It snaps to the top of a 9 Volt Battery with two Super bright, unbreakable LED bulbs that last for 100,000 hours. The Pak-Lite comes in a variety of cap colors, including a Super-Glow-in-the-Dark cap that glows up to 24 hours, which is so easy to find in the night!

The Pak-Lite has a variety of bulb colors with steady or flashing options or both. It was used in four hurricanes in two years with 30 days of no electricity... all on one battery! Handcrafted and hand

tested in the USA, it's one of the most durable flashlights out there. This little flashlight survived the washing machine, has been frozen in ice, dropped from an airplane, and hiked over 3600 miles all on one battery!

15 year old Ben Henry invented and patented the Pak-Lite idea when his brother, Barclay Henry, needed a small, lightweight flashlight to hike the 2600 mile Pacific Crest Trail from Mexico to Canada. Now it's the Henry family business, built off grid in Southern Oregon. Pak-Lite is now being used around the world by the US Military in Iraq, FEMA, the American Red Cross, Military Survival Instructions, and thousands of people who like to have a flashlight that isn't just a metal cylinder that stores dead batteries.

Pak-Lite, with its 25 year Warranty, is sold on line at **www.9voltlight.com** or 1-877-715-4448 (toll-free); (Pak-Lite Company, 512 Humberd Lane, Grants Pass, OR 97527). Pak-Lite Basic is $12.99; Pak-Lite Super is $24.99 for twice-as-bright LEDs plus a high-low switch. See the website for belt case and other accessories.

Popular Mechanics' Top Ten

Speaking of gadgets, check out **www.popularmechanics.com** for their third annual breakthrough awards for 2007 as published in their November issue. A number of these new products and ideas will appeal to radio hobbyists and technology geeks. For example, Ford's $395 Sync won an award for its voice activated control of phone, music, and other mobile gadgets for safer driving. Sync was

one of ten products which received the award. Another was the Zonbu Zonbox – can you guess what it is?

Eight inventors were also honored, several of whom had come up with simple solutions to problems affecting third world countries. One of interest to radio hobbyists is a non-turbine solution to generating small amounts of electricity using wind-power. Shawn Frayne's Windbelt is perfect for powering lamps and radios using a light breeze and no moving parts.

Books and Equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com.

WORLD RADIO TV HANDBOOK

WRTH 2008

We are delighted to announce the publication of the 2008 edition of *World Radio TV Handbook*, the best-selling directory of global broadcasting on LW, MW, SW & FM

The Features section includes a detailed description of rebuilding a Racal RA1792, and the story of two very different stations in the Falkand Islands and Zimbabwe.

The remaining pages are, as usual, full of information on:

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- Clandestine and other target broadcasters
- MW frequency listings by region
- International and domestic SW frequency listings as well as DRM listings
- International SW broadcasts in English, French, German, Portuguese & Spanish, listed by UTC
- Equipment reviews, *Digital Update* and more
- A further revision of TV by country
- Reference section with Transmitter Site Location Table, Standard Time & Frequency Transmissions, DX clubs, Internet Resources, and much more

Available December 2007

SOME COMMENTS ON WRTH 2007

World Radio TV Handbook 2007 continues to set the radio reference standard. It remains the most comprehensive and authorative source available to guide the listener. – *Gayle Van Horn,* Monitoring Times

The UK publisher of WRTH has continued to make substantial improvements to the content and quality of the book every year since taking it over, and the 2007 edition is once again the best and most comprehensive ever – *Richard Dixon, Radio Netherlands Media Network*

La World Radio TV Handbook, constituye una de las herramientas más valiosas para quienes deseen gozar de la escucha radiofónica en especial, y adentrarse en ese mundo tan particular de las emisiones...Este Manual, es, en verdad, un paradigma valiosísimo, que en cada aparación, refleja el perfeccionamiento de la labor de sus hacedores – *Prof. Charles Gerez, Argentina*

I just received my 2007 edition. Thank you for a wonderful publication – *Jim Siers*

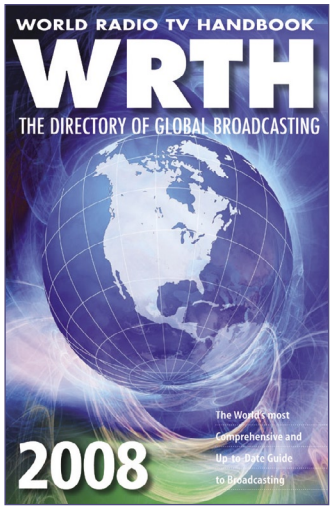
I don't know how I managed without this fantastic publication for so long! – *Adam Toynton, UK*

I love it the way it is – *Don Vincent, USA*

WRTH is just getting better and better every year – *Daisuke Endo, Japan*

The best buy ever! This book is marvellous, very complete – *Hannes Grünsteidl*

It's a greatest radio source I ever met – *Igor, Russia*



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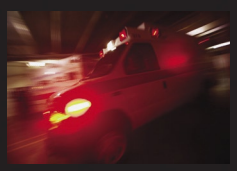
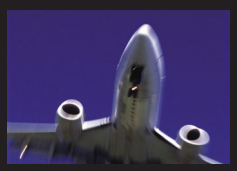
- Skywarn
- Spectrum Sweeper *PSR-100 only
- Backlit LCD Display
- PC Programmable, and MORE!





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LINE ADS
NON-COMMERCIAL SUBSCRIBER RATES: $.25 per word. All merchandise must be personal and radio-related.
COMMERCIAL, NON-SUBSCRIBER, AND MULTIPLE SALES RATES: $1.00 per word. Commercial line ads printed in bold type.

Ads for Stock Exchange must be received 45 days prior to publication date. All ads must be paid in advance to Monitoring Times.
Ad copy must be typed for legibility.

1-3/4" SQUARE DISPLAY AD:
$50 per issue if camera-ready copy or, $85 if copy to be typeset. Photo-reduction $5 additional charge. For more information on commercial ads, contact Beth Leinbach, 828-389-4007.

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!

MT: AMERICAN BANDSCAN
http://americanbandscan.blogspot.com/ - by Doug Smith
MT: EDITOR'S DESK
http://mt-editor.blogspot.com/ - by Rachel Baughn
MT: FED FILES
http://mt-fedfiles.blogspot.com/ - by Chris Parris
MT: MILCOM
http://mt-milcom.blogspot.com/ - by Larry Van Horn
Larry's Monitoring Post
http://monitor-post.blogspot.com/ - by Larry Van Horn
MT: SHORTWAVE
http://mt-shortwave.blogspot.com/- by Gayle Van Horn
MT: UTILITY WORLD
http://mt-utility.blogspot.com/- by Hugh Stegman

INDEX OF ADVERTISERS

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Fast Scan
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AM, FM, WFM, SSB, CW (Main)
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Select Icom receivers are now on sale for the holidays. Visit your authorized Icom dealer today!

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WIDE-BAND RECEIVER
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CTCSS/DTCS Decode
Weather Alert

IC-R75

WIDE BAND RECEIVER
0.03 - 60.0 MHz
Triple Conversion
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