

Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

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Monitoring Times

A Publication of Grove Enterprises

SURVEILLANCE IN THE CLEAR

A Satellite Sleuth Story

*Signals from China -
Stations, frequencies, addresses*

*etic Airline
Broadcast Satellites*



*****3-DIGIT 064
S9 P1
PERIODICALS
04/01/2003
THOMAS J SOKIRA
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G3

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The Professional Demodulator (optional) is adjustable in many respects, including the digital filter parameters.



The Professional Demodulator (optional) includes interactive block diagrams for all modes, with two real-time spectrum scopes and THD and SINAD measuring facilities.

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The secondary wide-band spectrum scope complements the primary narrow-band one.

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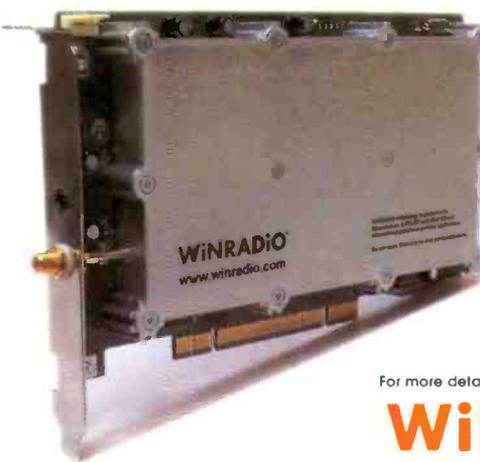
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Just when you thought that there is nothing in shortwave that could surprise you anymore, here comes the new WinRADIO G303i Receiver.

This new receiver continues in the fine tradition established by WinRADIO's successful range of wide-band PC-based receivers. The "G3" stands for "the third generation": As the original, award-winning, first-generation WR-1000i receiver was the world's first commercially available wide-band receiver on a PC card when launched seven years ago, the newly introduced WR-G303i is the world's first dedicated shortwave receiver on a PC card. It is also the first commercially available receiver where the entire final intermediate frequency stage and an all-mode demodulator are entirely executed in software, running on a PC.

The advantages of this receiver are too numerous to list in this limited space: In addition to the flexible and friendly user interface of a PC-based receiver, with its numerous functions and facilities not normally available on any conventional receiver, the WinRADIO G303i Software-Defined Receiver excels particularly by the ability of its demodulators: While the Standard Demodulator provides the performance of a highly respectable shortwave receiver including synchronous AM demodulation and a real-time spectrum scope, the optional Professional Demodulator offers even more: continuous IF bandwidth adjustment (in 1Hz increments), interactive block diagrams with two additional audio spectrum scopes, and even built-in THD and SINAD measurement facilities. Additional demodulators are planned as further options, including a DRM (digital radio) demodulator.

The WinRADIO G303i - a ground-breaking shortwave receiver that will surely amaze you.



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Monitoring Times

Vol. 21, No. 11 November 2002



Lead Story

Surveillance in the Clear

By John Locker

This satellite sleuth story began innocently, when hobbyist John Locker discovered real-time surveillance pictures appearing in the clear on his television screen. It was not too hard to determine the pictures were of locations over the former Yugoslavia.

Locker was anxious to identify who was responsible and to alert them of what appeared to be a major security breach. Finally, after seven months of fruitless letters, emails, and phone calls, someone listened. See page 10 for the story.

On the Cover: Superimposed on an aeronautical map of the area are a P-3 aircraft and Locker's captured image that may finally have gotten the attention of the US military!

C O N T E N T S

Signals Behind the Bamboo Curtain14

By Gayle Van Horn

In a country as large and diverse as China, logging China Radio International is only the tip of the iceberg. There's the national network China National Radio, there are regional stations, and then there are provincial stations – all of which have some presence on the shortwave bands. The trick is to be able to hear them!

This article provides a comprehensive list of shortwave frequencies and stations. Remember, you won't be hearing English on these domestic broadcasts. Once logged, we also tell you where to send that reception report!

First Air – Canada's Arctic Airline20

By John David Corby

First Air serves and is owned by the Inuit people of Northern Quebec. This is the airline that delivers explorers and scientists to Resolute and points north to various staging areas and resupply points. In this part of the world, where days are not measured by the rising and setting of the sun, "routine" is set by mealtimes at the hotel and the arrival of the plane. Communications, like everything else in the frozen North, is also subject to the weather.





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Reviews:

Tiny wideband receivers like the Japa-
 nese-distributed Standard VR-150 (nearly
 identical in appearance to the Yaesu VR-120),
 are prime subjects for computer programming.
 Eob Parnass has risen to the challenge with
 his **Tk150** software. He also has some good
 advice for anyone considering purchase of a
 wide frequency range, portable scanner (p.80).

Last month John Catalano used a couple
 of optical character recognition programs to
 scan a frequency list from *Monitoring Times*.
 This month he tests the results by importing
 the scanned list into **RadioMax v5.22** and
ScanCat Gold: will it be easy? More impor-
 tantly, will it be accurate? (p.82)

Jock Elliott is a battery junkie: he admits
 it freely. That's why he really flipped over C
 Crane's **QuickCharger** (p.86).

In the first of two parts, Ken Reitz ex-
 plores the world of big dish satellite recep-
 tion: what is there to be heard today? What
 kind of programming is available to the pub-
 lic, and what equipment do you have to have
 to decode it? (p.84).

Many folks have had great reception
 using an antenna design called the termi-
 nated, tilted, folded dipole (**T²FD**). *Antenna*
Topics looks at the background of this an-
 tenna and why it works so well (p.78).

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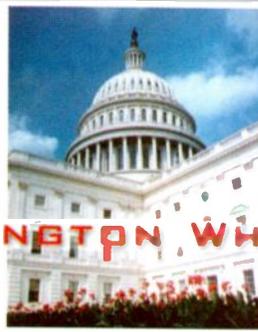
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WASHINGTON WHISPERS

FCC Mandates Digital Tuners In TV Sets

In 1996, Congress decreed that the nation switch to digital TV broadcasting which offers higher resolution pictures, rich color, and clearer, up to 6-channel sound. Toward that end, every television station was given new spectrum on which to phase in their digital channel.

Until 2006, each TV station will broadcast on two channels, one analog and one digital. After that – or when 85% of all consumers have access to digital programming, all TV stations will turn off their analog channel and return the spectrum to the government for auctioning. The analog spectrum is expected to provide up to \$50 billion to the U.S. treasury.

“Ultimately, the DTV transition will shift into high gear when three factors come together: (1) a critical mass of compelling digital content; (2) distribution of that content to consumers; and (3) reception equipment in consumers’ hands. Today’s decision promotes the availability of reception equipment, without which the first two factors are meaningless.” *Statement by FCC Chairman Michael K. Powell.*

But the transition to this new technology is not going well. It has been stalled by a number of issues including the limited availability of high-definition programming, the pricey equipment needed for viewers to see it and a reluctance within the industry to make any switch before most households can receive digital signals.

Cable and satellite service providers also have hesitated to allocate more space to HDTV programming which takes more spectrum. And smaller TV stations are struggling with the high cost of converting to digital signals that no one can yet receive. In a nutshell, it is all about “money.”

On August 8th, the Federal Communications Commission again took action to jumpstart digital television broadcasting. Over the adamant objections of the Consumer Electronics Association, the FCC voted 3-to-1 to require that off-air digital TV (DTV) tuners be included in all new television sets with 13-inch and larger screens by mid-2007.

The DTV tuners will be phased in over a five-year period. Larger screen sets will be first, beginning in July 2004. By enacting an

extended rollout plan, the FCC says it is minimizing the costs for equipment manufacturers and consumers.

“Adopting a tuner requirement will ensure that consumer expectations are met and will limit the number of new sets being purchased today that will become obsolete at the end of the transition.”
Commissioner Kathleen Q. Abernathy

The Commission said its authority to require DTV tuners was established by the 1962 All Channel Receiver Act. The ACRA requires that television sets be capable of receiving all television broadcast frequencies. Its purpose was originally to force manufacturers to include UHF channels in their VHF television receivers. The law is now being expanded to mean that the new digital channels must be included in a TV set along with analog.

The Commission would have preferred that the electronic manufacturers voluntarily add digital TV tuners on their own. But they balked, citing lack of consumer demand and digital programming. The CEA said the FCC mandate will add \$250 to the cost of a TV set in the first year and amounts to an annual \$7 billion “TV tax” on the industry and consumers.

“There is no question that DTV is the wave of the future; Congress has mandated the return of analog spectrum and the transition to digital broadcasting; this Commission and its Chairman are committed to moving the transition forward; and there are already some 400 stations across the country broadcasting digital signals.” *Commissioner Michael J. Copps*

The FCC took issue with CEA’s cost estimates and said that DTV prices are declining at a rate of \$100 to \$800 per year. Thus the additional cost of the DTV tuner will be more than offset by the general price decline.

“This plan will ensure that new TV receivers include a DTV tuner on a schedule as close as economically feasible to the December 31, 2006, target completion date for the DTV transition

that was set forth by Congress.” Powell said. Television set makers are expected to challenge the ruling in court.

The National Association of Broadcasters strongly supports the FCC’s DTV tuner mandate since they need consumers to be able to receive their digital signals. More than 450 television stations are now broadcasting digital signals in markets that include nearly 90 percent of the nation’s TV households. But they say less than 1 percent of the 25 million sets sold each year have internal digital tuners and therefore cannot decode the signals. The NAB says digital tuners are especially important to give people access to digital broadcasts from local stations and in rural areas that are not available by cable or satellite. They, too, do not think consumers will see any cost increase.

“...the vast majority of consumers receive broadcast programming through their cable or satellite provider. Thus, taking action on digital broadcast tuners alone, confers a real benefit only on the relatively small percentage of consumers (approximately fifteen percent) who do not rely on cable or satellite for broadcast reception. The costs, however, will be borne by every consumer who buys a television.” *Dissenting statement by Commissioner Kevin J. Martin*

There is much confusion among consumers and the media about just exactly what is digital television. High definition television (HDTV) provides the highest resolution (sharpest) form of digital TV. And all digital television schemes are not necessarily classified as ‘high definition.’ In fact, only two of the 18 different approved digital TV formats (those with 720 or 1080 horizontal scan lines) are crisp enough to be considered HDTV.

It is possible to have a digital tuner in a set and still not be able to receive HDTV. There is no mandate what-so-ever on display quality. Actually the digital display screen can be anything from HDTV quality (720/1080 scan lines) down to 480. But it is assumed that television manufacturers will incorporate all 18 advanced digital formats in their DTV tuners.

New for 2003

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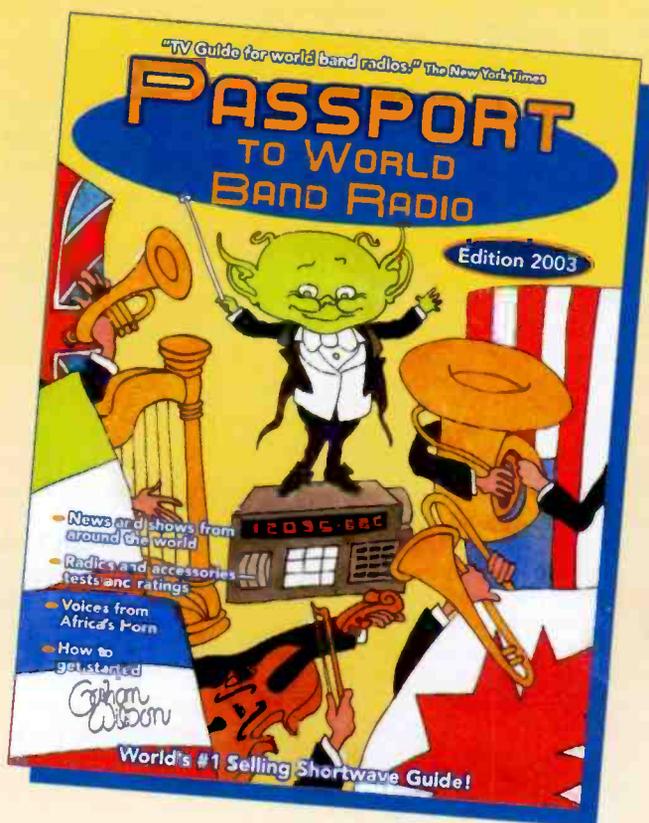
Richly illustrated, bulges with essential information.

PASSPORT'S frequency-by-frequency Blue Pages are nearly a book unto themselves. There are thousands of entries packed into 183 pages. Precise information, often confirmed by firsthand monitoring, for every transmitter on the air—times and days, transmitter locations and powers, target zones, networks, languages and jamming.

PASSPORT'S "What's On Tonight" also devotes 88 pages to detailing news, music, sports and entertainment shows in English. Need station contacts and Webcasts? PASSPORT'S "Addresses PLUS" chapter is the industry bible, 76 pages crammed with juicy tips. There's also a separate section on broadcasting in the Horn of Africa.

PASSPORT REPORTS includes over a hundred pages of rigorous tests, evaluations and scores for 61 portable, portatop, PC-controlled and tabletop receivers—17 outdoor and active antennas, too. *Outside* magazine minces no words, "The best. They tell you what's good about the good, bad about the bad, and advertisers be damned."

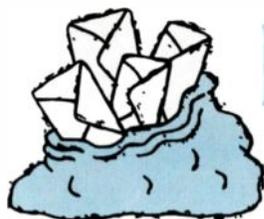
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LETTERS TO THE EDITOR

US Army Responds to MARS Investigation

The October *Monitoring Times* summarized a critical investigative report on Army Military Affiliate Radio System (MARS). According to Army policy all public statements on MARS must be funneled through the Fort Huachuca Public Affairs Office. The following response to *MT's Closing Comments* was made by Carol Conner, Public Affairs Officer for U.S. Army Network Enterprise Technology Command/9th Army Signal Command.

"The Department of the Army Inspector General (DAIG) investigative report on the Army Military Affiliate Radio System (MARS) raises valid points. US Army Network Technology Command (USANETC – formerly US Army Signal Command) is in the process of reviewing the findings and implementing changes.

"Like many other military programs, Army MARS is working with constrained resources after years of budget cuts, and must compete with other organizations to fund sometimes-unforeseen expenditures. That said; USANETC remains committed to the MARS mission.

"The Army MARS budget has increased by a total of \$60,000 over the last four fiscal years and the USANETC command has initiated funding requests to upgrade equipment located in overseas gateway stations. A contract was also let in September 1999 and implemented in October 1999 that hired full-time operators at both the Eastern and Western Gateways, which are located at Fort Huachuca, Ariz., and Fort Detrick, Md., making them 24-hour operations. Phase two of the contract, implemented in October 2000, added two additional positions (Eastern and Western area coordinators).

"As a result of the DAIG investigative findings, USANETC has taken actions to update Army MARS procedural manuals. A new Army MARS Net Plan was published in August 2001 and revised in July 2002. A revised National Emergency Operations plan was published in April 2002. Several new training guides have also been updated. The Net Control Station Guide was published in October 2001. The Essential Elements of Information Reporting Guide was published in March 2002 and a totally new Basic Training Manual was released in July 2002.

"The DAIG report cited discrepancies on our website. The Army MARS website is currently under review, changes have been made and the site will be updated on a regular basis.

"Army Signal Command is also dedicated to getting out the word about the great things Army MARS volunteers are doing.

As we transition to US Army Network Enterprise Technology Command, we will be establishing a presence in the National Capital Region and will have a designated representative attending the Shared Resources High Frequency Radio Program meetings as well as other events that require an Army MARS voice.

"The USANETC command believes Army MARS is a viable program. We remain committed to its mission and the thousands of volunteers who support it."

Carol Conner, Public Affairs Officer
U.S. Army Network Enterprise Technology Command/9th Army Signal Command

Fort Huachuca, AZ 85613-7070

Winterfest to Invite Arnie Coro

Readers may be interested in joining in the following worthwhile project:

"I've been raising funds to sponsor Arnie Coro's trip to be the keynote speaker at the 2003 SWL Winterfest, and am about halfway to our goal: <http://swlfest.com/coro.html> As you probably know, Arnie does the excellent show "DXer's Unlimited" on Radio Havana Cuba, which he co-founded over 40 years ago and still engineers. Arnie is truly a fixture in the shortwave community, and I have high hopes him being able to give us a fascinating slide presentation and keynote speech."

-ed cummings, longtime MT subscriber

Finnish isn't the end of it

In *Programming Spotlight* earlier this year, John Figliozzi wrote that Radio Finland would end all foreign language transmissions on shortwave and only broadcast in Finnish.

"Well, this is a little wrong. It is a pity that Finland seems to end all foreign language transmissions. But in Finland, both Finnish and Swedish are official languages. Finland was part of Sweden from the beginning of history (at least as history is counted in the USA) until 1809 when Sweden lost Finland to Russia (we lost the Baltic states around 1720).

"So Radio Finland will at least be broadcasting in Finnish and Swedish. I still see it as a mistake by the Finns, but.....

"After Radio Denmark, Radio Norway and Radio Finland, I wonder when Radio Sweden gets its cuts? Maybe soon time for a united Voice of the Nordic countries?"

- Sven Ohlsson, sven@swl.nu
ShortWaveListener Now - <http://www.swl.nu>

"Thank you for the correction... I agree that it is most unfortunate to have lost English transmissions first from Denmark, then Norway and now Finland. Hopefully, Sweden will be able to persist. In effect, it will be that Voice of the Nordic countries you refer to."

- John Figliozzi

"Who's Who" a Hit

"Just wanted to drop you a line and tell you the May *Who's Who in the Radio Spectrum* (ham bands) was awesome. I've always struggled to find a good lowdown on the frequency allocations, modes, etc. for amateur operators, but your article and guide were easy to follow. Indeed, you helped start me off on a whole new phase of the hobby. By listening for amateurs with my ICF-2010 and an outside longwire antenna, I've been able to log countries that previously went undetected. Ah, the miracle of single sideband.

"At the same time, I'm going to take a technician class so I can get a ham radio license of my own. Local amateurs offer the classes for free about four times a year. Thanks for inspiring, and keep up the good work. It's people like you who keep the amateur radio hobby thriving."

- Chris Boyd, Rancho Palos Verdes, Calif.

"After a long absence, I recently renewed my subscription to *Monitoring Times*. Unfortunately, by the time my subscription started I have only been able to receive the August and September issues; which means I've only seen Parts 7 & 8 of *Who's Who*? Is there a way I can get copies of Parts 1, 2, 3, 4, 5, & 6?"

"By the way, I read your 'Perspective' (in *Closing Comments*) and agree. While my world has gotten progressively more quiet (I live in the Washington, DC area) and a lot of agencies have gone first trunked and now digital (with all its reception problems), and many of the powerhouse shortwave broadcasters are going "Internet" and dropping their conventional and expensive transmissions (which I think is a bad idea), there is still a lot to monitor. Oh, and I do have a pending order for one of the new digital scanners, if and when you have them in stock."

- Tom Wensel

In reply to your query about obtaining the *Who's Who in the Radio Spectrum* as a standalone series, there is only one way: buy the *2002 Monitoring Times Anthology* on CD when it becomes available next month. In addition to providing the articles as originally published, the CD will also include the series as a separate pdf document for easy reference. A special bonus will include a chapter never published in *MT*: What's above 5000 MHz?

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to *Letters to the Editor*, 7540 Highway 64 West, Brasstown, NC 28902, or email editor@monitoringtimes.com. Letters may be edited for length and clarity. Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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Saved by a Scanner

- In Modesto, California, dispatchers have placed a scanner in the hospital room of a policeman in a coma, hoping it will cause some response. Sgt Steve May has been in a coma since a pickup truck ran a stop sign and slammed into his car July 29. At the top of each hour the dispatcher calls "A-21". The response is very slight, but it's enough to raise hopes. You can check his condition at <http://www.modestopolice.com>
- A man who robbed a liquor store in Salina, Kansas, at knife-point was apprehended when a woman who heard the suspect's description on a police radio scanner called police to say she saw a man with that description in a nearby wooded area.
- Three armed men who invaded a Millington, Tennessee, home ran off after hearing their descriptions broadcast over the home-owner's scanner. The wife had been able to escape their notice long enough to call 9-1-1.
- Michael Fair was out of prison only a few days after serving 16 years for a 1985 murder in Colorado, when police say he robbed a pharmacy in Ashland, Massachusetts, and fled with OxyContin and Percocet. Police received a tip from a tow truck driver who heard a description of the suspect on a police scanner. Fair was arrested at gun point at the restaurant where he had been spotted.
- Accused child rapist Russell Smith was captured in Oregon after he was profiled on the hit Fox show "America's Most Wanted: America Fights Back." Smith was wanted by the Prince William County Police Department in Virginia. The television show told viewers the model car he was driving and the license plate number. Several days later a deputy in Canyonville, Oregon, called dispatch reporting a red S-U-V with no tags abandoned in a wooded area off the interstate. The deputy assumed it was a stolen car that had been dumped.
- Diane Chapman heard the information about the abandoned vehicle over her scanner and remembered the *America's Most Wanted* segment on Smith. After her call, officers searched the woods nearby and found Smith's license plates. Smith and his 12-year-old daughter were picked up the next day.

Turmoil at Voice of America

Veteran foreign correspondent and journalist David Jackson has been appointed Director of VOA by the Broadcasting Board of Governors, following the resignation of Robert Reilly to "support the President in the war against international terrorism" (VOA press release via Bill Westenhaver). Jackson is a former *Time* magazine foreign correspondent.

Reuters quoted VOA sources that the agency had been in turmoil under Reilly's leadership, particularly over plans to set up new language services targeted to Middle East audi-

ences but without the "impartiality" provisions in the VOA charter. In a VOA staff meeting attended by several BBG members, new Board chairman Ken Tomlinson was asked about reports of a "strategic plan" that would result in VOA being split up into regional services similar to Radio Sawa. There was much discussion about plans to combine VOA Farsi and RFE/RL Persian into a new 24-hour radio service to Iran. Board member Pattiz confirmed this was in the works and could be launched as soon as March. The new service would have a music format similar to Radio Sawa to attract young listeners.

Reaction to the changes appears mixed, with many insisting that some hard news content is essential, and that the Iranian population is far different from those listening to Radio Sawa. People inside VOA familiar with the situation say there was no consultation with employees or staff or input from service managers. "We are treated as if the Farsi service was a failure. VOA research has shown that Farsi was one of the two most listened to radio stations in Iran," said one source.

In September VOA Farsi service launched *Next Chapter*, a satellite TV broadcast aimed at the youth of Iran; it is to offer fresh, informative and entertaining reporting on news, current events, and life in the US. Tuesdays at 10:30 p.m. local time in Iran [now 1900 UT] on Asiasat 2, HotBird 3 and New Sky, says another VOA press release. (Via Glenn Hauser; see *Global Forum* for more.)

VOA Memorial Park

Veterans' Voice of America website <http://www.veteransvoa.com> is devoted to raising funds to establish a VOA museum and memorial park at Bethany, says John Vodenik, CA, in the *Radio HF Internet Newsletter*.

Another Job Change

Vicki Huddleston, the top U.S. official in Havana, handed out 9,000 shortwave radios, 45,000 books, magazines and other literature to independent libraries and dissidents to bolster the free flow of information. Cuban officials denounced Huddleston for meddling in national affairs. Now she has a new job: U. S. ambassador to Mali, reports Gary Marx, *Chicago Tribune*.

The Other Side of Geocaching

The game of geocaching, in which GPS receivers are used to locate small boxes hidden by other players, may not be quite such a harmless pastime as one might think. In an article in *The Valley Times*, O'Neill Wilderness Park ranger Bobbie Calli says geocaching has prompted people to bushwack through sensitive habitat, damage native plants, track in invasive non-native plant seeds, and cut fences. Range Calli has removed three of five suspected caches.

Rangers say they aren't opposed to the game, but want to protect native plants and ani-

mals. "It would be nice if they would talk to us," she said. "We could work with them to figure out a place where they could hide it and where we would not end up with a bunch of illegal trails." Bryan Roth of Groundspeak says there are 24,000 caches worldwide, and that they try to be environmentally aware.

Want more statistics on geocachers? A new website allows you to sort by states, cities, players' names, etc. Go to <http://www.insidecorner.com/geocaching/stats/index.cgi>

Locationless Caches

Here's a new twist on GPS activity that doesn't focus on leading hundreds of players to the exact same spot, but instead encourages each person to find a new "cache" to add to the log. "Just for fun, here's a list of my 'locationless' geocaches to explore... They're also 'educational,' meaning you'll have tons of fun learning something new as you discover a new place somewhere in the world. Geography rules!"

— Anton Nimmo, *K12 Tech Integration Trainer*, aninno@cnyric.org

Women of Courage — What's a Suffragette?

http://www.geocaching.com/seek/cache_details.asp?ID=36018

Arboretum Walkabout — Got trees? Show me!

http://www.geocaching.com/seek/cache_details.asp?ID=35307

Presidents on Parade — These guys are carved in stone!

http://www.geocaching.com/seek/cache_details.asp?ID=33852

Chess for Kings — Want to play a king-size game of chess?

http://www.geocaching.com/seek/cache_details.asp?ID=28365

Ride the Underground Railroad — Can you hear the whistle blowing?

http://www.geocaching.com/seek/cache_details.asp?ID=27393

Observatory Quest — Where can we go stargazing tonight?

http://www.geocaching.com/seek/cache_details.asp?ID=27254

Native American History Lesson — Find a monument fit for a chief!

http://www.geocaching.com/seek/cache_details.asp?ID=26263

Historic Farts — Is there an old fart in your life?

http://www.geocaching.com/seek/cache_details.asp?ID=21378

Diners Club — Show me your favorite funky old diner!

http://www.geocaching.com/seek/cache_details.asp?ID=21289

BULLETIN BOARD

November 2: DX test

WDFB-1170, Danville, KY (COL Junction City, KY) will conduct a DX test from 12:00am-?? EST. The station's regular format is Christian; they go by "WDFB Christian Radio." Songs such as "Amazing Grace" "Sweet Beulah Land" and "My Country, My Flag" (by the Hoppers) will be played, along with voice and/or Morse code IDs. Reports (with return postage) may be sent to: WDFB Christian Radio, P.O. Box 106, Danville, KY 40423-0106; music@searnet.com; <http://www.wdfb.com> (Arranged for the IRCA CPC)

November 16: Seal Beach, CA

Southern California Area DXerS (SCADS) in the Community Room of the F&M Bank at 12535 Seal Beach Blvd in Seal Beach 90740. Guest speakers from Sangean. Also on the agenda: Clondestine, Pirates and Jamming. Contact Bill Fisher at 714-522-6434, billfishernow@netzero.net. Directions and more at <http://communitylink.ocnaw.com/groups/scads>

Satellites vs. Radar Detectors

Tests have shown that, though they are supposedly passive devices, some radar detectors emit radio signals in the very small aperture satellite downlink band far in excess of the limits that apply to other unintentional radiators. Since radar detectors are mobile, it is impractical to resolve interference problems on a case-by-case basis. Thus, the FCC concluded that it is necessary to require all radar detectors to comply with general emission limits to prevent interference to VSATs.

Specifically, the Commission has modified Part 15 of its rules to require radar detectors to meet emission limits in the 11.7-12.2 GHz band and to require that radar detectors obtain certification under the Commission's equipment authorization procedures.

Where Did They Go?

For the fifth year, monitoring enthusiasts are being asked to use their equipment to help wildlife biologists figure out the routes and final destinations of endangered Burrowing Owls. The University of Arizona seeks volunteers to listen for 53 birds that were radio-tagged in eastern Washington state during the summer. If you live in the western USA and can receive 150 MHz signals, you could help. Your scanner or

extended-range hand-held ham radio transceiver, plus an outside antenna, are all you need to join in. If you have radio direction finding equipment for VHF, so much the better.

For all the frequencies and more information on the project, go to <http://www.homingin.com>
- Joe Moell K0OV

The Human Race

This "human race" is a project of William Desjardins W1ZY in which two amateur radio operators are pitted against one another in a race around the planet. One heads east and the other west. Neither is allowed to use forms of transportation other than those volunteered by amateurs met along the way. Both are equipped with an assortment of highly advanced telecommunication devices. These devices enable both racing amateurs to maintain an active presence within the amateur radio global community, which tracks their positions and provides logistical support for the race itself. The race is slated to begin in June 2003 and conclude in December 2003.

The project proposes to broadcast the global race as a television documentary series, in hopes of increasing public awareness of amateur radio and the many opportunities for global understanding it offers. Hams may participate by hosting the competitors, making radio contact

with them, becoming sponsors, etc. Visit <http://www.humanrace.fr.st> for the full story and how you can join the effort.

"30" to "88"

Target stores recalled some shorts and hats which were imprinted with "88" - telegraphy shorthand for "hugs and kisses" - when they discovered white supremacists had appropriated this shorthand to also mean "Heil Hitler" (H being the 8th letter of the alphabet). Will this be the finish (30) for this venerable code?

"Communications" is compiled by editor Rachel Baughn (editor@monitoringtimes.com) from newspaper clippings and emails submitted by our readers. Many thanks to this month's reporters: Anonymous, Albany, NY; David Crawford, Bob Fraser, Cohasset, MA; Doug Robertson, Oxnard, CA; George Speck, Ft Worth, TX. Via email: Chanel Cordell, Glenn Hauser, Mary Ann Kehoe, Mike L, Henry LaViers, Larry Magne, Joe Moell, Jerry None, Laura Quarantiello, Larry Van Horn, Robert Wyman

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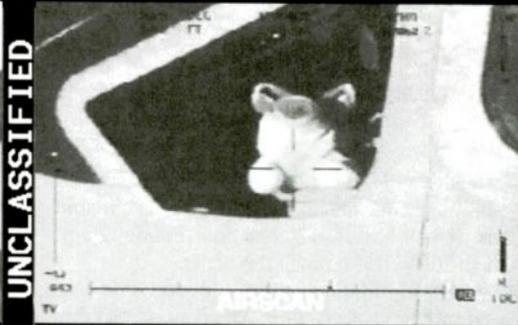
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Surveillance in the Clear

A True-Life Satellite Sleuth Story

By John Locker

It was April 2001 when a US Navy EP-3E made headline news when it was forced to land in China following a mid air collision with a Chinese Navy fighter. The EP3, packed with top-secret electronic monitoring equipment, was intercepted by two F8 Finback fighters over the South China Sea.

As it was being shadowed, one of the Chinese aircraft is thought to have clipped the P-3, causing a major international incident and thrusting one of the US Navy's most sophisticated aerial platforms into the spotlight.

You can imagine my disbelief, when just a few months later I found that I was able to monitor the output from a P-3 turret camera, in real time, from the comfort of my own home in northwest England.

The images were raining down from Telstar 11 a commercial satellite sitting off the coast of South America. No encryption method was being used. The pictures were there for all to see, revealing the true potential of the optical systems used on this aircraft as it flew over the Former Yugoslavia. From a height of 22,000 feet, the camera could pinpoint a vehicle up to 15 miles downrange!

In addition to images from the P-3, there were also two other aircraft operating over the Balkans: a C-12 (military derivative of the Beech Huron) based to the north of Sarajevo and a Cessna 337H "Skymaster" monitoring the Albanian border further south, the latter being flown by commercial operator "Airscan Inc" under contract to the Department of Defense.

What follows is an account of my efforts to resolve what appeared to be a major security breach – a journey that would take seven months to complete.

The Search Begins

This amazing discovery came just two months after the horrific events of September 11, 2001. Troops were and still are deployed in the Balkans to carry out a peacekeeping role. The world was – as it still is – at war.

This region is known to have been infiltrated by Islamic militants, some of whom presently languish in the surroundings of Camp X-ray. Could these surveillance flights be monitoring terrorists, cross border drug runners, arms smugglers or war criminals?

Why was this type of broadcast beaming off a commercial satellite, in the clear? I put this question to defense analysts. When I explained what I was seeing, they were stunned!

They talked of "Cluster Ranger" and "Guard Rail": two types of classified image/radar mapping systems which they thought might be in use here by the C-12 platform. One of the specialists even suggested that the C-12 could be testing a system codenamed "Lynx" for later use in UAVs (Unmanned Aerial

Vehicles).

Again the question was raised...why in the clear?

Alongside Telstar 11 at 37.5degrees west sits an old Intelsat bird, now renamed Columbia 515. This satellite, although quite well inclined, had been assigned to carry military traffic during the period that the US DoD was having problems with its Tracking and Data Relay satellite fleet (TDRS).

It was common knowledge that pressure on the military FleetSatCom satellites was high, due to traffic in and out of Afghanistan. Perhaps this signal was spillage, intended for Columbia, but put through Telstar in error. The 14 GHz uplink frequencies were common to both, and at the reception end it would be difficult to distinguish between the two birds, as tracking would no doubt be automatic.

My main concern was that if this was sensitive information, not only could it be seen here in the UK, but right across Europe, including the target areas, Kazoo and Macedonia.



Footprint of Ku band beam showing the extent of the coverage, from northwest England to well into eastern Europe (Loral)

There was no doubt the signal carried on the P-3 Serial Data channel was the real McCoy. On this aircraft the camera is situated in a retractable ball turret under the main fuselage, forward of the nose gear. When target tracking, the images would often show the telltale four engine configuration of the Orion. This was probably a VP-5 aircraft home based at US Naval Air Station Sigonella, Sicily, a couple of hundred miles to the south.

First Attempts

My attempts to contact the Naval unit there went unanswered.... so too my correspondence to KFOR HQ (Kosovo Forces Headquarters) in Skopje. If anyone knew what was going on, surely they would!

The weeks passed by: it was early December. The signals continued.

Early one morning I noticed that the P-3 camera was looking at a target off the port wing tip. There in full view was what at first looked like a pylon-mounted missile. On closer inspection



Lt Col Ed Loomis, US European Command (EUCOM) gave this reply on BBC Newsnight, when asked about the content of the transmissions: "We consider the video as it is and without the specifics of where, what is shooting the video, where it is being shot, when and as to why it is being shot, as to render it unclassified and without further interpretation, that video is unclassified."

An interesting response when you consider that the images of Camp Bondsteel clearly showed, in real time, the exact location of the complex, what was going on there....and what's more, not only the type of aircraft, but also the registration number of that platform....(Cessna 337H N 731AS. Airscan Inc.) Registration was seen on a number of occasions as the camera swept across the tail boom. Also operating from time to time was sistership N729AS

tion, it had the appearance of an Electronic Counter Measures pod.

This type of pod would only be carried on special mission aircraft.

My concerns were voiced to the UK Ministry of Defense. The information, I was told, had raised a few eyebrows, enquiries would be made. Military Intelligence had been informed.

No doubt some of you are by now thinking, why all the fuss? Why not just watch and enjoy?

Well, if for some reason this broadcast was mistakenly in the clear, then it might put at risk the lives of those US and European forces on the ground in Macedonia.

My intentions were simple. Make sure the source was aware that the information was unencrypted, and clarify whether or not the content was of a classified nature. But events would prove that it wasn't going to be that easy.

Stalemate

Eventually, contact was made with the P-3 unit at Sigonella. By this time I had identified the missile-like object as a Theatre Injection Point, a device which allowed the Orion to communicate directly with ground stations and satellites, sending encrypted data and imagery.

In an email reply from the base tactical unit I was advised...

"Spoke with my folks who are responsible for injecting the feed to the satellite. Unfortunately, due to the hardware purchased for this use, the system is indeed unencrypted.

It is working as designed, although subject to type of viewing you are experiencing.

It is a known hardware limitation, and my Chain of Command is aware of the issue. Appreciate your interest in pursuing this matter.

(Name omitted)
TSC Operations Officer "

So, at last an answer, but it didn't clarify what was going on, nor did it specify the security level of the signal.

Who is GBS?

All this time I had also been trying to follow up another lead.

Along with the transmissions being used for surveillance downlinks, were two channels showing US domestic versions of CNN, one of which was badged "GBS Norfolk Virginia."

Again, a US Navy link. However, all attempts to obtain information about GBS failed. Until, that is, I checked "FAS," a website run by the Federation of American Scientists. FAS has pages and pages

of data on scientific and military subject matter.

GBS (Global Broadcast Services), it transpires, is a Department of Defense initiative formed in the late 1990s to oversee satellite transmissions targeted at world-wide military establishments. Their motto ... "Information For The Warfighter."

GBS areas of operation include signals intelligence (SIGINT), tactical information, and also the relay of homebased services (quality of life programming) such as Armed Forces Television and Radio Service (AFRTS) and the distribution of news material, including CNN.

GBS fact sheets show the relative security level of their services. The type of broadcast going through Telstar was, it seemed, classified "secret" and came under the broad spectrum of air to ground surveillance/UAV video and EP3 SIGINT.

Christmas 2001, I finally made phone contact with KFOR HQ Skopje. They were surprised by the situation, but the matter was beyond their area of responsibility. It was suggested I give Allied Forces South, Naples, a call.

More calls, more non-answers

January 22, 2002. I phoned US Naval Air Station, Norfolk, Virginia. They had never heard of

GBS ... but the female officer on the duty desk didn't want to let this one go....although she admitted it was too hot for her to handle. After a few minutes discussion with a colleague, and with an air of uncertainty in her voice she said, "Sir, I think you need to talk to this person."

...and she gave me the direct call number of the Commander in Chief US Atlantic Command!

I didn't bother the CIC, but I did put a call into the Pentagon...."Global Broadcast who?" came the reply. Very strange!

A chance call to RAF Oakingham, the UK NATO satellite ground station was to give me my first real break.

Oakingham is not your usual RAF Base. From this top secret ground station, British Forces and NATO communicate with the highly classified Skynet fleet of military satellites.

They had no access to the signal to check it, but did, however, have a US Naval Officer serving with them in the unit. The PRO promised to run the details by him, and was pretty confident that in a day or two I would hear something.

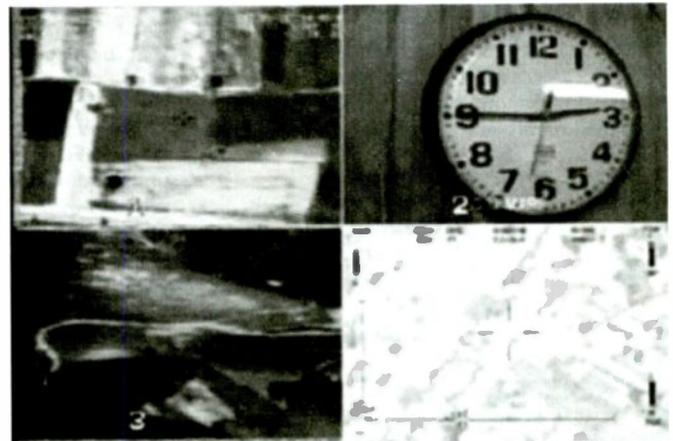
Sure enough, a couple of days later I was left a phone message by Gary Wagner, US Naval Space Command. Gary tried to be helpful as he could. He asked me to email him some background information, plus a list of questions. I explained that this whole issue seemed to be clouded by the number of departments involved, each one unaware of the others' activities. Typical military compartmentalization.

"So how come the Pentagon didn't know where to find GBS?" I asked. "We like to keep a low profile," came the dry reply!

Off went the email, accompanied by yet more copies of correspondence.

At last, I thought, I should get some answers.

A few more days passed; Gary acknowledged receipt of the mail and said he would be back in touch. Unbeknownst to me, he had passed the details back into Europe, this time to the Public Affairs Office, US European Command (EUCOM), Germany, prompting a call from a Lt Colonel there. The US military through GBS, he explained, had set up a contract with



Three aircraft are active in the Skopje region, shown on the aeronautical map. Top left Hunter UAV. Bottom left P-3 and bottom right Airscan Skymaster. Top right shows unit clock indicating that the C-12 is on the ground.

the operators of the Telstar fleet to distribute information worldwide. This system made use of military birds and Ku band transmissions via domestic satellites.

He was not familiar with the specific broadcast on 37 west, but advised me that what I was seeing was "information" only.

"We are at war," he reminded me, and asked if I was aware of the difference between "information" and "military intelligence." This, of course, was the whole point of my quest for answers! What was information to the casual viewer could quickly become "intelligence" with a little bit of background research ... especially to someone in the target area. Unencrypted satellite signals shower down on anyone within the footprint, regardless of their political affiliations, and this was my very concern.

The saga continues

Eventually I received written confirmation from EUCOM that the information being broadcast was deemed "unclassified." Hallelujah!

To this point it had taken the best part of three months to track down someone who was prepared to answer that one question. This, after three months, dozens of phone calls, emails and faxes. All along I had been quite open about my concern and my reluctance to publish anything until I was sure this was unclassified material.

But the story didn't end there.

I decided to go ahead and put together an article for a popular European magazine which eventually went to press in mid April.

Somewhere along the line my investigations had come to the attention of a Joint Staff member at the Pentagon. So concerned was I about the content of the magazine piece, that I forwarded the text to him prior to publication, perhaps expecting that some of the details would be censored. But it wasn't.

In due course, copies of the finished article were sent out to the ministry of Defence here in the UK, and the Pentagon Joint Staff.

Meanwhile the transmissions continued, and by May, two more aerial platforms had appeared. A pair of Hunter unmanned drones (UAVs) extended the theatre of operations to the Pristina region and splattered the images from their highly sensitive cameras all over Europe.



An armed Kiowa Warrior gunship passes beneath the Airscan camera giving top cover to the peacekeeping troops below.



P3 similar to the one used over the Balkans, possibly from VP-5 stationed at Sigonella (Credit US navy)

Live mission video often showed quite specific activity. The aircraft type, location, etc. was always displayed on screen, regularly pinpointing the platform and ground forces to within a few meters using UTM

locator co-ordinates. During some sorties it was apparent that security alerts were in full swing, with armed troops on the ground being provided top cover by missile-equipped helicopter gunships which swept through the field of view below the Cessna.

How could this simply be regarded as unclassified information? I wondered.

It was at this juncture I enlisted the help of well-known investigative journalist and SIGINT expert Duncan Campbell. Duncan, a member of the Washington-based International Consortium of Investigative Journalists,

made some discreet enquiries.

It seemed that the shadowy world of military intelligence was also showing concern over these broadcasts. (For further read-

Global Broadcast Services

Global Broadcast Services came about during the latter part of the 1990s. It was created to meet the critical communications needs of warfighters as part of the Talon KNIGHT initiative, providing broadband satellite communications to field units.

The proving ground was Bosnia-Herzegovina where it supported the UN peacekeeping forces.

Initial tests were carried out feeding UAV video to forward deployed commanders. This proof of concept was a Joint Broadcast Service/EUCOM arrangement and was highly successful. However, it took a couple of years for suitable technology to be developed which allowed near real time data and imagery satellite links.

It was GBS Phase I that first utilized the Telstar 11 satellite (then known as Orion I), supporting the Bosnia Command and Control Center Augmentation System (BC2A) as part of Operation Joint Endeavor. Two Ku band commercial transponders were leased to accommodate the DoD requirements.

GBS Phase II involved the procurement of Ka band transponders on the new series of UHF Follow On military satellites. Special GBS payloads were added to these birds allowing full Ka band (30 GHz) uplinks. The satellites, Hughes HS 601 spacecraft, have steerable downlink spot beam antennas, delivering up to 130 watts. (That's 50 percent more than the highest domestic signals.)

Three craft give the DoD near global coverage via 22.5 west (Flight 9), 72 degrees east (Flight 10) and 172 east (Flight 8), transmitting to small mobile tactical terminals, including ship and aircraft based units.

Full details of the UHF Follow On satellite can be found on the Navy Communications Satellite Programs website <http://www.pmw146.navy.mil>

While GBS now uses military satellites for its communication network, there is still an arrangement with commercial operator Loral Skynet. They maintain the "Telstar" fleet of birds with ten satellites in their constellation, stretching all the way round from 129 west to 76 degrees East.

Through a special agreement, the military has access to Ku band transponders on these spacecraft, and it is the output from one of these, Telstar 11 at 37.5 west, formerly Orion I, that we are presently seeing over Europe.

How It Works

Aircraft, transmitting real time imagery, fire their information to their respective ground stations (EUCOM Ops) in the 2 GHz range (S band). The information is gathered by the mobile units and transmitted up to the UFO 9 satellite stationed over the Atlantic at around 22.5 degrees west. (The exact location of this satellite is a closely guarded secret. It can operate anywhere in a slot between 15 degrees west and 25 west and is one of the few classified geostationary birds for which orbital elements are not available.) This uplink will be in Ka band around 30 GHz (30,000 MHz).

The downlink from this bird is received in Continental USA (CONUS) and packaged by GBS. This information will be monitored by military analysts on site, while the bundled channels, including the US versions of CNN, are sent back to Europe for field commanders via the commercial slot at 37.5 west...all in a couple of seconds!

This procedure is doubtless repeated in other theaters of operation, providing real time data and information.

More details are available on the "National Security Space Road Map" website <http://www.wslfweb.org/docs/roadmap/spacroad.htm>

For more detailed background information, video clips, links to BBC Newsnight and the ICIJ, visit John's website ... <http://www.satcom.freemove.co.uk>



Hunter UAV checks out a bridge near to the Albanian border from an altitude of 10,000 feet. Infrared image.



This nighttime infrared image downlinked from a Hunter UAV as it loiters high above a small Macedonian village.

ing and streaming video see <http://www.icij.org/dtwoweb/report.asp?ReportID=189>

Raising the stakes

As no one in the Department of Defense was taking corrective action following my article, we decided to take things a stage further.

And so it was that on June 12, 2002, the story was featured on the BBC's internationally acclaimed evening program, *Newsnight*, which was broadcast live, to a worldwide audience of millions.

In the studio to discuss the issue were UK Defense Committee member Donald Anderson MP, and the Chairman of the Pentagon Defense Policy Board, Richard Perle.

The Pentagon's response was low key, and Germany-based EUCOM representative LtCol Ed Loomis, to whom I had spoken six months earlier, continued to play the party line. This was unclassified material, information only, not intelligence.

However, by the end of the program, Pentagon spokesman Richard Perle, having seen some of the footage first hand, admitted it made sense to encrypt, sooner rather than later!

"There are plans to encrypt this data so that we don't get stories like this one we are enjoying this evening," he said.

No wonder the sudden change of policy:

Just thirty six hours before *Newsnight* went to air, the Airscan Cessna, flying out of Petrovac airport east of Skopje, had downlinked real time video from the vicinity of Camp Bondsteel, Urosevac, the US Forces regional Headquarters. So detailed were the images that every inch of Bondsteel's perimeter could have been mapped and information about every vehicle and piece of equipment within the compound logged!

What's more, the very center of the compound had been marked by UTM coordinates in real time.

End of story ... Or is it?

On July 1, more than seven months after the downlinks were first observed, the Pentagon applied access controls to the broadcasts making them invisible to all but those military units authorized to see them. EUCOM and the Pentagon insist, however, that the transmissions have not been encrypted.

Access controls, encryption – the end result is the same: A higher level of security has been imposed, and for the time being these extremely sensitive transmissions are safe from prying eyes. But it begs the question: with ever increasing pressures being forced

on military satellite bandwidth, could this happen again? Next time perhaps via a commercial satellite over continental USA?

About the Author:



John Locker is a freelance writer based in the UK, who specializes in satellite and aerospace communications. You can contact John directly at satcom@cybase.co.uk or visit the "Satcom" website at: <http://www.satcom.freemove.co.uk>.



This study of a Royal New Zealand Air force P-3 clearly shows the position of the nose camera. This is an early version of the P-3 with fixed turret. In US Navy variants, the turret retracts into the fuselage and is hidden from view.

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Signals Behind the Bamboo Curtain

By Gayle Van Horn

For decades, radio signals in China have captured the attention of shortwave listeners and DXers from all corners of the world. To many hobbyists, China remains a fascination amid a vast continent of mystery, dynasties and revolution.

Radio in China was introduced in 1928, when a station of the China Broadcasting Corporation began broadcasting from a 500 watt transmitter in Nanking. Today, China's radio presence has emerged as a complex and expanding labyrinth of medium wave, FM, shortwave, relays, and communication satellites. Broadcasting in China embodies 23 provinces, five autonomous regions, and four municipalities, each under the direct control of regional broadcasting administrations.

The first Communist-controlled station was New China Radio, which began broadcasting in 1941 during the eight year war with Japan. At the height of war, due to territorial control between both nations, as well as between the Chinese Communists and the Chinese Nationalists, the station moved to Yan'an, then seat of government for the Communists. By 1945 national broadcasting was completely controlled by the government. In 1947, the station began an English service, broadcasting from the Taihang Mountains in northern China. During this period, despite their rigid control, the government briefly allowed a few private stations to broadcast also.

By 1950, government-sponsored broadcasting had broadened to 83 transmitters, a milestone from the first broadcast, and became known as Radio Peking, with a foreign service on shortwave comprising nine languages. On January 1, 1983, to better reflect Chinese spellings the station became known as Radio Beijing. Currently, it is referred to as China Radio International and it includes 43 language services. CRI remains the most widely heard of all the forms of radio in

China. General programming for CRI typically includes culture, *Listener's Letterbox*, *Learn to Speak Chinese*, news, interviews, travelogues, traditional Chinese music and official propaganda.

The bulk of transmitters for CRI are located in and near Beijing, many built and installed by the Russians in earlier years of friendly relations. Additional transmitters are located in Kunming and Urumqi. For more on transmitter sites, the Asian Broadcasting Institute has CRI transmitter sites on line at <http://www.246.ne.jp/~abi/sked-chn.htm>.

Radio China International also exchanges transmitting facilities with Radio Canada International, Radio France International, Radio Exterior de Espana, and Voice of Russia. Relay facilities are located in Brazil, Cuba, and Mali in

West Africa. Current English CRI frequencies may be obtained by checking *MT's* monthly *Shortwave Guide*.

As you scan the bands for Chinese broadcast, you may find that some of the CRI frequencies, as well as some regional and provincial stations, use "out of band" frequencies. These frequencies are located in an area outside the customary agreed-upon international broadcasting bands.

Monitoring and verifying CRI is a good place to begin your China quest. The station's response remains excellent and timely, despite receiving over 900 thousand letters and emails in 2001! It is also worth requesting notation of the frequency transmitter site on your reception report. Hopefully, they will oblige your request, and intermittently do so. In addition, you are likely to receive a gamut of souvenirs that may include colorful pennants, stickers, souvenir cards, notebooks, large wall calendars and hard-sell propaganda. Most likely you will regularly receive *The Messenger*, CRI's bi-monthly tabloid magazine. Return postage is not required and IRCs are not recommended. Addresses for China Radio International, and other China stations, plus websites, may be found in Table Two.

As an introduction to your listening, the easiest way to hear China Radio International is on the Internet. CRI is available via World Radio Network <http://www.wrn.org>. Audio on Demand is available in German, French and English. The CRI <http://www.com.cn> website also contains links to Real Audio.

But wait, there's more

Once you have logged and verified CRI from your shortwave, you may discover another series of networks showing another side to China's extensive broadcast coverage – China National Radio.

CNR operates from Beijing, as well as nu-



China's Radio International Building

merous other sites, and covers the vast country on a multitude of frequencies, some operating on parallel. Transmitter sites are difficult to confirm, but not impossible. Much of the programming is in Standard Mandarin Chinese.

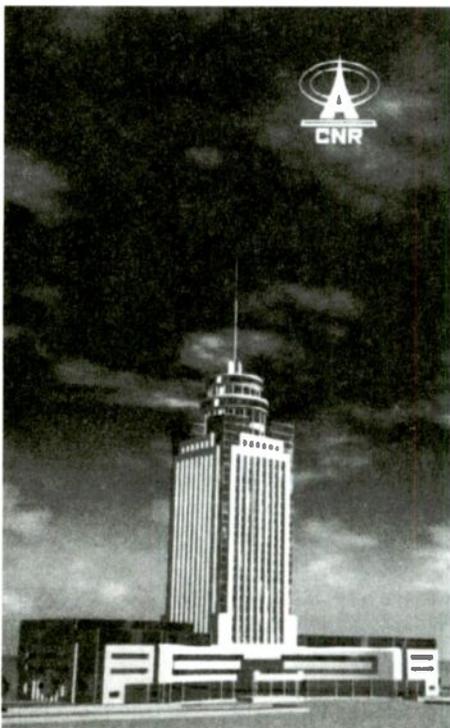
Broadcasts from CNR comprise two central networks, CNR-1 and CNR-2, which operate on medium wave, shortwave and FM nationwide. CNR-4 operates mainly on shortwave in several minority languages, as does CNR-8. CNR-5, Taiwan Service, operates on medium wave, shortwave and FM aimed at the island of Taiwan. CNR-6, in Chinese, operates on medium wave, shortwave, and FM.

China National Radio is frequently referred to in hobby publications and newsletters as Central People's Broadcasting Station (CPBS), corresponding to the on-air identifications in Chinese, "Zhongyang Renmin Guangbo Diantai." Either reference is correct, as CPBS has changed the name to China National Radio.

Broadcast hours vary from 0900-1800; 2100-0500 UTC. Many stations broadcast various services in winter or spring months only, while others adjust their time schedules or which frequencies and languages are in parallel. Your location, propagation, and time of day will dictate when you are able to monitor CNR stations.

Verifying CNR is possible using English or Standard Chinese reports. Like CRI, CNR responds with an assortment of stickers and small souvenirs. Station T-shirts, books or music tapes are available for purchase. Don't forget return postage for this one, preferably mint postage stamps from Bill Plum's *Airmail & DX Supplies*. (*QSL Report/MT Oct. 2002*). This applies to attempts to verify regional and provincial stations as well.

For active frequencies, language services and schedule hours, refer to *Domestic Broadcasting Survey 4th Edition*, edited by Anker Petersen.



China National Radio

(*MT/Oct. 2002 What's New review*). *World Radio TV Handbook* and *Passport to World Band Radio* contain broadcast and QSLing information. Despite these reference sources, experienced DXers continue to uncover new or discontinued frequencies, owing to China's frequency data tending to be erratic even in the best of DX seasons.

But wait...there's more!

MT's former Managing Editor, Larry Miller, once summed up DXing the Chinese regional stations as, "the meek need not apply," and rightly so. DXing these stations can be an exercise in futility in the best of radio conditions. Those of us living on the East Coast of North America have had to learn the fine art of persistence and patience, due in part to "flutter fading" caused by the "trans-polar route" of the signal from China. Flutter fading is actually dozens of fades per second, which leaves the signal understandable, but with a strange audio reminiscent of "bubbling water."

China's regional stations operate on shortwave, medium wave and FM. The optimum time to monitor them on shortwave, depending on your location, are mornings as early as 0900 UTC, especially in the winter. During the early hours, DXers note audible signals from the lower-powered signals on 4, 5, 6 and 7 MHz. Our West Coast counterparts have a definite advantage in the length of time these stations remain audible.

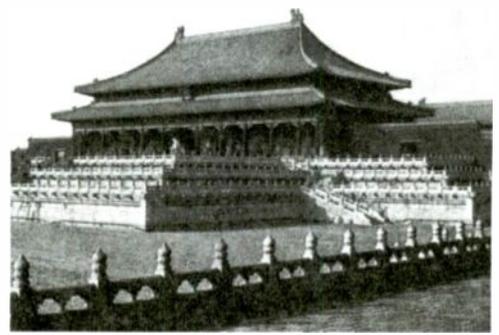
Late afternoon can be equally favorable for monitoring China during the DX season. Many of the Chinese stations begin to sign-on around 2100 UTC. If conditions are conducive, the signal may remain steady as late as 0300 UTC, depending on your location. Some stations sign-off between 0000-0100 UTC, so a planned listening session may be what you need to approach China's regionals.

Provincial DXing

If you're really serious about monitoring China, have a go at the provincial stations. Each station uses the standard identification beginning with the name of the province, followed by "People's Broadcasting Station." In Chinese, this is "Hunan (the province) Renmin Guangbo Diantai," followed by five distinctive time pips. Provinces recently heard include Yunnan, Shaanxi, Xinjiang, and Fujian. Most provincials broadcast in minority languages, but a few include brief English programming. Operation is not always continuous, and several broadcast only in winter.

For country counting DXers, two additional countries may be counted while working the provincials, by following the *North American Shortwave Association* (NASWA) country list. Stations listed as Xizang PBS Lhasa are counted as Tibet; while stations noted as Heilong PBS, Harbin, or Hulun Beir PBS, Hailar, are counted as Manchuria. Consult the NASWA website <http://www.anarc.org/naswa/> (or) 45 Wildflower Road, Levittown, PA 19057 USA, for membership information.

One extra provincial station that remains on many DXers *Hit List* to log and verify is The Voice of the Strait. VO Strait, is operated by the military branch of the People's Liberation Army



China's Tai Ho Hall

(PLA) of China, and broadcasts from Fuzhou in the Fujian province. Programming is beamed to Taiwan in Chinese and Amoy languages, and identifications are given as "Haixia zhi Sheng Guangbo Diantai." Frequencies include: 4900, 4940, 5050, 6115, 7280, 9505, and 11590 kHz. Check around 0800-1000 and 2055-2300 UTC.

It's About Time

If you still seek a real challenge, BPM Shaanxi is active on 2.5, 5.000, 10.000 and 15.000 MHz. BPM is China's official time and frequency station, and is operated by the Shaanxi Astronomical Observatory. Usually it is buried beneath the WWV / WWVH time/frequency stations. Depending on favorable propagation, you may hear BPM, transmitting in Morse code. Send your report to: Shaanxi Astronomical Observatory, Chinese Academy of Sciences, P.O. Box 18, Lintong (near Xi'an), People's Republic of China. Including the "near Xi'an" is said to enhance delivery to the observatory.

QSLing the Extras

Now that you've become an expert at verifying China Radio International and China National Radio, it's time to proceed. Several of the regional and provincials (usually those with English programming) will accept English reports. If you'd rather not attempt to write either, particularly regarding a minority or Chinese program, or your report has been unanswered, try the "direct approach." China Radio International will verify many of the regional and provincial stations, and hopefully make note of the transmitter site, but do include a request in your report. This includes all of the relay sites plus Tibet and Manchuria.

Longwave Resources

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བོད་སྐད་ཀྱི་རྒྱུང་འཕྲིན།

China's Voice of Tibet logo

Whether you report directly to the station or to CRI, do not refer to the latter two as "countries." That term is used by radio club country lists only, and very likely the Chinese will be insulted.

Other Voices

Monitoring utility stations (non-broadcast transmissions) continues to attract a large group of enthusiasts. Utility targets from China present a plethora of stations in aeronautical communications, embassy networks, marine communications, military frequencies, longwave, and more. If you want to monitor China in the utility bands, I recommend you purchase the new *Grove Shortwave Frequency Directory* on CD-ROM by Larry Van Horn. It is available now from Grove Enterprises.

A number of DXers enjoy an even more unusual aspect of radio – monitoring clandestine stations which broadcast anti-establishment political programming. Although not as prevalent as in other political hot spots, some clandestine activity in or directed to China has been logged by DXers. Voice of Tibet broadcasts in minority languages and has been logged at *1215-1300* on 15635 (from Tajikistan; alternate frequency 15645), 15715 (from Kazakhstan), 17525 (Uzbekistan), and 21570 kHz (Uzbekistan; alternates 21585, 21520 kHz). Additional V of Tibet was reported at 1432-1520 UT on 21650 kHz. (*DXLD* 2101) *Clandestine Radio Watch* <http://www.clandestineradio.com> is an excellent source for clandestine information.

Two other clandestine stations reported this year are Falun Dafa, possibly from Irkutsk, Russia (2100-2200 on 5925, 9445 kHz - *Global Forum/MT Jan. 2002*), and Fang Guang Ming Radio, via Sitkunai, Lithuania, in Chinese Mandarin (*2100-2200*, 5925, 9945 kHz - *DXLD*)

The Numbers Game

Tuning outside the normal shortwave or amateur bands, you probably have encountered a broadcast with a series of number recitations in a stilted, mechanical voice. Most often, they

are in Spanish, German and English. These spy stations broadcast from numerous locations and operate on a set schedule, transmitting a series of coded numbers.

One such suspected spy station has been the longtime clandestine station Star Star, widely reported from the early 1990s. DXers have confirmed that Star Star is broadcasting from Taiwan. Broadcasts begin with Chinese music followed by identification and number characters. (*Global Forum/MT Sept. 2002*)

Clandestine Radio Watch has logged Star Star at *0830-0930* on 11940, and at *2230-2330* on 7270 kHz. Schedules include Station # 1 on 11430 kHz; Station # 2 on 13750 kHz; Station # 3 on 9725 kHz; and Station # 4 on 8300 kHz (*World Utility News*). The station has been reported active almost daily every half hour on 8300, 8375, 9725, 11430, 13750 and 15388 kHz. According the Glenn Hauser's *DXLD* 2127, "the best time to catch the station here in North America is from 1000 to 1400 UTC." The only reported address to attempt a verification is: P.O. Box 12587, Tai'pei, Taiwan. (*ACE/DXLD*), but none have been confirmed. For additional information on this station, go to <http://www.geocities.com/hfasia/files/New-Star.html>, or send your email to: w2789@hotmail.com.

Number chasers may do well to view Cris Smolinski's *Spy Numbers.Com* website <http://www.spynumbers.com> This informative site contains links on numbers and related topics of interest.

"Number stations" may be a misnomer, for tones or music are audible as well. Jamming signals featuring Chinese instrumental folk music have been observed from European DXers. Sources reveal that the musical jamming is from a long distance, high power skywave operation (100-500 kW). Suitable hours for European reception include: 1600-0900 UTC; 21700, 21690, 21650, 21540, 21500, 17720, 17640, 17615, 15680, 15665, 15515, 15510, 13690, 13675, 13670, 13625, 13610, 11945, 11935, 11795, 11785, 11750, 11700, 11520, 11510, 9955, 9945, 9915, 9455, 9355, 7515, 7190, 7160, 7150, 5035, 5925 kHz (*CRW/DXLD 2118*).

Are you ready to DX China?

With an abundance to monitor, it's not surprising to find DXers firing up their shouinji (radio), for a glimpse into the mysterious and periodically volatile world of China. Casual pro-

gram listeners should consult *MT's* monthly *Selected Programming* for China Radio International features.

Without question, one of the world's best sources for China schedules and frequencies remains the Danish SW Club International/*DSWCI/Domestic Broadcasting Survey*. (*See Oct. 2002 What's New.*) This publication, with listings for China (as well as an extensive listings of other countries represented on shortwave), is only available via email in your choice of PDF format or as an MS Works database. Send seven IRCs or \$5.00 US currency to DSWCI c/o Bert Nielsen, Egekrogen 14, DK-3500 Vaertoe, Denmark, to order your online survey. For additional information, consult their website at: <http://www.dswci.org>.

I would like to thank the following sources for their timely information in preparing this feature. Those include: *ACE, Cumbre DX, ODXA, NASWA, Glenn Hauser/DXLD, Clandestine Radio Watch, World Utility News, DSWCI/Domestic Broadcasting Survey*-4th edition, *TV Radio World, WRTH, PTWBR, Larry Van Horn, Cris Smolinski, Larry Miller, Anker Petersen, Bent Nielsen, and BCL News/QSL Gallery*.

Whether you prefer China Radio International, National China Radio, the challenging provincials, or the fascinating and bizarre world of utilities, China offers a cornucopia for listeners. Armed with the *China Frequency List* (Table One) and my recommended sources, your passage to China should bring many interesting hours of DXing. Why not tune in to the captivating signals behind the bamboo curtain?

TABLE ONE: CHINA FREQUENCY LIST

CNR: China National Radio	
CRI: China Radio International	
PBS: Peoples Broadcasting Station	
2340	Fujian PBS, Fuzhou, Fujian
3280	Voice of Pujian, Shanghai
3290	CNR-2, Beijing
3900	Hulun Beier PBS, Hailar, Nei Menggu
3950	Xinjiang PBS, Urumqi, Xinjiang
3985	CNR 2, Lingshi, Shaanxi
3990	Gannan PBS, Hezhou, Gansu
4000	Nei Menggu PBS, Hohhot, Nei Menggu
4190	CNR-8, Beijing
4220	Qinghai PBS, Xining, Qinghai
4330	Xinjiang PBS, Urumqi, Xinjiang
4460	CNR-1, Beijing
4460	CRI, Xi'an, Shaanxi
4500	Xinjiang PBS, Urumqi, Xinjiang
4525	Nei Menggu PBS, Hohhot, Nei Menggu
4620	Nei Menggu PBS, Hohhot, Nei Menggu
4750	CNR-1, Xinjiang
4750	Qinghai PBS, Xining, Qinghai
4785	Nei Menggu PBS, Hohhot, Nei Menggu
4800	CNR-1, Shijiazhuang, Hebei
4815	CRI, Hohhot, Nei Menggu
4820	Xizang PBS, Lhasa, via Baoji, Shaanxi
4830	China Huayi BC Corp., Chengdu, Sichuan
4840	Heilong PBS, Harbin, Nei Menggu
4850	CNR-2, Beijing
4865	Gansu PBS, Hezhou, Gansu
4883	CRI, Hohhot, Nei Menggu
4900	Voice of the Strait-PLA, Fuzhou, Fujian
4905	Xizang PBS, Lhasa, Tibet
4920	Xizang PBS, Lhasa, Tibet, via Xi'an, Shaanxi
4930	Honghe PBS, Gejiu, Yunnan
4940	Voice of the Strait-PLA, Fuzhou, Fujian
4950	Voice of Pujiang, Shanghai
4975	Fujian PBS, Fuzhou, Fujian



China's Tiantan Park

- 4980 Xinjiang PBS, Urumqi, Xinjiang
4990 Hunan PBS, Changsha, Hunan
5010 CNR-2, Beijing
5030 CNR-1, Beijing
5040 Fujian PBS, Fuzhou, Fujian
5050 Guangxi PBS, Nanning, Guangxi
5050 Voice of the Strait-PLA, Fuzhou, Fujian
5060 Xinjiang PBS, Urumqi, Xinjiang
5075 Voice of the Puijiang, Shanghai
5090 CNR-5, Beijing
5240 Xizang PBS, Lhasa, Tibet, via Xi'an, Shaanxi
5320 CNR-1, Beijing
5420 CNR-8, Beijing
5860 Voice of Jingling, Nanjing, Jiangsu
5880 CNR-1, Shijiazhuang, Hebei
5935 Xizang PBS, Lhasa, Tibet, via Xi'an, Shaanxi
5950 Heilongjiang PBS, Harbin, Nei Menggu
5955 CNR-1, Shijiazhuang, Hebei
5960 Yunnan PBS, Kunming, Yunnan
5960 Xinjiang PBS, Urumqi, Shaanxi
5970 Gannan PBS, Hezou, Ganzu
5990 CRI, Havana, Cuba (relay)
6010 CRI, Kunming, Yunnan
6010 CNR-2, Xi'an, Shaanxi
6015 Xinjiang PBS, Urumqi, Xinjiang
6020 CRI, Shijiazhuang, Hebei
6025 Ala PBS, Inner Mongolia (tent.)
6030 CNR-1, Beijing
6035 Yunnan PBS, Kunming, Yunnan
6035 CNR-1, Beijing
6040 CRI, Urumqi, Xinjiang
6045 Nei Menggu PBS, Hohhot, Nei Menggu
6050 Xizang PBS, Lhasa, Tibet via Baaji, Nei Menggu
6060 Sichuan PBS-Voice of the Golden Bridge, Chengdu, Sichuan
6075 CNR-1, Beijing
6075 Yushu PBS, Qinghai
6080 Hulun Beier PBS, Hailar, Nei Menggu
6090 CNR-1, Xi'an, Shaanxi
6110 CNR-1, Beijing
6115 Voice of the Strait-PLA, Fuzhou, Fujian
6120 Xinjiang PBS, Urumqi, Xinjiang
6125 CNR-1, Shijiazhuang, Hebei
6130 Xizang PBS, Lhasa, Tibet, Xi'an, Shaanxi
6135 CNR-2, Xi'an, Shaanxi
6135 CRI, Urumqi, Xinjiang
6135 CRI, Xi'an, Shaanxi
6140 CRI, Kunming, Yunnan
6145 Qinghai PBS, Xining, Qinghai
6150 CRI, Beijing
6150 CRI, France (relay)
6160 CNR-1, Beijing
6165 CRI, Beijing
6165 CRI, Urumqi, Xinjiang
6165 CNR-1, Beijing
6175 CNR-1, Shijiazhuang, Hebei
6176 Shaanxi PBS, Xi'an
6185 China Huayi BC Corp., Fuzhou, Fujian
6190 Xinjiang PBS, Urumqi, Xinjiang
6195 Nei Menggu PBS, Hohhot, Nei Menggu
6200 Xizang PBS, Lhasa, Tibet via Xi'an, Shaanxi
6260 Qinghai PBS, Xining, Qinghai
6500 Qinghai PBS, Xining, Qinghai
6790 CNR-6, Beijing
6937 Yunnan PBS-2, Kunming, Yunnan
7105 Nei Menggu PBS, Hohhot, Nei Menggu
7110 CRI, Hohhot, Nei Menggu
7110 CRI, Jinhua, Zhejiang
7110 CRI, Urumqi, Xinjiang
7110 CRI, Xi'an, Shaanxi
7115 CNR-2, Baaji, Shaanxi
7120 Xinjiang PBS, Urumqi, Xinjiang
7120 CRI, Urumqi, Xinjiang
7120 CRI, Xi'an, Xizang
7130 Gannan, Hezou, Ganzu
7130 CRI, St Petersburg, Russia (relay)
7130 CRI, Russia (relay)
7135 CRI, Beijing
7140 CNR-2, Beijing
7140 CRI, Urumqi, Xinjiang
7150 CRI, Urumqi, Xinjiang
7150 CRI, Xi'an, Xizang
7150 Xizang PBS, Lhasa, Tibet via Baaji, Shaanxi
7155 Xinjiang PBS, Urumqi, Xinjiang
7160 CRI, Kunming, Xinjiang
7160 CRI, Urumqi, Xinjiang
7160 CRI, Xi'an, Shaanxi
7165 Nei Menggu PBS, Hohhot, Nei Menggu
7170 CRI, Jinhua, Zhejiang
7170 Xizang PBS, Lhasa via Baaji, Shaanxi
7170 CRI, Bamako, Mali (relay)
7170 CRI, Moscow, Russia (relay)
7175 CRI, Kunming, Yunnan
7175 CRI, Moscow, Russia (relay)
7180 CRI, Urumqi, Xinjiang
7180 CRI, Xi'an, Shaanxi
7185 CNR-2, Xi'an, Shaanxi
7190 CRI, Beijing
7190 CRI, Urumqi, Xinjiang
7195 Xinjiang PBS, Urumqi, Xinjiang
7200 CNR-2, Beijing
7200 CRI, Moscow, Russia (relay)
7210 Nei Menggu PBS, Hohhot, Nei Menggu
7215 CRI, Beijing
7215 CRI, Jinhua, Zhejiang
7215 CRI, Kunming, Xinjiang
7215 CRI, Samara, Russia (relay)
7220 CNR-2, Xi'an, Shaanxi
7220 CRI, Beijing
7225 CRI, Jinhua, Zhejiang
7225 CRI, Shijiazhuang, Hebei
7225 CRI, Urumqi, Xinjiang
7225 Sichuan PBS-Voice of the Golden Bridge, Chengdu, Sichuan
7230 Xinjiang PBS, Urumqi, Xinjiang
7230 CNR-1, Xi'an, Shaanxi
7235 CRI, Beijing
7235 CRI, Jinhua, Zhejiang
7245 CRI, Xi'an, Shaanxi
7250 CNR-1, Beijing
7255 CRI, Xi'an, Shaanxi
7265 CRI, Beijing
7270 Nei Menggu PBS, Hohhot, Nei Menggu
7275 Xinjiang PBS, Urumqi, Xinjiang
7280 Voice of the Strait-PLA, Fuzhou, Fujian
7285 CRI, Jinhua, Zhejiang
7290 CNR-1, Beijing
7305 CRI, France (relay)
7310 Xinjiang PBS, Urumqi, Xinjiang
7315 CRI, Kunming, Yunnan
7315 CNR-2, Xi'an, Shaanxi
7325 CRI, Kunming, Yunnan
7335 CNR-2, Xi'an, Shaanxi
7340 Xinjiang PBS, Urumqi, Xinjiang
7345 CNR-1, Beijing
7350 Heilongjiang PBS, Harbin, Heilongjiang
7360 CRI, Kunming, Yunnan
7360 CNR-2, Xi'an, Shaanxi
7385 Xizang PBS, Lhasa, Tibet via Xi'an, Shaanxi
7405 CRI, Jinhua, Zhejiang
7470 CNR-2, Baaji, Shaanxi
7550 Xizang PBS, Lhasa, Tibet via Xi'an, Shaanxi
7620 CNR-5, Beijing
7660 CRI, Xi'an, Shaanxi
7820 CRI, Beijing
7935 CNR 1 & 8, Lingshi, Shanxi
9170 CNR-6, Beijing
9355 CNR-2, Lingshi, Shanxi
9365 CRI, Beijing
9380 CNR-5, Ouadian, Beijing
9440 CRI, Beijing
9440 CRI, Kunming, Yunnan
9445 CNR-2, Baaji, Shaanxi
9455 CNR 1 & 8, Lingshi, Shanxi
9470 Xinjiang PBS, Urumqi, Xinjiang
9480 CNR-8, Beijing
9490 Xizang PBS, Lhasa, Tibet
9500 Xizang PBS, Lhasa, Tibet via Baaji, Shaanxi
9505 Voice of the Strait-PLA, Fuzhou, Fujian
9515 CNR-1, Beijing
9515 CRI, Kunming, Yunnan
9520 Nei Menggu PBS, Hohhot, Nei Menggu
9530 CNR-2, Xi'an, Shaanxi
9535 CRI, Urumqi, Xinjiang
9535 CRI, Xi'an, Shaanxi
9550 CRI, Beijing
9550 CRI, Jinhua, Zhejiang
9550 CRI, Urumqi, Xinjiang
9560 CRI, Sackville, Canada (relay)
9560 CRI, Kunming, Yunnan
9560 Xinjiang PBS, Urumqi, Xinjiang
9565 CNR-1, Lingshi, Shaanxi
9565 CRI, Jinhua, Zhejiang
9570 CNR-2, Baaji, Shaanxi
9570 CRI, Urumqi, Xinjiang
9570 CRI, Havana, Cuba (relay)
9570 CRI, Xi'an, Shaanxi
9575 CNR-1, Lingshi, Shaanxi
9585 CRI, Kunming, Yunnan
9585 CRI, Urumqi, Xinjiang
9590 CRI, Kunming, Yunnan
9600 CNR-1, Shijiazhuang, Hebei
9600 Xinjiang PBS, Urumqi, Xinjiang
9610 CNR-8, Beijing
9620 CNR-2, Beijing
9620 CRI, Xi'an, Shaanxi
9635 CRI, Urumqi, Xinjiang
9640 CRI, Urumqi, Xinjiang
9645 CNR-1, Beijing
9645 CRI, Kunming, Yunnan
9655 CNR 1 & 8, Lingshi, Shaanxi
9665 CRI, Urumqi, Xinjiang
9665 CRI, Brasilia, Brazil (relay)
9670 CRI, Kunming, Yunnan
9675 CNR-1, Beijing
9675 CRI, Kunming, Yunnan
9680 CNR-2, Baaji, Shaanxi
9685 CRI, Kunming, Yunnan
9690 CPNR-2, Baaji, Shaanxi
9690 CRI, Urumqi, Xinjiang
9690 CRI, Noblejas, Spain
9695 CRI, Hohhot, Nei Menggu
9695 CRI, Urumqi, Xinjiang
9700 CNR-2, Xi'an, Shaanxi
9700 CRI, Kunming, Yunnan
9705 Voice of Puijiang, Shanghai
9705 Xinjiang PBS, Urumqi, Xinjiang
9710 CNR-1, Shijiazhuang, Hebei
9720 CRI, Beijing
9720 CRI, French Guiana (relay)
9730 CNR-1, Lingshi, Shaanxi
9730 CRI, Kunming, Yunnan
9730 CRI, French Guiana (relay)
9730 CRI, Xi'an, Shaanxi
9745 CNR-2, Beijing
9745 CRI, Kunming, Yunnan
9750 Nei Menggu PBS, Hohhot, Nei Menggu
9755 CNR-2, Xi'an, Shaanxi
9760 CRI, Beijing
9765 CRI, Beijing
9765 CRI, Urumqi, Xinjiang
9770 CRI, Beijing
9775 CNR-2, Beijing
9785 CRI, Jinhua, Zhejiang
9785 CRI, Kunming, Yunnan
9790 CRI, Sackville, Canada (relay)
9795 CRI, Xi'an, Shaanxi
9800 CNR-1, Shijiazhuang, Hebei
9810 CNR-2, Xi'an, Shaanxi
9820 Guangxi PBS Nanning, Guangxi
9830 CNR-1, Beijing
9840 CRI, Urumqi, Xinjiang
9845 CNR-1, Beijing
9855 CRI, Beijing
9860 CRI, Beijing
9860 CRI, Urumqi, Xinjiang
9870 CRI, Beijing
9870 CRI, Hohhot, Nei Menggu
9870 CRI, Xi'an, Shaanxi
9880 CRI, Kunming, Yunnan
9880 CRI, Moscow, Russia (relay)
9885 CNR-1, Beijing
9885 CRI, Beijing
9890 CNR-1 & 8, Lingshi, Shaanxi
9900 CNR-1, Beijing
9945 CNR 1 & 8, Beijing
9945 CRI, Beijing
9965 CRI, Beijing
11000 CNR-6, Beijing
11100 CNR-5, Ouadian, Beijing
11575 CRI, Xi'an, Shaanxi
11590 Voice of the Strait-PLA, Fuzhou, Fujian
11600 CRI, Xi'an, Shaanxi
11610 CNR-2, Beijing
11610 CRI, Beijing
11610 CRI, Urumqi, Xinjiang
11630 CNR 1 & 8, Lingshi, Shaanxi
11650 CRI, Urumqi, Xinjiang
11650 CRI, Xi'an, Shaanxi
11660 CNR-2, Xi'an, Shaanxi
11660 CRI, Xi'an, Shaanxi
11670 CNR-2, Beijing
11675 CRI, Beijing
11675 CRI, Kunming, Yunnan
11680 CRI, Beijing
11685 CRI, Beijing
11685 CRI, Xi'an, Shaanxi
11685 CNR-2, Xi'an, Shaanxi
11690 CRI, Urumqi, Xinjiang
11695 CNR-1, Lingshi, Shaanxi
11695 Xizang PBS, Lhasa via Xi'an, Shaanxi
11700 CRI, Beijing
11700 CRI, Xi'an, Shaanxi
11710 CNR-1, Beijing
11710 CNR-2, Baaji, Shaanxi
11720 CNR-1, Shijiazhuang, Hebei
11730 CNR-2, Beijing
11730 CRI, Jinhua, Zhejiang
11735 CRI, Bamako, Mali (relay)
11740 CRI, Beijing
11740 CRI, Urumqi, Xinjiang
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11760 CRI, Beijing
11760 CRI, Kunming, Yunnan

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 11765 CRI, Urumqi, Xinjiang
 11770 CRI, Hohhot, Nei Menggu
 11770 Xinjiang PBS, Urumqi, Xinjiang
 11775 CRI, Shijiazhuang, Hebei
 11780 CNR-8, Beijing
 11780 CRI, Beijing
 11780 CRI, Xi'an, Shaanxi
 11790 CRI, Jinhua, Zhejiang
 11790 CRI, Urumqi, Xinjiang
 11800 CNR-2, Beijing
 11810 CRI, Kunming, Yunnan
 11810 CRI, Urumqi, Xinjiang
 11815 CNR-8, Beijing
 11825 CNR-1, Shijiazhuang, Hebei
 11825 CRI, Xi'an, Shaanxi
 11835 CNR 1 & 8, Xi'an, Shaanxi
 11835 CRI, Kunming, Yunnan
 11840 CNR-1, Lingshi, Shaanxi
 11840 CRI, Xi'an, Shaanxi
 11845 CRI, Kunming, Yunnan
 11850 CRI, Jinhua, Zhejiang
 11850 CRI, French Guiana (relay)
 11860 CNR-1, Beijing
 11860 Xizang PBS, Lhasa, Tibet
 11870 CRI, Xi'an, Shaanxi
 11875 CRI, Kunming, Yunnan
 11875 CRI, Urumqi, Xinjiang
 11880 CRI, Kunming, Yunnan
 11880 CRI, Xi'an, Shaanxi
 11885 Xinjiang PBS, Urumqi, Xinjiang
 11890 CNR 1 & 8, Xi'an, Shaanxi
 11895 CRI, Xi'an, Shaanxi
 11900 CRI, Jinhua, Zhejiang
 11915 CNR-2, Xi'an, Shaanxi
 11920 CRI, Xi'an, Shaanxi
 11925 CNR 1 & 8, Lingshi, Shaanxi
 11925 CRI, Xi'an, Shaanxi
 11935 CNR-5, Beijing
 11945 CNR-1, Lingshi, Shaanxi
 11945 CRI, Kunming, Yunnan
 11945 CRI, Shijiazhuang, Hebei
 11950 Xizang PBS, Lhasa via Baaji, Shaanxi
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 11960 CNR-1, Beijing
 11965 CRI, Kunming, Yunnan
 11970 CRI, Bamako, Mali (relay)
 11975 CNR-1, Lingshi, Shaanxi
 11975 CRI, Bamako, Mali (relay)
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 11980 CRI, Kunming, Yunnan
 11980 CRI, Urumqi, Xinjiang
 12000 CRI, Kunming, Yunnan
 12010 CRI, Samara, Russia (relay)
 12015 CRI, Urumqi, Xinjiang
 12035 CRI, Moscow, Russia (relay)
 12055 CNR 1 & 8, Lingshi, Shaanxi
 12080 CNR 2 & 8, Xi'an, Shaanxi
 12110 CRI, Kunming, Yunnan
 13610 CNR-1, Kunming, Yunnan
 13610 CRI, Xi'an, Shaanxi
 13615 CNR-1, Lingshi, Shaanxi
 13635 CRI, Bamako, Mali (relay)
 13640 CRI, Bamako, Mali (relay)
 13650 CRI, Jinhua, Zhejiang
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 13655 CRI, Urumqi, Xinjiang
 13670 Xinjiang PBS, Urumqi, Xinjiang
 13680 CRI, Sackville, Canada (relay)
 13685 CRI, Bamako, Mali (relay)

13685 CRI, French Guiana (relay)
 13700 CNR-1, Lingshi, Shaanxi
 13715 CRI, Urumqi, Xinjiang
 13755 CRI, Jinhua, Zhejiang
 13790 CRI, Kunming, Yunnan
 15100 CRI, Xi'an, Shaanxi
 15110 CRI, Beijing
 15110 CRI, Hohhot, Nei Menggu
 15110 CRI, Urumqi, Xinjiang
 15110 CRI, Xi'an, Shaanxi
 15120 CRI, Havana, Cuba (relay)
 15125 CRI, Bamako, Mali (relay)
 15130 CRI, Beijing
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 15145 CRI, Kunming, Yunnan
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 15210 CRI, Xi'an, Shaanxi
 15250 CRI, Kunming, Yunnan
 15260 CRI, Xi'an, Shaanxi
 15265 CRI, Jinhua, Zhejiang
 15290 CNR-2, Baaji, Shaanxi
 15300 CNR-1, Beijing
 15300 CRI, Xi'an, Shaanxi
 15330 CNR-1, Beijing
 15340 CRI, Xi'an, Shaanxi
 15380 CNR-1, Beijing
 15390 CNR-1, Lingshi, Shaanxi
 15400 CRI, Beijing
 15405 CNR-8, Lingshi, Shaanxi
 15415 CRI, Beijing
 15420 CRI, Beijing
 15435 CRI, Beijing
 15440 CRI, Kunming, Yunnan
 15480 CNR-1, Beijing
 15490 CRI, Kunming, Yunnan
 15500 CNR-2, Beijing
 15500 CRI, Bamako, Mali (relay)
 15540 CNR-2, Beijing
 15500 CNR-1, Beijing
 15550 CRI, Bamako, Mali (relay)
 15570 CNR 2 & 8, Xi'an, Shaanxi
 15580 CRI, Urumqi, Xinjiang
 15585 CNR-1, Shijiazhuang, Hebei
 15595 CRI, St Petersburg, Russia (relay)
 15670 CNR-8, Beijing
 15710 CNR-5, Duodian, Beijing
 15880 CNR-6, Beijing
 17550 CNR-1, Beijing
 17565 CNR-1, Beijing
 17580 CNR 1 & 8, Lingshi, Shaanxi
 17580 CRI, St Petersburg, Russia (relay)
 17590 CNR-1, Lingshi, Shaanxi
 17605 CNR-1, Beijing
 17625 CNR-2, Beijing
 17680 CRI, Xi'an, Shaanxi
 17710 CRI, Beijing
 17710 CRI, Hohhot, Nei Menggu
 17710 CRI, Xi'an, Shaanxi
 17720 CRI, Havana, Cuba (relay)
 17720 CRI, Xi'an, Shaanxi
 17735 CRI, Beijing
 17740 CRI, Xi'an, Shaanxi
 17755 CRI, Xi'an, Shaanxi
 17785 CRI, Xi'an, Shaanxi
 17880 CRI, Bamako, Mali (relay)
 17890 CNR-1, Beijing
 21560 CNR-1, Lingshi, Shaanxi

TABLE TWO: CHINA STATION ADDRESSES

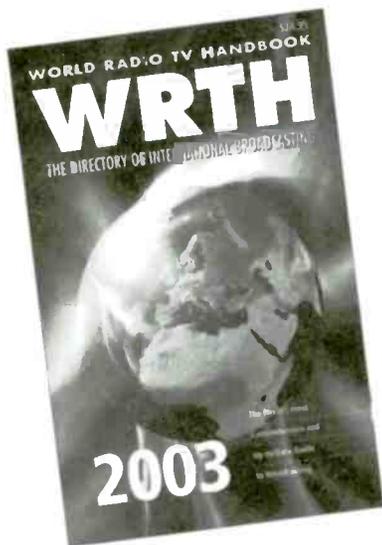
China National Radio/CPBS (Zhongyang Renmin Guangbo Diantai P.O. Box 4501 Beijing 100866 China http://www.cnradio.com.cn	Nei Menggu/Inner Mongolia- People's Broadcasting Station 19 Xinhua Darjie Hohhot Nei Menggu 010058, China
China Huayi Broadcasting Company P.O. Box 251 Fuzhou, Fujian 350001, China	Qinghai People's Broadcasting Station 96 Kunlun Lu Xining, Qinghai 810001, China
China Radio International 16A Shijingshan Street Beijing 100040, China (or) P.O. Box 4216 CRI-2 Beijing 100040 China http://www.cri.com.cn	Sichuan People's Broadcasting Station 119-1 Hongxingg Zhonglu Chengdu, Sichuan 610017, China
Fujian People's Broadcasting Station 2 Gutian Lu Fuzhou, Fujian 350001, China	Voice of the Jingling Jingling zhi Sheng P.O. Box 268 Nanjing, Jiangsu 210002, China
Gannan People's Broadcasting Station 49 Renmin Xije Hezuo Zhen, Xiabe, Gian Su 747000, China	Voice of Pujiang Pujiang zhi Sheng P.O. Box 3064 Shanghai 200002, China
Gansu People's Broadcasting Station 226 Donggang Xilu Lanzhou, 730000, China	Voice of the Strait Haixia zhi Sheng People's Liberation Army Broadcasting Centre P.O. Box 187, Fuzhou, Fujian 350012, China http://www.radiohx.com
Guangxi Foreign Broadcasting Station 75 Min Zu Avenue Nanning, Guangxi 530022, China http://www.gxpbs.com	Wenzhou People's Broadcasting Station 19 Xianxue Qianlu Wenzhou, Zhejiang 325000, China
Guizhou People's Broadcasting Station 259 Quingyun Lu Guiyang, Guizhou 550002, China	Xilingol People's Broadcasting Station Xilin Dajie, Xilinhot Nei Menggu 026000, China
Heilongjiang People's Broadcasting Station 181 Zhongshan Lu Harbin, Heilongjiang 150001, China http://www.am621.com.cn	Xinjiang People's Broadcasting Station 84 Tuanjie Lu Urumqi, Xinjiang 830044, China http://www.xjbs.com.cn
Honghe People's Broadcasting Station 32 Jianshe Donglu Gejiu, Yunnan 661400, China	Xizang People's Broadcasting Station 180 Beijing Zhonglu Lhasa, Xizang 850000, China
Hubei People's Broadcasting Station 563 Jieshe Dadao Wuhan, Hubei 430022, China	Yunnan People's Broadcasting Station 73 Renmin Xilu Central Building of Broadcasting & TV Kunming, 650031 Yunnan, China
Hunan People's Broadcasting Station 27 Yuhua Lu Changsha, Hunan 410007, China	Zhejiang People's Broadcasting Station 111 Moganshan Lu Hangzhou, Zhejiang 310005, China
Jiangxi People's Broadcasting Station 111 Hongdu Zhong Dadao Nanchang, Jiangxi 330046, China	

Thank you to the following sources, for their cooperation in compiling the *China Frequency List*: Glenn Hauser/DXLD, Cumbre DX, and Anker Petersen/Domestic Broadcasting Survey-4th Edition.

For programming information, language services, broadcast hours, seasonal adjustments, parallel frequencies, transmitter information, and inactive frequencies, consult: *Domestic Broadcasting Survey-4th Edition*, Edited by Anker Petersen. DSWCI, c/o Bert Nielsen, Egekrogen 14, DK-3500 Vaertoese, Denmark, or consult their website for additional information at: <http://www.dswci.org>.

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FIRST AIR

THE AIRLINE OF THE NORTH

First Air – Canada’s Arctic Airline

By John David Corby, VA3KOT

Photos courtesy of Malak Photographs

I took my first trip on First Air in the summer of 1999. It hadn't been easy getting a seat on the plane because I was freeloading – liquidating some frequent flyer points accumulated on another airline that shares its plan with First Air. My destination was Resolute in the Canadian High Arctic – a popular destination for the scientific community as we will discuss later. Airlines don't readily give their seats away when there are fare-paying passengers lined up at the check-in desks. However, I had contacts who knew people in the airline, so I called in a favor to get my seat.

Unfortunately, the favor didn't extend as far as getting a connecting flight from Toronto to Ottawa where I picked up the First Air flight. So, late one evening in June, I packed a hefty load of radio gear and some warm clothes into a large military style duffel bag and drove up to Ottawa overnight. Packing the winter parka coat and the Kamik snow boots didn't seem right in the circumstances. The mercury was way high in southern Ontario.

A couple of days later, while strolling along the frozen beach in Resolute Bay, I caused some amusement with the local kids who saw me dressed in my southern Canadian winter clothes, while the local temperature soared to its early summer high of almost zero degrees Celsius. I felt pretty cold when the high winds and driving June snow bit into my tender southern skin. The locals are acclimatized to winter lows of minus 45 degrees Celsius and regard zero degrees as beach weather.

My flight was scheduled to leave around breakfast time and I was at the check-in desk while most of the population of the nation's capital was still soundly asleep. My plane was a Boeing 727-Combi. This unusual configuration carries freight at the front of the fuselage and passengers at the rear. The route planned for that flight would take us up to Iqaluit (the capital of the new Canadian territory of Nunavut). Iqaluit is near the southern tip of Baffin Island –

just below the Arctic Circle. After a short stop there, the flight was scheduled to go on to Nanisivik at the northern end of Baffin Island and then into Resolute. After leaving Resolute the plane would go on to Yellowknife, the capital city of the North West Territories, before returning to Ottawa.

Airline to the Explorers

First Air was founded in 1946 as Bradley Air Services. The original name is still used by many people who use its charter services regularly. Today the airline is owned by the Inuit people of Northern Quebec.

The airline's fleet comprises 27 aircraft of the following types:

- 6 Boeing 727-combi
- 3 Boeing 737-combi
- 1 Beech 99
- 1 Beaver
- 1 L382 G Super Hercules
- 8 Hawker Siddeley 748
- 4 ATR42-300
- 3 Twin Otter DHC 6

The Twin Otters are the workhorses of the Arctic. They are used to carry explorers to their dropoff points out on the ice. (Ward Hunt Island at the northern tip of Ellesmere Island is the most popular dropoff point for North Pole attempts.) The same planes pick up successful (and sometimes not so successful) explorers at the geographic North Pole, the Magnetic North Pole and sundry other points on the surface of the frozen Arctic Ocean.

Explorers have to prepare a landing strip for the aircraft on the surface of the ice. First Air's pilots are highly skilled at determining whether ice conditions will permit a safe landing on the frozen ocean. Stories abound of explorers who have spent fruitless hours preparing a landing strip only to find that their pickup pilot makes a landing a couple of kilometers away

where he prefers the look of the ice. Worse still, some pilots will abort the landing completely if ice conditions do not meet with their approval. The hapless explorers still have to pay for the flight even if it can't land!

The general rule is that the further north the pilot flies, the more expensive the flight becomes. A charter in a Twin Otter over the Arctic Ocean costs thousands of dollars; the seats are notoriously uncomfortable and a fellow passenger might just turn out to be a drum of aviation gas on its way to a fuel cache out on the ice.

A Flight to the Top of the World

My trip from Ottawa to Resolute was not in a Twin Otter, though. I enjoyed a warm, comfortable, free ride in the cabin of a Boeing 727, with food, drinks, and in-flight entertainment. First Air is based in Carp, Ontario, with southern maintenance facilities in Ottawa and Montreal. Travelers through Ottawa will find First Air operations traffic on 130.550 and 131.250 MHz. You can follow Arctic bound departures by monitoring Ottawa Ground on 121.900 MHz and Ottawa Tower on 118.800 MHz.

Passengers boarded the flight through a door under the tail of the aircraft. We departed on time and landed in Iqaluit after a couple of uneventful hours. This was my first trip to the Arctic and two things caught my attention immediately. The first was the rugged beauty of the Arctic scenery. Barren rocky hills surrounded the airport. The nearby city displayed a prosperous, yet sparse and temporary character. In the Arctic, most buildings are factory-built shacks standing on stilts above the permafrost ground. In Iqaluit, federal funding had added some structures with a more ornate and purpose-built style.

The second thing that caught my attention was the Inuit people. In an earlier generation the Inuit people were called "Eskimos." This term is now considered a slur and is no longer used. I had met Inuit people in Ottawa before my trip.

In the south, the Inuit adopt southern dress styles and dietary habits. In the north the Inuit dress in their traditional clothes and, in their villages, they adopt dietary preferences which non-Inuit people often find difficult to come to terms with. The charm of the Inuit is hard to resist and I came to admire them tremendously for their ability to survive and prosper in a climate that is alien and hostile to southerners.

In the transit lounge at Iqaluit my trip looked as though it might be in jeopardy. Thick summer fog had enshrouded our next stop at Nanisivik and take-off was delayed while waiting for further weather reports. The same fog was clearing in Resolute but the weather station there was still reporting uncertain landing conditions. First Air advised its passengers that if they chose to abort they would be taken back to Ottawa on the next flight. If we chose to go on, we might have to find, and pay for, our own accommodation in Yellowknife if the plane could not land at Nanisivik or Resolute.

Iqaluit is the Eastern Arctic hub for First Air's passengers and there were quite a few of them waiting for flights to sundry frozen destinations. Places such as Rankin Inlet, Pangnirtung, Igloolik, and Qikiqtarjuak appeared on the destination boards. Inuit women dressed in ornately decorated local dress with children on their backs and mukluks (sealskin boots) on their feet came and went. After a couple of hours delay the flight to Nanisivik, Resolute, and Yellowknife was announced on the intercom. Nanisivik was still

enshrouded in fog and First Air regretted to announce that today's flight would be unable to land there. The Environment Canada weather station at Resolute airport was reporting clearing fog and conditions were expected to be fine by the time the plane was scheduled to arrive. Minutes later we were back on board and rolling towards a takeoff that would carry us across the Arctic Circle en route for the top of the world.

The low mountains of Baffin Island looked barren and uninviting as the plane flew hundreds of miles up island to cross the Barrow Strait and land at Resolute. The Barrow Strait forms part of the famous "North West Passage." Resolute is a scientific outpost, weather station and native hamlet on the south shore of Cornwallis Island at 74 degrees north. As the plane came under the direction of the tower at Resolute Air Traffic Control, we circled the hills near the shore and descended toward a plateau about seven kilometers inland from the tiny Inuit hamlet of Resolute Bay nestled on the beach at the south end of the island.

Arching my neck to see out of the windows from my aisle seat, I could just make out the control lights and other familiar symbols of an airport. One thing was missing, though – a runway! Cornwallis Island, like most of the Arctic, is technically a desert. There is insufficient precipitation to support vegetation so the topography is a hilly expanse of gravel surrounded by a sea of ice. The gravel is only a couple of inches deep. Below it lies permafrost – a firm

layer of permanently frozen ground that provides fine support for a heavily laden jet aircraft from the factories of Seattle. It was on this gravel-covered permafrost that First Air's 727 landed. "Runway" 17T/35T is 200 feet wide and 6500 feet long and described simply as "gravel." Pilots are warned of severe turbulence on approach caused by gusty easterly winds. I felt those winds on my extremities over the next several days and can attest to their strength.

"Three Days" And "Three Nights" under the Sun

Arriving in destinations north of the Arctic Circle for the first time can be a daunting experience for newcomers to the roof of the planet. You quickly learn that your life in the south is governed by the daily cycles of "night" and "day" caused by the Sun rising and setting. In the Arctic, the Sun does not rise and set at all for extended periods in the summer and winter. In June, during my trip, the Sun merely made lazy circles in the sky. It was expected to set a few weeks later. Routine for visitors to Resolute is dictated by the set meal times at the hotel.

The natives of the hamlet of Resolute Bay seemed to pay very little attention at all to the "time of day." Children play in the streets all "night" long. Folks eat when they are hungry and sleep when they are tired. I would be willing to bet that there are many over-worked, stressed-out cubicle occupants in New York and Toronto who might just envy that kind of existence.



First Air Boeing 727 Combi at Iqaluit

Residents of Resolute Bay – even the local “mountie” from the RCMP detachment – use the arrival of the First Air jet from Ottawa as a timestamp and flock to the airport to greet the incoming flights (just twice a week at the time of my visit). One born and bred Arctic resident confessed to me that she also uses First Air to head south – way south to the Caribbean – for two weeks every year.

Expedition Air Support

My journey to Resolute was in the capacity of a volunteer technical consultant to the Otto Sverdrup Centennial Expedition that would be spending a year in the Arctic just north of Resolute. That story has already been told in the pages of *MT* (“SatCom North Arctic Expedition,” August 2000) so I will not repeat the details. Suffice it to say that my trip involved spending long periods standing on the gravel beach with satellite phones and my trusty Icom R10 scanner. Bemused fellow travelers questioned me about the reason for waving a strange device resembling a divining rod around in the air. The strange device was, in fact, a Radio Shack ground plane antenna that had to be hand held for lack of any other readily available means of support.

Besides Arctic explorers, Resolute is also the major staging point for science missions in the Arctic. The Qausuittuq (pronounced like “Cow sweet tuck”) Coop Hotel played host to myself and a group of National Science Foun-

dation scientists from the US. An NSF turbo-prop plane was parked at the airport and made nightly trips toward the Pole to study the Arctic atmosphere. On the last night of my stay, that plane suffered an engine failure (one of four engines) over the North Pole. The scientists used this trifling excuse to noisily celebrate their safe return in the early hours of the morning by over-imbibing illicit adult beverages smuggled in from the south. (Adult beverages are not sold in Resolute.) Who says scientists can’t have fun, too?

Canada also supports science missions in the Arctic through the Polar Continental Shelf Project. A PCSP office at Resolute provides accommodation, offices, transportation and communications services to approved science missions in the north.

Communications are conducted using satellite phones and HF radio. A Canadian success story called Spilsbury Communications of Vancouver, British Columbia, is the vendor of choice for HF gear. Science missions venturing onto the ice from Resolute take along a Spilsbury SBX11 HF radio. These rugged sets are ideal for cold weather and rough camp conditions. A typical PCSP Project team would ride in a First Air Twin Otter to their project camp and make a daily scheduled contact with Resolute via HF. The Polar Continental Shelf Project frequency is 4472.5 kHz, or 4441.0 kHz for in-camp use.

The SBX11 radios cover a frequency range of 1.6 to 10 MHz with an output power of just

10W. When used in the field (i.e. out on the ice), a dipole antenna is strung between two skis planted vertically in the ice. The radiation pattern of such an antenna is likely to be almost vertical with short range signal propagation – not good for DX, perhaps, but adequate for reaching as far as the North Pole only a thousand miles away.

Other local HF frequencies to listen for (a really good DX catch from the south perhaps?) are the hunters and trappers on 5031 kHz and, of course, First Air on 5281.5 kHz. The hunters and trappers go out onto the ice in their komatiks (Inuit hunting sleds) for days at a time in pursuit of seals, musk ox, polar bears, and walrus. Dog teams (Canadian Eskimos) live year-round out in the open on the beach (and howl like a pack of wolves when they are hungry). Polar bear skins are staked out to dry in the sun in the hamlet. Other evidence of the hunter’s trade can be found all along the beach in Resolute Bay. Hunting is a survival industry, not a sport, in the Arctic.

A Visitor’s Paradise

Canada’s Arctic is a region of wilderness and stunning beauty that attracts many visitors every summer. Unfortunately, very few Canadians ever take the trouble to visit the region; most prefer to head south to Florida during the southern Canadian winter. Yet there is much to commend to the adventurous in Nunavut. Visitors to the region hail from the all over the world.



First Air Twin Otter – Workhorse of the Arctic.

Many are Americans who head north for the hunting, or as part of a scientific mission. With the shrinking Canadian airline industry, First Air remains the principal major air carrier to the region. They are doing a great job, and long may they continue to rule some of the most challenging skies and landing strips on the planet.

Major Airports on First Air's Route Map

Iqaluit Airport (63 45 23N; 68 33 21W)
South Baffin Island, Nunavut
Single asphalt runway 18/36 8600 feet long, 200 feet wide
Air Traffic Control: Radio 122.2, 126.7, 296.2 MHz and 5680 kHz
International Air 2971, 4675, 8891, 11279 kHz
Navigation: VOT 114.8, DME/ILS "IFB" 109.9 MHz
NDB "YFY" 204 kHz
Iqaluit is the capital city of the new (1999) Canadian territory of Nunavut

Nanisivik Airport (73 00 19N; 85 01 59W)
North Baffin Island, Nunavut
Single gravel runway 11/29, 6400 feet long, 150 feet wide
Air Traffic Control: MF/ATF 122.1 MHz
NDB (Non Directional Beacon) "YSR" 382 kHz
Nanisivik is the site of a major zinc and silver mine – treasure beneath the ice.

Resolute Airport (74 43 01N; 94 58 10W)
Cornwallis Island, Nunavut
Single gravel runway 17/35 6500 feet long, 200 feet wide
Air Traffic Control: RCO 126.7, MF 122.1, and 5680 kHz
Navigation: VOT 114.8, VOR/DME "YRB" 112.1, DME/ILS "IRB" 110.3
NDB "RB" 350 kHz, "RU" 391 kHz
Resolute is the northernmost stop on First Air's Arctic route.

Yellowknife Airport (62 27 46N; 114 26 25W) North West Territories
Runways (asphalt): 15/33 7500x150 feet; 09/27 5000x150 feet
Air Traffic Control: Radio 122.5, 126.7, 262.0MHz and 5680 kHz
ATIS 128.4, Ground 121.9, Tower 118.5, 340.8, MF 118.5, VDF 118.5, 121.9, 122.5 126.7
Navigation: VORTAC "YZF" 115.5, ILS "IZF" 109.5
NDB "ZF" 356 kHz
Yellowknife is the capital city of the North West Territories

Whitehorse Airport (60 42 33N; 135 04 00W)
Runways (asphalt): 13R/31L 9500x150 feet; 13L/31R 4000x100 feet; 01/19 1800x75 feet
Air Traffic Control: Radio 122.5, 126.7, 286.2 MHz and 5680 kHz

Ground 121.9, Tower 118.3, 236.6, MF 118.3, VDF 118.3, 121.9, 122.5, 126.7
Navigation: VOR/DME "YXY" 116.6, ILS "IXY" 109.5
NDB "XY" 302 kHz, "JB" 236 kHz, "PJ" 329 kHz
Whitehorse is the capital city of the Yukon Territory

Glossary

ATIS – Automatic Terminal Information Service
DME – Distance Measuring Equipment
ILS – Instrument Landing System
MF/ATF – Mandatory Frequency/Aerodrome Traffic Frequency
NDB – Non Directional Beacon
RCO – Remote Communications Outlet
VDF – VHF Direction Finder
VOR – VHF Omnidirectional Range
VORTAC – VHF Omnidirectional Range/Tactical Air Navigation equipment
VOT – VHF Omnidirectional range Testing equipment

About the author

John David Corby is *MT's* "Scanning Canada" columnist. He is a licensed ham with call sign VA3KOT, an aviation enthusiast, long time LF, HF, VHF and UHF monitoring enthusiast and an ardent fan of all things north of the Arctic Circle. He can be emailed at johncorby@monitoringtimes.com.

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A Beginner's Look at Microphones and Audio

One of the hottest topics on the amateur radio HF bands is the perennial search for "great audio." If you've not been paying attention you'll be amazed to find out that the search can take many hams to financial extremes. Some hams have never actually used the hand-held mic that came with their transceiver, substituting, instead, preamplified desk mics or fancy "studio look" boom mics reminiscent of the great recording studio mics of the '50s and '60s.

In fact, one amateur radio catalog features three pages of microphones – including the revered Astatic D-104 in a special collector's edition, complete with display case, for just \$200. That's about the price you might expect to pay for a used 160-10 meter transceiver, hand mic included! There are dozens of articles in the ham press and on the Internet detailing the use of special audio processors designed to beef up the sound of your transmitted audio and somehow miraculously transform your communications style audio into smooth, full-bodied sound.

Once you start looking you'll find that there's a huge assortment of audio accessories you can add to your station to improve your audio. You can choose from headset boom mics to sophisticated desk models. But, don't let the small headset mics fool you: It's possible to get great sounding audio from these little wonders, as I'll explain later.

There are many desk mics to choose from to try to improve your audio. Shure makes their 526T series II "Super Punch®" dynamic mic, with built-in preamp, designed to replace ceramic or dynamic mics with a frequency response from 200-6,000 Hz (\$125). Yaesu offers their MD-200A8X with a range from 30-17,000 Hz for "studio quality" audio. Designed for Yaesu models only (\$380).

◆ The Guru Speaks

I have an older model Kenwood HF transceiver and sometimes, when I'm on the bands, I get a comment like, "...I can tell you're running one of the older Kenwoods, the audio is great!" That caused me to wonder if there really was a difference in the audio among the various manufacturers. I put the question to Audio Guru Bob Heil, K9EID, manufacturer of the Heil line of amateur radio microphones and a fixture on the hamfest circuit. Here's what he had to say: "Years ago your statement about the



Audio Guru Bob Heil, K9EID, at the controls in Lab One. When it comes to amateur radio audio, he's done it all! (Courtesy: Heilsound)

'sound' of the different rigs was absolutely correct; however, in the last few years the quality of the various rigs is very similar and difficult to detect ... I have almost every transceiver in the lab here and it is fun to switch back and forth from a TS2000, TS870, IC756 PRO, FT1000MP ... when fed with the exact same audio chain ... it becomes very difficult to distinguish the difference. They have all worked long and hard to achieve some higher quality audio ... most with filters out to 3k on transmit now instead of 2.1 kc on the old Collins and TS520's, etc." (He's saying that the manufacturers have expanded the audio range on the output of their units from a very limited 2.1 kilocycles per second to 3 kc, giving a slightly broader, but certainly discernable, audio range.)

Bob Heil continues, "...most rigs have 'matching' microphones and when you really know that story you discover that not a single manufacturer makes their microphone. They purchase O.E.M. models from just a very few companies that actually build most of the microphones and their microphone designs are primarily for CB, paging, sound reinforcement [PA], definitely not for SSB ... It is important to have that perfect balance of nice articulate highs along with those [bassy] lows. This is the important factor." Bob has lobbied these transceiver makers and, as a result, has become the mic supplier to the "top of the line" rigs for ICOM, Kenwood and TenTec.

◆ Your Own Audio

So, aside from buying a new, top of the line rig with its new Heil mic, what can you do

to improve your on-air HF audio? First, it's off to school to learn as much as you can about the subject of HF audio and for that we turn to the Internet and the web sites of some of the leading proponents of "HiFi audio in SSB."

I believe the best introduction to HiFi SSB is from Larry Wassman, W3OZ at <http://www.w3oz.net/firms.com/audiosetup.htm>. The site is plainly written, explains the basics of what you need to know as a beginner, and he's not selling any particular product. He also has links to other hams who have done a lot of work in HiFi SSB.

Other places to find out more information about improving your audio are <http://W2IHY.com/twoband.asp>. Julius Jones, W2IHY, makes his Dual Band Audio Equalizer and Noise Gate which is widely heard on the air among audiophile hams. His website is mostly an ad for the product, but he does go into detail on how to set it up and use it for optimal performance. At \$165 dollars (including special mic cable) it's a fairly inexpensive way to get better on-air audio. You may need a separate power supply, which is usually recommended to power the equalizer and isolate any potential rf/power interference.

William Winkis, KC4PE, has a large web site with what may be the most information on the subject of SSB HiFi, but it's very technical and may not be the best place for beginners to start. Check out the others first and then try <http://www.kc4pe.com>. And, of course, for information on the Heil Sound line of amateur radio microphones check out K9EID's site: <http://www.heilsound.com>.



The W2IHY Dual Band Audio Equalizer and Noise gate. Thousands of hams are mixing their own "HiFi SSB" audio and getting great results. (Courtesy W2IHY Technologies)

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For a wide range of headset and desk microphones go to <http://www.aesham.com> or call for a catalog at 800-321-3594.

◆ Personal Experience

Most hams make a distinction between cracking DX pile-ups and regular contacts. They believe that a very narrow band, all-highs sounding audio has a better chance of cutting through the pile-up and attracting the attention of the DX station. Maybe so, but I've found that simply having clear audio and speaking distinctly works just as well.

When I first bought my Kenwood TS-140S fourteen years ago, I bought a desk mic (an \$80 extra) because I wanted to be able to just sit at the desk, lock on the push-to-talk (PTT) button and talk. It never occurred to me that it might make any difference in the audio and, apparently, it didn't. I never received any comment, negative or positive, about the audio from any of my contacts. Later I wanted a headset boom mic because I wanted to be able to have complete hands-off operation, and with a long enough cord I'd be able to wander around the shack and chat via

VOX (voice operated transmission). So, I built a homebrew headset boom mic following instructions from an article in *QST* magazine. Again, few commented on the audio.

Then I moved the rig to another much larger, "live" room, and that's when the comments started. At first I didn't pay much attention, but the unsolicited reports persisted, and included comments such as "great audio," "your audio has a real 'presence,'" or "I'm showing you on the meter as 5-7 but you sound 20/9," or "fantastic audio." Even "...as close to broadcast quality as I've heard on the bands!" I'm always totally amazed. Most advised, "Don't change a thing! Whatever you're doing, it's great!" This from a \$5 mic!

What I had done, inadvertently, was to take advantage of my own voice qualities when combined with the ambient audio qualities in the room. The result was simply a better sounding station. The "live" sound from the room gave the audio the "presence" and the effect was to simply sound, not just louder, but "bigger." I still use the homebrew headset boom mic and, as you might imagine, I am reluctant to change a thing. And that's really the point of building your HF audio. No matter what audio chain you employ, once you get the kind of audio reports you're looking for, just *enjoy* it!

If you want to try making your own headset boom mic look up the January '93 issue of *QST*. You'll find it in the table of contents under "A \$5 Headset Mike." If you're an ARRL member you can find it on

their website [<http://www.arrrl.org>]: Search under "an inexpensive amplified boom/headset mike." What you'll get, in PDF format, is this project as well as instructions for building an amplified desk mic.

I found the headset boom mic project to be extremely easy and well worth the time. In my own construction I used a busted telephone headset boom mic from the junk box. I removed the phone mic element and wires, threaded the RG-174 miniature coax through the boom and soldered it to the mic element I bought from Radio Shack. I also used 20 feet of coax so that I could go anywhere in the room and still chat, even outside on the deck!

However, if you're running power, 300 to 500 watts or more, there may be enough RF in the room to be picked up by the extra long mic cord and added to your audio as hash. So, stick to the 4 or 5 feet if you're planning to use a linear amplifier.

Finally, remember that everyone's voice is different and the audio characteristics of your voice into the microphone you're now using may not be a good match. If you're not getting unsolicited audio reports, you can assume that your audio is at least adequate. It could be that by simply trying other mics you'll come up with a better sound. Now, try for more by changing the room ambiance. If none of this is working, try the equalizers and other outboard items in the audio chain. When you start getting unsolicited, positive reports, you'll know you now have "outstanding audio."

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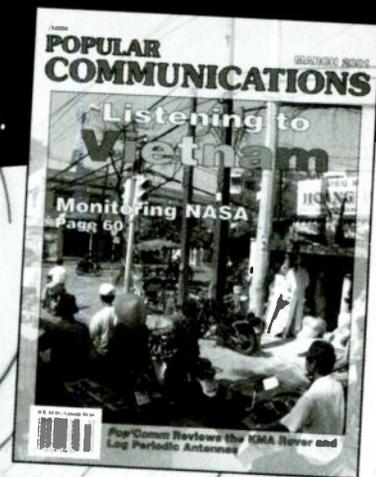
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Q. Is it safe to have my BC895XLT sitting on top of a small microwave oven? (Mike Borton, email)

A. Absolutely safe. The microwave is metal enclosed, so the shielding prevents any harmful level of radiation from being emitted. And any heat that's generated is brief and internal as well, with very little reaching the scanner.

Q. Are the military services and the White House involved with the FCC in radio frequency allocations?

A. Absolutely. For government/military agencies, the Interdepartmental Radio Advisory Committee (IRAC) meets regularly with the Federal Communications Commission (FCC) to resolve frequency allocation and licensing issues and conflicts.

Q. When should I use a digital multimeter (DMM) rather than an analog volt-ohm-milliammeter (VOM)?

A. For accurate, stable readings, select the DMM; for watching changes occur as you make adjustments, or for probing around looking for approximate readings, use the VOM because of its rapid settling time and visual indication of level fluctuations.

Digital meters are about ten times more accurate than VOMs, but they take longer to stabilize. DMMs also have extremely high input impedances, so they don't load the circuit you are testing, thus giving a misleading lower value reading, as much as a VOM will.

Many DMMs also have built-in accessory functions as well, like transistor testers, frequency counters, and inductance/capacitance measurements.

Q. Is it possible that, since most cell phones are now digital, the restriction on analog cell-capable scanners might be lifted? (Scott D'Amico, email)

A. I have serious doubts that this is forthcoming. For one thing, analog cell phones will be with us for years; for another, it's almost im-

possible to get Congressional inertia to rescind a law once it's in place.

Q. I have recently acquired an older shortwave receiver which has an antenna input for twin lead. Is there an available adaptor to convert twin-lead screws to an SO-239 for coax? (Scott Morton, email)

A. Not that I've seen, since the old twin-lead shortwave radios have been out of production for several decades. But you may be closer to a "fix" than you think:

- (1) You can simply run a random wire 50-100 feet long from one of the antenna screws, and ground the other screw to a chassis screw.
- (2) You can try using a standard TV balun transformer, putting the two spade lugs under the radio's antenna screws and find an adaptor for the F connector to your PL-259 requirement. TV baluns have wider frequency response than their claimed 54-800 MHz.
- (3) You can forget the whole impedance-matching concern and attach the coax center wire and shield directly to the two screws; this may slightly reduce signal strengths, but the noise goes down, too, so the net result is that all you have to do is slightly turn up the volume and you will hear signals pretty much the same as if you had the original balanced system.

Q. I am planning to install a Becker Mexico mobile shortwave radio in a 2000 Honda Accord. The radio tunes 5.9-15.7 MHz as well as 153-282 kHz. I do not want to drill a hole in the car to install an antenna, and prefer that a whip or mast antenna be minimized. I understand that there is recent technology utilizing geometric structures as a compact antenna. Can you offer suggestions to address this dilemma? (Robert Mirabella)

A. I believe the technology that you are referring to is called "fractal" antennas. While these are amazing experimental designs, you still can't

get large signal levels from a tiny antenna. Radio signals are voltages, and the longer the antenna element, the more voltage it picks up.

You can try attaching the radio's antenna coax lead to an interior automotive screw; I'd suggest one as far back on the car as possible so it doesn't appear to the incoming signals as a short circuit by being too close to the radio's own ground connections to the automotive framework.

Grove Enterprises used this approach in the "No-Tenna" several years ago. The main problem is that its success is unpredictable, and ignition noise is likely to be a problem.

Ideally, you need a long antenna on the back of the vehicle like a full-length (102") CB whip; much better, though, would be the H800 Skymatch active antenna, but it is obvious on the back bumper. The September and October 2001 issues of *MT* addressed some ideas for mobile antennas and how they worked in the real world.

For shortwave listening, a suitable, unimposing mobile antenna remains as elusive today as it did decades ago.

Q. Is there any reason I can't use my CB whip for general VHF/UHF monitoring? (Doug Chandler)

A. Yes. While a CB whip will work just fine at the lower end of low band (30-40 MHz), any resonant (cut-to-frequency) element, such as a half-wave dipole on a mast or quarter-wave whip on a vehicle, develops higher and higher VSWR as you approach twice its design frequency, thus creating impedance-match losses in the feedline.

Perhaps worse, the higher in frequency you attempt to use a cut-to-frequency element, the more the pattern favors the ends rather than the sides of the element; thus, in VHF/UHF verticals, the antenna favors directly overhead and underneath, while nulling out signals coming in from the horizon where you want them.

That's why wide-frequency-coverage antennas have multiple elements - some elements only work some of the time.

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

Gary Webbenhurst

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garywebbenhurst@monitoringtimes.com

A couple of months back, I vowed to back off the bright ideas that referred to an internet sites. Easier said than done. I am finding that the monitoring hobby is now closely entwined with this new marvel of communication. You can listen to real time audio from shortwave broadcasters, police, and fire traffic in major metro areas. You can join specific radio interest groups, and find the best buys, or hard to find products. With "search engines" you can quickly find information or products that are available.

The world wide web (WWW) is rapidly becoming as commonplace as the telephone, or television. If you do not yet own a computer or have internet service, it's time to join the masses. The local library, or a friend with internet access are also possibilities. While I strive to dig out the hidden gems of radio related tips, you should meet me halfway, and get on the "web."

99

A reader recently emailed me to check out a new radio accessories site. Well, here it is: <http://www.ssejim.co.uk/>. (Note: this company is located in the U.K.)

The owner/manufacture is James Finch. His company, Solid State Electronics (SSE), produces many exciting products. I ordered some. I am really impressed. Craftsmanship is outstanding: heavy weight, quality materials, and careful construction. I wish I could make my coax connections look this good. Their desktop radio stands are made out of heavy steel, not plastic. And I do mean heavy. This one is not going to slide around. I cannot even begin to

count all the times my handheld radios have fallen over. This is the solution. Some stands even come with a BNC pigtail and a counterpoise ground wire. These are also useful for desktop multi-meters.

SSE also makes several specialized antennas. I especially liked the VHF air band rubber duck cut for the 118-137 MHz. Hearing is believing, and I am very impressed. For those of us that like to monitor UHF military aircraft, I tried the custom UHF magmount. Wow. Remember that you always hear signals best when the antenna is designed for that specific range. UHF Mil-Air is a large bandwidth, but this one really works. More on other radio accessories next month.

At this time, the owner/manufacture does not take credit cards. You must make the extra effort to get an international money order at your local US Post Office. Mr. Finch is seriously considering opening an operation in the U.S. He sent me a few extra catalogues. If you have internet service, you can visit his website, but if you want a printed catalog drop me a request in the regular US Mail at my address above. Only 20 available. (See Photo.)

100

In the wintertime, the mountain snow keeps me close to home. Here is a good indoor house project. I decided to reorganize all my AC to DC wall warts, as well as my cigarette plug power sources for the various radios. First, I checked them out to make certain all were working properly. A few of the wall adapters were DOA. I cut off the wire leads and the connectors for the spare parts bin. I sorted the working ones by voltage, connector size, and polarity. Remember, all electronics are not powered alike, and there are several proprietary (odd ball) connections. When I finished, I had a centralized location for all my power adapters. I purchased a new, plastic, see-through storage box for just this purpose. Did I mention that I put a small Avery colored label on each to confirm their voltage and polarity? Naturally, I used clear scotch tape to cover the mini-label and protect it from dirty fingers and other pollutants.

101

By the time you read this, there are probably only a few left. I am referring to the Yaesu VR-120 wide coverage receiver/scanner. They are being cleared out of dealer stock at around a hundred dollars. This is to make room for the new VR-120D, whose only difference is a DC power jack. No, it does not do trunking, but for conventional scanning, even HF monitoring, this 640 channel scanner is a great addition to anyone's collection. I *had* to have one. Check with the major

radio dealers if you are interested. Bob Parnass even wrote *free* software to program the radio. Visit <http://www.parnass.org>.

102

Reader Paul K. wrote with an email request. He admits that he often loses track of the Operator's Instruction Manual that comes with most electronic gizmos these days. He asked for suggestions, so here they are:

- Upon purchase, I immediately make a photocopy of the manual. (While you are charging the batteries, naturally.)
- Place the original manual, along with the sales receipt and warranty information and all packing materials back in the original box. This is in case you decide to return or sell the item. You should store the empty box in the closet, garage or anywhere out of the weather elements. If you squirrel these away in a "special location" you will probably forget, or you-know-who will throw them out. Keep 'em in plain sight.
- While the battery is charging up (notice how everything requires a battery), I read the *photocopy* of the Owner's Operating Manual.
- Then I read it again. Since it is a photocopy, and not the original, I can use a yellow highlight pen to mark important or tricky instructions. I also use the small, brightly colored post-it-notes as bookmarks for the really important pages.
- With the radio (or other electronic device) in hand, I begin the process of understanding how the darn thing works.

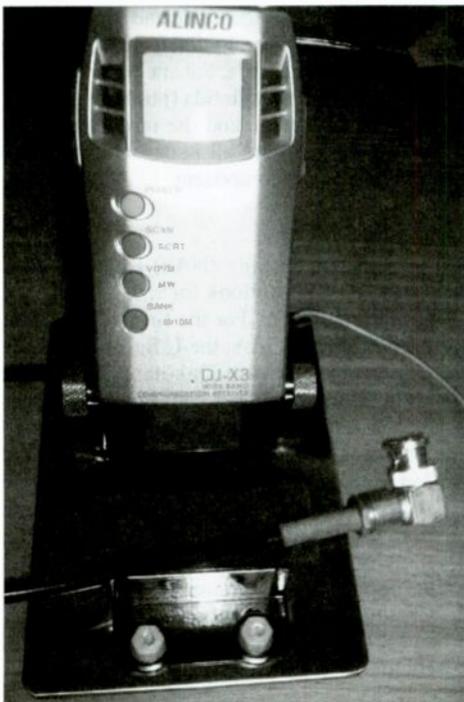
As to keeping track of the photocopied manual, I have two approaches. For small manuals like TV remotes or watches, I keep them all in one plastic storage container under my desk. For radios, I store the photocopy in a three ring binder; the type with a clear, see-through cover. I download a nice picture of the radio from <http://www.rigpix.com>. I add some large text print, then use a color printer. This becomes my cover for the binder. In addition to the manual, I can add pages I found on the web listing mods, cheat sheets, manufacture's sales brochure, any yahoo.com groups, etc. The Yaesu VX-5R website is a classic example of supplemental information the web.

I keep these binders (I have many) on a shelf in the radio room.

For my everyday radios, I keep a cheat sheet under a piece of clear plexiglass on the desktop. More on cheatsheets next month.

Let me know how this works out for you, Paul.

That's all for this month. Enjoy your Thanksgiving. As a considerate holiday host, I keep the radios off while friends and family are present. More unique Christmas gift ideas next month.



FACE-ing the Weather, Part 2

From the ground, a thin, white line was being painted across the late afternoon sky. It looked similar to other contrails around Miami, except this one was really high ...over 50,000 feet, in fact. A tiny gray-white speck leads the track out toward the Everglades.

"809, Proteus...we're starting our west-bound track," reported the pilot of NASA 809, the ER-2 spy plane derivative used for high-altitude environmental research, on 123.4 MHz. "Proteus copies...is that your contrail at my ten o'clock?"

Proteus, a one-of-a-kind high altitude, long duration aircraft and sensor platform, was featured on the cover of last month's *MT*. Along with four other research aircraft, the ER-2 and Proteus recently spent a month in South Florida conducting a groundbreaking study of environmental conditions and "global warming" issues. CRYSTAL-FACE, the Cirrus Regional Study of Tropical Anvils and Cirrus Layers - Florida Area Cirrus Experiment, was jointly staffed by NASA, NOAA, the National Science Foundation, Department of Energy, Office of Naval Research, U.S. Weather Research Program, plus scientists from the University of North Dakota and other atmospheric science programs.

CRYSTAL-FACE is part of a series of environmental investigations and field campaigns conducted by the U.S. Government and the academic community. Previous studies have included a wide range of subjects and locations, all of which serve to identify facets of our changing global environment.

Recent projects have included PACJET, the Pacific Landfalling Jets Experiment, which collected data about winter storms in Washington, Oregon, and Northern California from January through March of 2002; BRACE, the Bay Regional Atmospheric Chemistry Experiment in Tampa Bay, for the study of Nitrogen emissions in May of 2002; IHOP, the International H₂O Project, which studied water vapor distribution in Oklahoma during May and June of 2002; SMEX02, a Soil Moisture Experiment in Iowa during June and July 2002; and the New England Air Quality Study in July and August 2002, which studied the production and distribution of air pollution in the New England region.

All of these projects required the movement of personnel and equipment into the study area, and most utilized a wide range of sensor platforms and communications. Most importantly, scientists working on these

projects appreciate public interest and involvement. It's a great way to show how tax dollars are spent and how the government is responding to ongoing environmental concerns. Projects of this type can be researched at the NOAA website listed at the end of this column.

◆ Looking at Clouds from All Sides Now

Dr. Donald E. Anderson is Manager of the Radiation Sciences Program at NASA Headquarters in Washington, D.C., and the Program Manager for CRYSTAL-FACE. A soft-spoken scientist with an adventurous spirit, Dr. Anderson explained the program and logistics of bringing 450 researchers, tons of equipment, and six specialized aircraft to South Florida during "media day" last July.

CRYSTAL-FACE encompasses several research goals, as listed in Dr. Anderson's NASA program archive: "How are global precipitation, evaporation and cycling of water changing? What trends in atmospheric constituents and solar radiation are driving global climate? What are the effects of clouds and surface hydrologic processes on Earth's climate?"

These questions are being answered by the program's data collection efforts and subsequent analyses. The formation, lifecycle and composi-

tion of tropical cirrus clouds are indicators of greater atmospheric mechanisms and may help in the forecasting of future conditions.

Cirrus clouds, which may reach 60,000 feet in altitude, are energetic structures with a variety of interrelated functions: The large, high-altitude clouds screen sunlight from Earth's surface, reflect sunlight back into the atmosphere, and trap heat rising from below. Convection within the cloud moves water vapor, water droplets, ice crystals and chemical aerosols through different altitudes and temperatures. Finally, the clouds may act as a "fingerprint" of the surrounding environment since dust and pollutants are often trapped and concentrated within the convection layers...and detection of these particles may lead toward improved mitigation efforts.

The water and chemical movements, in conjunction with high- and low-altitude temperature fluctuations, make for a dynamic heating-cooling mix within the cloud, surrounding airspace, and the landscape below. Data collected through on-site observations and atmospheric sampling will be used to better understand how cirrus clouds relate to local climate conditions and global atmospheric trends. This information will also be used to validate and refine forecast models and remote sensing equipment.

Monitoring global atmospheric movements also has political, economic and social ramifications. Industrial pollution from China being detected in California, Sahara Desert dust being found in South Florida (possibly affecting local Coral Reefs), and the recent spread of West Nile Virus are all issues with an atmospheric science component.

◆ Base Ops

Naval Air Facility (NAF) Key West was the base of operations for the scientists of CRYSTAL-FACE. For the first time, aircraft from NASA, NOAA, the U.S. Navy and the University of North Dakota (UND) were brought together for a coordinated environmental science mission. Flying in a stacked formation at altitudes from a few thousand feet up to over 60,000 feet, the aircraft used sensors and sampling equipment to obtain data from cloud formations during late afternoon summer storms. NASA's ER-2 and WB-57, the Proteus research aircraft, UND's Cessna Citation, and the Navy's UV-18A Twin Otter and NP-3D Orion (each detailed in last month's column) were on station for this effort.



Like a little science with your radio? NASA's Surface Measurements for Atmospheric Radiative Transfer (SMART) unit houses RF, Lidar and direct optical sensors for measuring cloud properties.

❖ A Day in the Life of Atmospheric Science

Thomas L. Thompson, a principal investigator with NOAA's Aeronomy Laboratory in Boulder, Colorado, sits in a large NAF Key West room currently set up as an auditorium. He's running a notebook computer with a high-speed Internet connection feeding an LCD projector. Tom is using Flight Explorer software, a "Commercial-Off-The-Shelf" (COTS) product he researched and obtained for the CRYSTAL-FACE program. (See *Plane Talk*, June 2001 - ed) As an Amateur Radio operator, Tom not only appreciates the importance of communications, but he also has the creativity to solve problems using simple, readily available resources. In this case, Tom signed up for a 30-day free trial of the software, saving taxpayers and the program budget the extra expense.

With the software in operation, Tom and the Key West staff can see each CRYSTAL-FACE aircraft in real-time, plus any other aircraft in the FAA radar system. A map of Florida is displayed, with flight tracks illustrated as a curious series of lines and spirals as the research aircraft approach each target cloud formation and orbit in spiral or racetrack patterns. With one mouse click, Tom toggles the weather display as an overlay to the flight tracks and map. Now, not only are the aircraft visible, but so, too, are the clouds and storm cells they are sampling!

Tom advised that principal scientists have been issued Nextel radios for statewide coverage between Key West and the ground sites in Miami and Naples, Florida. Aircraft have a variety of VHF, UHF, HF and SatCom radios as needed to support their missions, including both data and voice circuits.

Down the hall, Kenneth F. Broda is sitting at a "COTS" aircraft radio and HF rig. He's one of the elite ER-2 pilots, and today he's on ground duty. Ken explained the two-pilot concept, in which a pilot handles the ground radio instead of a radio technician or communications operator. With an aircraft as unique as the ER-2, plus the other specialized aircraft in the CRYSTAL-FACE inventory, having another pilot readily available is a safety and operational enhancement. 123.4 is the primary frequency being monitored.

❖ Ground East

Over at East Coast Ground at Kendall-Tamiami Executive Airport in suburban Miami, Sergey Matrosov mans the Vertical Profiling Cloud Radar and Radiometer Package from NOAA's Environmental Technology Laboratory in Boulder, Colorado. Sergey is a Russian native

now working as a physicist for the University of Colorado, and he is the principal author of two published papers dealing with cloud particle sensing techniques and data validation.

Housed in a transportable cargo container called the Portable Cloud Observatory, this self-contained NOAA unit contains a Millimeter-wave Cloud Radar operating at 34.86 GHz...that's 34,860 Megahertz, just a tad above what most of us are used to tuning on our radios. The Cloud Radar provides a vertical picture of clouds as they pass over the sensor, resulting in graphical and tabulated information about water vapor, water droplets, ice crystals, and chemical properties of other aerosols and chemicals within the cloud structure.

Next to the Cloud Radar is a Microwave Radiometer operating at 20.6, 31.65 and 90.0 GHz. This device monitors the movement of water vapor and water droplets within the cloud. Finally, an Infrared Radiometer device detects cloud layer heights and densities. Together, these instruments provide a detailed view of the size, movement and composition of cloud particles. For the science buffs, this means reflectivity, Doppler velocity and spectral properties.

This NOAA sensing unit has been deployed worldwide for climate studies, calibration and validation of satellite-based cloud sensors, and even the investigation of how clouds impact high-frequency (HF) radio communications. 123.175 MHz is used for coordination with nearby CRYSTAL-FACE aircraft.

Across the tarmac, Dr. Santiago Gassó of the University of Maryland sits in a similar cargo container. Dr. Gassó has traveled worldwide to participate in various environmental science projects, and today he's in the NASA "SMART" trailer from Goddard Space Flight Center in Greenbelt, Maryland. This is the Surface Measurements for Atmospheric Radiative Transfer unit housing RF, Lidar and direct optical sensors for measuring cloud properties.

Dr. Victor E. Delnore is the Ground Project Manager. Tanned, jovial and dressed in shorts and a tank top for this mission, Dr. Delnore nevertheless radiates an air of authority and command. His business card provides some insight: Senior Research Scientist and Project Manager of the Airborne Atmospheric Science Office at NASA Langley Research Center in Hampton, Virginia, and Captain, Flight Meteorologist and Executive Officer of the Naval Meteorology and Oceanography Activity at Naval Air Reserve New Orleans.

For those of you who are fans of fiction adventure books, Dr. Delnore is the personifica-

tion of "Dirk Pitt," the heroic character in Clive Cussler's novels. Victor has degrees in electrical engineering and marine physical science, and has taught at Rutgers University in the Department of Meteorology and Physical Oceanography. He has participated in a variety of environmental, oceanographic and defense remote sensing projects, and is credited with the design, development, validation and flight testing of NASA Langley's airborne windshear radar to enhance aviation safety.

If you're feeling insignificant compared to Dr. Delnore's impressive credentials, here's a little secret that will restore some confidence. Dr. Delnore is really one of us, a reader of *MT* and also an Amateur Radio operator. For CRYSTAL-FACE, he carries a JD-100 airband scanner to monitor the various interplane and air traffic control frequencies associated with the project. Mission frequencies include the aforementioned 123.4 and 123.175, plus 122.95, 314.125 and 327.575 MHz.

❖ Check Your Attitude at the Door

For CRYSTAL-FACE in July of 2002, it was a shirtsleeve environment for the scientists at Naval Air Facility Key West and ground stations near Miami and Naples, Florida. The concentration of Ph.D.'s and multi-disciplinary specialists was larger than a Miami traffic jam, but fancy titles were replaced by first names on a daily basis. These men and women are simply the best in the world at what they do, and they conducted themselves with the confidence and camaraderie of a finely trained team...no matter what agency logo they were wearing.

Nearly a generation ago, the combination of cutting-edge science and highly competent personnel defined NASA. That aura of determination and resourcefulness has been the subject of many books and movies, and it fueled the career choices of children who ultimately became pilots, engineers, scientists and science fiction authors. This historic spirit was evident at CRYSTAL-FACE...The men and women of NASA, NOAA, and the supporting agencies and universities still have "The Right Stuff."

CRYSTAL-FACE Home: <http://cloud1.arc.nasa.gov/crystalface/index.html>
NOAA Environmental Technology Laboratory: <http://www.etl.noaa.gov/programs/2002/fireface/>

NASA Goddard SMART system: <http://climate.gsfc.nasa.gov/~hsieh/index.html>

NASA Langley Atmospheric Sciences Division: <http://asd-www.larc.nasa.gov/>

Flight Explorer software: <http://www.flightexplorer.com/>

Proteus now spies on the weather (photos by Robert Wyman)



I've Been Working On The Railroad

Canada's renowned singer/songwriter Gordon Lightfoot immortalized the pride this country has in its railroads in his "Canadian Railroad Trilogy" song:

*"There was a time in this fair land
When the railroad did not run
When the tall majestic mountains
Stood alone against the sun."*

The building of Canada's railroads was a major civil engineering undertaking that is a part of our folklore. Teams of "navvies" (navigators) – mostly foreign workers who laid the ties and steel and hammered in the spikes – worked their way inland from the Atlantic and Pacific coasts. They met at Eagles Pass in British Columbia in November 1885 where, in a historic but private ceremony, "the last spike" was driven to link this vast nation from the Atlantic to the Pacific.

The principal railroad companies were the Canadian Pacific Railroad (CPR) and, later Canadian National (CN). In more recent times regional rail lines such as "Via Rail" linking Quebec City to Windsor, Ontario, have appeared. Canada is also famous for its specialty tourist trains like the "Rocky Mountaineer" and the "Polar Bear Express."

Scanning Canada will take a look at some of those rail lines, or what the French call "les chemins de fer" as we climb and spiral through mountains and follow the tracks to all three of our nation's oceans. Just like our air journey, we will begin on the West Coast and ride the rails in

"Sea to Sky" country in British Columbia. But first, a West Coast diversion for US readers.

◆ Americans – We Have You Surrounded!

No, this isn't another friendly jab about who won the war of 1812. This is a modern day tale of a small enclave of the United States called Point Roberts, USA. This tiny isolated community lies south of the 49th parallel in Washington State. However, due to a quirk of geography it is entirely surrounded by Canada. The only way to reach Point Roberts from the rest of the US is by boat or by road – through Canada! Check it out at <http://www.pointroberts.com>. There is a US Border Patrol Station on the main road into Point Roberts, but if you don't wish to be inconvenienced by the trifles of international border crossings you can simply walk through a gap in the fence a block away, or stroll between the two countries along the beach. Point Roberts is an ideal location from which *Scanning Canada's* growing American readership can monitor radio activity on British Columbia's lower mainland and Gulf Islands.

◆ From Sea to Sky

Having left Point Roberts, travel north on highway 99 into Vancouver, then cross the Lions Gate Bridge into the city of North Vancouver and make your way to the BC Rail station on 1st Street to begin the rail journey up the coast alongside the Sea to Sky Highway.

BC Rail operates a single route out of North Vancouver northwards into the BC Interior. The main line goes to Fort Nelson, but there are spurs to other destinations for passengers and freight. The line has its roots in an older system called the "Pacific Great Eastern." A sign at the side of the Sea to Sky Highway tells its story. It was named after England's Great Eastern Railway and was built between 1912 and 1956.

The rail tracks follow the shores of beautiful Howe Sound up through Squamish and on

to the internationally famous ski resort of Whistler. From there the line weaves its way through spectacular summer snow-capped mountains to Pemberton and into the Fraser River Canyon. You can relax on the train, or you can enjoy the thrill of white-knuckle driving on tight alpine bends and steep precipices that do not forgive those who take their eyes off the road to enjoy the breathtaking scenery.

Our rail journey begins in North Vancouver from where the rail frequencies listed below can be monitored. Of course the marine bands and the VHF/UHF utility bands in the greater Vancouver area are rich with activity, too, but our space is limited.

You can see the Vancouver skyline just across Burrard Inlet as you enter North Vancouver. Huge freight vessels are making their way in through the First Narrows from the Pacific to Vancouver harbor. On the other side of the Narrows, the cruise ships are lined up at Canada Place. Behind you are the mountains of the Coast range, ski country and adventures to come.

◆ North Vancouver Railroad Frequencies:

N.B. Many of the frequencies are used nationally by member companies of the Railway Association of Canada. CN = Canadian National, CP = Canadian Pacific, BC = BC Rail, RAC = Railway Association of Canada.

156.600 CN	160.785 CN	161.205 CN
159.570 BC	160.815 BC	161.235 CN
159.570 BC	160.815 BC	161.235 BC
159.810 CN	160.875 CN	161.265 CN
159.810 CN	160.875 CN	161.265 BC
159.885 CP	160.875 CP	161.295 CN
160.215 CN	160.905 CN	161.325 CP
160.245 BC	160.935 CN	161.325 BC
160.275 CP	160.965 CN	161.355 CN
160.305 CN	160.995 CN	161.355 CP
160.365 CN	160.995 CP	161.370 BC
160.365 BC	161.025 CN	161.385 CN
160.395 CN	161.055 CN	161.385 CN
160.395 BC	161.085 CN	161.385 CN
160.425 CP	161.100 RAC	161.385 CN
160.455 CN	161.100 CN	161.415 CN
160.485 CN	161.100 CN	161.445 CN
160.575 RAC	161.115 CN	161.475 CN
160.605 CN	161.115 CP	161.475 CN
160.665 CN	161.145 CN	161.475 CP
160.695 BC	161.145 CP	161.505 CN
160.725 CN	161.175 CP	161.535 CN
160.725 CP	161.205 CN	



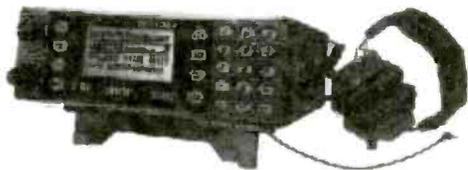
The Whistler Northwind alongside Howe Sound; copyright BC Rail Partnership.

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Simple as ABC: More Letters from Israel

The "numbers" broadcasts from Israel remain very active. We have heard a lot more of their special callups, in which one-time strings of letters, numbers, and sometimes time schedules are added to the normal, three-letter, phonetic beginning. These used to be a sure sign that something was up in the Middle East. Now... well, presumably something's always up in the Middle East.

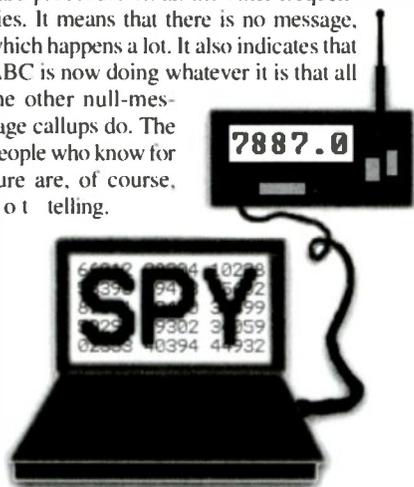
What's more, we have one whole new identifier. It's simply "ABC."

In keeping with standard Israeli intelligence procedure, the ABC is from a machine, using computer-edited female voice samples in English. As is the case on all the identifiers, the ABC is given phonetically, in this case "Alpha, Bravo, Charlie."

Like all these transmissions, it gets reported by listeners both as standard amplitude modulation (AM) and upper sideband (USB). Fans of the pop band Wilco have already heard another Israeli numbers identifier, since "Yankee Hotel Foxtrot" is heard under the song *Poor Places* on their hit CD, also named Yankee Hotel Foxtrot.

ABC was first discovered last spring, intoning the three phonetics for many hours at a stretch, and always (but once) on 6428 kilohertz (kHz). The one other frequency was 14000 kHz, noteworthy because another numbers operation with a slightly similar format sometimes comes up here. Being right on the fiercely guarded edge of the 20-meter amateur band, it's guaranteed to get noticed.

Most listeners figured ABC was a test transmission of some sort, but it wasn't. In early August, ABC began adding the number "2," as in "ABC2." This postpended "2" is a standard procedure on all the other frequencies. It means that there is no message, which happens a lot. It also indicates that ABC is now doing whatever it is that all the other null-message callups do. The people who know for sure are, of course, not telling.



This "2" variation is often called "E10a" in utility radio's arcane jargon. That's because the full version, with message, is called "E10" – the tenth English-speaking station to be identified by the European Numbers Information Gathering and Monitoring Association 2000 (ENIGMA 2000). Why English? No clue, unless it's because that's the language used by military phonetics in NATO (the North Atlantic Treaty Organization).

ABC2 has been reported on an irregular schedule, starting at the top of various hours from 1500 to 2300 UTC. The frequency is still 6428 kHz, except for the one time ABC2 accidentally came up on top of Yankee Hotel Foxtrot on 4560, saw the error of its way, and high-tailed it right back to 6428. Oops!

Usually the Israeli operators are far slicker than to make such mistakes, but then, they've been busy lately.

❖ And Then There's Cuba

While it's rare for the Israeli "numbers" to mess up, it's nearly as rare for the Cuban intelligence stations not to. On the one hand, Cuba pulls off the world's tightest broadcast format – all-news Radio Reloj ("Clock Radio") with transmitters ticking precisely away all over the island – but then its spy stuff teeters forever on the edge of chaos. Weird.

The more entertaining screw-ups are the stuff of shortwave legend. One hears Radio Havana bleeding in, parrots screeching in the background (*Why is there even a mike open?*), garbled or low audio, and messages abruptly cutting off, to be replaced by the "right" ones.

These frequent mess-ups have pretty well shown that the Cuban Morse Code station (ENIGMA M8) is the same operation as the better-known Spanish-language "female" voice (V2). Transmissions have, on occasion, switched in the middle, from Morse to voice or vice versa, without missing a single number. Presumably a computer file is being dumped to the appropriate circuits. Furthermore, analysis of audio glitches proves that the Morse is sent by putting voice transmitters into single-sideband mode, and feeding in a computer-generated audio tone. This, after all, is how most ham radios do it.

Chris Smolinski, keeper of the Internet "Spooks" mailing list, recently heard one of these switcheroos on 6982 kHz, when a Morse

code schedule was accidentally started in lower-sideband voice and abruptly changed to badly-keyed Morse. (Those who like to discuss this sort of weirdness might check out Chris' web site and new message board at <http://www.blackcatsystems.com>.)

M8 sends fast, and further speeds up by "cutting" the numbers, substituting shorter letters for them. Cuba's substitution is completely unique. It's A, N, D, U, W, R, I, G, M, and T for I through O.

Testimony in a recent espionage case hints that M8 may be intended for computer decoding by agents in the United States. When everything works, the extremely strong signals and machine keying are perfect for simple, sound-card programs running on laptop computers. Secure software might even replace the tiny "one-time pad" traditionally used to decode "numbers," making the whole process quick and transparent.



❖ Hams on 5 Meg?

Several countries have proposed ham radio operations just above 5 megahertz (MHz). In the United Kingdom, hams can now apply to communicate with one another, or even with existing military users, on 5260, 5280, 5290, 5400, and 5405 kHz.

A US amateur allocation from 5250 to 5400 kHz seemed like a slam-dunk, until it was opposed by the Federal government's powerful NTIA (National Telecommunications and Information Administration). An NTIA representative wrote that the military, the Coast Guard, and the Department of Justice are currently making extensive use of this band for emergency and enforcement activities.

Indeed, a quick scan of recent loggings shows Drug Enforcement Agency (DEA) on 5277 kHz, the Air Force on 5300, Navy on 5318, Coast Guard on 5320, and US Army Engineers on 5327. Known Federal bandplans also show the Interior Department on 5287.5 and 5380, and Transportation on 5255. All these are USB voice, and so that's not even counting the many digital or secure tactical and tracking operations which can show up here.

Pretty good for the supposedly hopelessly outmoded shortwave band. We'll be anachronistic for you again next month.

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CIA	US Central Intelligence Agency
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
E3	UK M16/SIS English "numbers" and tune
E5	CIA English test count and 4-number groups
E10	Israeli phonetic English female "numbers"
E10a	Israeli "numbers," callup only
EAM	Emergency Action Message
FAX	Radiofacsimile
FACSFAC	Fleet Area Control & Surveillance Facility
FEC	Forward Error Correction teleprinting system
GHFS	Global High-Frequency System
HFDL	High-Frequency Data Link (air digital system)
LSB	Lower Sideband
M8	Cuban CW, "cut numbers" ANDUWRIGMT
M12	Russian CW 5-number groups, ends 000 000
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
SPAR	Special Air Resources
UK	United Kingdom
Unid	Unidentified
US	United States
V2	Cuban Spanish female "numbers"
VOLMET	Aviation weather broadcast

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

- | | | | |
|--------|--|--------|---|
| 3195.0 | "R"-Russian military, Izhevsk, single-letter CW channel marker at 2001. (Ary Boender-Netherlands) | 4503.1 | Unid-Possible time count in CW, repeating hour (Moscow time) and minute, at 2205. (Watson-UK) |
| 3335.7 | "L"-Russian Navy, St. Petersburg, single-letter CW channel marker at 2000. (Boender-Netherlands) | 4560.0 | ABC-Israeli intelligence "numbers" callup (E10), mixing with YHF callup on same frequency at 1900, then going to its normal 6428 at 1920. (Boender-Netherlands) [Oops, wrong frequency. -Hugh] |
| 3438.5 | New York-New York Radio, with aviation weather at 0450. (Barry Williams-AL) | 4570.0 | HZN46-Jeddah Meteo, Saudi Arabia, RTTY weather at 2218. (Watson-UK) |
| 3828.9 | The Squeaky Wheel-Weird Russian AM channel marker, at 2000. (Boender-Netherlands) | 4583.0 | DDK2-Hamburg Meteo, Germany, RTTY Mediterranean forecasts, at 2223. (Watson-UK) |
| 4027.0 | Cuban "Cut Number" station (M8), CW 5-figure letter-substituted groups two Fridays at 0300. (Camillo Castillo-Panama) | 4610.0 | GYA-UK Royal Navy Northwood, FAX weather chart at 2229. (Watson-UK) |
| 4031.0 | IDR-Italian Navy, Rome, radio checks with units using tactical callsigns at 2011. (Boender-Netherlands) | 5019.0 | HSP-UK military/diplomatic, Hanslope Park, sounding in ALE at 1457, 1633, and 1952. (Watson-UK) |
| 4125.0 | Unid-Unknown commercial fishermen discussing equipment problems, at 0126. (Mark Cleary-SC) | 5230.0 | KPA2-Israeli intelligence, with abnormal "numbers" callup (E10a) of "KPA2 1ZKIMD," at 1920, then here and also on 8025 at 1950. Abnormal callup "KPA 0146EHJFG" (E10), also at 1920. (Boender-Netherlands) |
| 4304.0 | 6WW-Dakar Naval, Senegal, RTTY markers at 0456. (Tom Severt-KS) | 5418.0 | Cuban "Cut Number" station (M8), CW groups two Saturdays at 0200. Cuban "Atencion" station (V2), Spanish female AM "numbers" voice in progress at 0230. (Castillo-Panama) |
| 4372.0 | "Z-1-M"-Probable US Navy, in tracking coordination with "1-G-Z" and "L-0-V," in Virginia Capes operating area, at 0123. (Cleary-SC) Giant Killer-US Navy FACSFAC, VA, working aircraft 4C and Q9 in an exercise, at 0452. (Larry Wheeler-VA) | 5450.0 | Possible UK Royal Air Force aviation weather, at 0440. (Williams-AL) |
| 4418.0 | FDUM-Very abnormal Israeli intelligence "numbers" callup (E10), at 2212. (Boender-Netherlands) | 5616.0 | Aeromexico 001-Flight giving position to Shanwick, at 0500. (Patrice Privat-France) |
| 4426.0 | NMN-US Coast Guard weather, live female voice instead of synthesized "Perfect Paul," at 0504. (Severt-KS) | 5680.0 | Kinloss Rescue, UK, working Rescue 122, 125, 131, 177, and 193, starting at 1438. (Boender-Netherlands) |
| 4476.0 | "P"-CIS Navy, Kaliningrad, single letter CW channel marker, at 2153. (Day Watson-UK) | 5690.0 | Panther-US DEA, Bahamas, in patch with Coast Guard 1718, Coast Guard 22C, and CG 24C, in pursuit of a "go-fast" drug runner at 0554. (Cleary-SC) |
| | | 5696.0 | CAMSLANT Chesapeake-US Coast Guard, VA, announcing to all aircraft that the station has gone to emergency power in a severe storm, also on 8983, at 0032. (Ron Perron-MD) CAMSLANT, working Coast Guard assets in same pursuit as on 5690, at 0318. (Cleary-SC) CAMSLANT, working Coast Guard 01, the Commandant's aircraft, at 2242. (Rick Baker-OH) |
| | | 5708.0 | 100451-US Air Force C-5, sounding in ALE at 1758. (Watson-UK) |
| | | 5758.0 | Cuban "Cut Number" station (M8), CW groups, Wednesday at 0201, and two Fridays at 0300. (Castillo-Panama) |
| | | 5760.0 | Cuban "Atencion" station (V2), very low AM modulation, Saturday at 0201. (Castillo-Panama) |
| | | 5768.0 | LFI-Globe Wireless digital node, Rogaland, Norway, CW identifier, listening on 5421, at 0551. (Watson-UK) |
| | | 5800.0 | FUE-French Navy, Brest, usual RTTY test marker at 1420. (Watson-UK) |
| | | 6348.0 | FUE-French Navy, Brest, garbled RTTY test marker (bad tape?) at 1324. (Watson-UK) |
| | | 6350.0 | Unid-American Forces Network program rebroadcast, probably Hawaii, at 0616. (Severt-KS) |
| | | 6389.0 | CTP-Oeiras Naval, Portugal, testing in RTTY at 0622. (Severt-KS) |
| | | 6458.5 | Unid-American Forces Network program rebroadcast, probably Puerto Rico, at 0628. (Severt-KS) |
| | | 6577.0 | New York-New York Radio, oceanic air traffic control with unknown aircraft, at 0147. (Severt-KS) |
| | | 6675.0 | Lunch Box-US military, with EAM at 0615. (Jeff Haverlah-TX) |
| | | 6679.0 | Auckland VOLMET-Auckland, New Zealand, with flight weather at 0654. Honolulu VOLMET took over at 0656. (Severt-KS) |
| | | 6697.0 | Reassign-US military, with EAM at 0437. (Haverlah-TX) |
| | | 6721.0 | 170034-US Air Force transport, ALE sounding at 2140. (Privat-France) |
| | | 6757.0 | Lunch Box-US military, with EAM, also on 8992 and 11244, at 0606. (Haverlah-TX) |
| | | 6768.0 | Cuban "Atencion" numbers in AM, abnormal callup at 0053. (Williams-AL) |
| | | 6768.0 | Cuban CW "Cut Numbers" (M8), two Sundays at 1200. (Castillo-Panama) |
| | | 6795.0 | Cuban CW "Cut Numbers" (M8), at 1200 and 1300. (Castillo-Panama) |
| | | 6826.0 | Cuban CW "Cut Numbers" (M8), also 6924, two Thursdays at 1200. (Castillo-Panama) |
| | | 6845.0 | FDG-French Air Force Bordeaux, CW marker at 2245. (Watson-UK) |
| | | 6854.0 | Cuban CW "Cut Numbers" (M8), at 1200. (Castillo-Panama) |
| | | 6855.0 | Cuban "Atencion" numbers in AM (V2), at 0315. (Williams-AL) |
| | | 6867.0 | Cuban CW "Cut Numbers" (M8), also 6981, Friday at 1200. (Castillo-Panama) |

- 6933.0 Cuban CW "Cut Numbers" (M8), two Saturdays at 1300. (Castillo-Panama)
- 6950.0 US CIA "Counting Station" (E5), test count and message, also on 7585, at 2100. (Boender-Netherlands)
- 6959.0 Lincolnshire Poacher-British "numbers" (E3), with 5-figure groups and musical tune, at 0647. (Roger Huff-VA)
- 6982.0 Weird Cuban "numbers," started as female voice (V2) in LSB, then sudden shift to normally scheduled audio-keyed Morse (M8), at 1200. (Chris Smolinski-MD) Cuban CW "Cut Numbers" (M8), two Mondays at 1200. (Castillo-Panama)
- 6990.0 Unid-two males chewing rag in LSB, one signed as "Radio Free Texas," another as "Bubba," at 0230. (Sevart-KS) Two males discussing hunting, one said a peacock was on his roof, at 0245. (Williams-AL) [The whole range 6950-7000 kHz is attracting some very weird stations. -Hugh]
- 7555.0 Cuban "Atencion" station (V2), bad audio, two Sundays at 0300. (Castillo-Panama)
- 7657.0 22C-US Coast Guard aircraft working Panther at 0100. (Cleary-SC)
- 7708.0 Moanda-Gabon Railways, ALE sounding at 2103. (Watson-UK) . (Watson-UK)
- 7710.0 VFF-Canadian Coast Guard, Iqaluit, FAX ice chart at 2140. (Watson-UK)
- 8191.7 9MR-Malaysian Navy, RTTY weather in English, at 1709. (Bob Hall-RSA)
- 8427.5 A9M-Hamala Radio, Bahrain, SITOR-A marker and "TLX" (Telex) at 0216. (Ken Maltz-NY)
- 8431.0 TAH-Istanbul Radio, Turkey, CW marker at 0141. (Castillo-Panama)
- 8433.0 UFN-Novorossiysk Radio, Russia, CW marker at 0139. (Castillo-Panama)
- 8450.0 5AB-Benghazi Radio, Libya, CW marker at 0224. (Maltz-NY)
- 8557.0 SPB-Sczcecin Radio, Poland, with SITOR-B traffic list at 1500. (Privat-France)
- 8788.0 Unid-Two fishermen chatting in English, at 2355. (Williams-AL)
- 8879.0 Gander-Gander air route control, Canada, getting heavy interference from a Spanish speaker; sent 7 minutes of audio tones, then gave up and left frequency at 0207. (Williams-AL)
- 8912.0 Unknown-Possible US Customs Service, encrypted traffic at 0023, 0210, 2220, and 2312. (Cleary-SC)
- 8942.0 "F-WWCC"-French airliner, with HF DL message to Shannon, at 0718 AY2764-Finnair charter, HF DL with Shannon at 1905. (Privat-France)
- 8971.0 Card File 71D-US Navy, passing coded position to Fiddle (USN, Jacksonville, FL), at 2044. Blue Star-US Navy, PR, taking target position from Dunlop 10 (a P-3C), at 0305. Blue Star, position from UniRoyal 01, another P-3C, at 2154. (Cleary-SC) [Wonder where the Goodyear Blimp was? -Hugh]
- 8983.0 CAMSLANT-US Coast Guard, VA, working Herk 02 and cutter Mohawk, also using 6234 and 8337 secure, at 1153. CAMSLANT, telling Panther that "B-4-Q" is on-station at 2159. USCG Cutter Eagle, the sailing training ship, asking CAMSLANT for weather schedule at 2309. (Cleary-SC) Coast Guard Rescue 2112-US Coast Guard aircraft, working CG rescue 2113 in a search off FL, at 1555. CG Rescue 1501, search off Cape Canaveral, at 1904. (Allan Stern-FL)
- 9008.4 Unid-Probably US military exercise traffic, with control station "Bambi" working "Chieftain" and others, one whole weekend. (Jim Barre-CA)
- 9016.0 Reassign-US military, with EAM, also on 8992 and 11244, at 0406. (Haverlah-TX)
- 9055.0 BU2C2-Romanian government, Bucharest, calling BACC2, Bacau, in ALE at 1705. (Watson-UK)
- 9983.0 KVM 70-Honolulu weather FAX, satellite picture at 1630. (Hall-RSA)
- 10320.0 American Forces Network program rebroadcast, probably Hawaii, at 0526. (Sevart-KS)
- 11175.0 Reach 395Y-US Air Force Air Mobility Command, patch for arrival weather at Rhein Mein, Germany, at 0010. Reach 9166, a C-17, arrival arrangements in patch to McChord AFB, at 0230. Andrews AFB, with Skyking at 2034. (Cleary-SC) Puerto Rico-US Air Force GHFS, Salinas, PR, working Reach 524Y, at 0045 (Peron-MD) SPAR 28-US Air Force distinguished visitor flight, working Andrews at 1819. (Haverlah-TX)
- 11184.0 N325UP-United Parcel Service aircraft, reporting HF DL position at 1616. (Watson-UK)
- 11232.0 Canforce-Canadian Forces, with traffic in French at 0142. (Cleary-SC)
- 11235.0 Air Force Townsville-Royal Australian Air Force, working Shepparton 4 (sounds like), at 0713. (Sevart-KS)
- 11244.0 Offutt-US Air Force GHFS, NE, with EAM at 1847. (Haverlah-TX)
- 11309.0 Santa Maria-Air traffic control, working KLM 754 at 2343. (Sevart-KS)
- 11396.0 New York-Air traffic control, working AI05177 at 2356. (Sevart-KS)
- 11489.0 DG-Moroccan government, with ALE sounds at 2127, 2156, 2226, and 2256. (Watson-UK)
- 12840.5 PBC312-Dutch Navy, Goeree Island, Netherlands, RTTY channel status at 2137. (Maltz-NY)
- 12843.0 HLO-Seoul Radio, Korea, CW marker at 2142. (Maltz-NY)
- 12877.5 UIW-Kaliningrad Radio, 3rd-shift Cyrillic RTTY traffic for vessel *Vilhelm Pik*, at 1030. (Watson-UK)
- 12923.0 HLW2-Seoul Radio, Korea, CW marker at 1954. (Privat-France)
- 13245.0 Unknown US military, with EAM at 1931. (Haverlah-TX)
- 13510.0 CFH-Canadian Forces, Halifax, NS, with RTTY weather at 1945. (Privat-France)
- 13526.7 Unid-Egyptian embassy, Tripoli, Lebanon, SITOR-A traffic and chatter, at 1518. (Watson-UK)
- 13597.4 Unknown-Possibly Rome Meteo, Italy, with FAX charts from World Area Forecast Centre, London (like Bracknell used to run), at 1903. (Boender-Netherlands)
- 13900.0 BMF-Taipei Meteo, Taiwan, with Chinese character FAX at 1700. (Privat-France)
- 14982.5 RBV76-Tashkent Meteo, Uzbekistan, weak FAX at 1615. (Privat-France)
- 15016.0 Ruby Red-US military, calling Offutt GHFS, then Mainsail ("any station"), no joy, at 1931. (Haverlah-TX)
- 15615.0 Unid-Russian CW "numbers" (M12), callup 642 642 0 0 0, right on top of Kol Israel broadcast, at 1900. (Maltz-NY)
- 15920.0 CFH-Canadian Forces, Halifax, NS, with RTTY marker, listening on "2822 4170 6254 8303 12830 16576 22200," at 1338. (Watson-UK)
- 15988.0 DDK8-Hamburg Meteo, Germany, RTTY marker, also 11638, at 1926. (Watson-UK)
- 16035.0 9VF 252-Kyodo News, Singapore, with Japanese newspaper FAX, 60 lines/minute, at 1954. (Watson-UK)
- 16324.7 RFTJD-French Forces, Libreville, Gabon, ARQ marker at 2000. (Privat-France)
- 16812.5 NRV-USCG, Apra Harbor, Guam, SITOR-A marker at 1847. (Maltz-NY)
- 16814.5 NMC-USCG, San Francisco, CA, SITOR-A marker at 1841. (Maltz-NY)
- 16830.5 SVO-Olympia Radio, Athens, Greece, CW marker at 1838. (Maltz-NY)
- 16879.0 LZW-Varna Radio, Bulgaria, calling in CW, at 1836. (Maltz-NY)
- 16932.0 7TF-Boufarik Radio, Algeria, CW marker at 1830. (Maltz-NY)
- 16992.0 CLA-Havana Radio, Cuba, CW marker on possible new frequency, at 1825. (Maltz-NY)
- 17190.0 NMN-US Coast Guard, Portsmouth, VA, with SITOR-A at 0127. (Cleary-SC)
- 17314.0 Unid-Female broadcasting an unknown event in Russian, long silences, at 2045. (Williams-AL)
- 17430.0 9VF 252-Kyodo News, Singapore, very clear Japanese news FAX, 60 lines/minute, at 1600. (Privat-France)
- 17967.0 LH8441-Lufthansa flight with HF DL position for Bahrain, at 0734. (Watson-UK)
- 18220.0 JMH5-Tokyo Meteo, Japan, weather FAX at 0943. (Watson-UK)
- 19031.7 Unid-Pakistan diplomatic, coded ARQ message to unknown station, at 0700. (Hall-RSA)
- 19777.0 ASI-UK military, Ascension Island, ALE sounding at 1446. (Hall-RSA)
- 22542.0 JJC-Tokyo Radio, with very clear Japanese news FAX, 60 lines/minute, at 0940. (Hall-RSA)
- 23265.5 HGX21-Hungarian MFA, Budapest, ARQ message to HGX44, Baghdad embassy, Iraq, at 1604. HGX21, ARQ flood warnings and Formula One results, at 1654. (Hall-RSA)
- 23337.0 Very active US Air Force ALE, including MPA (?), PLA (Lajes?), HAW (Ascension Island), CRO (Croughton, UK), ADW (Andrews AFB, MD), OFF (Offutt AFB, NE), GUA (Guam), JNR (Salinas, PR), HIK (Hickam AFB, HI), 291190 (aircraft), and MP10X (?), all in two hours after 1228. (Hall-RSA)
- 25186.0 ASI-UK military, Ascension, ALE sounding at 1301. CYP-UK military, Cyprus, ALE sounding at 1343. (Hall-RSA)

ALE Network Breakthroughs

This month we look at a few letters which raise some interesting points and give us new insights into some ALE networks we've covered here before. As always, we encourage you to write or email us here at *Digital Digest*.

◆ Why No Free PSK Software?

JJ Owens writes to us from an undisclosed location and asks a number of questions which we've certainly heard before, so we'd like to take a stab at answering them as best we can. Here are some of JJ's points:

1. PSK rules the HF airwaves now; all FSK decoding software is useless.

I guess we'd say this one is probably half right. While we've certainly championed awareness of the newer PSK (Phase Shift Keyed) systems in this column, there is plenty of FSK traffic still around. Here's a sample of what we've mentioned as active FSK modes, carrying interesting traffic, available on most decoders and previously covered in various DD columns:

SITOR-A: Egyptian Diplomatic Service and Maritime stations
SITOR-B: Ecuador Navy, Brazilian Navy and NAVTEX stations
MIL-188-141A: Military, Intelligence and Commercial ALE Networks
RTTY: Military, Meteorological and Intelligence Stations
RS-ARQ: Italian Diplomatic Service
ARTRAC: Hungarian Diplomatic Service
CW: Military and Intelligence Stations

2. You need to tell us where to find low cost or free decoders on the web that decode modes like STANAG, PacTOR-II and Globe Wireless Dataplex with a PC soundcard.

Well, we hope that our usual practice of letting readers know where to hear or see more on the web through our resources section has helped somewhat, but it's probably worth exploring this a little more thoroughly.

First, though, let's answer JJ's choice of modes. We have heard rumors that Charles Brain (author of the massively popular PC-ALE and PC-HFDL software) had been working on a soundcard-based STANAG4285 decoder. However, since most 4285 transmissions are heavily encrypted, having a decoder in any form is worth little as far as the digital monitor's armory goes.

As for PacTOR-II, there are at least three important reasons why this has not yet made it into the well-known decoder packages or free soundcard based software. Firstly, SCS (the maker of the PacTOR modems and owner of the intellectual property that makes up the PacTOR mode) protects its work heavily for obvious reasons – the mode has been and still is a great commercial success. The licensing fees are almost certainly too expensive for a hobbyist to bear.

Secondly, the mode is both technically chal-

lenging and requires the sort of performance that is much easier to achieve with dedicated hardware. That, of course, is *after* you've invested the time in reverse engineering the modulation and coding schemes! And who knows, after all that effort, the enterprising monitoring software guru might then be receiving a letter from SCS's lawyers as reward.

So PacTOR, despite its obvious popularity on the air, is an unlikely candidate for the free soundcard software or even commercial suites like the Code 3/30/300 and Wavecom. And again, as in the case of STANAG4285, much PacTOR-II traffic is also encrypted. For those who have the money and are particularly interested in this mode, purchasing a dedicated PacTOR modem from SCS or their distributors might be the only solution to copying this mode.

So, by long way of explanation, to answer JJ's first request: Oliver Welp, a German amateur radio operator, maintains an excellent website (see Resources) cataloguing soundcard-based software (free, shareware and commercial) for various radio monitoring uses. Categories include software for decoding many different modes, audio recorders, spectrum analyzers, tone decoders, and other general DSP (Digital Signal Processing) tools. The website features programs that work on Windows, Mac OS and Linux in addition to specialized DSP microprocessors. Over here in the US, another radio amateur, WM2U, also has an excellent selection of radio software catalogued at his website (see Resources).

◆ ALE Network News

Another regular, Mr Yoo Fu Ba, writes to us from the Far East with the results of some long-term monitoring of a number of the unidentified ALE networks we've mentioned in this column before.

The "055" Network

Yoo reports an even more extensive network than we had presented in the September issue of *DD*. He has reported finding 93 frequencies over a period of about six weeks of listening. Given the spread of these (fixed) frequencies, Yoo estimates that the complete network probably has in the range of 110-130 channels active across the incredible range of 2 to 29 MHz. Here's Yoo's complete listing (kHz):

2396, 5396, 5736, 5782, 6394, 6470, 6474, 7373, 7517, 7565, 8591, 8618, 8686, 9043, 9070, 9303, 9903, 10119, 10137, 10618, 10627, 11475, 12194, 12297, 12626, 13378, 13422, 13422, 13442, 13463, 14422, 14535, 14731, 14913, 15279, 15602, 15627, 15685, 16528, 16642, 16788, 17198, 17313, 17434, 18194, 18297, 18336, 18531, 18834, 19043, 19207, 19309, 19554, 19722, 19844, 20107, 20197, 20266, 20307, 20438, 20471, 20666, 20759, 22015, 22186, 22277, 22511, 22769, 23428, 23471, 23482, 23644, 24362, 24695, 24741,

24770, 24777, 24805, 24833, 25155, 25347, 25374, 25432, 25447, 25537, 25571, 26358, 26996, 27667, 27677, 29771, 29923, 29954

Yoo's best guess, gleaned from monitoring USB voice communications following the ALE, is that this network is located in Indonesia which fixes the origin of "055" a little more accurately than our previous "Far East" designation.

Myanmar Network

Some time ago, we reported a number of ALE identifiers appearing on 19500 kHz that suggested locations in Myanmar (Burma). Yoo has also been able to devote a considerable amount of time to this network and concludes that it probably supports an oil exploration or extraction organization. He has noted that the ALE triggers PKZIPed file transfers using the Racal Skyfax modem and one frequency also carries traffic in SITOR-A using the same three-letter identifiers as those used with ALE. Here are the details of this network:

Frequencies:

3395, 4004, 4006, 4040, 4060, 5100, 5385, 6233, 6385, 6495, 6685, 6795, 6850, 6860, 6865, 7300, 7310, 7200, 7388, 7955, 8180, 8195, 8200, 8273.5, 8520, 9040, 12050, 13000, 13500, 14370, 14450, 14470, 14500, 15250, 15800, 16000, 16200, 18500, 19000, 19500, 20500

Identifiers:

APK, CHK, KKT, LPD, MAG, MAN, MER, PAY, TAN, YGN, YMA, YNG

Saudi National Guard Network

These guys used to be audible throughout the spectrum using a proprietary 125bd FEC system, but have now re-appeared using ALE. Yoo reports the following network details with Arabic voice communications often following the ALE.

Frequencies:

5598, 6655, 7710, 8194, 14559kHz

Identifiers:

101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 112, 113, 114, 115, 116, 117, 118, 119, 120, 124, 126, 131, 141, 142, 143, 145, 147, 148, 149, 153, 155, 158, 163, 167, 169, 171, 174, 175

That's all for this month. Keep writing in with your thoughts, questions or any other feedback you may have for us here. Until next time...

◆ Resources

SCS PacTOR: <http://www.scs-ptc.com>

Oliver Welp's Soundcard Software: <http://www.muenster.de/~welp/sb.htm>

WM2U's Rodio Collection: <http://www.qsl.net/wm2u/>

New VOA Director in Less Than a Year

Veteran foreign correspondent and journalist David Jackson has been appointed Director of VOA by the Broadcasting Board of Governors. He is a former *Time* magazine foreign correspondent. Jackson replaces Robert Reilly, who announced his resignation to "support the President in the war against international terrorism," says a VOA press release via Bill Westenhaver.

Reuters quoted VOA sources that the agency had been in turmoil under Reilly's leadership, particularly over plans to set up new language services targeted to Middle East audiences but without the "impartiality" provisions in the VOA charter. New director of VOA David Jackson, worked for *Time* magazine from 1978 until 2001, when he took a job running the Pentagon's Web site on the U.S. "war against terrorism." (via Mike Cooper)

The *Washington Times* put a more partisan spin on the matter:

Doubts from above about his managerial skills and suspicions from below about his conservative political leanings torpedoed VOA Director Robert Reilly, who resigned abruptly after 11 months on the job, insiders at the U.S. broadcasting service said. A former Reagan administration official, Mr. Reilly wrote editorials and hosted a foreign-policy talk show at VOA for more than a decade before assuming the director's post last October. ... Mr. Reilly's fatal mistake might have been to upset the oversight board with a proposal to close five overseas bureaus, including a major news center in Hong Kong, to help finance a planned new Farsi radio service targeting Iran. (David R. Sands, *Washington Times*) And, escalating:

The sacking of Bob Reilly by the federal Broadcasting Board of Governors is not being well received on Capitol Hill. Several House Republicans are at work on a letter to members of the BBG demanding to know why Reilly, a presi-

dential appointee, was made to resign under pressure. The letter reportedly threatens additional cuts in funding for VOA of up to 25 percent of the total budget unless the oversight committee is given a satisfactory explanation as to why the board, most of whom were originally appointed to the BBG by the Clinton administration and whose terms have expired, thought they should interfere with Reilly's effort to carry out the administration's priorities for the agency in the war against terrorism. This issue is not likely to go away quietly (UPI *Capital Comment* via *Washington Times*)

"Basically this guy had zero credibility (with the board)," one source familiar with the dynamics between Reilly and the governors told UPI. "He wanted to be all things to all people," said the source, "he wanted to be loved by the staff, loved by the board and loved by the unions. He wound up being loved by none of them." (Eli J. Lake, UPI via Jill Dybka, *NASWA Flashsheet*)

AFGHANISTAN A Fort Bragg unit runs a popular radio station in Kandahar, alternating music and messages in an effort to win the hearts and minds of Afghans. For 18 hours a day, members of the 8th Psychological Operations Battalion broadcast from a makeshift studio that's actually a truck covered by a tent. Their signal on SW and AM radio restores a freedom lost when the Taliban ruled, and instructs Afghans on how to rebuild their country; 1 kW on 6100 and 5 kW on AM 864 (Peter Smolowitz, *Charlotte Observer* via Mike Cooper)

Nepal, Malaysia, Tannu Tuva and North Korea all occupy 6100, but what may be Kandahar is best around 1630-1700, similar format to 8700-USB, lots of local music with short announcements by male and female (Jari Savolainen, Kuusonkoski, Finland) 8700-AM heard in local mid-afternoon until late at night, but 6100 cannot be confirmed. 8700 reception is much better in Islamabad (T. Hirayama, Kabul, *Clandestine Radio Watch*)

ARGENTINA On 2379.58, presumably LRA15, Radio Nacional de Tucumán, 2 x 1190 at 0938-1001 including a Radio Nacional Córdoba correspondent (Mark Mahrmann, Coventry, VT, *DX Listening Digest*)

LTA heard on 29810 kHz LSB one Sunday from tune-in 2200 past 2400 when propagation rapidly collapsed, relay of R. Continental with fútbol, news bulletins, music (John Cobb, GA, *World of Radio*)

AUSTRIA Radio Afrika International, Vienna, 17875, Sat 1530-1600. French news, hilife music, vernacular, many IDs; E mail address r.Africa@sil.au VOA *1600 obliterated the signal. Enjoyable program and very good reception. This is the student domestic program via Moosbrunn, Austria, not the United Methodist Church effort also called Radio Africa International (Mark Taylor, WI, *DX Listening Digest*)

[non] At least two DXers have managed to "QSL" the Vienna station by unknowingly reporting to the other R. Africa International, UMC in NY, which equally unknowingly automatically verified a frequency and site they do not use! Goes to show what can be accomplished in relentless pursuit of so-called "verifications" by not paying attention, on the part of broadcasters as well as listeners (gh)

BHUTAN BBS has an excellent program, Sundays at 1100-1130 on 6035, Internet on the Radio. Homepage: <http://www.bbs.com.bt> (Partha Sarathi Goswami, Siliguri, West Bengal, *DX Listening Digest*)

BRAZIL Rádio Gazeta, [15325v], São Paulo is the only Brazilian currently active on 19m (Célio Romois, @tvidade DX)

Programming on 4845 is now R. Ternura FM, from Ibitinga, SP, heard at 0905 (Célio Romois, @tvidade DX) That would be the seldom-reported one previously known as R. Ibitinga, or R. Meteorologia Paulista, listed by 2002 PWBR as 1 kW on the strange sched-

ule of 0700-2100 UT, and not to be confused with R. Cultura, Manaus, also on 4845, and per *Shortwave Guide* with 250 kW at 0800-0200 while SWG says Ibitinga runs 0800-2300. Note also that the Manaus frequency varies on the high side (gh) These three stations are all part of Centro Paulista de Rádio e TV. Roque da Rosa there, who is also a DXer, confirms Ternura FM musical programming is on 4845, 0800-1300, 1900-2200. Just as well Ternura closes during daytime as nothing much is audible on 60m. Next year they plan to double the 2.5 kW power and expand hours into the night. E-mail: radio.ibitinga@ibinet.com.br (Célio Romois, Porto Alegre, Brasil, *DX Listening Digest*)

Management of R. 9 de Julho, 1600 kHz in São Paulo tells me they plan to add SW 9820 by next March; awaiting construction permit for antenna and transmitter (Célio Romois, @tvidade DX) Are they aware of RHC and others already using 9820? (gh)

BURMA [non] Democratic Voice of Burma cancelled transmission via Rangitaiki, New Zealand, 1430-1530 on 9500 or 15620 (Observer, Bulgaria) In mid-August due to poor propagation (Erik Køie, Denmark, OZ3YI, BC-DX) unID music tests in same time period may replace this: 1430-1445 on 12090, 1445-1500 on 15600. DVOB B-02 also via Almaty, Kazakhstan: 1430-1530 5905 200 kW, 132 degrees (Observer, Bulgaria)

BURUNDI A new station, Radio Isanganiro (Kirundi for 'meeting'), is due to start in October. Aim will be to "promote dialogue, peace, reconciliation, and the prevention, management and resolution of the conflicts in the sub-region." Project obtained approval of regulatory authorities in June, and now awaits a SW frequency allocation (© Rodio Netherlands Media Network)

CHILE [non?] 6880.1-LSB, Andino Relay Service. 0240-0320 Andean music, ID, counting, IDs in Spanish, English; asking for reports to Casilla 159, Santiago 14, Chile or arss@yahoo.com (Arnaldo Slaen, Argentine, Cumbre DX) Also reported earlier and later the same date by Enrique Wembagher, Bs. As., and Gabriel Iván Barrera, Argentina, *Conexión Digital*)

CHINA [non] Falun Dafa Radio, 5925, clandestine via Sitkunai, Lithuania at 2122-2201* in Mandarin? Chinese jammer music at 2133 heard underneath, but didn't disrupt too badly. // 9945 was a mess of jammer QRM. Fair (Scott R. Barbour Jr., NH, *NASWA Flashsheet*) Falun Dafa from Russia reported new 6035 at 2100-2200 / / 9945 (Hans Johnson, Cumbre DX) I heard on 6035 at this time instead, R. Korea (Olle Alm, Sweden, *DX Listening Digest*) B-02 Fang Guang Ming Radio in Mandarin: 2100-2200 on 6035, 9945, both Samara, Russia, 200 kW, 297 degrees (Observer, Bulgaria) i.e. beamed away from China! **COLOMBIA** Ondas del Orteguzza, Florencia, 4975, is irregular, only heard at 2230-2300 with Sendas Apostólicas, evangelical program, cutting off the air when it is over (Rafael Rodriguez R., Bogotá, *Conexión Digital*)

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-02=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

LV de tu Conciencia, 6060.08, heard with an English ID at 0555, (The Voice of Your Conscience) (Volodya Solmani, Victoria BC, DX Listening Digest) Went off 6060 Sept 9, when MinCom assigned them to move immediately from 6060 to 6010. This is because Colmundo had not officially turned in its permit for 6065; not realizing that Conciencia acquired the Colmundo transmitter, which thus has no possibility of returning to SW1 Reports will be wanted about QRM on 6010. Other channels are being considered, 5905, 5925, 6170, 6115 – the last one officially relinquished by La Voz del Llono (Rafael Rodriguez, Conexión Digital) Still not heard on 6010 or anywhere else as of Sept 21; at least Mexico seems gone (gh)

COSTA RICA RFPI's 7445 converted from USB to AM, 0000-0800; 15039 also AM at 2200-0500. New for Sept-Nov quarter is A World of Possibilities, a whole brain, whole-hearted radio program – manna for the mind and sustenance for the soul, Wed 0230, Fri 0300. World of Radio: Fri 1930, Sat 1800, Sun 1830, Tue 1900; however, these first broadcast times had been suspended on SW, so add 6 and 12 hours (RFPI) After 11 years at RFPI in Costa Rica, Joe Bernard is returning home to Oregon, but will remain with RFPI, managing the US office (RFPI Fiesta on the Air)

CUBA R. Reloj heard 0708-0800 on 9550, 9650 and best on 9600; test? (Adán González, Venezuela, DX Listening Digest) RHC transmitter on 9550, Rebelde on 9600, may have mixed to produce 9650. Reloj is occasionally reported after RHC programming is finished around 0700 (gh) Reloj heard another night at 0650-0700 on 9665 USB (Alfredo "Spacemaster" Cañete, Lima, Peru, Conexión Digital)

Cuban jommer on odd 11847.00, loud and clear around 0600-0900, apparently 24 hours, although R. Marti is on 11845 only at 1300-1700 (Wolfgang Bueschel, Germany, BC-DX)

CZECH REPUBLIC [non] R. Prague's Spanish at 0200-0227* heard on USCG frequency 5696, poor audio but booming signal (Bob Montgomery, PA, NASWA Flashsheet) Same two nights in a row; Coast Guard not amused (Rik van Riel, Curitiba, Brasil, DX Listening Digest) And this was previously reported on another USCG frequency 8989. Obviously a deliberate relay by a third party. Calling these spurs implies they are actually coming out of Prague transmitters. It is inconceivable that this could happen by accident on more than one USCG frequency. Someone should also check whether the Prague/USCG frequencies are in synch with Prague direct, or WRMI (gh)

ECUADOR R. Quito, 4919 with 7.5 kW, has a program for Ecuadorians abroad, Cartas a los ecuatorianos ausentes, also popular with DXers, 0430-0500 and 1000-1030 "day in and day out," whatever that means. Includes folk music, discussions. Remote jungle and coastal areas depend on 4919 for news. No new QSL, still using up old ones, 40,000 printed 50 years ago. Address: R. Quito, P O Box 17-21-1971, Quito. Xavier himself replies to E-mail reports to radioquito@elcomercio.com (Xavier Almeida, R. Quito manager, on HCJB DX Partyline)

EL SALVADOR 17833.16, R. Imperial, 2310-0051* Spanish religious ballads, best on LSB plus sync. Fade down but back up by 0039, canned ID: "Sintonicenos en la ... Imperial, 810 AM, un mensaje a seguir en su vida" (Thanks to Henrik Klemetz for listening to my audio clip, and extracting the ID). Next night on 17833.15, at 2315 stronger and steadier, but modulation a bit low (George Maroti, NY Cumbre DX) On 17833.3v, YSDA, R. Imperial, Sonsonate, 2200-2350. Two nice clear IDs at 2347 (David Hodgson, TN, DX Listening Digest) 17833.19, 0043-0105, upbeat pop and campo vocals, some with religious themes. 0054 canned ID "...Radio Imperial, ocho cientos diez A-M" (Mark Mohrmann, Coventry VT)

FINLAND YLE confirmed plans to axe transmissions in English, German and French, leaving Finnish, Swedish, Russian and Latin (Mika Mäkeläinen, DXing.info) R. Finland has been phasing out English, down to only two daily broadcasts, 0630 on 15135, 21670, 1230 to NAm on 15400, 21670, Mon-Sat only. All English will be terminated by 27 October, last day of current broadcasting season. Before going off, English service would broadcast some highlights from archives, bringing back familiar voices from the past (© Radio Netherlands Media Network) Like Eddy Hawkins, Patrick Humphreys? (gh) Decision made by the Administrative Council, largely parliamentarians. Not only will broadcasts be terminated, but YLE's webpages in those languages will also disappear. There are other online sources of news in English and German from Finland; not much in French (Juhani Niinistö, YLE R. Finland chief, interviewed by Roger Broadbent on RA Feedback) French TDF may buy more than the 49% of the shares it owns today, and then leasing of airtime to other broadcasters is likely (Anker Petersen, DSWCI report on EDXC Conference)

FRANCE Another possible TIS station, on 25775 AM, heard 1200-1900+, stronger than last year's Lo Rochelle outlets on 11m. Has a 51-52 minute loop, half in French, half in English (Alan Roberts, QC, DX Listening Digest) 25775.1, possibly Comité Département du Tourisme de la Charente-Maritime, 1850-2110 with French language features and pop songs followed by English segments. No IDs noted but English features were called Weekend Adventures, discussion about Normandy, interview with author Tiffany Capote. Poor to fair with some very deep fades (Richard D'Angelo, PA, NASWA Flashsheet)

GERMANY 6085, Bayer Rundfunk will cease shortwave as from Jan 1, 2003, due to financial difficulties. Maybe will come back with new DRM mode 2005 or 2006 (Open Day Ismaning, via Wolfgang Büschel, DX Listening Digest)

GUATEMALA Radio Cultural Coatan, 4780 at 1045-1115, religious music and ID on ham (Chuck Bolland, FL, DXLD) Reactivated after 27 months per <http://www.sover.net/~hackmohr/swarchive.htm>

R. Amistad says that they are only operating 4698 during daylight hours, primarily as an "STL" to get signal over the volcano to be rebroadcast on a little 25-watt carrier current AM transmitter in Santiago Atitlán on 540 kHz – because their main FM signal on 97.6 can't be heard beyond the mountain range (Larry Baysinger, KY, DX Listening Digest)

GUYANA On 3291.27, V. of Guyana, modulation improved to excellent in early Sept, 0925 with Early Bird Show, ads, subcontinental music. I look forward to quiet fall and winter conditions to enjoy this gem of a station (David Hodgson, TN, DX Listening Digest)

KAZAKHSTAN [non] The organization behind DAT-Radio, 9775, might be the Republican People's Party of Kazakhstan (RPPK), founded by the ex-prime minister Akezhan Kazhegeldin (1994-1997) who in absentia was sentenced to 10 years in prison in Kazakhstan in 2001, and lives in exile in Europe. The party's website <http://kazhegeldin.addr.com/english.htm>; also a short article about DAT-Radio: http://kazhegeldin.addr.com/english/engl_16_08_02.html There is also a Canadian office of the RPPK, see http://kazhegeldin.addr.com/english/engl_03_06_02.html (Bernd Trutenau, Lithuania, BC-DX)

The Almaty paper Vremya reports that DAT focuses on the Kazakh political situation, publicizes names of corrupt high-ranking officials. Takes its name from an opposition newspaper closed down by the government for publishing news that displeased it (Catherine Cosman, RFE/RL Media Matters)

Most likely coming from a CIS site in Europe, like Maia Grigoriopol', Moldova (DSWCI DX Window) Kazakhstan's National Security Ministry established that Radio DAT, "the voice of democratic forces in Kazakhstan fighting for justice, well-being of the people, human rights, and political freedoms," broadcasts not from the West, but from an unnamed town in the Russian Federation, forumkz.org reported. According to the Center for Journalism in Extreme Situations, Kazakh journalist and public figure Bigeldin Gabdullin, a political refugee in the US, served as anchor for Radio DAT's first broadcast (RFE/RL Newswire)

Group behind this is Société Pour la Démocratie en Asie, Rue Jourdan 95, Brussels, Belgium 1060 (Hans Johnson, Cumbre DX) E-mail reply from R. Dot [translated]: Cost of our 1000 kW transmitter doesn't allow us to send cards. We offer time for all real opposition parties/movements and for everybody who's ardent to fight against the fascist regime of Nazarbayev and his jackals. External intelligence of Kazakhstan started a hunt upon our radio station and all our supporters (info@datradio.com via Igor Zhurkin, Provdivinskiy, Russia, dxing.info) Radio DAT, 1515 ID on new 9925 ex-9775 (Mike Barraclough, UK, DX Listening Digest) At 0110 check something still behind VOA 9775, and 9925 fully occupied by Croatia in English via Germany (gh)

KOREA NORTH V. of Korea block language schedule: <http://www2.starcat.ne.jp/~ndxc/nk.htm> (gh)

KOREA SOUTH Han Hee Joo of Multiwave Feedback announced that she is the new Executive Director of RKI and must relinquish on-air duties (Daniel Say, BC, DX Listening Digest) Sounded like Assistant Director to me... (gh) RKI antennas in Kimjae were severely damaged by typhoon Rosa. Those to North America and Europe had to be replaced by non-directional ones, worsening reception on 15575 at 2300-0400 and 13670 0700-1100 (Md. Azizul Alam Al-Amin, Rajshahi, Bangladesh, hard-core-dx)

KYRGYZSTAN Brief English news is on R. Kyrgyzstan, Biskek at 2325-2330 on 4010, 4795 (Harjot Singh Brar, Punjab, GRDX) Ms. Baïma Sutenova, VP of Kyrgyz State TV and R. Corporation, has been v/s for a number of QSLs in recent years. Her address: meerim2002@netmail.kg (Bernd Trutenau, Lithuania, BC-DX)

LAOS [non] A Merlin operation heard fair to poor on 17540 via Uzbekistan at 0100-0201* called ULMD (Walt Salmani, BC, BC-DX) United Lao Movement for Democracy, something new?

LIBERIA R. Veritas, 5470, heard at 2320-2402* with African music, mentioning Monrovia and Liberia (Rafael Rodriguez R., Colombia, Conexión Digital) According to The News, Monrovia, the Catholic-owned R. Veritas began a new broadcast season on both FM and SW, increased from 12 to 18 hours a day (© Radio Netherlands Media Network) Best before sign-off at around 2300 or 0000. Years ago also heard on 3450. Can be contacted through Archdiocese of Monrovia. A few years ago address was Box 3569, Monrovia, telephone +231-221658 (DXing.info) Later off again, due to failure of modules in new Omnitronics 10 kW transmitter, into dipole. Resumed schedule to be 0600-1700 6090, 1700-2300 5470 (Hans Johnson, WY, Cumbre DX) See PERU for another 5470 station! (gh)

5100, Liberian Communications Network; 2339-2402* Af news, rap and reggae tunes, LCN ID and closing at 2401. All in English (Harold Frodge, MI, Cumbre DX)

LIBYA [non] B-02 schedule for LJB via Issoudun [France]:

9415	1800-1900	17695	1100-1130
11635	1800-1900*	17695	1500-1600
11635	1900-2130	17880	1700-1800
11715	1800-2030	21640	1100-1130
15220	1600-1800	21640	1500-1600
15615	1600-1900	21675	1100-1500
15660	1700-1800	21695	1000-1400
15660	1800-1900 from March 2, 2003		

* still March 1, 2003 (Observer, Bulgaria)

NEPAL R. Nepal left 41m for 6100, heard 1030-1714 \ 5005 including English news 1415-1425 (Partha Sarathi Goswami, Siliguri, West Bengal, DX Listening Digest) Both 5005 and new 6100 were opening at 2345, closing at 1545; English news at 0215, 0815, 1415 - all 10 minute duration (Alok Dasgupta, Kolkata, India, BC-DX) 6100 at 1200 is much better than // 5005. Malaysia signs on 6100 around 1300 and it is then a mess (Victor Goonetilleke, Sri Lanka, DSWCI DX Window) Website with lots of info about the station: <http://www.catmando.com/radionepal/> (via Arnoldo Slaen, Conexión Digital)

NIGERIA [non] B-02, Salama Radio in Hausa/Ndebele/French/Arabic: 1900-2000 on 15365; until March 1 this is via Sackville, Canada! 250 kW, 105 degrees; from March 2 same frequency via Rampisham, UK, 500 kW, 169 degrees (Observer)

PAKISTAN Powerful new R. Pakistan SW transmitter is installed at Skardu, to counter the poisonous propaganda of Indian Radio stations (Frontier Post, Peshawar, 5 Sept., via Kim Elliott, DC) No further details and not yet reported by anyone; place also spell Skardo and Sakardo in some article!

PAPUA NEW GUINEA R. New Ireland, 3905, coming in beautifully after ham net closed at 1125, until 1200*, atop Indonesia (Ron Trotto, IL, DX Listening Digest) Heard on different occasions in Aug/Sept, R. New Ireland was on 3904.9998, while RRI Merauke was on 3904.9996 (Stig Adolfsson, Sweden, SW Bulletin)

PARAGUAY R. Nacional reactivated on 9736.1, especially during football, one day at

Shortwave Broadcasting

2308, 0134 into traditional music; drifting upwards to 9737.2 a few days later, (Adán González, Venezuela, DX Listening Digest)

Radiodifusión América, Asunción, fair on 7737 in late August at 0910, voices in Spanish // 7300, also fair (Charles Jones, Australia, DSWCI DX Window) As of mid-Sept: 24-hour daily tests with power raised to 800 watts on both: 7300 at 4 degrees, and 7373 at 184 degrees; the latter has a higher gain antenna. Reception reports most welcome! (Adán Mur, Technical Advisor, Radiodifusión América, Asunción, Paraguay ramerica@rieder.net.py DX Listening Digest) Continues to cause consternation: despite claims to be on 24 hours, no one in neighboring countries has heard anything concrete – no signal, not even a trace of a carrier on its frequencies, so far; a 'legend' (Gabriel Iván Barrera, Argentina, Conexión Digital)

PERU A visit to the government's telecommunications website uncovered an enormous amount of info on Catholic radio stations, including a number of new SW stations licensed but perhaps not on the air. New stations discovered include OZU2U, Radio Virgen de la Alta Gracia, in Huamachuco, OAZ2A on 5030. Clearly states that this replaces Radio Los Andes. And OAW7D, Teleducacional, 4795, 1 kW in Urubamba, Cusco [not yet reported heard].

R. La Inmaculada in Santa Cruz listed on 5305 in the World Radio-TV Handbook does not appear on the government list. Since WRTH gives no call, may have been unlicensed. Nor is the un-call-lettered Radio San Francisco Solano in Sónor listed on 4750. Radio Quillabamba, Santa Ana, OAX7Q on 5025 with 5 kW operates 1000-0300 including Quechua 1300-1430 and 2100-0100 (Michael Dorner, Catholic Radio Update)

5470.8, Radio San Nicolás, San Nicolás, 0052+, Andean tropical music (Arnaldo Slaen, DX Camp in Chascomus, Argentina, dxing.info) Not to be confused with Liberia

R. San Miguel de el Fajue, 6895.4, 2350-0010, Peruvian music in Sentimiento Popular show, ads, good signal, free of RTTY QRM (Rafael Rodriguez R., Colombia, Conexión Digital)

POLAND New leadership of R. Polonia decided to continue using SW facilities at Leszczynka during winter season, not move to relays abroad. Further reduction of transmission times under consideration (Bernd Trutenau, Lithuania, DX Listening Digest) "Polish transmitters seem to be falling to bits in front of our ears" is a good description of this daily disaster (Kai Ludwig, Germany)

RUSSIA [non?] Heard September 15, +0323-0420+, 7416.5-7418.3v, Radio Krishnaloka in Russian, poor to fair to almost good with some QRM from WBCQ + utility (CW, RTTY on 7421). According to <http://www.harekrishna.ru/news/krishnaloka.shtml> has broadcast on SW from September 1 on 7410 at 0300-0500 and 1300-1500 on even days only. They have two postal addresses, in Donetsk, Ukraine and in Moscow (ul. Avtozavodskaya, dom 6, kvartira 24 A) and one e-mail address as schyamamohan@ukr.net (Mikhail Timofeyev, St. Petersburg, hard-core-dx) E-mail says it broadcasts from "Eastern Ukraine"; very interested in reception reports to Aradhana Priya at scsm@peterlink.ru (Bernd Trutenau, Lithuania, DX Listening Digest) Assume 'loka' does not mean 'wacky' in Russian? One place on the website mentions both 7415 and 7400, evidently as variable range; another says 7410. What does "even days" mean? Of the week? month? year? Julian? Log on Sept 15 was certainly not an even day of the month (gh) Says power is only 300 watts; hopes to increase, improve antenna (Mauno Ritola via Bernd Trutenau, BC-DX)

RWANDA Antenna farm of Deutsche Welle Kigali relay is under renewal, modernization until May 2003 (FUNK magazine, via BC-DX)

SPAIN An interesting show on REE is Con Respuesta, Sat 1100 on 21570. Listeners, especially Cubans, use it as a dating and marriage service (Célio Romais, @tividade DX)

SUDAN [non] Millennium Voice, 21550 via UK, schedule reduced to Mondays and Fridays only 1330-1430, instead of daily (Hans Johnson, Cumbre DX) Heard on Fri Sept 20 *1330 in English, Arabic (Mike Barraclough and Noel Green, UK, DX Listening Digest) Same for B-02, Woolferton 250 kW, 140 degrees (Observer, Bulgaria)

SWEDEN Anne Sseruwagi has been appointed the new head of Radio Sweden, replacing Finn Norgren, who is working on a development project in Rwanda. Our new boss comes from Swedish Public Radio's Finnish service Sisuradio (SCDX/MediaScan)

SYRIA [non] Evidence indicates that the Syrian Human Rights Committee (SHRC) is involved in the 12115 transmissions [also 12085 at 1500-1600]. At least, the Committee's material is being used in the broadcasts. Literally all their broadcasting commentary scripts and materials of human right abuse in Syria can be found at <http://www.shrc.org> English translation of one report being broadcast serially in Arabic: http://www.shrc.org/english/reports/2002/annual_report/1.htm (Mahmud Faihi, Germany, Cumbre DX)

Same report this as Voice of the Homeland (Sout Al-Watan). Contact info is on SHRC website (Hans Johnson, Cumbre DX) Sout Al Watan, 9950, *0328-0401*, political talks and a few vocals selections. However, the following received from Saleem el-Hasan, President of SHRC, in response to an e-mail reception report: "I am really amazed that SHRC has any connection with this new broadcast! We are absolutely unaware of this broadcast. We have never heard of it, or anybody sought any permission to speak on our behalf. We have nothing to do with the station. It is a sign of friendship with all philanthropists." (Rich D'Angelo, PA, NASWA Flashsheet) Then someone is doing SHRC a very big favor by broadcasting their material; why should we believe his denial? (Hans Johnson, Cumbre DX)

TAIWAN Why RTI has a hard time covering breaking news: programs relayed through Family Radio and Merlin have to receive them via satellite at least two hours in advance (Carlson Wong, RTI, Taipei Wave via Christopher Williams, World DX Club Contact via Alan Roe) Why does there have to be any delay? (gh)

TANNU TUVA Thought to be Russian station GTRK Tuva from Kyzyl, 6100.5 at 2300

with Radio Rossii news in Russian \ 5290 Krasnoyarsk until 2310, heard whilst waiting for Nepal *2315 on 6100 (Tony Rogers, UK, BDXC-UK)

TIBET V. of Holy Tibet, in English at 0700-0715, 1100-1115 and 1630-1645 on 9490, 6130. Address is: V. of Holy Tibet, Foreign Affairs Office, China Tibet Peoples Broadcasting Company, Lhasa 850000, PR China (Partha Sarathi Goswami, Siliguri, West Bengal, DX Listening Digest) V. of Holy Tibet in English was heard at 1630 on 4905, 4920, 5240, 6130 and 7385 (Jari Savolainen, Kuusankoski, Finland, DXLD)

[non] V. of Holy Tibet at 1100 in English on 9490. But WRTH lists this as Xi'an; (John Cobb, GA) PWBR '2002' says Baoji; HFCC site list shows: BJL Baoji CHN 34N30 107E10, which is just west of Xi'an and well outside Tibet, but no China listings at all on 9490, a 'traditional' Tibet frequency for sesquidecades. Of course due to skip distances, it makes sense to site higher 'domestic' frequencies for Xizang outside it, not to mention maintaining control over them in case of insurrection (World of Radio)

Not to be confused with the above official Chinese station is a real clandestine: B-02 schedule for Voice of Tibet in Tibetan and Mandarin Chinese:

1215-1300	15400	100 kW / 130 deg	Tashkent
	15645	100 kW / 117 deg	Dushanbe
	15655	100 kW / 115 deg	Dushanbe
	15680	100 kW / 132 deg	Almaty
1430-1515	11975	100 kW / 130 deg	Tashkent

(Observer, Bulgaria)

UNITED KINGDOM [non] High Adventure Gospel in Canada together with Bible Voice Broadcasting in the UK began broadcasts July 1 to India on 15615, Europe on 11645, 7425; Middle East 7430 (Mrs. M. McLaughlin, Bible Voice via Iwao Nagatani, Kobe, Japan Premium) Sites?

11645 probably Tbilisskaya, Russia; 7425 probably via Merlin, including but not limited to Russian sites (Kai Ludwig, Germany, DX Listening Digest) 7430 Armavir/Krasnodar; 7425 Moscow/Taldom; 11645 to Western Europe via Moscow, Sat/Sun 2000-2115 on 11645 (Wolfgang Bueschel, BC-DX)

UNITED NATIONS [non] B-02 United Nations Radio in English via Merlin, with kW, azimuths, M-F:

1730-1745	7170	MEY 100 / 005	South Africa
	15495	SKN 300 / 125	UK
	17580	ASC 250 / 065	Ascension

(Observer, Bulgaria)

USA R. Marti heard on 45990, very strong until 0300*, 3 x 15330 (Sam Neal, TX, N5AF, 50 MHz reflector via Wayne Heinen) That's Delano beamed 100 degrees across you toward Cuba, A-02 schedule 2200-0300 (gh)

PanGlobal Wireless is new 'pirate' show on WBCQ, Fri 2100-2130 on 7415, Sat 1900 on 17495 – music, commentary, bad Spanish and worse comedy! (Paul at Secret Studio, rec.radio.broadcasting via Mike Terry) After DST if still on, would be Fri 2200, Sat 2000

WRNO Worldwide, 7354.9v at 0100 with off-the-wall religious talk. Strong but distorted with very poor modulation. Tough copy and almost unlistenable. First time I've noticed them in quite a while (Brandon Jordan, TN, Sept 20, Cumbre DX)

Thanks to transmitter work by Larry Baysinger, WJIE finally resumed a strong signal August 26, which lasted intermittently until September 13 when 7489.9 disappeared again. World of Radio was carried most weekdays at 1200, and in the 0000, 0500 and 1600 UT hours, but at 1200 clashed with V. of Russia 7490.0 USB in Japanese from Far East site. 7490 continued to be erratic due to various breakdowns (gh)

Projected World of Radio times, shifted post-DST: WWCR Thu 2130 15825 (Dec-Feb 9475), Sat 0600, Sun 0330 5070, Sun 0730 3210, Wed 1030 9475. WBCQ: Thu 2300 7415, 17495; Man 0515 7415. Also see COSTA RICA

WGFY harmonic on 4440, 1480 x 3, Charlotte, NC, at 1055, North Carolina Network news, ID 1100. Good copy here (David Hodgson, Nashville, TN, DX Listening Digest) On 2479.98, WGVA Geneva, NY, 2 x 1240 at 2255, ID, Finger Lakes News Network, 2300 ABC news. Fair, stable signal (Mark Mohrmann, Coventry, VT, DX Listening Digest)

URUGUAY Banda Oriental, Sarandi del Yi, Durazno, is active on 6155, signing on at *0140 with address norason@adinet.com.uy and folk music (Horacio Nigro, Uruguay, DX Listening Digest)

VENEZUELA R. Amazonas, rather irregular on 4940, low power, and bad modulation (Adán González, Catio La Mar, Venezuela, DX Listening Digest) 4939.65, faded out by 1040 (Dan Ziolkowski W1, Cumbredx)

VIETNAM [non] My advance info is that VOV may be abandoning all its overseas relays for the B-02 season from October 27 (Bab Padula, EDXP) Like Sackville evenings on 6175.

R. Free Vietnam, formerly via Tajikistan, is via KWHR now, 9930 at 1230, M-F (Hans Johnson, Cumbre DX)

B-02, V. of Khmer Krom Radio in Khmer: 1400-1500 Tue only on 11560 Vladivostok, 250 kW, 230 degrees (Observer, Bulgaria)

WINDWARD ISLANDS About the breakup of the onetime Windward Islands Broadcasting Service on SW: <http://www.nbcsvg.com/wibs.htm> (gh)

YUGOSLAVIA R. Yugoslavia resumed SW Sept 19 or 20 after a long suspension during which it was only available on Internet. Following an agreement between the Federal Republic of Yugoslavia and the Ministerial Council of Bosnia-Herzegovina, the Central Regulatory Agency for Communications (CRA) issued a long-term permit to broadcast again via Bijeljina, Bosnia-Herzegovina (© Radio Netherlands Media Network) Quickly heard on previous summer schedule, English at 0000 exc Sun, and 0430 daily on 9580; usual winter sked is 0000 and 0100 on 7 MHz frequencies (gh)

ZIMBABWE V. of the People building was destroyed in an explosion in Harare, but continued broadcasts via Madagascar, 0330-0430 on 7310 (Media Network)

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

0000 UTC on 6155

BOLIVIA: Radio Fides. Station ID to AM/medium wave quote. "Ad Joyeria el Centro, Calzados America, Embotelladora Tejada," to Spanish pops vocals. Bolivia's **Radio Yura** 4716.7, 0030; **La Voz del Campesino** 6214.6, 0900. (Fernando Garcia, Baltimore, MD) **Radiodiffusion Tropico**, 6036.8, 2312-2330. (Arnaldo L. Slaen, Buenos Aires, Argentina) **Radio San Gabriel** 6085.25, 2315-2335 reception audible only in USB. (Michael Schnitzer, Hassfurt, Germany/Hard Core DX).

0020 UTC on 6040

BRAZIL: Radio Clube Paranense. Portuguese station call letters to listener's music request. Local time check, ID to "6040 onda corta y 1430 onda media, para to do Brazil, desde Parana." Brazil's **Radio Cancao Nova** 9675, 0756. (Garcia, MD) **Radio Inconfidencia** 6010, 0841-0900. (Slaen, ARG)

0025 UTC on 11970

IRAN: French service with piano instrumentals to talk. Choral anthem to ID and freq quote. Call to prayers 0030-0037; // 9610 (SIO 434). Islamic text to ID, program preview and commentary. *World Service News* headlines 0040. (Sam Wright, Biloxi, MS).

0114 UTC on 5637

PERU: Radio San Ignacio. Banda music to huaynos tunes. Local time check to, "desde Maranon su Emi. Radio Peru." (Garcia, MD) **Radio Andina** 4995, 0200-0205; **Radio Cusco** 6193.47, 0125-0145. (Frank Hillton, Charleston, FL) **Radio Tacna** 9504.91, 1046-1120. Commentary, time check and weather. (Slaen, ARG)

0120 UTC on 7520

USA: CBS Taiwan relay. Cantonese service from announcer duo to 0132 // 5950 (Okeechobee), 15290 (Taiwan), 15440 (Okeechobee). **Radio Taipei Intl** audible 0205 on 9680 (Okeechobee) // 11740 (Okeechobee). (Wright, MS)

0134 UTC on 3320

SOUTH AFRICA: Radio Sondergrense. Tune-in to announcer's Afrikaans chat. Opera music program to 1039, pause for announcement. Intermittent signal fading during SINPO 42233. Signal peaked at 0150 recheck, as music program continues. (Van Horn, NC)

0135 UTC on 4755

BRAZIL: Radio Educacao Rural. Brazilian music ballads to Portuguese IDs and regional ad. Brazil's **Radio Difusora Pocos de Caldas** 0150-0200, 4945; **Radio Mundial** 0145-0155; **Radio Brasil Tropical** 0215-0230, 5015. (Duane Hadley, Bristol, TN)

0142 UTC on 9725

RUSSIA: Voice of. Instrumental jazz music program including news from *Africa Heart* ensemble. // 11825 (Vatican State relay). Bell tone to *World Service* ID. // 7180, 17595. (Hadley, TN) VOR 15735, 1950. (Bob Fraser, Cohasset, MA)

0145 UTC on 6115

ALBANIA: Radio Tirana. English sign-on into national newscast and feature on life in the 18th century, // 7160. (Garcia, MD)

0153 UTC on 6952.5

PIRATES: WMPR. Techno pop music vocals to numerous canned "this is WMPR" identification, minimal fading. Additional pirates logged: **KRMI** 6955, 0353-0415 with music parodies; **WHYP** 6952.6, 0220-0300 "WHYP Anthology show." (Van Horn, NC) **KIPM**, 6925 USB, 0330-0340+; **KDAZE** 6955 USB, 0553-0601+; **Mystery Science Radio** 6960 USB, 0127-0141+; **Radio Time Machine** 6955 USB, 0604-0613+; **Voice of Captain Ron** 6950.2 USB, 0129-0150; **Alfa Lima Intl** (Euro) 15069.65, 2139-2200+. (Harold Frodge, Midland, MI)

0210 UTC on 20276 LSB

ARGENTINA: Radio Diez. Station feeder channel noting Carlos Gardel presenting evening tangos to station call letters. Station ID, "Radio Diez 710 AM la numero uno, la estacion mas potente en Argentina." Newscast to weather and local time check. **Radio Continental**, Buenos Aires 20276, 2045 with market and lottery results. (Garcia, MD)

0213 UTC on 11440 USB

PIRATES: Seldom Heard Radio. Instrumental music to complete ID at 0214, followed by additional music and IDs, plus QSL maildrop Elkhorn, Nebraska, address given. **Radio Cochiguaz** (S. America) 11440 USB, 0300-0320. "El Condor Pasa" ID into Spanish and Quecha; **Radio Time Machine** 11440 USB, 0300-0320. Old pop tunes to "Radio Time Machine broadcasting on shortwave." Musical jingles with SINPO 34443. (Slaen, ARG)

0326 UTC on 6210

ETHIOPIA: Radio Fana. Station interval signal to ID at 0329. Brief talk segment in Amharic into possibly prayers and news at 0336. (Garcia, MD)

0330 UTC on 15400

UAE: Radio Dubai. Home finance ad // 13675. Credit card ads into national news, followed by *Islam* and *the Arabs* last episode. (Garcia, MD)

0345 UTC on 9900

EGYPT: Radio Cairo. Lady's Arabic style vocals to station news at 0400; 9950, 0350. (Stewart MacKenzie, Huntington Beach, CA) 9900, 2320 (SIO 444) exceptional signal quality. Middle Eastern news, ID, editorial on Palestine to Egyptian music. Arabic language lesson at 0004 recheck. (Van Horn, NC)

0410 UTC on 4960

SAO TOME: VOA relay. News on Zimbabwe to ID as, "VOA News" promo. Relay on 4950, 2003. (Klaus Elsebusch, Marienthal, Germany/HCDX) 9895, 0404 (MacKenzie, CA)

1350 UTC on 17765

RUSSIA: University Network. Dr. Gene Scott's biblical text (SIO 433); // 17775 Anguilla's **Caribbean Beacon**, noting slight signal delay (555); // 13845 **WWCR** (SIO 554); // 13815 **KAIJ** at 1400. Website: <http://www.drgenescott.com>. Doc's **University Network-Costa Rica**, 1915 on 9715 // 11870; 2200-2230, 7375 // 9725. (Van Horn, NC)

1403 UTC on 9580

AUSTRALIA: Radio. National news to sports update, closing with "ABC News" ID. Weekend program preview, // 11650 (SIO 343) // 11660 (SIO 333). Feature on Adelaide music entertainer. Segment on health issues; 0007 on 15240 // 15415, 17580, 17750 17795, 21725. (Van Horn, NC)

1435 UTC on 11770.20

MEXICO: Radio Mexico Intl. Classic guitar ballads to Spanish ID at 1438. English service commenced 1500. (Van Horn, NC) // 9705 audible 0135. (Garcia, MD)

1535 UTC on 6105

PAKISTAN: Radio Pakistan. Station identification to Asian style vocals in Urdu. English commentary 7213 at 1540, followed by additional Urdu. (Mahenda Vaghjee, Mauritius/HCDX)

1815 UTC on 11585

ISRAEL: Kol Israel. Easy-listening Israeli pop vocals, audible only in USB due to interferences. Station ID 1826; 1900+-15615 // 15640, 17545. 9815, 0408. (MacKenzie, CA) Israel's **Galei Zahal** (Defence Forces Radio) audible on 6973, 2319-0145+. Hebrew service with IDs, newscast at 0100. Pop/Top 40 music format. This station use to be reported rarely, now booms in nightly. (Van Horn, NC)

2302 UTC on 13680

CANADA: China Radio Intl relay. *CRI News and Report* program focus on World Summit update, Israel/Palestine conflicts, Iraq and Egypt. China's **Cuba relay** 1550, 17720. (Wright, MS) 9790, 0410 (MacKenzie, CA) **French Guiana relay** 9730, 0415 with newscast and *History of China* feature. (MacKenzie, CA)

2350 UTC on 9875

LITHUANIA: Radio Vilnius. Male's pop vocals into cultural program on archeological restorations from the Renaissance period. Lithuanian folk music to closing comments, ID and interval signal melody. Audible on 9855, 0030. (Tom Banks, Dallas, TX)

*Thanks to our contributors - Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com) Please note: paper strips and cassette
recordings will no longer be accepted.
English broadcast unless otherwise noted.*

Do's and Don'ts of China QSLing

This month's focus on China continues with tips for successful QSLing. There are several elements in preparing a quality report, which begin with the date of reception. Spell the month out to avoid confusion, followed by time of reception in Coordinated Universal Time (UTC). The frequency on which you logged the station is vital, expressed either in Megahertz (MHz) or kiloHertz (kHz). Any notation of parallel frequencies should be noted as well.

Twenty minutes of programming information is usually adequate, unless you are monitoring a weak signal over several days. Details should be specific as possible including program and announcer names, station identifications and musical formats. A word-for-word diary is not necessary.

Don't forget to include reception signal quality observed, and don't attempt to make the station staff feel good by giving a better

signal rating than deserved. Your comments and observations play a vital role in future frequency planning.

Whether your initial QSLing is via China Radio International or China National Radio, both stations present quality programming and QSL promptly. Remember, if a Chinese regional or provincial station does not respond to your report within four months, resend your report to China Radio International. Always ask for the transmitter site regardless of the station. Usually CRI will respond and include a personal note.

Mint return postage or currency is not required when writing CRI, but should be included when reporting directing to a regional, provincial or CNR. Keep your letter or report friendly. Questions relating to programming, culture or the station's future plans is advisable, while human-right issues and politics should be avoided.

QSLing CRI and CNR is an excellent beginning in the verification game. Let us know your results!

AMATEUR RADIO

American Samoa-AH8A, 20 meters SSB. Black & white full data card. Received in 23 days via AC7DX QSL manager, for a SASE. (Larry Van Horn N5FPW, NC)

Cocos Island-T19M, 10/12/15 meters. Full data color folder card. Received in four months for a SASE to QSL Manager AK0A. DXCC Country # 151. (Van Horn NC)

North Cook Islands-ZK1KDN, 20 meters SSB. Two full data color QSL cards via JR2KDN. Received in 52 days on second request, plus two dollars and a SAE. QSL address: Yuichi Yoshida, Kato Bldg. 4F, 529 Rokugaike, Kita, Nagoya, 462-0002 Japan. (Van Horn, NC)

AUSTRALIA

VMC Charlesville Radio, 12365 kHz & VMW Wiluna Radio 8113 kHz USB. Full data card signed by "Brendan", plus station literature, schedule and magnet. Received in 28 days for one US dollar. Station address: Marine Weather Services, Bureau of Meteorology, GPO Box 129K, Melbourne VIC 3001 Australia. Return address shown on envelope: GPO 1289K. Email: webmar@bom.gov.au; website: <http://www.bom.gov.au/marine>. (John Wilkins, Denver, CO/WUN)

BONAIRE

Radio Netherlands relay, 9590 kHz. Full data Dutch Morning series card, plus program schedule. Received in 30 days for an English report. Station address: P.O. Box 222, 1200 JG Hilversum, Holland. (Stephen Zolvinski, Columbus, OH)

CHINA

China Radio Intl, 9560 kHz. Full data Palace Museum card signed by Ying Lian, plus personal letter, program schedule and China Today contest offer. Received in 30 days for an English report. Station address: 16A Shijingshan Road, Beijing 100040 China. (Zolvinski, OH)

Yunnan PBS, Kunming, 6937 kHz. Two page personal letter in Chinese signed by Chengcai Meng (via Kunming), plus English schedule. Received in 43 days for an English report, one IRC, souvenir brochure and ten U.S. stamps. Station address: 73 Renmin Xilu, Central Building of Broadcasting and TV, Kunming, 650031, Yunnan, China. (George Glotzbach, NM/Cumbre DX)

Voice of Pujaiing, Shanghai, 3280 kHz. Full data Leshan Buddha card signed by Ying Lian-China National Radio. Received in 352 days for an English follow up report via Beijing. Station address: P.O. Box 3064, Shanghai 200002, China. (Glotzbach, NM/CDX)

Xizang PBS Lhasa, Tibet, 6130. Full data three page hand written English letter, who commented "your letter brightened my day!" Received for an English report. Station address: 180 Beijing Zhonglu, Lhasa, Xizang 8500005 China. (Bjorn Fransson, Gotland, Sweden/Hard Core DX)

Xinjiang PBS. Chinese verification letter. Received in three months for a Chinese report, used postage stamps, one US dollar and a SWL card. Station also sent used PRC stamps taking care to leave complete postmarks showing town names in Chinese and Uygur, plus a postmark of the Id-Kah mosque in Kashgar. The letter is stamped with the station seal in Chinese and Uygur. Station address: 84 Tuanjie Lu, Urumqi, Xinjiang 830044, China. (Richard Lam, Singapore/CDX)

GREECE

Voice of, 17705 kHz. Full data unsigned QSL card, plus program schedule. Received in 23 days for an English report. Station address: c/o English Service, 432 Mesogian Av., 153-42 Athens, Greece. (Joe Squashic, Wake Forest, NC) Macedonia Radio 9935, 11595 kHz. Full data card, two travel booklets and schedule. Received

in 25 days for an email report to: era5@ert.gr (Gayle Van Horn, NC)

GUYANA

GBC, 3290 kHz. Partial data letter signed by W. Carr, plus sheet with geographical information on Guyana. Received in 64 days for an English report and one IRC. Station address: 44 High Street, Georgetown, Guyana. (Marcelo Toniolo, Greenvale, NY/HCDX) Received letter signed by S. Goodman-Chief Engineer in 770 days. (Enzio Gehrig, Denia, Spain/HCDX)

LITHUANIA

Radio Vilnius, 11690 kHz. Full data unsigned card. Received in 38 days for an English report. Station address: Lietuvos Radijas, Konarskio 49, LT-2674 Vilnius, Lithuania. (Squashic, NC)

MEDIUM WAVE

KRLD, 1080 kHz AM. Verification letter signed by Erick Disen-Director of Engineering, plus station magnet. Received in eight days for an AM report and one mint stamp. Station address: 1080 Ballpark Way, Arlington, TX 76011. (James C. Lindberg, Tempe, AZ)

KDJI Holbrook, AZ, 1270 kHz AM. Full data letter signed by Floyd L. Simmons. Received in 45 days. Station address: Petracom Media, 3051 S. White Mountain Rd., Show Low, AZ 85901. (Patrick Griffith, Westminster, CO)

VIETNAM

Voice of, 6175 kHz. Full data card signed by the station Director, plus program/frequency guide and station pennant. Received in 75 days for an English report. Station address: Overseas Service, 58 Quan Su, Hanoi, Vietnam. Website: <http://www.vov.org.vn>. (John Vercellino, Downers Grove, IL)

Programs on DXing, SWLing and the Media

It's time for our semi-annual review of media-related programs on shortwave. Capsule descriptions are provided, as each program has a slightly different focus. For most stations refer to the *Shortwave Guide* pages for frequency information. (Some listings have frequency information to clarify which of the station's multiple services is carrying the program.) The one letter day abbreviations track those used in *MT's Shortwave Guide* section. Times are approximate and both times and frequencies are subject to change. Internet web addresses are provided if the program is also available on-demand.

Ask WWCR - focuses on listener questions and station operations.

On *R. Canada Int.* - S 2107; M 0207; W 2135; H 0235 (fortnightly within *The Mailbag* program). (<http://www.wwcr.com>)

CIDX Report - Sheldon Harvey reviews recent developments in international broadcasting.

On *R. Canada Int.* - S 2107; M 0207; W 2135; H 0235 (fortnightly within *The Mailbag* program). (<http://www.rcinet.ca>)

Continent of Media - Glenn Hauser's periodic review of domestic broadcasting activities.

On *R. for Peace Intl.* - F 1900; A 0100, 0700, 1300, 1730, 2330; S 0530, 1130; T 2000; W 0200, 0800, 1400. (Note: Although heard weekly, program is updated about every six weeks.) (<http://www.worldofradio.com>)

DX Corner* - How the SWLing and DXing hobby looks from central Europe.

On *R. Budapest* - A 2120, 2250; S 0220, 0350. (<http://www.wm.org/ondemand/hungary.html>)

DX Corner* - A friendly program from the Voice of Turkey for radio enthusiasts.

On *Voice of Turkey*, fortnightly - A 1245, 1845, 2045, 2215; S 0315.

[*These are not the same program, although they share the same title.]

DXers' Corner - All India Radio's entry in this genre featuring reports from Indian hobbyists.

On *All India Radio*, fortnightly - M 1840, 2130; T 2340

DX Mailbag - Essentially a letters program.

On *R. Romania Intl.* - A 1345, 2345; S 0245, 0445.

DX Partyline - Allen Graham hosts and produces this program designed for new and seasoned DXers and SWLers, providing a place for the clubs to impart information about their events and projects and reading reports from listeners around the world about what is being heard on the bands in their respective regions.

On *HCJB Ecuador* - A 0200, 0600, 0700, 2000; S 0100, 0400. (<http://www.hcjb.org/english>)

DXers Special - Presumably a program supported by Latin American hobbyists with information from a station that is heard only sporadically in North America, unfortunately.

On *RAE Argentina* - W 1945; H 0345.

DXers Unlimited - Arnie Caro emphasizes amateur radio and technical topics in a friendly, accessible program.

On *R. Habana Cuba* (in two weekly editions) -

First edition - A 2110, 2310; S 0140, 0340, 0540.

Second edition - T 2105, 2305; W 0140, 0340, 0540.

(<http://www.radiohc.org> - scripts)

DXing with Cumbre - Marie Lamb hosts a relaxed program that, whenever possible, likes to emphasize new DX catches.

On *WHRI Indiana* - A 0600 (5745 & 7315), 0830 (5745 & 7315), 1300 (6040), 1330 (9495), 1900 (13760), 2030 (9495) 2330 (9495); S 0730 (5745), 2200 (5745); M 0430 7315.

On *KWHR Hawaii* - A 0600 (17780), 1000 (11565); S 0430 (17780), 1600 (9930).

On *WHRA Maine* - F 2100 (17650); A 0430 (7580), 2130 (17650). (<http://live365.com>)

Feedback - Roger Broadbent produces and hosts a program that answers listener letters, provides updates on developments at Radio Australia and examines timely topics in international broadcasting and communications.

On *R. Australia* - F 2105; A 0005, 0605; S 0305. (<http://www.abc.net.au/ra> - selected scripts and audio)

Ham Radio Today - John Beck and Graham Bulmer host a weekly segment for the amateur radio hobbyist.

On *HCJB Ecuador* - W 0618, 0718, 2018; H 0118, 0418. (<http://www.hcjb.org/english>)

Mailbox - Myra Oh reads letters and news of interest, Paul Ormandy reports on the latest South Pacific DX news and RNZI frequency manager Adrian Sainsbury answers and explains technical questions and issues.

On *R. New Zealand Intl.* (fortnightly) - M 0805, 2135; W 1735; H 0305; F 1930. (<http://www.rnzi.com>)

Media Report - A unique program looking at the motivations behind the mass media and those who seek to influence it, both at home (in Australia) and abroad.

On *R. Australia* - H 0130, 1030, 1530, 2330. (<http://www.abc.net.au/rn>)

Multiwave Feedback - A friendly program of listener letters, reports and regular features about the shortwave listening hobby.

On *R. Korea Intl.* - S 0835, 1205, 1335, 1635, 2035, 2205, 2235; M 0235. (<http://tki.kbs.co.kr/>)

Radio Bulgaria Calling - Like RRI's program, primarily a letters and reception report program.

On *R. Bulgaria* - F 2045; A 0045, 1245, 2245; S 0345. (<http://www.nationalradio.bg/real.htm> - only on the day of broadcast)

Radio Waves - In essence, a short observation on some aspect of the radio hobby.

On *R. Exterior de Espana* - A 2140; S 0040.

Radio World - Frans Yossen with timely information and commentary on the international radio scene.

On *R. Vlaanderen Intl.* - S 0700, 1130, 1730, 1930, 2230; M 0400. (<http://www.rvi.be/uk/hoeantvang/world/index.htm>)

Spectrum - A rather unfocused discussion and call-in program ostensibly on radio topics.

On *WWCR Tennessee* - S 0400 (5070); M 0705 (3210).

The Real Amateur Radio Show - Interactive discussion about amateur radio topics.

On *WBCQ Maine* - S 0000 (7415).

The Whole World on the Radio Dial - A new program.

On *R. Ukraine Int.* - A 2218; S 0118, 0418, 1218.

Viva Miami - Radio Miami International's weekly magazine program with letters and DX news.

On *WRMI Florida* - S 0330 (7385), 1200 (15725), 1315 (15725), 2130 (15725); M-F 0230 (7385), 1130 (9955); A 0900 (9955), 1100 (9955). [Schedule changes frequently; consult <http://www.wrmi.net> and click on "Programming" for updates.]

Wavescan - Adventist World Radio's excellent program for DXers and SWLs around the world, produced by longtime DXer Adrian Peterson and presented by David Barasoain.

On *Adventist World R., Austria* - S 0200, 0830, 2130

On *Adventist World R., Slovakia* - S 1930

On *Adventist World R., South Africa* - S 0400, 0430, 0500, 0600, 1800, 1830, 2030

On *Adventist World R., UAE* - S 0030, 0330, 1300, 1330, 1630

On *KSDA Guam* - S 1000, 1030, 1300, 1330, 1630, 2130

On *WRMI Florida* - S 2100 (15725); F 0330 (7385); A 1030 (9955). [Schedule changes frequently; consult <http://www.wrmi.net> and click on "Programming" for updates.]

(<http://english.owr.org/wavescan>)

World of Radio - Glenn Hauser's comprehensive activities report on the HF broadcast bands, including frequencies, personalities, station and program information.

On *WBCQ Maine* - H 2300 (7415/17495), M 0515 (7415).

On *WJIE Kentucky* - M-F 1200 (cycle begins each H)

On *WWCR Tennessee* - H 2130 (9475); A 0600 (5070); S 0330 (5070), 0730 (3210); W 1030 (9475).

On *R. for Peace Intl.* - A 0130, 0730, 1330; S 0000, 0600, 1200, M 0030, 0630, 1230; W 0100, 0700, 1300.

(<http://www.worldofradio.com>)

In addition to the radio programs listed above, two long-time favorites continue to provide timely information in print form on the Internet: **Media Network** from *Radio Netherlands*, edited by Andy Sennitt <http://www.rnw.nl/medio> and **MediaScan** from *Radio Sweden*, edited by George Wood http://www.st.se/rs/red/ind_eng.htm. Both also provide listeners, upon request, with regular newsletters via e-mail.

Special thanks to Glenn Hauser, Marie Lamb, John Norfolk and Harold Sellers whose valuable work has been included in this month's column.

Until December, good listening!

HOW TO USE THE SHORTWAVE GUIDE

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

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings Time) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

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

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

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

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

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

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

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

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

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

Target Areas

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

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

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Program Highlights

John Figliozzi

Radio Africa International

Although beamed to Africa from Juelich, Germany, the United Methodist Church's General Board of Global Ministries' **Radio Africa International** service puts an excellent signal into North America daily between 1700 and 1900 UT on 13820 and 15265 kHz. For listeners seeking a quality alternative at this time of day when services to North America are lean, **Radio Africa International** more than nicely fills the bill. The station received this accolade from a listener in Maine. "I have heard countless religion based broadcasts from every corner of the globe. None, in my opinion, matches the quality of the broadcast I heard today. Your delicate balance of Christian message, western and indigenous music, AIDS education and social issues are a breath of fresh air to the entire shortwave broadcasting industry."

It is the devastation being wreaked by the AIDS crisis in Africa that, in January 2001, spurred the GBGM to launch a radio service emphasizing HIV prevention and treatment information, along with other health, social, environmental and development issues. The two hour program is in magazine format with news, interviews, features and drama, as well as a broad scope of music from the sacred to jazz, classical to gospel to the indigenous music of Africa.

Another listener described the station as "a religious-oriented shortwave station that actually has something pertinent to say...Good educational broadcasts without preaching and propaganda are hard to come by these days."

RCI Morning – Changes Unknown

At deadline, Radio Canada International was still keeping its plans for weekday mornings under wraps. This may be because CBC Radio One, the domestic network from which RCI draws much of its programming, had divulged only cursory information about its own plans. Consequently, we have no weekday morning information for you in the listings this month. We are assuming, however, that RCI will continue transmitting in English for three hours, commencing at 1300 UT on weekdays and 1400 on weekends.

0000 UTC - 7PM E / 6PM C / 4PM P

0000	0015	Cambodia, National Radio Of	11940as				
0000	0015	Japan, Radio	6145na	13650as	17810as		
0000	0027	Czech Rep, Radio Prague Intl		7345na	11615na		
0000	0030	Egypt, Radio Cairo	9900na				
0000	0030	Mexico, Radio Mexico Intl		9705am	11770am		
0000	0030	mtwhf/vl	Solomon Islands, SIBC	5020do			
0000	0030	Thailand, Radio	9690va				
0000	0030	vi	Vanuatu, Radio	4960do	7260do		
0000	0045	India, All India Radio	9705as	9950as	11620as	13605as	
0000	0055	Spain, R Exterior Espana	15385na				
0000	0100	Anguilla, Caribbean Beacon	6090am				
0000	0100	Australia, ABC NT Alice Springs	4835do				
0000	0100	Australia, ABC NT Katherine	5025do				
0000	0100	Australia, ABC NT Tennant Crk	4910do				
0000	0100	Australia, Radio	9660do	12080do	15240do	15415as	
0000	0100		17580do	17750as	17775do	21725as	
0000	0100	Canada, CBC Northern Service	9625do				
0000	0100	Canada, CFRX Toronto ON	6070do				
0000	0100	Canada, CFVP Calgary AB	6030do				
0000	0100	Canada, CKZN St John's NF	6160do				
0000	0100	Canada, CKZU Vancouver BC	6160do				
0000	0100	Canada, Radio Canada Intl	9640as	11895as			
0000	0100	Costa Rica, R for Peace Intl	7445va	15039va			
0000	0100	Costa Rica, University Network	5030am	6150am	7375am	9725do	
0000	0100	m/vl	Guatemala, Radio Cultural	3300do	5955do		
0000	0100	Guyana, Voice of	3290do	5950do			
0000	0100	Malaysia, Radio	7295do				
0000	0100	Namibia, NBC	3270af	3290af			
0000	0100	Netherlands, Radio	6165na	9845na			
0000	0100	New Zealand, Radio NZ Intl	17675do				
0000	0100	Russia, University Network	9940as				
0000	0100	Singapore, SBC Radio One	6150do				
0000	0100	UK, BBC World Service	3915as	5875as	5970as	5975am	6195va
0000	0100		9410as	9825do	11835ca	11765me	11945as
0000	0100		12095do	15280as	15310as	15360as	17615as
0000	0100	Ukraine, R Ukraine Intl	5905as	7320as	12040as		
0000	0100	USA, Armed Forces Network	6458usb	10320usb	10940usb	12579usb	12689usb
0000	0100	USA, KAJJ Dallas TX	13815va				
0000	0100	USA, KTBN Salt Lk City UT		15590na			
0000	0100	USA, KWHR Naalehu HI	17510as				
0000	0100	twhta	USA, Voice of America	5995am	6130am	7405am	9455am
0000	0100		11695am	13790am			
0000	0100	USA, WBCQ Kennebunk, ME	7415na	9335na			
0000	0100	USA, WEWN Birmingham AL	5825na	9355na	15745na		
0000	0100	USA, WHRA Greenbush ME	7580va				
0000	0100	USA, WHRI Noblesville IN	5745va	7315am			
0000	0100	USA, WINB Red Lion PA	12160am				
0000	0100	USA, WJIE Louisville KY	7490am	13595am			
0000	0100	mtwhf	USA, WRMI Miami FL	7385am			
0000	0100		USA, WRMI Miami FL	9955am			
0000	0100	USA, WRNO New Orleans LA	7355am				
0000	0100	USA, WSHB Cypress Creek SC	7535am	9430do	15285do		
0000	0100	USA, WTJC Newport NC	9370na				
0000	0100	sm	USA, WWBS Macon GA	11900na			
0000	0100		USA, WWCR Nashville TN	13845na	15685na	3210na	5070na
0000	0100					7435na	
0000	0100	USA, WWRB Manchester TN	3270va	5085va	6890va	9320va	
0000	0100	USA, WYFR Okeechobee FL	6085na	9505na			
0000	0100	Zambia, Christian Voice	4965af				
0000	0115	vi	Pakistan, Radio	11580as	15455as		
0003	0010	Croatia, Croatian Radio	9925do				
0015	0100	Japan, Radio	6145na				
0025	0100	Sri Lanka, SLBC	6005as	9700as	15425as		
0030	0100	Iran, VOIRI	9610am	11970na			
0030	0100	Lithuania, R Vilnius	9855na				
0030	0100	as	Russia, Bible Voice BC	15615as			
0030	0100	as/vl	Solomon Islands, SIBC	5020do			
0030	0100	Thailand, Radio	15395na				
0030	0100	UAE, AWR	6035as	6055as			
0030	0100	USA, Voice of America	7215va	9770va	11760va	15185va	15290va
0030	0100		17740va	17820va			
0055	0100	Italy, RAI Intl	9675na	11800na			

0100 UTC - 8PM E / 7PM C / 5PM P

0100	0115	Italy, RAI Intl	9675na	11800na			
0100	0125	Netherlands, Radio	6165na	9845na			
0100	0127	Czech Rep, Radio Prague Intl		6200na	7345na		
0100	0127	Vietnam, Voice of	6175na				
0100	0130	s	Germany, Universal Life	9435as			
0100	0130	Hungary, Radio Budapest		9560na			
0100	0130	Iran, VOIRI	9610am	11970na			
0100	0130	as	Russia, Bible Voice BC	15615as			
0100	0130		Slovakia, R Slovakia Intl	5930na	6190ca	9440do	
0100	0130	twhta	USA, Voice of America	5995am	6130am	7405am	9455am
0100	0130			13790am			
0100	0130		Uzbekistan, Radio Tashkent	5025as	7190as	9375as	9530as
0100	0145		Germany, Deutsche Welle	6040na	9640am	11810na	
0100	0156			13720am			
0100	0159		North Korea, Voice of	6195as	7140as	9345as	11735ca
0100	0159			13750ca	15180ca		
0100	0200		Canada, Radio Canada Intl	5960am	13670am	15170am	
0100	0200			15305am			
0100	0200		Anguilla, Caribbean Beacon	6090am			
0100	0200		Australia, ABC NT Katherine	5025do			
0100	0200		Australia, ABC NT Tennant Crk	4910do			
0100	0200		Australia, Radio	9660do	12080do	15240do	15415as
0100	0200			17580do	17750as	17775do	21725as
0100	0200		Canada, CBC Northern Service	9625do			
0100	0200		Canada, CFRX Toronto ON	6070do			
0100	0200		Canada, CFVP Calgary AB	6030do			
0100	0200		Canada, CKZN St John's NF	6160do			
0100	0200		Canada, CKZU Vancouver BC	6160do			
0100	0200		China, China Radio Intl	9580na	9790na		
0100	0200		Costa Rica, R for Peace Intl	7445va	15039va		
0100	0200		Costa Rica, University Network	5030am	6150am	7375am	9725do
0100	0200			11870am	13750na		
0100	0200		Cuba, Radio Havana	6000na	9820na	11705usb	
0100	0200		Ecuador, HCJB	9745na	11960na	21455usb	
0100	0200	m/vl	Guatemala, Radio Cultural	3300do	5955do		
0100	0200		Guyana, Voice of	3290do	5950do		
0100	0200		Indonesia, Voice of	9525do	11785af	15150as	
0100	0200		Japan, Radio	11860as	11870me	11880me	15325as
0100	0200			17685do	17810as	17835do	17845as
0100	0200		Malaysia, Radio	7295do			
0100	0200		Namibia, NBC	3270af	3290af		
0100	0200		New Zealand, Radio NZ Intl	17675do			
0100	0200		Russia, University Network	9940as			
0100	0200		Russia, Voice of Russia	7180na	9725na	11825na	12000na
0100	0200			17595na			
0100	0200		Singapore, SBC Radio One	6150do			
0100	0200	vi	Solomon Islands, SIBC	5020do			
0100	0200		Sri Lanka, SLBC	6005as	9700as	15425as	
0100	0200		UK, BBC World Service	5975am	6195as	9410as	9825as
0100	0200			11955do	15280as	15310as	15360as
0100	0200		USA, Armed Forces Network	6319usb	10320usb	10940usb	12579usb
0100	0200			6458usb	10320usb	10940usb	12579usb
0100	0200			13362usb			
0100	0200		USA, KAJJ Dallas TX	5755va			
0100	0200		USA, KTBN Salt Lk City UT		7505na		
0100	0200		USA, KWHR Naalehu HI	17510as			
0100	0200		USA, Voice of America	7115me	9635va	11705va	11725va
0100	0200			11820va	13650va	17740va	17820va
0100	0200		USA, WBCQ Kennebunk, ME	7415na	9335na		
0100	0200		USA, WEWN Birmingham AL	5825na	9355na	15745na	
0100	0200		USA, WHRA Greenbush ME	7580va			
0100	0200		USA, WHRI Noblesville IN	5745va	7315am		
0100	0200		USA, WINB Red Lion PA	9320am			
0100	0200		USA, WJIE Louisville KY	7490am	13595am		
0100	0200		USA, WRMI Miami FL	9955am			
0100	0200		USA, WRNO New Orleans LA	7355am			
0100	0200		USA, WSHB Cypress Creek SC	7535am	9430do	15285do	
0100	0200		USA, WTJC Newport NC	9370na			
0100	0200		USA, WWCR Nashville TN	13845na	15685na	3210na	5070na
0100	0200					5935na	7435na
0100	0200		USA, WWRB Manchester TN	5085va	6890va		
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	15060as	
0100	0200		Zambia, Christian Voice	4965af			
0103	0110		Croatia, Croatian Radio	9925do			
0130	0145	vi	Libya, Voice of Africa	15435ir	17750ir		
0130	0150		Vatican City, Vatican Radio	9650au	12055au		
0130	0200		Australia, Voice International	17775as			
0130	0200		Austria, Radio Austria Intl	9870na			

SELECTED PROGRAMMING BEGINS ON PAGE 55

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0130	0200		Sweden, Radio	13625va			
0130	0200		UK, RTE Radio	6155na			
0130	0200	twfha	USA, Voice of America	5995sam	6130am	7405va	9455sam 9775va
			13740va				
0145	0200	twfha	Albania, Radio Tirana Intl	6115na	7160na		

0200 UTC - 9PM E / 8PM C / 6PM P

0200	0230		Austria, AWR	9820as			
0200	0230	sm w fa	Belarus, Radio Belarus Intl	6070eu	7210eu		
0200	0230		Myanmar, Radio	7185do			
0200	0230	as/vl	Soloman Islands, SIBC	5020do			
0200	0245		Germany, Deutsche Welle	11965as	13720as	15370as	
0200	0256		North Korea, Voice of	11845as			
0200	0257		Canada, Radio Canada Intl	15260as	17860as		
0200	0300		Anguilla, Caribbean Beacon	6090am			
0200	0300	twfha	Argentina, RAE	11710am			
0200	0300		Australia, ABC NT Alice Springs	4835do			
0200	0300		Australia, ABC NT Katherine	5025do			
0200	0300		Australia, ABC NT Tennant Crk	4910do			
0200	0300		Australia, Radio	9660do	12080do	15415as	
			15515do 17580do	17750as	21725as		
0200	0300		Bulgaria, Radio	9400na			
0200	0300		Canada, CBC Northern Service	9625do			
0200	0300		Canada, CFRX Toronto ON	6070do			
0200	0300		Canada, CFVP Calgary AB	6030do			
0200	0300		Canada, CKZN St John's NF	6160do			
0200	0300		Canada, CKZU Vancouver BC	6160do			
0200	0300		Costa Rica, R for Peace Intl	7445va	15039va		
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9725do
			11870am 13750na				
0200	0300		Cuba, Radio Havana	6000na	9820na	11705usb	
0200	0300		Ecuador, HCJB	9745na	11960na	21455usb	21470as
0200	0300		Egypt, Radio Cairo	9475na			
0200	0300	m/vl	Guatemala, Radio Cultural	3300do	5955do		
0200	0300		Guyana, Voice of	3290do	5950do		
0200	0300		Kenya, Kenya BC Corp	4885do	4935do		
0200	0300		Malaysia, Radio	7295do			
0200	0300		Namibia, NBC	3270af	3290af		
0200	0300		New Zealand, Radio NZ Intl	17675do			
0200	0300		Philippines, Radio Pilipinas	12015as	15120as	15270as	
0200	0300		Romania, R Romania Intl	9510na	11940na	15105as	15180as
			17815do				
0200	0300		Russia, University Network	9940as			
0200	0300		Russia, Voice of Russia	7180na	9725na	12000na	17595na
			17660na				
0200	0300		Singapore, SBC Radio One	6150do			
0200	0300	mtwh/vl	Solomon Islands, SIBC	5020do			
0200	0300		South Korea, R Korea Intl	11810do	15575na		
			Sn Lanka, SLBC	6005as	9700as	15425as	
0200	0300		Taiwan, R Taipei Intl	5950na	11740na	15320as	15345as
0200	0300		UK, BBC World Service	5975sam	6195as	9410as	9510eu 9770af
			9825do 11835ca	12095do	15280as	15310as	15360eu 15470af
			17790af				
0200	0300		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb
			6458usb 10320usb	10940usb	12579usb	12689usb	13362usb
0200	0300		USA, KAIJ Dallas TX	5755va			
0200	0300		USA, KJES Vado NM	7555na			
0200	0300		USA, KTBN Salt Lk City UT	7505na			
0200	0300		USA, KWHR Naalehu HI	17510as			
0200	0300		USA, Voice of America	7115va	9635va	11705va	11725va 11820va
			13650va 17740va	17820va			
0200	0300		USA, WBCQ Kennebunk, ME	7415na	9335na		
0200	0300		USA, WEWN Birmingham AL	5825na	9355na	15745na	
0200	0300		USA, WHRA Greenbush ME	7580va			
0200	0300		USA, WHRI Noblesville IN	5745va	7315am		
0200	0300		USA, WINB Red Lion PA	9320am			
0200	0300		USA, WJIE Louisville KY	7490am	13595am		
0200	0300		USA, WRMI Miami FL	7385am			
0200	0300		USA, WRNO New Orleans LA	7355am			
0200	0300		USA, WSHB Cypress Creek SC	5850am	7535eu	9430af	
0200	0300		USA, WTJC Newport NC	9370na			
0200	0300		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na
			15685na				
0200	0300		USA, WWRB Manchester TN	5085va	6890va		
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na		
0200	0300		Zambia, Christian Voice	4965af			
0200	1215		Cambodia, National Radio Of	11940as			
0203	0210		Croatia, Croatian Radio	9925na			
0215	0220		Nepal, Radio	3230as	5005as	6100as	
0230	0257		Vietnam, Voice of	6175na			
0230	0300		Albania, Radio Tirana Intl	6115eu	7160eu		

0230	0300		Hungary, Radio Budapest	9570na			
0230	0300		Slovakia, AWR	7235as			
0230	0300		Sweden, Radio	9490na			
0230	0300	a	UK, Wales Radio Intl	9795na			
0230	0300	vl	Zambia, Radio ZNBC	4910do	6265af		
0250	0300		Vatican City, Vatican Radio	7305am	9605am		

0300 UTC - 10PM E / 9PM C / 7PM P

0300	0310		Vatican City, Vatican Radio	7305am	9605am		
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na	9870na	
0300	0330		Ecuador, HCJB	11960na	21470as		
0300	0330		Egypt, Radio Cairo	9475na			
0300	0330		Philippines, Radio Pilipinas		12015as	15120as	15270as
0300	0330		SAfrica, Channel Africa	6035af			
0300	0330		Thailand, Radio	15395na			
0300	0330		USA, KJES Vado NM	7555na			
0300	0330		USA, KVOH Los Angeles CA	9975na			
0300	0345		Germany, Deutsche Welle	9535na	9640na	11935am	
			15105na				
0300	0356		China, China Radio Intl	9560na	9690na		
0300	0356		North Korea, Voice of	6195as	7140as	9345as	
0300	0400		Anguilla, Caribbean Beacon	6090am			
0300	0400		Australia, ABC NT Alice Springs	4835do			
0300	0400		Australia, ABC NT Katherine	5025do			
0300	0400		Australia, ABC NT Tennant Crk	4910do			
0300	0400		Australia, Radio	9660do	12080do	15240as	15415as
			15515do 17580do	17750as	21725as		
0300	0400	vl	Botswana, Radio	3356do	4820do	7255do	
0300	0400		Canada, CBC Northern Service	9625do			
0300	0400		Canada, CFRX Toronto ON	6070do			
0300	0400		Canada, CFVP Calgary AB	6030do			
0300	0400		Canada, CKZN St John's NF	6160do			
0300	0400		Canada, CKZU Vancouver BC	6160do			
0300	0400		Costa Rica, R for Peace Intl	7445va	15039va		
0300	0400		Costa Rica, University Network	5030am	6150am	7375am	9725do
			11870am 13750na	17645as			
0300	0400		Cuba, Radio Havana	6000na	9820na	11705usb	
0300	0400		Ecuador, HCJB	9745na	11960na	21455usb	
0300	0400	vl	Guatemala, Radio Cultural	3300do	5955do		
0300	0400		Guyana, Voice of	3290do	5950do		
0300	0400		Japan, Radio	17825ca	21610do		
0300	0400		Kenya, Kenya BC Corp	4885do	4935do		
0300	0400		Malaysia, Radio	7295do			
0300	0400		Namibia, NBC	3270af	3290af		
0300	0400		New Zealand, Radio NZ Intl	17675do			
0300	0400		Oman, Radio	15355va			
0300	0400		Russia, University Network	17765as			
0300	0400		Russia, Voice of Russia	7180na	11750na	12000na	15455na
			17650na 17660na	17690na			
0300	0400		Singapore, SBC Radio One	6150do			
0300	0400	mtwh/vl	Solomon Islands, SIBC	5020do			
0300	0400		Sn Lanka, SLBC	6005as	9700as	15425as	
0300	0400		Taiwan, R Taipei Intl	5950na	9680na	11875as	15320as
0300	0400		Turkey, Voice of	7270va	9650va		
0300	0400		Uganda, Radio	4976do	5026af	7195af	
0300	0400		UK, BBC World Service	3255af	6005af	6190af	6195eu 7120af
			7160af 9410eu	11730as	11835am	12095do	15280as 15310as
			15360as 15420af	15575me	17790as		
0300	0400		Ukraine, R Ukraine Intl	7150as	12040as		
0300	0400		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb
			6458usb 10320usb	10940usb	12579usb	12689usb	13362usb
0300	0400		USA, KAIJ Dallas TX	5755va			
0300	0400		USA, KTBN Salt Lk City UT	7505na			
0300	0400		USA, KWHR Naalehu HI	17510as			
0300	0400		USA, Voice of America	5855af	6080af	7105af	7290af 7340af
			9575af 9885af	17895af			
0300	0400		USA, WBCQ Kennebunk, ME	7415na	9335na		
0300	0400		USA, WEWN Birmingham AL	5825na	7425na	15745na	
0300	0400		USA, WHRA Greenbush ME	7580va			
0300	0400		USA, WHRI Noblesville IN	5745va	7315am		
0300	0400		USA, WJIE Louisville KY	7490am	13595am		
0300	0400		USA, WMLK Bethel PA	9465eu			
0300	0400		USA, WRMI Miami FL	7385am			
0300	0400		USA, WRNO New Orleans LA	7395am			
0300	0400		USA, WSHB Cypress Creek SC	5850am	7535eu	9455eu	11550va
0300	0400		USA, WTJC Newport NC	9370na			
0300	0400		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na
			15685na				
0300	0400		USA, WWRB Manchester TN	5085va	6890va		
0300	0400		USA, WYFR Okeechobee FL	6065na	9505na		
0300	0400		Zambia, Christian Voice	4965af			
0300	0400	vl	Zambia, Radio ZNBC	4910do	6265af		

Shortwave Guide

0310	0315	Vatican City, Vatican Radio	7305am	9605am	9660af				
0315	0340	Vatican City, Vatican Radio	9660af						
0330	0345	Libya, Voice of Africa	15435mrr	17750mrr					
0330	0350	UAE, Emirates Radio	12005na	13675na	15395na	15435na			
0330	0357	Czech Rep, Radio Prague Intl	11600va	15620va					
0330	0357	Vietnam, Voice of	6175na						
0330	0400	Ecuador, HCJB	11960na						
0330	0400	Malaysia, RTM Kota Kinabalu	5979do						
0330	0400	Nigeria, Radio/Kaduna	4770do						
0330	0400	Nigeria, Radio/Lagos	3326do	4990al					
0330	0400	Sweden, Radio	9490na						
0330	0400	UAE, AWR	17780as						
0345	0400	Seychelles, FEBA Radio	11880af						
0345	0400	Tajikistan, Radio	4760as	7245al					

0400 UTC - 11PM E / 10PM C / 8PM P

0400	0415	Israel, Kol Israel	9435na	15640va	17600va				
0400	0425	Belgium, RVI Flanders R Intl	15565na						
0400	0430	France Radio France Intl	11910af	15155af					
0400	0430	Guatemala, Radio Cultural	3300do	5955do					
0400	0430	Mexico, Radio Mexico Intl	9705am	11770am					
0400	0430	S Africa, AWR	7235af						
0400	0430	S Africa, Channel Africa	5955af						
0400	0430	Sri Lanka, SIBC	6005es	9700as	15425as				
0400	0445	Germany, Deutsche Welle	6180af	7225af	12045af	13690af			
0400	0458	New Zealand, Radio NZ Intl	17675do						
0400	0500	Anguilla, Caribbean Beacon	6090am						
0400	0500	Australia, ABC NT Alice Springs	4835do						
0400	0500	Australia, ABC NT Katherine	5025do						
0400	0500	Australia, ABC NT Tennant Crk	4910do						
0400	0500	Australia, Radio	9660do	12080do	15240do	15415as			
		15515do	17580do	17750as					
0400	0500	Botswana, Radio	3356do	4820do	7255do				
0400	0500	Canada, CBC Northern Service	9625do						
0400	0500	Canada, CFRX Toronto ON	6070do						
0400	0500	Canada, CKZN St John's NF	6160do						
0400	0500	Canada, CKZU Vancouver BC	6160do						
0400	0500	China, China Radio Intl	9730na						
0400	0500	Costa Rica, R for Peace Intl	7455va	15039va					
0400	0500	Costa Rica, University Network	5030am	6150am	7375am	9725do			
		11870am	13750na	17645as					
0400	0500	Cuba, Radio Havana	6000ra	9820na	11705usb				
0400	0500	Ecuador, HCJB	9745na	11960na	21455usb				
0400	0500	Guyana, Voice of	3290do	5950do					
0400	0500	Kenya, Kenya BC Corp	4885eo	4935do					
0400	0500	Malaysia, Radio	7295co						
0400	0500	Malaysia, RTM Kota Kinabalu	5979do						
0400	0500	Malaysia, Voice of	6175as						
0400	0500	Namibia, NBC	3270af	3290af					
0400	0500	Nigeria, Radio/Kaduna	4770do	6090do					
0400	0500	Nigeria, Radio/Lagos	3326do	4990al					
0400	0500	Nigeria, Voice of	7255af						
0400	0500	Romania, R Romania Intl	9510na	11940na	17735as	21480as			
0400	0500	Russia, University Network	17765as						
0400	0500	Russia, Voice of Russia	7180na	11750na	12000na	15455na			
		17650na	17660na	17690na					
0400	0500	Singapore, SBC Radio One	6150do						
0400	0500	Solomon Islands, SIBC	5020do						
0400	0500	Uganda, Radio	4976do	5026al	7195al				
0400	0500	UK, BBC World Service	3255af	6005af	6190af	6195af	7120af		
		7160af	9410eo	11835am	12095va	15280as	15310as	15420af	
		15575va	21660as	21830as					
0400	0500	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb			
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb		
0400	0500	USA, KAUJ Dallas TX	5755va						
0400	0500	USA, KTBN Salt Lk City UT	7505na						
0400	0500	USA, KWHR Naalehu HI	17780as						
0400	0500	USA, Voice of America	4960af	5855af	6080af	9530va	7275af		
		7290af	9575af	11965va	15205va	17895af			
0400	0500	USA, WBQC Kennebunk, ME	7415na						
0400	0500	USA, WEWN Birmingham AL	5825na	7425na	15745na				
0400	0500	USA, WHRA Greenbush ME	7580va						
0400	0500	USA, WHRI Noblesville IN	5745va	7315am					
0400	0500	USA, WJIE Louisville KY	7490am	13595am					
0400	0500	USA, WMLK Bethel PA	9465eo						
0400	0500	USA, WRMI Miami FL	7385am						
0400	0500	USA, WSHB Cypress Creek SC	5850am	7535eu	9455eu				
		11550am	15195am						
0400	0500	USA, WTJC Newport NC	9370na						
0400	0500	USA, WCCR Nashville TN	3210na	5070na	5935na	7560na			
		15685na							
0400	0500	USA, WWRB Manchester TN	5085va	6890va					

0400	0600	USA, WYFR Okeechobee FL	6065na	9355eu	9505na	11580eu			
0400	0600	Zambia, Christian Voice	6065af						
0400	0600	Zambia, Radio ZNBC	4910do	6265al					
0403	0410	Croatia, Croatian Radio	9925na						
0427	0600	Madagascar, Radio VO Hope	12060af	15320af					
0430	0600	Germany, Voice of Hope	15715me						
0430	0600	Netherlands, Radio	6165na	9590na					
0430	0600	Nigeria, Radio/Enugu	6025do						
0430	0600	Nigeria, Radio/Ibadan	6050do						
0430	0600	S Africa, AWR	11975af						
0430	0600	Swaziland, TWR	4775af						
0430	0600	Swaziland, TWR	3200af						
0430	0600	UK, BBC World Service	6010eu	9815eu	13645me	21735me			
0445	0600	Italy, RAI Intl	7235af	9875af					

0500 UTC - 12AM E / 11PM C / 9PM P

0500	0520	Vatican City, Vatican Radio	4005eu	5890eu	7250eu	9660af			
		11625af	15570af						
0500	0525	Madagascar, Radio VO Hope	12060af	15320af					
0500	0530	France Radio France Intl	15155af	17800af					
0500	0530	Mexico, Radio Mexico Intl	9705am	11770am					
0500	0530	Netherlands, Radio	6165na	9590na					
0500	0530	S Africa, AWR	5960af	6015af					
0500	0530	S Africa, Channel Africa	11710af						
0500	0530	Uganda, Radio	4976do	5026al	7195al				
0500	0545	Germany, Deutsche Welle	9670na	9785na	11985na				
0500	0600	Anguilla, Caribbean Beacon	6090am						
0500	0600	Australia, ABC NT Alice Springs	4835do						
0500	0600	Australia, ABC NT Katherine	5025do						
0500	0600	Australia, ABC NT Tennant Crk	4910do						
0500	0600	Australia, Radio	9660do	12080do	15240do	15415as			
		15515do	17580do	17750as					
0500	0600	Bhutan, Bhutan BC Service	5030al	6035do					
0500	0600	Botswana, Radio	3356do	4820do	7255do				
0500	0600	Canada, CBC Northern Service	9625do						
0500	0600	Canada, CFRX Toronto ON	6070do						
0500	0600	Canada, CKZN St John's NF	6160do						
0500	0600	Canada, CKZU Vancouver BC	6160do						
0500	0600	China, China Radio Intl	9560na						
0500	0600	Costa Rica, R for Peace Intl	7455va	15039va					
0500	0600	Costa Rica, University Network	5030am	6150am	7375am	9725do			
		11870am	13750na	17645as					
0500	0600	Cuba, Radio Havana	9550am	9820usb	9830usb				
0500	0600	Ecuador, HCJB	9745na	11960na	21455usb				
0500	0600	Germany, Voice of Hope	15715me						
0500	0600	Guyana, Voice of	3290do	5950do					
0500	0600	Japan, Radio	5975eu	6110na	7230eu	11715as	11760as		
		13630na	15195as	17810as	21755do				
0500	0600	Kenya, Kenya BC Corp	4885do	4935do					
0500	0600	Liberia, R Libena Intl	6100do						
0500	0600	Malaysia, Radio	7295do						
0500	0600	Malaysia, RTM Kota Kinabalu	5979do						
0500	0600	Malaysia, Voice of	6175as	9750as	15295as				
0500	0600	Namibia, NBC	3270af	3290af					
0500	0600	New Zealand, Radio NZ Intl	15340do						
0500	0600	Nigeria, Radio/Enugu	6025do						
0500	0600	Nigeria, Radio/Ibadan	6050do						
0500	0600	Nigeria, Radio/Kaduna	4770do	6090do	9570do				
0500	0600	Nigeria, Radio/Lagos	3326do	4990al					
0500	0600	Nigeria, Voice of	7255af						
0500	0600	Russia, University Network	17765as						
0500	0600	Russia, Voice of Russia	17635au	17685au	17795as	21790au			
0500	0600	Singapore, SBC Radio One	6150do						
0500	0600	Solomon Islands, SIBC	5020do						
0500	0600	Swaziland, TWR	4775af	6035af	9500af				
0500	0600	UK, BBC World Service	6005af	6190af	6195eu	7160af	9410eu		
		9875eu	11675eu	11760me	11765af	11940af	11955as	12095eu	
		15280as	15310as	15360as	15420as	17640as	17790as	17885af	
		17790as							
0500	0600	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb			
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb		
0500	0600	USA, KAUJ Dallas TX	5755va						
0500	0600	USA, KTBN Salt Lk City UT	7505na						
0500	0600	USA, KWHR Naalehu HI	11565as	17780as					
0500	0600	USA, Voice of America	5970af	6035af	6080af	7195af	9530va		
		11965va	12080af	13670af	15205va				
0500	0600	USA, WBQC Kennebunk, ME	7415na						
0500	0600	USA, WEWN Birmingham AL	5825na	7425na	15745na				
0500	0600	USA, WHRA Greenbush ME	11730va						
0500	0600	USA, WHRI Noblesville IN	5745va	7315am					
0500	0600	USA, WJIE Louisville KY	7490am	13595am					
0500	0600	USA, WMLK Bethel PA	9465eu						

Shortwave Guide



0500	0600	USA, WRMI Miami FL	7385am				
0500	0600	USA, WRNO New Orleans LA	7395am				
0500	0600	USA, WSHB Cypress Creek SC	5850am	7535eu	9455eu	9840eu	
		11550va					
0500	0600	USA, WTJC Newport NC	9370na				
0500	0600	USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
		15685na					
0500	0600	USA, WWRB Manchester TN	6890va				
0500	0600	USA, WYFR Okeechobee FL	9355eu				
0500	0600	Zambia, Christian Voice	6065af				
0503	0510	Croatia, Croatian Radio	9925na				
0520	0530	Vatican City, Vatican Radio	9660af	11625af	15570af		
0525	0600	vi Ghana, Ghana BC Corp	3366do	4915do			
0530	0550	UAE, Emirates Radio	15435au	17830au	21695au		
0530	0600	mtwhf/vl Italy, IRRS 13840va					
0530	0600	S Africa, AWR	15105af				
0530	0600	Thailand, Radio	21795eu				
0532	0600	Austria, Radio Austria Intl	6155eu	13730eu	17870me		

0600 UTC - 1AM E / 12AM C / 10PM P

0600	0615	S Africa TWR	11640af				
0600	0630	mtwhf France Radio France Intl	11710af	17800af	21620af		
0600	0630	mtwhf/vl Italy, IRRS 13840va					
0600	0630	S Africa, AWR	15105af				
0600	0630	S Africa, Channel Africa	15215af				
0600	0630	vi Zimbabwe, ZBC Corp	5975do				
0600	0645	Germany, Deutsche Welle	6140eu	11925af	13790af	17860af	
0600	0700	Anguilla, Caribbean Beacon	6090am				
0600	0700	Australia, ABC NT Alice Springs	4835do				
0600	0700	Australia, ABC NT Katherine	5025do				
0600	0700	Australia, ABC NT Tennant Crk	4910do				
0600	0700	Australia, Radio	9660do	12080do	15240do	15415as	
		15515do	17580do	17750as	21725as		
0600	0700	vi Botswana, Radio	4820do				
0600	0700	Canada, CFRX Toronto ON	6070do				
0600	0700	Canada, CFVP Calgary AB	6030do				
0600	0700	Canada, CKZN St John's NF	6160do				
0600	0700	Canada, CKZU Vancouver BC	6160do				
0600	0700	Costa Rica, R for Peace Intl	7455va	15039va			
0600	0700	Costa Rica, University Network	5030am	6150am	7375am	9725do	
		11870am	13750na	17645as			
0600	0700	Cuba, Radio Havana	9550am	9820usb	9830usb		
0600	0700	Ecuador, HCJB	11680eu				
0600	0700	vi Ghana, Ghana BC Corp	3366do	4915do			
0600	0700	Guyana, Voice of	3290do	5950do			
0600	0700	Japan, Radio	7230eu	11740as	13630na	15195as	
		17870do	21755do				
0600	0700	Kenya, Kenya BC Corp	4885do	4935do			
0600	0700	irreg Liberia, ELWA	4760do				
0600	0700	Liberia, R Liberia Intl	6100do				
0600	0700	Malaysia, Radio	7295do				
0600	0700	Malaysia, Voice of	6175as	9750as	15295as		
0600	0700	Namibia, NBC	3270af	3290af			
0600	0700	New Zealand, Radio NZ Intl	15340do				
0600	0700	Nigeria, Radio/Enugu	6025do				
0600	0700	Nigeria, Radio/Ibadan	6050do				
0600	0700	Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0600	0700	Nigeria, Radio/Lagos	3326do	4990af			
0600	0700	Nigeria, Voice of	7255af				
0600	0700	Romania, R Romania Intl	9635na	11940na			
0600	0700	Russia, University Network	17765as				
0600	0700	Russia, Voice of Russia	15490au	17635au	17685au	17795as	
		21790au					
0600	0700	Singapore, SBC Radio One	6150do				
0600	0700	vi Solomon Islands, SIBC	5020do				
0600	0700	Swaziland, TWR	4775af	6035af	9500af		
0600	0700	UK, BBC World Service	6055af	6190af	9410eu	11765af	11940af
		11955as	12095eu	15280as	15310as	15360as	15420af
		17790as	17885af				17640as
0600	0700	mtwhf UK, BBC World Service	15400af	15575me			
0600	0700	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
0600	0700	USA, KAUJ Dallas TX	5755va				
0600	0700	USA, KTBN Salt Lk City UT	7505na				
0600	0700	USA, KWHR Naalehu HI	11565as				
0600	0700	USA, Voice of America	5970af	6035af	6080af	7195af	9530va
		9760va	11965va	11995af	12080af	13670af	15205va
0600	0700	USA, WEWN Birmingham AL	5825na	7425na	15745na		
0600	0700	USA, WHRA Greenbush ME	11730va				
0600	0700	USA, WHRI Noblesville IN	5745va	7315am			
0600	0700	USA, WJLE Louisville KY	7490am	13595am			
0600	0700	USA, WMLK Bethel PA	9465eu				

0600	0700	USA, WRMI Miami FL	7385am				
0600	0700	USA, WRNO New Orleans LA	7395am				
0600	0700	USA, WSHB Cypress Creek SC	9455do	11550am			
0600	0700	USA, WTJC Newport NC	9370na				
0600	0700	USA, WWCR Nashville TN	3210na	5070na	5935na	7560na	
		15685na					
0600	0700	USA, WWRB Manchester TN	6890va				
0600	0700	USA, WYFR Okeechobee FL	9355eu	11580eu			
0600	0700	vi Vanuatu, Radio	4960do	7260do			
0600	0700	Yemen, Rep of Yemen Radio	9780me				
0600	0700	Zambia, Christian Voice	9865af				
0600	0700	vi Zambia, Radio ZNBC	4910do	6265af			
0630	0700	Ecuador, HCJB	21455usb				
0630	0700	Vatican City, Vatican Radio	11625af	13765af	15570af		
0637	0656	Romania, R Romania Intl	7105eu	9625eu	9550eu	11775eu	
0645	0655	as Monaco, TWR	9870eu				
0645	0700	Germany, Deutsche Welle	6140eu				
0645	0700	as Germany, TWR	6045eu				
0655	0700	mtwhf Germany, TWR	6045eu				
0655	0700	Monaco, TWR	9870eu				

0700 UTC - 2AM E / 1AM C / 11PM P

0700	0704	vi Pakistan, Radio	17520as	21465as			
0700	0725	Belgium, RVI Flanders R Intl	5985eu				
0700	0727	Czech Rep, Radio Prague Intl	9880eu	11600eu			
0700	0730	Austria, AWR	7230va				
0700	0730	Slovakia, R Slovakia Intl	9440va	15460va	17550va		
0700	0750	Germany, TWR	6045eu				
0700	0750	Monaco, TWR	9870eu				
0700	0750	Swaziland, TWR	4775af	6035af	9500af		
0700	0800	Anguilla, Caribbean Beacon	6090am				
0700	0800	Australia, ABC NT Alice Springs	4835do				
0700	0800	Australia, ABC NT Katherine	5025do				
0700	0800	Australia, ABC NT Tennant Crk	4910do				
0700	0800	Australia, Radio	9660do	12080do	15240do	15415as	
		17580do	17750as	21725as			
0700	0800	vi Botswana, Radio	4820do	7255do			
0700	0800	Canada, CFRX Toronto ON	6070do				
0700	0800	Canada, CFVP Calgary AB	6030do				
0700	0800	Canada, CKZN St John's NF	6160do				
0700	0800	Canada, CKZU Vancouver BC	6160do				
0700	0800	Costa Rica, R for Peace Intl	7455va	15039va			
0700	0800	Costa Rica, University Network	5030am	6150am	7375am	9725do	
		11870am	13750na	17645as			
0700	0800	Ecuador, HCJB	11680eu	11755do	21455usb		
0700	0800	mtwhf Eqt Guinea, Radio Africa	15185af				
0700	0800	as/vl Eqt. Guinea, Radio East Africa	15185af				
0700	0800	mtwhf France Radio France Intl	15605af				
0700	0800	Germany, Deutsche Welle	6140eu				
0700	0800	Germany, Voice of Hope	5975eu				
0700	0800	vi Ghana, Ghana BC Corp	3366do	4915do			
0700	0800	Guyana, Voice of	3290do	5950do			
0700	0800	Kenya, Kenya BC Corp	4885do	4935do			
0700	0800	irreg Liberia, ELWA	4760do				
0700	0800	Liberia, R Liberia Intl	6100do				
0700	0800	Malaysia, Radio	7295do				
0700	0800	Malaysia, RTM Kota Kinabalu	5979do				
0700	0800	Malaysia, Voice of	6175as	9750as	15295as		
0700	0800	Myanmar, Radio	9730do				
0700	0800	New Zealand, Radio NZ Intl	11675do				
0700	0800	Nigeria, Radio/Enugu	6025do				
0700	0800	Nigeria, Radio/Ibadan	6050do				
0700	0800	Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0700	0800	Nigeria, Radio/Lagos	3326do	4990af			
0700	0800	Palau, KHBN/V/O Hope	9965as	9985as	15725as		
0700	0800	Papua New Guinea, NBC	4890do	9675af			
0700	0800	Romania, R Romania Intl	21530af				
0700	0800	Russia, University Network	17765as				
0700	0800	Russia, Voice of Russia	15490au	17495au	17525au	17635au	17675as
		17685au	17795as				
0700	0800	Singapore, SBC Radio One	6150do				
0700	0800	vi Solomon Islands, SIBC	5020do				
0700	0800	Taiwan, R Taipei Intl	5950na				
0700	0800	UK, BBC World Service	6190af	11760me	11765af	11940af	11955as
		12095eu	15310as	15360as	15400af	15565eu	17640af
		17790as	17885af	21660as	21735me		17760as
0700	0800	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
0700	0800	USA, KAUJ Dallas TX	5755va				
0700	0800	USA, KTBN Salt Lk City UT	7505na				
0700	0800	USA, KWHR Naalehu HI	11565as				
0700	0800	USA, WEWN Birmingham AL	5825na	7425na	15745na		
0700	0800	USA, WHRA Greenbush ME	11730va				
0700	0800	USA, WHRI Noblesville IN	5745va	7315am			
0700	0800	USA, WJLE Louisville KY	7490am	13595am			
0700	0800	USA, WMLK Bethel PA	9465eu				

Shortwave Guide



0700	0800	USA, WHRA Greenbush ME	11730va			
0700	0800	USA, WHRI Noblesville IN	5745va	7315am		
0700	0800	USA, WJIE Louisville KY 7490am	13595am			
0700	0800	USA, WMLK Bethel PA 9465eu				
0700	0800	USA, WRNO New Orleans LA	7395am			
0700	0800	USA, WSHB Cypress Creek SC	9455do	11550am		
0700	0800	USA, WTJC Newport NC 9370na				
0700	0800	USA, WWCR Nashville TN 15685na	3210na	5070na	5935na	7560na
0700	0800	USA, WWRB Manchester TN	6890va			
0700	0800	USA, WYFR Okeechobee FL	7355eu	13695af	15170af	
0700	0800	vi Vanuatu, Radio	4960do	7260do		
0700	0800	Zambia, Christian Voice 9865af				
0700	0800	vi Zambia, Radio ZNBC	4910do	6265af		
0715	0800	Guam, TWR 11850as				
0730	0800	th Georgia, Georgian Radio	11805me			
0730	0800	Switzerland, Swiss R Intl	15445af	17685af	21750af	
0730	0800	as UK, BBC World Service	15575as			
0750	0800	smtwhf Germany, TWR	6045eu			
0750	0800	smtwhf Monaco, TWR	9870eu			

0800 UTC - 3AM E / 2AM C / 12AM P

0800	0815	Guam, TWR 15215as						
0800	0820	smtwhf Germany, TWR	6045eu					
0800	0820	smtwhf Monaco, TWR	9870eu					
0800	0830	s Ammeria, Voice of	15270eu					
0800	0830	Australia, ABC NT Alice Springs	4835do					
0800	0830	Australia, ABC NT Katherine	5025do					
0800	0830	Australia, ABC NT Tennant Crk	4910do					
0800	0830	Malaysia, RTM Kota Kinabalu	5979do					
0800	0830	Malaysia, Voice of	6175as	15295as				
0800	0830	Myanmar, Radio	9730do					
0800	0900	Anguilla, Caribbean Beacon	6090am					
0800	0900	Australia, Radio	5995do	9710do	12080do	15240as		
		15415as	21725as					
0800	0900	mtwhf Bhutan, Bhutan BC Service	5030al	6035do				
0800	0900	vi Botswana, Radio	4820do	7255do				
0800	0900	Canada, CFRX Toronto ON	6070do					
0800	0900	Canada, CFVP Calgary AB	6030do					
0800	0900	Canada, CKZN St John's NF	6160do					
0800	0900	Canada, CKZU Vancouver BC	6160do					
0800	0900	Costa Rica, University Network	5030am	6150am	7375am	9725do		
		11870am	13750na	17645as				
0800	0900	Ecuador, HCJB	11755do	21455usb				
0800	0900	mtwhf Eqi Guinea, Radio Africa	15185af					
0800	0900	as/vl Eqi. Guinea, Radio East Africa	15185af					
0800	0900	Germany, Deutsche Welle	6140eu					
0800	0900	vi Ghana, Ghana BC Corp	3366do	4915do				
0800	0900	Guyana, Voice of	3290do	5950do				
0800	0900	Indonesia, Voice of	9525do	11785al	15150as			
0800	0900	as/vl Italy, IRRS 13840va						
0800	0900	Kenya, Kenya BC Corp	4885do	4935do				
0800	0900	irreg Libena, ELWA	4760do					
0800	0900	Liberia, R Liberia Intl	6100do					
0800	0900	Malaysia, Radio	7295do					
0800	0900	vl/s Malta, VO Mediterranean	9605eu					
0800	0900	New Zealand, Radio NZ Intl	11675do					
0800	0900	Nigeria, Radio/Enugu	6025do					
0800	0900	Nigeria, Radio/Ibadan	6050do					
0800	0900	Nigeria, Radio/Kaduna	4770do	6090do	9570do			
0800	0900	Nigeria, Radio/Lagos	3326do	4990al				
0800	0900	Nigeria, Voice of	7255af					
0800	0900	Palau, KHBN/VO Hope	9965as	9985as	15725as			
0800	0900	Papua New Guinea, NBC	4890do	9675al				
0800	0900	Russia, University Network	17765as					
0800	0900	Russia, Voice of Russia	15490au	17495au	17525au	17635au	17675as	
		17685au	17795as					
0800	0900	Singapore, SBC Radio One	6150do					
0800	0900	South Korea, R Korea Intl	9570am	13670eu				
0800	0900	UK, BBC World Service	6190af	9410eu	11940af	11955as	12095eu	
		15310as	15360eu	15485eu	15565eu	17640af	17760as	17885af
		21470af	21660as	21735me				
0800	0900	mtwhf UK, BBC World Service	15400af	17830af				
0800	0900	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
		USA, KAU Dallas TX	5755va					
0800	0900	USA, KNLS Anchor Point AK	9615as					
0800	0900	USA, KTBN Salt Lk City UT	7505na					
0800	0900	USA, KWHR Naalehu HI 11565as	17780as					
0800	0900	USA, Voice of America 11930va	13610va	15190va				
0800	0900	USA, WEWN Birmingham AL	5825na	7425na	15745na			
0800	0900	USA, WHRI Noblesville IN	5745va	7315am				

0800	0900	USA, WJIE Louisville KY 7490am	13595am			
0800	0900	USA, WMLK Bethel PA 9465eu				
0800	0900	USA, WRMI Miami FL 7385am				
0800	0900	USA, WRNO New Orleans LA	7395am			
0800	0900	USA, WSHB Cypress Creek SC	9845eu	9860eu	11550am	
0800	0900	USA, WTJC Newport NC 9370na				
0800	0900	USA, WWCR Nashville TN 15685na	3210na	5070na	5935na	7560na
0800	0900	USA, WYFR Okeechobee FL	13570af			
0800	0900	vi Vanuatu, Radio	4960do	7260do		
0800	0900	Zambia, Christian Voice 9865af				
0815	0900	Guam, TWR 15215as	15330as			
0830	0900	Australia, ABC NT Katherine	2485do			
0830	0900	Australia, ABC NT Tennant Crk	2325do			
0830	0900	Austria, AWR	17780af			
0830	0900	Greece, Voice of	15630eu	17905eu		
0830	0900	vi Solomon Islands, SIBC	5020do			
0830	0900	Switzerland, Swiss R Intl	21770af			
0840	0850	Turkmenistan, Turkmen Radio	5015as			

0900 UTC - 4AM E / 3AM C / 1AM P

0900	0915	mtwhf/vl Solomon Islands, SIBC	5020do					
0900	0929	Czech Rep, Radio Prague Intl	21745va					
0900	0930	Austria, AWR	17780af					
0900	0930	Guam, TWR 15330as						
0900	0930	irreg Liberia, ELWA	4760do					
0900	0945	Germany, Deutsche Welle	6140eu	6160va	9510am	12035af		
		15410af	15470as	17715as	17770do	17800af	17820as	21560af
		21780af	21790do					
0900	1000	Anguilla, Caribbean Beacon	6090am					
0900	1000	Australia, ABC NT Katherine	2485do					
0900	1000	Australia, ABC NT Tennant Crk	2325do					
0900	1000	Australia, Radio	9580va	11880as	15240as	17750as	21820as	
0900	1000	Australia, Voice International	13685as					
0900	1000	vi Botswana, Radio	4820do	7255do				
0900	1000	Canada, CFRX Toronto ON	6070do					
0900	1000	Canada, CFVP Calgary AB	6030do					
0900	1000	Canada, CKZN St John's NF	6160do					
0900	1000	Canada, CKZU Vancouver BC	6160do					
0900	1000	China, China Radio Intl	11730do					
0900	1000	Costa Rica, University Network	5030am	6150am	7375am	9725do		
		11870am	13750na	17645as				
0900	1000	Ecuador, HCJB	11755do	21455usb				
0900	1000	mtwhf Eqi Guinea, Radio Africa	15185af					
0900	1000	as/vl Eqi. Guinea, Radio East Africa	15185af					
0900	1000	vi Ghana, Ghana BC Corp	4915do					
0900	1000	Guyana, Voice of	3290do	5950do				
0900	1000	as/vl Italy, IRRS 13840va						
0900	1000	Kenya, Kenya BC Corp	4885do	4935do				
0900	1000	Libena, R Liberia Intl	6100do					
0900	1000	Malaysia, Radio	7295do					
0900	1000	New Zealand, Radio NZ Intl	11675do					
0900	1000	Nigeria, Radio/Enugu	6025do					
0900	1000	Nigeria, Radio/Ibadan	6050do					
0900	1000	Nigeria, Radio/Kaduna	4770do	6090do	9570do			
0900	1000	Nigeria, Radio/Lagos	3326do	4990al				
0900	1000	Nigeria, Voice of	7255af					
0900	1000	Palau, KHBN/VO Hope	9965as	9985as	15725as			
0900	1000	Papua New Guinea, NBC	4890do	9675al				
0900	1000	Russia, University Network	17765as					
0900	1000	Singapore, SBC Radio One	6150do					
0900	1000	as/vl Solomon Islands, SIBC	5020do					
0900	1000	UK, BBC World Service	6190af	6195eu	9605as	9740as		
		11760me	11940af	11945as	12095eu	15310as	15360as	15485eu
		15565eu	17640af	17760as	17790as	21470af	21735me	
0900	1000	mtwhf UK, BBC World Service	15190do	17830af				
0900	1000	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
0900	1000	USA, KAU Dallas TX	5755va					
0900	1000	USA, KTBN Salt Lk City UT	7505na					
0900	1000	USA, KWHR Naalehu HI 11565as	17780as					
0900	1000	USA, Voice of America 11930va	13610va	15190va				
0900	1000	USA, WEWN Birmingham AL	5825na	7425na	15745na			
0900	1000	USA, WHRA Greenbush ME	11730va					
0900	1000	USA, WHRI Noblesville IN	5745va	7315am				
0900	1000	USA, WJIE Louisville KY 7490am	13595am					
0900	1000	USA, WRMI Miami FL 9955am						
0900	1000	USA, WSHB Cypress Creek SC	9455do	9860eu	11550am			
0900	1000	USA, WTJC Newport NC 9370na						
0900	1000	USA, WWCR Nashville TN 15685na	9475na	5070na	5935na	7560na		
0900	1000	vi Vanuatu, Radio	4960do	7260do				
0900	1000	mtwhf Vatican City, Vatican Radio	5890eu					

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0900	1000		Zambia, Christian Voice	9865af				
0930	0950		Greece, Voice of	15630eu	17900eu			
0930	1000		Georgia, Georgian Radio		11910me			
0930	1000	mtwhf	Guam, TWR	15330as				
0930	1000		Lithuania, R Vilnius	9710eu				
0930	1000		Netherlands, Radio	9790do	12065as	13710as		
0945	1000		Germany, Deutsche Welle		6140eu			
0945	1000	mtwhf/vl	Solomon Islands, SIBC	5020do				

1000 UTC - 5AM E / 4AM C / 2AM P

1000	1005	vl	Pakistan, Radio	17520as	21465as			
1000	1027		Vietnam, Voice of	9840au	12020au			
1000	1030		Guam, AWR	11560as	11930as			
1000	1030		Mongolia, Voice of	12085as				
1000	1030		Netherlands, Radio	9790do	12065as	13710as		
1000	1030		UK, RTE Radio	15280au				
1000	1056		North Korea, Voice of	9335ca	11710ca	11735as	13650as	
1000	1100		Anguilla, Caribbean Beacon	6090am				
1000	1100		Australia, ABC NT Katherine	2485do				
1000	1100		Australia, ABC NT Tennant Crk	2325do				
1000	1100		Australia, Radio	9580va	11880as	15240as	17750as	21820as
1000	1100		Australia, Voice International		13685as			
1000	1100	as	Bhutan, Bhutan BC Service	5030al	6035do			
1000	1100	vl	Botswana, Radio	4820do	7255do			
1000	1100		Canada, CFRX Toronto ON	6070do				
1000	1100		Canada, CFVP Calgary AB	6030do				
1000	1100		Canada, CKZN St John's NF	6160do				
1000	1100		Canada, CKZU Vancouver BC	6160do				
1000	1100		China, China Radio Intl	11730do	15210do			
1000	1100		Costa Rica, University Network	5030am	6150am	7375am	9725do	
			11870am	13750na	17645as			
1000	1100		Ecuador, HCJB	11755do	21455usb			
1000	1100	mtwhf	Eq Guinea, Radio Africa	15185af				
1000	1100	as/vl	Eq. Guinea, Radio East Africa	15185af				
1000	1100		Germany, Deutsche Welle	6140eu				
1000	1100	vl	Ghana, Ghana BC Corp	4915do				
1000	1100		Guyana, Voice of	3290do	5950do			
1000	1100		India, All India Radio	11585as	13695au	15020as	15260as	
			17510au	17800au	17895au			
1000	1100	as/vl	Italy, IRRS	13840va				
1000	1100		Japan, Radio	9695as	15590as	21755do		
1000	1100		Liberia, R Liberia Intl	6100do				
1000	1100		Malaysia, Radio	7295do				
1000	1100		New Zealand, Radio NZ Intl	11675do				
1000	1100		Nigeria, Radio/Enugu	6025do				
1000	1100		Nigeria, Radio/Ibadan	6050do				
1000	1100		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
1000	1100		Nigeria, Radio/Lagos	3326do	4990al			
1000	1100		Nigeria, Voice of	7255af				
1000	1100		Palau, KHBN/VO Hope	9965as	9985as	12160as	15725as	
1000	1100		Papua New Guinea, NBC	4890do	9675al			
1000	1100		Russia, University Network	17765as				
1000	1100		Singapore, SBC Radio One	6150do				
1000	1100	vl	Solomon Islands, SIBC	5020do				
			UK, BBC World Service	6190af	6195va	9605as	9740as	
			11760me	11945af	12095eu	15280as	15310as	15335as
			15485eu	15565eu	15575as	17640af	17790as	17885af
			21470as	21660as				21730af
1000	1100		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1000	1100		USA, KAU Dallas TX	5755va				
1000	1100		USA, KTBN Salt Lk City UT	7505na				
1000	1100		USA, KWHR Naalehu HI	9930as	11565do			
1000	1100		USA, Voice of America	5745am	7370am	9590am	9770va	15240va
			15425va					
1000	1100		USA, WEWN Birmingham AL	1545eu	7425na	7520na	9465na	15405eu
			15685na					
1000	1100		USA, WHRI Noblesville IN	6040na	9495am			
1000	1100	as	USA, WINB Red Lion PA	9320am				
1000	1100		USA, WJIE Louisville KY	7490am	13595am			
1000	1100		USA, WRMI Miami FL	9955am				
1000	1100		USA, WRNO New Orleans LA	7395am				
1000	1100		USA, WSHB Cypress Creek SC	6095am	9455am			
1000	1100		USA, WTJC Newport NC	9370na				
1000	1100		USA, WWCR Nashville TN	5070na	5935na	7560na		
			15685na					
1000	1100		USA, WYFR Okeechobee FL	5950na				
1015	1030		Israel, Kol Israel	15640va	17545va			
1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9704do		
1030	1057		Czech Rep, Radio Prague Intl	9880eu	11615eu			
1030	1100		Georgia, Georgian Radio	11910me				
1030	1100		Guam, AWR	11560as				

1030	1100		Netherlands, Radio	5965na	6045eu	9790do	9860eu	12065as
			13710as					
1030	1100		UAE, Emirates Radio	13675eu	15370eu	15400eu	21597eu	

1100 UTC - 6AM E / 5AM C / 3AM P

1100	1105		New Zealand, Radio NZ Intl	11675do				
1100	1120	to	Kazakhstan, R Almaty	9620eu	11840eu			
1100	1127		Vietnam, Voice of	7285as				
1100	1130	as	Bhutan, Bhutan BC Service	5030al	6035do			
1100	1130		Netherlands, Radio	5965na	6045eu	9790do	9860eu	12065as
			13710as					
1100	1130	mtwhf	UK, BBC World Service	15220am				
1100	1130		UK, BBC World Service	15400af	17790as			
1100	1145		Germany, Deutsche Welle	6140eu	11785af	15410af	17860af	
			21525af	21665af				
1100	1200		Anguilla, Caribbean Beacon	11775am				
1100	1200		Australia, ABC NT Katherine	2485do				
1100	1200		Australia, ABC NT Tennant Crk	2325do				
1100	1200		Australia, Radio	5995do	6020do	9475as	9580do	
			11650do	11880as	12080do	15240as	21820as	
1100	1200		Australia, Voice International		13685as			
1100	1200	vl	Austria, Radio Africa Intl	17815eu				
1100	1200		Bulgaria, Radio	15700eu	17500eu			
1100	1200		Canada, CFRX Toronto ON	6070do				
1100	1200		Canada, CFVP Calgary AB	6030do				
1100	1200		Canada, CKZN St John's NF	6160do				
1100	1200		Canada, CKZU Vancouver BC	6160do				
1100	1200		Costa Rica, University Network	5030am	6150am	7375am	9725do	
			11870am	13750na	17645as			
1100	1200		Ecuador, HCJB	12005am	15115na	21455usb		
1100	1200	mtwhf	Eq Guinea, Radio Africa	15185af				
1100	1200	as/vl	Eq. Guinea, Radio East Africa	15185af				
1100	1200	vl	Ghana, Ghana BC Corp	4915do				
1100	1200		Guyana, Voice of	3290do	5950do			
1100	1200		Iran, VOIRI	15215as	15585as	15600as	21470as	21730au
1100	1200	as/vl	Italy, IRRS	13840va				
1100	1200		Japan, Radio	6120na	9695as	15590as		
1100	1200		Jordan, Radio	11690eu				
1100	1200		Malaysia, Radio	7295do				
1100	1200		Palau, KHBN/VO Hope	9965as	9985as	12160as	13840as	
1100	1200		Papua New Guinea, NBC	4890do	9675al			
1100	1200		Russia, University Network	17765as				
1100	1200		Singapore, R Singapore Intl	6150as	9600as			
1100	1200		Taiwan, R Taipei Intl	7445as	11985as			
1100	1200		UK, BBC World Service	6190af	6195va	9605as	9740as	
			11760me	11945as	12095eu	12105do	15190va	15220am
			15310as	15400af	15485eu	15565eu	15575as	17640af
			17760as	17830af	17885af	21470af	21660as	17700eu
1100	1200		Ukraine, R Ukraine Intl	11840na	15520na			
1100	1200		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1100	1200		USA, KAU Dallas TX	5755va				
1100	1200		USA, KTBN Salt Lk City UT	7505na				
1100	1200		USA, KWHR Naalehu HI	9930as	11565do			
1100	1200		USA, Voice of America	6160va	9645va	9760va	9770va	15190va
			15240va	15425va				
1100	1200		USA, WEWN Birmingham AL	15745eu	7425na	7520na	9465na	15405eu
			15685na					
1100	1200		USA, WHRI Noblesville IN	6040na	9495am			
1100	1200		USA, WINB Red Lion PA	9320am				
1100	1200		USA, WJIE Louisville KY	7490am	13595am			
1100	1200		USA, WRMI Miami FL	9955am				
1100	1200		USA, WRNO New Orleans LA	7395am				
1100	1200		USA, WSHB Cypress Creek SC	6095am	9455am	11660am		
1100	1200		USA, WTJC Newport NC	9370na				
1100	1200		USA, WWCR Nashville TN	5070na	5935na	7560na		
			15685na					
1100	1200		USA, WYFR Okeechobee FL	5850na	5950na	11725do		
1106	1200		New Zealand, Radio NZ Intl	15175do				
1115	1145		Nepal, Radio	3230as	6100as			
1120	1145	w	Kazakhstan, R Almaty	9620eu	11840eu			
1130	1145	vl	Libya, Voice of Africa	15435irr	17750irr			
1130	1155		Belgium, RVI Flanders R Intl	9865as				
1130	1200		Austria, Radio Austria Intl	6155eu	13730eu	21780as		
1130	1200		Netherlands, Radio	5965na	6045eu	9860eu		
1130	1200		South Korea, R Korea Intl	9650na				
1130	1200		Sweden, Radio	17505va	18960na			
1130	1200	mtwhf	UK, BBC World Service	11835am	15190do			
1130	1200	f	Vatican City, Vatican Radio	15595va	17515va			
1140	1200	t	Kazakhstan, R Almaty	9620eu	11840eu			
1145	1200		Germany, Deutsche Welle	6140eu				
1155	1200	vl	Zimbabwe, ZBC Corp	5975do				

Shortwave Guide

1200 UTC - 7AM E / 6AM C / 4AM P

1200	1215	UK, BBC World Service	7135af						
1200	1225	Netherlands, Radio	5965na	6045eu	9860eu				
1200	1230	France Radio France Intl	15540af	25820af					
1200	1230	Iran, VOIRI	15215as	15585as	15600as	21470as	21730au		
1200	1230	Mongolia, Voice of	12015eu						
1200	1230	South Korea, R Korea Intl		9650na					
1200	1230	Uzbekistan, Radio Tashkent		5975as	7285as	9715as	15295as		
			17775as						
1200	1230	vi Zimbabwe, ZBC Corp	5975do						
1200	1259	Poland, Radio Polonia	6095eu	9525eu	11820eu				
1200	1300	Anguilla, Caribbean Beacon		11775am					
1200	1300	Australia, ABC NT Katherine		2485do					
1200	1300	Australia, ABC NT Tennant Crk		2325do					
1200	1300	Australia, Radio		5995do	6020do	9475as	9580do		
			11650do	11880as	21820as				
1200	1300	Australia, Voice International		13685as					
1200	1300	Bangladesh, Bangla Betar		7185as	9550as				
1200	1300	Canada, CBC Northern Service		9625do					
1200	1300	Canada, CFRX Toronto ON		6070do					
1200	1300	Canada, CFVP Calgary AB		6030do					
1200	1300	Canada, CKZN St John's NF		6160do					
1200	1300	Canada, CKZU Vancouver BC		6160do					
1200	1300	Canada, Radio Canada Intl		9660as	15190as				
1200	1300	mtwhf Canada, Radio Canada Intl		9515na	13655na	17820na			
1200	1300	China, China Radio Intl		9730as	9760as	11760do	11855do	11980as	
			15415do						
1200	1300	China, Voice of Hope		7485as					
1200	1300	Costa Rica, University Network		5030am	6150am	7375am	9725do		
				11870am	13750na	17645as			
1200	1300	Ecuador, HCJB		12005am	15115na	21455usb			
1200	1300	Germany, Deutsche Welle		6140eu					
1200	1300	Germany, Overcomer Ministries		5975eu					
1200	1300	Guyana, Voice of		3290do	5950do				
1200	1300	Jordan, Radio		11690eu					
1200	1300	Malaysia, Radio		7295do					
1200	1300	New Zealand, Radio NZ Intl		15175do					
1200	1300	Palau, KHBN/VO Hope		9985as	12160as	13840as			
1200	1300	mtwhfa Papua New Guinea, NBC		4890do	9675al				
1200	1300	Russia, University Network		17765as					
1200	1300	Russia, Voice of Hope		13590as					
1200	1300	Singapore, R Singapore Intl		6150as	9600as				
1200	1300	Taiwan, R Taipei Intl		7130as	9610au				
1200	1300	UK, BBC World Service		6190af	6195va	9605as	9740as		
1200	1300			11760me	11945as	12095eu	12105do	15190va	15310as
				15565eu	15575as	17640af	17700eu	17760as	17830af
				21660as					
1200	1300	USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb		
				6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1200	1300	USA, KAU Dallas TX		13815va					
1200	1300	USA, KTNB Salt Lk City UT		7505na					
1200	1300	USA, KWHR Naalehu HI		9930as	11565do				
1200	1300	USA, Voice of America		6160va	9645va	9760va	15160va	15240va	
				15425va					
1200	1300	USA, WEWN Birmingham AL		9465na	11550na	11875na	15405eu		
				15745eu					
1200	1300	USA, WHRI Noblesville IN		6040na	9495am				
1200	1300	USA, WINB Red Lion PA		13570am					
1200	1300	USA, WJIE Louisville KY		7490am	13595am				
1200	1300	USA, WRMI Miami FL		15725am					
1200	1300	USA, WRNO New Orleans LA		7395am					
1200	1300	USA, WSHB Cypress Creek SC		6095am	9455am	11660am			
1200	1300	USA, WTJC Newport NC		9370na					
1200	1300	USA, WWCR Nashville TN		5935na	7560na	12160na			
				13845na	15685na				
1200	1300	USA, WYFR Okeechobee FL		5850na	5950na	13695na			
				17750na					
1230	1257	Vietnam, Voice of		9840as	12020as				
1230	1300	Sri Lanka, SLBC		6005as	9700as	15425as			
1230	1300	Sweden, Radio		17505va	18960na	21530as			
1230	1300	Thailand, Radio		9885va					
1230	1300	Turkey, Voice of		17615as	17830eu				
1230	1300	a UK, Wales Radio Intl		17845au					
1245	1300	fta Seychelles, FEBA Radio		15535me					

1300 UTC - 8AM E / 7AM C / 5AM P

1300	1305	New Zealand, Radio NZ Int'		15175do					
1300	1310	mtwhfa Turkmenistan, Turkmen Radio		5015as					

1300	1330	Guam, AWR		15385as					
1300	1330	Turkey, Voice of		17615as	17830eu				
1300	1330	UAE, AWR		17740as					
1300	1356	North Korea, Voice of		9335eu	11710na	13760eu	15244eu		
1300	1357	Czech Rep, Radio Prague Intl			13580eu	21735as			
1300	1400	Anguilla, Caribbean Beacon			11775am				
1300	1400	Australia, ABC NT Katherine			2485do				
1300	1400	Australia, ABC NT Tennant Crk			2325do				
1300	1400	Australia, Radio			5995do	6020do	9475as	9580do	
				11650do	11880as	21820as			
1300	1400	Australia, Voice International			13685as				
1300	1400	Canada, CBC Northern Service			9625do				
1300	1400	Canada, CFRX Toronto ON			6070do				
1300	1400	Canada, CFVP Calgary AB			6030do				
1300	1400	Canada, CKZN St John's NF			6160do				
1300	1400	Canada, CKZU Vancouver BC			6160do				
1300	1400	mtwhf Canada, Radio Canada Intl			9515na	13655na			
1300	1400	as Canada, Radio Canada Intl			15190na	17800na			
1300	1400	China, China Radio Intl			7405na	9570do	11760do	11980as	15180as
1300	1400	China, Voice of Hope			7485as				
1300	1400	Costa Rica, University Network			5030am	6150am	7375am	9725do	
				11870am	13750na	17645as			
1300	1400	Ecuador, HCJB			12005am	15115na	21455usb		
1300	1400	Germany, Deutsche Welle			6140eu				
1300	1400	Germany, Overcomer Ministries			13810me				
1300	1400	Jordan, Radio			11690eu				
1300	1400	Malaysia, Radio			7295do				
1300	1400	Palau, KHBN/VO Hope			9985as	12160as	13840as		
1300	1400	Papua New Guinea, NBC			4890do	9675al			
1300	1400	Russia, University Network			17765as				
1300	1400	as Africa, Channel Africa			11720af	17780af	21725af		
1300	1400	Singapore, R Singapore Intl			6150as	9600as			
1300	1400	South Korea, R Korea Intl			9570as	13670am			
1300	1400	Sri Lanka, SLBC			6005as	9700as	15425as		
1300	1400	UK, BBC World Service			6190af	6195va	9605as	9740as	
				11760me	11940af	12095eu	12105do	15190va	15285as
				15565eu	15420af	15485eu	15575eu	17640af	17720eu
				17795af	17830af	17885af	21470af	21640af	17760as
1300	1400	USA, Armed Forces Network			4319usb	4993usb	5765usb	6350usb	
				6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1300	1400	USA, KAU Dallas TX			13815va				
1300	1400	USA, KNLS Anchor Point AK			11870as				
1300	1400	USA, KTNB Salt Lk City UT			7505na				
1300	1400	USA, KWHR Naalehu HI			9930as	11565do			
1300	1400	USA, Voice of America			6160va	9645va	9760va	15160va	15425va
1300	1400	USA, WBCQ Kennebunk, ME			17495na				
1300	1400	s USA, WBCQ Kennebunk, ME			7415na				
1300	1400	USA, WEWN Birmingham AL			11550na	11875na	15405eu	15745eu	
1300	1400	USA, WHRI Noblesville IN			6040na	9495am			
1300	1400	USA, WINB Red Lion PA			13570am				
1300	1400	USA, WJIE Louisville KY			7490am	13595am			
1300	1400	USA, WRMI Miami FL			15725am				
1300	1400	USA, WRNO New Orleans LA			7395am				
1300	1400	USA, WSHB Cypress Creek SC			6095am	9455am	11660am		
1300	1400	USA, WTJC Newport NC			9370na				
1300	1400	USA, WWCR Nashville TN			5935na	7560na	12160na		
					13845na	15685na			
1300	1400	USA, WYFR Okeechobee FL			5850na	5950na	13695na		
					17750na				
1310	1400	occ New Zealand, Radio NZ Intl			6095do				
1330	1350	UAE, Emirates Radio			13610eu	15400eu	21597eu		
1330	1357	Vietnam, Voice of			7145eu	9730eu			
1330	1400	Austria, Radio Austria Intl			6155eu	13730eu			
1330	1400	Germany, Voice of Hope			17550as				
1330	1400	Guam, AWR			11705as	11980as	15385as		
1330	1400	India, All India Radio			9690as	11620as	13710as		
1330	1400	Laos, Lao National Radio			7145as				
1330	1400	Sweden, Radio			17505va	18960na			
1330	1400	UAE, AWR			15320as				
1330	1400	Uzbekistan, Radio Tashkent			5975as	7285as	9715as	15295as	
					17775as				

1400 UTC - 9AM E / 8AM C / 6AM P

1400	1415	mtwhf UK, BBC World Service		11860af	21490af				
1400	1430	Ecuador, HCJB		12005am	15115na	21455usb			
1400	1430	Germany, Voice of Hope		17550as					
1400	1430	Thailand, Radio		9830va					
1400	1500	Anguilla, Caribbean Beacon			11775am				
1400	1500	Australia, ABC NT Katherine			2485do				
1400	1500	Australia, ABC NT Tennant Crk			2325do				

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1400	1500	Australia, Radio	5995do	9580do	11650do	11660as	
1400	1500	Australia, Voice International		13685as			
1400	1500	Canada, CBC Northern Service		9625do			
1400	1500	Canada, CFRX Toronto ON		6070do			
1400	1500	Canada, CFVP Calgary AB		6030do			
1400	1500	Canada, CKZN St John's NF		6160do			
1400	1500	Canada, CKZU Vancouver BC		6160do			
1400	1500	Canada, Radio Canada Intl		9515na	13655na	15305na	
		17820na					
1400	1500	Canada, Radio Canada Intl		15190na	17800na		
1400	1500	China, China Radio Intl 7405na		9700as	11675do	13685va	15125as
		17720na					
1400	1500	China, Voice of Hope		7485as			
1400	1500	Costa Rica, University Network		5030am	6150am	7375am	9725do
		11870am 13750na		17645as			
1400	1500	France Radio France Intl		11610af	17620af		
1400	1500	Germany, Deutsche Welle		6140eu			
1400	1500	India, All India Radio		9690as	11620as	13710as	
1400	1500	Japan, Radio		7200as	9505na	11730as	17755me
1400	1500	Jordan, Radio		11690eu			
1400	1500	New Zealand, Radio NZ Intl		6095do			
1400	1500	Oman, Radio		13725va			
1400	1500	Palau, KHBN/V/O Hope		9985as	12160as	13840as	
1400	1500	Papua New Guinea, NBC		4890do	9675af		
1400	1500	Romania, R Romania Intl		15250eu	17735eu		
1400	1500	Russia, University Network		17765as			
1400	1500	Russia, Voice of Russia		7390as	12055as	15560as	17645as
1400	1500	S Africa, Channel Africa		11720af	17780af	21725af	
1400	1500	Singapore, SBC Radio One		6150do			
1400	1500	Sn Lanka, SLBC		6005as	9700as	15425as	
1400	1500	Taiwan, R Taipei Intl		15265as			
1400	1500	UK, BBC World Service		6190af	6195va	9605as	9740as
1400	1500	12105do		15105af	15190va	15310as	15365as
1400	1500	15575eu		15595eu	17640af	17810do	17830af
1400	1500	USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb
1400	1500	6458usb		10940usb	12579usb	12689usb	13362usb
1400	1500	USA, KAJI Dallas TX		13815va			
1400	1500	USA, KJES Vado NM		11715na			
1400	1500	USA, KTBN Salt Lk City UT		7505na			
1400	1500	USA, KWHR Naalehu HI		9930as	11565do		
1400	1500	USA, Voice of America		6160va	7125va	9760va	15160va
1400	1500	15425va				15255va	
1400	1500	USA, WBCQ Kennebunk, ME		17495na			
1400	1500	USA, WBCQ Kennebunk, ME		7415na			
1400	1500	USA, WEWN Birmingham AL		11550na	11875na	15375na	15745eu
1400	1500	USA, WHRI Noblesville IN		6040na	15105am		
1400	1500	USA, WINB Red Lion PA		13570am			
1400	1500	USA, WJIE Louisville KY		7490am	13595am		
1400	1500	USA, WRMI Miami FL		15725am			
1400	1500	USA, WRNO New Orleans LA		7395am			
1400	1500	USA, WTJC Newport NC		9370na			
1400	1500	USA, WWCR Nashville TN		9475na	12160na	13845na	
1400	1500	15685na					
1400	1500	USA, WWRB Manchester TN		9320va	9400va	12172va	
1400	1500	USA, WYFR Okeechobee FL		11550as	11830na	11865do	
		11970na		17510do	17750na		
1415	1420	Nepal, Radio		3230as	5005as	6100as	
1430	1500	Guam, TWR		15330as			
1430	1500	Myanmar, Radio		4725do	5985do		
1430	1500	Netherlands, Radio		9890as	11835as	12075as	15220na
1445	1500	Seychelles, FEBA Radio		11600as			

1500 UTC - 10AM E / 9AM C / 7AM P

1500	1515	Pakistan, Radio		11570me	15100me	15725af	17750af
1500	1530	Mexico, Radio Mexico Intl			9705am	11770am	
1500	1530	Mongolia, Voice of		12015eu			
1500	1530	S Africa, Channel Africa		17770af			
1500	1550	Sri Lanka, SLBC		6005as	9700as	15425as	
1500	1556	North Korea, Voice of		9335na	11710na	13760eu	15245eu
1500	1559	Canada, Radio Canada Intl		15455as	17720as		
1500	1559	Canada, Radio Canada Intl		17800na	9515na	13655na	15190na
		17800na					
1500	1600	Anguilla, Caribbean Beacon		11775am			
1500	1600	Australia, Radio		5995do	9580do	11650do	11650do
		11650do		11660as			
1500	1600	Australia, Voice International		11930as			
1500	1600	Austria, Radio Africa Intl		17895eu			
1500	1600	Canada, CBC Northern Service		9625do			
1500	1600	Canada, CFRX Toronto ON		6070do			
1500	1600	Canada, CFVP Calgary AB		6030do			
1500	1600	Canada, CKZN St John's NF		6160do			

1500	1600	Canada, CKZU Vancouver BC		6160do			
1500	1600	China, China Radio Intl		7160as	9785as	17720as	
1500	1600	China, Voice of Hope		7485as			
1500	1600	Costa Rica, University Network		5030am	6150am	7375am	9725do
		11870am 13750na		17645as			
1500	1600	Germany, Deutsche Welle		6140eu			
1500	1600	Germany, Overcomer Ministries		6015eu			
1500	1600	Germany, Voice of Hope		15715me			
1500	1600	Guam, TWR		15330as			
1500	1600	Japan, Radio		7200as	9750as	11730as	
1500	1600	Jordan, Radio		11690na			
1500	1600	Myanmar, Radio		4725do	5985do		
1500	1600	Netherlands, Radio		9890as	11835as	12075as	15220na
1500	1600	New Zealand, Radio NZ Intl		6095do			
1500	1600	Palau, KHBN/V/O Hope		9965as	12160as	13840as	
1500	1600	Papua New Guinea, NBC		4890do	9675af		
1500	1600	Russia, Voice of Russia		4940me	4965me	4975me	7325me
1500	1600	11500as		11985me		7390as	
1500	1600	Singapore, SBC Radio One		6150do			
1500	1600	UK, BBC World Service		5975am	6190af	6195va	9740as
1500	1600	11860af		12095eu	15190va	15310as	15400af
1500	1600	17700as		17830af	17860af	21470af	21490af
1500	1600	USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb
1500	1600	6458usb		10320usb	10940usb	12579usb	12689usb
1500	1600	USA, KAJI Dallas TX		13815va			
1500	1600	USA, KJES Vado NM		11715na			
1500	1600	USA, KTBN Salt Lk City UT		15590na			
1500	1600	USA, KWHR Naalehu HI		9930as	11565do		
1500	1600	USA, Voice of America		6160va	7125va	9590va	9700va
1500	1600	9845va		12040va	15205va	15255va	15550va
1500	1600	USA, WBCQ Kennebunk, ME		17495na			
1500	1600	USA, WBCQ Kennebunk, ME		7415na			
1500	1600	USA, WEWN Birmingham AL		11550na	11875na	15375na	15745eu
1500	1600	USA, WHRA Greenbush ME		17650va			
1500	1600	USA, WHRI Noblesville IN		13760na	15105am		
1500	1600	USA, WINB Red Lion PA		13570am			
1500	1600	USA, WJIE Louisville KY		7490am	13595am		
1500	1600	USA, WRMI Miami FL		15725am			
1500	1600	USA, WRNO New Orleans LA		7395am			
1500	1600	USA, WTJC Newport NC		9370na			
1500	1600	USA, WWCR Nashville TN		9475na	12160na	13845na	
		15685na					
1500	1600	USA, WYFR Okeechobee FL		17750na	17800as	6280as	11830na
1515	1600	Seychelles, FEBA Radio		11600as			
1530	1550	Vatican City, Vatican Radio		12065au	13765au	15235au	
1530	1600	Austria, Radio Austria Intl		17860na			
1530	1600	Iran, VOIRI		7245as	9635eu	11775as	
1530	1600	Seychelles, FEBA Radio		11600as			
1540	1550	Turkmenistan, Turkmen Radio		4930as			

1600 UTC - 11AM E / 10AM C / 8AM P

1600	1610	Vatican City, Vatican Radio		12065au	13765au	15235au	
1600	1625	Netherlands, Radio		9890as	11835as	12075as	15220na
1600	1627	Czech Rep, Radio Prague Intl		5930eu	21745af		
1600	1627	Vietnam, Voice of		7145eu	9730eu		
1600	1630	Iran, VOIRI		7245as	9635eu	11775as	
1600	1630	Mexico, Radio Mexico Intl		9705am	11770am		
1600	1630	S Africa, Channel Africa		9525af			
1600	1630	USA, KWHR Naalehu HI		9930as			
1600	1635	Germany, Voice of Hope		13810af	15715me		
1600	1640	UAE, Emirates Radio		13610eu	13675eu	15400eu	21597af
1600	1645	Germany, Deutsche Welle		6140eu	6170as	7225as	9735af
		11665af		17595as	21840af		
1600	1650	New Zealand, Radio NZ Intl		6095do			
1600	1656	North Korea, Voice of		9975af	11735af		
1600	1700	Algeria, Radio Algiers Intl		11715eu		15160eu	
1600	1700	Anguilla, Caribbean Beacon		11775am			
1600	1700	Australia, Radio		5995do	9475as	9580do	11650do
1600	1700	Australia, Voice International		11930as			
1600	1700	Canada, CBC Northern Service		9625do			
1600	1700	Canada, CFRX Toronto ON		6070do			
1600	1700	Canada, CFVP Calgary AB		6030do			
1600	1700	Canada, CKZN St John's NF		6160do			
1600	1700	Canada, CKZU Vancouver BC		6160do			
1600	1700	China, China Radio Intl		7190af	13650af		
1600	1700	Costa Rica, University Network		5030am	6150am	7375am	9725do
		11870am 13750na					
1600	1700	Ethiopia, Radio		5990do	7110af	7165af	9560af
		11800af				9704af	
1600	1700	France Radio France Intl		11615af	11995af	12015af	15605af
		17850af				17605af	

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1600	1700	a	Germany, Overcomer Ministries	6015eu					
1600	1700	a	Greece, Voice of	9420eu	15630eu	17705na			
1600	1700		Jordan, Radio	11690na					
1600	1700		Palau, KHBN/V/O Hope	9965as					
1600	1700		Russia, Voice of Russia	7350as	11985as	15540me			
1600	1700		South Korea, R Korea Intl		5975am	9515af	9870af		
1600	1700		Taiwan, R Taipei Intl	11550as					
1600	1700	as	UK, BBC World Service	9635af	12095eu				
1600	1700		UK, BBC World Service	3915as	5975as	6190af	6195va	7160af	
			9410eu	9510as	11860af	11940af	12095eu	15190va	15310as
			15400af	15485eu	15565eu	17700eu	17830af	17860af	21470af
			21490af	21660af					
1600	1700		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
1600	1700		USA, KAUJ Dallas TX	13815va					
1600	1700		USA, KJES Vado NM	11715na					
1600	1700		USA, KTBN Salt Lk City UT	7505na					
1600	1700		USA, Voice of America	6035af	6160va	7125va	9700va	9760va	
			13600va	13710af	15205va	15225af	15255va	15410af	15445va
			17810af	17895va					
1600	1700		USA, WBCQ Kennebunk, ME	17495na					
1600	1700	s	USA, WBCQ Kennebunk, ME	7415na					
1600	1700		USA, WEWN Birmingham AL	11550na	13615na	15375na	15745eu		
1600	1700		USA, WHRA Greenbush ME	17650va					
1600	1700		USA, WHRI Noblesville IN	13760na	15105am				
1600	1700		USA, WINB Red Lion PA	13570am					
1600	1700		USA, WJIE Louisville KY	7490am	13595am				
1600	1700		USA, WMLK Bethel PA	9465eu					
1600	1700		USA, WRMI Miami FL	15725am					
1600	1700		USA, WRNO New Orleans LA	7395am	15420am				
1600	1700		USA, WSHB Cypress Creek SC	18910af					
1600	1700		USA, WTJC Newport NC	9370na					
1600	1700		USA, WWCN Nashville TN	9475na	12160na	13845na			
			15685na						
1600	1700		USA, WYFR Okeechobee FL	11830na	17750na	17800as	18980eu		
			21455eu	21525af					
1610	1625		Armenia, TWR	5855eu					
1615	1630		Vatican City, Vatican Radio	4005eu	5890eu	7250eu	9645eu		
			15595eu						
1630	1645		Israel, Kol Israel	15615va	17545va				
1630	1700		Guam, AWR	9385me	11850me	17630me			
1630	1700		Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu			
1630	1700		UAE, AWR	9600me					
1630	1700		UK, BBC World Service	11955as	15645eu				
1645	1700		Germany, Deutsche Welle	6140eu					
1645	1700		Tajikistan, Radio	4760as	7245af				
1650	1700	mtwhf	New Zealand, Radio NZ Intl	11725do					

1700 UTC - 12PM E / 11AM C / 9AM P

1700	1715	swhfa	Russia, Bible Voice BC	7430af					
1700	1727		Czech Rep, Radio Prague Intl	5930eu	21745af				
1700	1730		Azerbaijan, Voice of	6110eu					
1700	1730		France Radio France Intl	15605af	17605af				
1700	1730		S Africa, Channel Africa	17860af					
1700	1750	mtwhf	New Zealand, Radio NZ Intl	11725do					
1700	1759		Poland, Radio Polonia	5995eu					
1700	1800		Anguilla, Caribbean Beacon	11775am					
1700	1800		Australia, Radio	5995do	9475as	9580do	9815do		
			11880do						
1700	1800		Australia, Voice International	11930as					
1700	1800		Canada, CBC Northern Service	9625do					
1700	1800		Canada, CFRX Toronto ON	6070do					
1700	1800		Canada, CFVP Calgary AB	6030do					
1700	1800		Canada, CKZN St John's NF	6160do					
1700	1800		Canada, CKZU Vancouver BC	6160do					
1700	1800		China, China Radio Intl	7150af	9570af	9670as	11910af	15205af	
1700	1800		Costa Rica, University Network	5030am	6150am	7375am	9725do		
			11870am	13750na	17645as				
1700	1800	mtwhf	Eq Guinea, Radio Africa	15185af					
1700	1800	a	Germany, Overcomer Ministries	6015eu					
1700	1800		Germany, Voice of Hope	9495eu					
1700	1800		Japan, Radio	9505na	11970eu	15355af			
1700	1800		Romania, R Romania Intl	11740eu	15380eu	15365eu	17805eu		
1700	1800		Russia, Voice of Russia	7310eu	7360af	9745eu	9775af	9820af	
			11510af	11675af	11985af				
1700	1800	as	Russia, Voice of Russia	7360eu	9480eu	9820eu	11675eu		
1700	1800		Taiwan, R Taipei Intl	11550as					
1700	1800		UK, BBC World Service	3255af	5975as	6190af	6195eu		
			7160af	7230af	9410eu	9510as	9630af	11860af	12095eu
			15310as	15400af	15420af	17830af	17860af	21470af	
1700	1800		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	

1700	1800		USA, KAUJ Dallas TX	13815va					
1700	1800		USA, KTBN Salt Lk City UT	7505na					
1700	1800		USA, Voice of America	6160va	7125va	7170va	9700va	9645va	
			15205va	15255va	15410af	15445af	17895af		
1700	1800	mtwhf	USA, Voice of America	5990va	6045va	7215va	9770va	9785va	
1700	1800		USA, WBCQ Kennebunk, ME	17495na					
1700	1800	s	USA, WBCQ Kennebunk, ME	7415na					
1700	1800		USA, WEWN Birmingham AL	11550na	13615na	15745eu	17595eu		
1700	1800		USA, WHRA Greenbush ME	17650va					
1700	1800		USA, WHRI Noblesville IN	9495am	13760va				
1700	1800		USA, WINB Red Lion PA	13570am					
1700	1800		USA, WJIE Louisville KY	7490am	13595am				
1700	1800		USA, WMLK Bethel PA	15265eu					
1700	1800		USA, WRMI Miami FL	15725am					
1700	1800		USA, WRNO New Orleans LA	7395am	15420am				
1700	1800		USA, WSHB Cypress Creek SC	18910af					
1700	1800		USA, WTJC Newport NC	9370na					
1700	1800		USA, WWCN Nashville TN	9475na	12160na	13845na			
			15685na						
1700	1800		USA, WWRB Manchester TN	9495va	12172va				
1700	1800		USA, WYFR Okeechobee FL	18980eu	21455eu	21680eu			
1715	1800	stwhfa	Russia, Bible Voice BC	7430af					
1725	1745	mtwhf/vl	UK, United Nations Radio	7170af	15495af	17580eu	21535eu		
1730	1745	vl	Libya, Voice of Africa	15435irr					
1730	1745		UK, BBC World Service	9525af					
1730	1755		Belgium, RVI Flanders R Intl	9925eu	13690eu	13710eu			
1730	1800		Georgia, Georgian Radio	6180me					
1730	1800	irreg	Liberia, ELWA	4760do					
1730	1800	vl/mtwhfa	Malta, VO Mediterranean	9605eu					
1730	1800		Netherlands, Radio	6020af	7120af	11655af			
1730	1800		Swaziland, TWR	9500af					
1730	1800	mtwhfa	Sweden, Radio	6065va	13580va				
1730	1800		Switzerland, Swiss R Intl	15220va	17735va	21720va			
1730	1800		Vatican City, Vatican Radio	13765af	15570af	17515af			
1735	1745	vl/th	Paraguay, Radio Nacional	9739do					
1745	1800		Bangladesh, Bangla Belar	7185eu	9550eu	15520eu			
1745	1800		India, All India Radio	7410eu	11620eu	11935af	13605af	15075af	
			15155af	17670af					
1751	1800	mtwhf	New Zealand, Radio NZ Intl	15160do					

1800 UTC - 1PM E / 12PM C / 10AM P

1800	1815		Russia, Bible Voice BC	7430af					
1800	1827		Vietnam, Voice of	5970eu	7145eu	9725eu	9730eu		
1800	1830	s	Germany, Universal Life	15750af					
1800	1830	s	Greece, Voice of	9420eu	15630eu	17705na			
1800	1830		Netherlands, Radio	6020af	7120af	11655af			
1800	1830		S Africa, AWR	5970af	6095af	7170af			
1800	1830		S Africa, Channel Africa	17860af					
1800	1830		UK, RTE Radio	15315me					
1800	1830	vl	Zimbabwe, ZBC Corp	4828do					
1800	1900		Anguilla, Caribbean Beacon	11775am					
1800	1900		Australia, Radio	6080do	7240do	9475as	9580do	9815do	
			11880do						
1800	1900		Australia, Voice International	11930as					
1800	1900		Bangladesh, Bangla Belar	7185eu	9550eu	15520eu			
1800	1900		Canada, CBC Northern Service	9625do					
1800	1900		Canada, CFRX Toronto ON	6070do					
1800	1900		Canada, CFVP Calgary AB	6030do					
1800	1900		Canada, CKZN St John's NF	6160do					
1800	1900		Canada, CKZU Vancouver BC	6160do					
1800	1900		Costa Rica, University Network	5030am	6150am	7375am	9725do		
			11870am	13750na	17645as				
1800	1900	mtwhf	Eq Guinea, Radio Africa	15185af					
1800	1900		India, All India Radio	7410eu	11620eu	11935af	13605af	15075af	
			15155af	17670af					
1800	1900		Kuwait, Radio	11990va					
1800	1900	irreg	Liberia, ELWA	4760do					
1800	1900		Liberia, R Liberia Intl	5100do					
1800	1900	mtwhf	New Zealand, Radio NZ Intl	15160do					
1800	1900		Russia, Voice of Russia	7300eu	7310eu	7360eu	9480eu	9745eu	
			9775af	9820eu	11870eu				
1800	1900		Swaziland, TWR	9500af					
1800	1900		Taiwan, R Taipei Intl	3955eu					
1800	1900		UK, BBC World Service	3255af	5975as	6050eu	6190af	6195eu	
			9410eu	9510as	12095eu	15310me	15400af	15420af	17830af
			17885af	21470af					
1800	1900		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
1800	1900		USA, KAUJ Dallas TX	13815va					
1800	1900		USA, KTBN Salt Lk City UT	7505na					
1800	1900		USA, Voice of America	6035af	7415af	9760va	9770va	11975af	
			15410af	15580af	17895af				

Shortwave Guide



1800	1900	USA, WBCQ Kennebunk, ME	17495na				
1800	1900	s USA, WBCQ Kennebunk, ME	7415na				
1800	1900	USA, WEWN Birmingham AL	11530na	13615na	15745eu	17595eu	
1800	1900	USA, WHRA Greenbush ME	17650va				
1800	1900	USA, WHRI Noblesville IN	9495am	13760va			
1800	1900	USA, WINB Red Lion PA	13570am				
1800	1900	USA, WJIE Louisville KY	7490am	13595am			
1800	1900	USA, WMLK Bethel PA	15265eu				
1800	1900	USA, WRMI Miami FL	15725am				
1800	1900	USA, WRNO New Orleans LA	7395am	15420am			
1800	1900	USA, WSHB Cypress Creek SC	15665eu	18910af			
1800	1900	USA, WTJC Newport NC	9370na				
1800	1900	USA, WWCR Nashville TN	9475na	12160na	13845na		
		15685na					
1800	1900	USA, WYFR Okeechobee FL	18980eu				
1800	1900	Yemen, Rep of Yemen Radio	9780me				
1815	2000	s Russia, Bible Voice BC	7430af				
1830	1900	Austria, Radio Austria Intl	5945eu	6155eu			
1830	1900	Greece, Voice of	11645eu				
1830	1900	s Greece, Voice of	9420eu	15630eu	17705na		
1830	1900	Netherlands, Radio	6020af	7120af	9895af	11655af	13700af
		17605af	21590af				
1830	1900	S Africa, AWR	7170af				
1830	1900	Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu		
1830	1900	Turkey, Voice of	9785eu				
1830	1900	UK, RTE Radio	13640na	21630af			
1830	1900	as USA, Voice of America	11690af	13835af	15525af		
1845	1900	mtwhfa Albania, Radio Tirana Intl	7210na	9520na			

1900 UTC - 2PM E / 1PM C / 11AM P

1900	1927	Vietnam, Voice of	7145eu	9730eu			
1900	1930	Hungary, Radio Budapest	6025eu	7130eu			
1900	1930	Turkey, Voice of	9785eu				
1900	19300	Israel, Kol Israel	9725va	11605va	15615va	15640af	17545va
1900	1945	Germany, Deutsche Welle	17810af	11805af	11965af	13720af	15390af
1900	1945	India, All India Radio	7410eu	11620eu	11935af	13605af	15075af
		15155af	17670af				
1900	1945	Iraq, Radio Iraq Intl	7157irr	9887irr	11787irr		
1900	1945	vi Zimbabwe, ZBC Corp	4828do	5012do			
1900	1956	North Korea, Voice of	13760eu	15245eu			
1900	2000	Anguilla, Caribbean Beacon	11775am				
1900	2000	mtwhf Argentina, RAE	9690eu	15345eu			
1900	2000	Australia, Radio	6080do	7240do	9500as	9580do	9815do
		11880do					
1900	2000	vi Botswana, Radio	3356do	4820do	7255do		
1900	2000	Bulgaria, Radio	9400eu	11900eu			
1900	2000	Canada, CBC Northern Service	9625do				
1900	2000	Canada, CFRX Toronto ON	6070do				
1900	2000	Canada, CFVP Calgary AB	6030do				
1900	2000	Canada, CKZN St John's NF	6160do				
1900	2000	Canada, CKZU Vancouver BC	6160do				
1900	2000	China, China Radio Intl	9440af	9585af			
1900	2000	Costa Rica, University Network	5030am	6150am	7375am	9725do	
		11870am	13750na	17645as			
1900	2000	mtwhf Eq Guinea, Radio Africa	15185af				
1900	2000	Germany, Voice of Hope	15715me				
1900	2000	vi Ghana, Ghana BC Corp	3366do	4915do			
1900	2000	Guyana, Voice of	3290do	5950do			
1900	2000	Kenya, Kenya BC Corp	4885do	4935do			
1900	2000	Kuwait, Radio	11990va				
1900	2000	irreg Liberia, ELWA	4760do				
1900	2000	Liberia, R Liberia Intl	5100do				
1900	2000	Malaysia, Radio	7295do				
1900	2000	smtwhfa Malta, VO Mediterranean	12060eu				
1900	2000	Namibia, NBC	3270af	3290af			
1900	2000	Netherlands, Radio	6020af	7120af	9895af	11655af	13700af
		17605af	21590af				
1900	2000	New Zealand, Radio NZ Intl	15160do				
1900	2000	Nigeria, Radio/Enugu	6025do				
1900	2000	Nigeria, Radio/Ibadan	6050do				
1900	2000	Nigeria, Radio/Kaduna	4770do	6090do	9570do		
1900	2000	Nigeria, Radio/Lagos	3326do	4990af			
1900	2000	Nigeria, Voice of	7255af				
1900	2000	mtwhfa Papua New Guinea, NBC	4890do	9675af			
1900	2000	Russia, Voice of Russia	7310eu	7330eu	7350eu	7360eu	7440eu
		9775eu	9820am	15735am			
1900	2000	South Korea, R Korea Intl	5975am	7275eu			
1900	2000	Thailand, Radio	7155eu				
1900	2000	Uganda, Radio	4976do	5026af	7195af		
1900	2000	UK, BBC World Service	3255af	5975as	6005af	6190af	6195eu

1900	2000	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1900	2000	USA, KAJI Dallas TX	13815va				
1900	2000	USA, KJES Vado NM	15385au				
1900	2000	USA, KTBN Salt Lk City UT	7505na				
1900	2000	USA, Voice of America	4950af	6035af	6095va	6160va	7260va
		7375af	7415af	9525va	9680va	9770va	11770va
		13635va	15180va	15410af	15445af	15580af	
1900	2000	USA, WBCQ Kennebunk, ME	17495na				
1900	2000	s USA, WBCQ Kennebunk, ME	7415na				
1900	2000	USA, WEWN Birmingham AL	11550na	13615na	15745eu	17595eu	
1900	2000	USA, WHRA Greenbush ME	17650va				
1900	2000	USA, WHRI Noblesville IN	9495am	13760va			
1900	2000	USA, WINB Red Lion PA	13570am				
1900	2000	USA, WJIE Louisville KY	7490am	13595am			
1900	2000	USA, WMLK Bethel PA	15265eu				
1900	2000	USA, WRMI Miami FL	15725am				
1900	2000	USA, WRNO New Orleans LA	7395am	15420am			
1900	2000	USA, WSHB Cypress Creek SC	15665eu	18910af			
1900	2000	USA, WTJC Newport NC	9370na				
1900	2000	USA, WWCR Nashville TN	9475na	12160na	13845na		
		15685na					
1900	2000	USA, WYFR Okeechobee FL	3230eu	18930eu	18980eu		
1900	2000	vi Vanuatu, Radio	4960do	7260do			
1900	2000	Zambia, Christian Voice	4965af				
1900	2000	vi Zambia, Radio ZNBC	4910do	6265af			
1930	1955	Belgium, RVI Flanders R Intl	9925eu	13690eu			
1930	2000	Austria, AWR	7130eu				
1930	2000	th Belarus, Radio Belarus Intl	7105eu	7210eu			
1930	2000	Georgia, Georgian Radio	11760eu				
1930	2000	Iran, VOIRI	9800eu	11670eu	11750af	11855eu	
1930	2000	Poland, Radio Polonia	7165eu	7265eu			
1930	2000	mtwh/vl Solomon Islands, SIBC	5020do				
1930	2000	Sweden, Radio	6065va				
1930	2000	Switzerland, Swiss R Intl	13645af	15220af	17580af	17735af	
1930	2000	USA, Voice of America	9550va	9840va	11780va	11970va	12015va
		13715va	15235va				
1935	1955	Italy, RAI Intl	5970eu	9745eu			
1940	2000	mtwhfa Armenia, Voice of	4810eu	9960eu			
1950	2000	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9645eu	

2000 UTC - 3PM E / 2PM C / 12PM P

2000	2010	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9645af	
		9660af	11625af	13765af			
2000	2015	s/vl Solomon Islands, SIBC	5020do				
2000	2025	Netherlands, Radio	6020af	7120af	9895af	11655af	13700af
		17605af	21590af				
2000	2027	Czech Rep, Radio Prague Intl	5930eu	11600va			
2000	2027	Iran, VOIRI	9800eu	11670eu	11750af	11855eu	
2000	2029	Poland, Radio Polonia	7165eu	7265eu			
2000	2030	Mongolia, Voice of	12015eu				
2000	2030	mtwh/vl Solomon Islands, SIBC	5020do				
2000	2030	Switzerland, Swiss R Intl	13645af	15220af	17580af	17735af	
2000	2030	USA, Voice of America	4950af	6035af	7375af	7415af	11855af
		11975af	15410af	15445af	15580af	17745af	17895af
2000	2045	Germany, Deutsche Welle	6140eu				
2000	2045	Iraq, Radio Iraq Intl	7157irr	9887irr	11787irr		
2000	2050	New Zealand, Radio NZ Intl	15160do				
2000	2059	Canada, Radio Canada Intl	5850va	12015va	15325va	15470va	17870va
		12015va	15325va	15470va	17870va		
2000	2100	Algeria, Radio Algiers Intl	11715eu	15160eu			
2000	2100	Anguilla, Caribbean Beacon	11775am				
2000	2100	Australia, ABC NT Katharine	2485do				
2000	2100	Australia, ABC NT Tennant Crk	2325do				
2000	2100	Australia, Radio	9500as	9580do	9815do	11880do	
		12080do					
2000	2100	vi Botswana, Radio	3356do	4820do	7255do		
2000	2100	Canada, CBC Northern Service	9625do				
2000	2100	Canada, CFRX Toronto ON	6070do				
2000	2100	Canada, CFVP Calgary AB	6030do				
2000	2100	Canada, CKZN St John's NF	6160do				
2000	2100	Canada, CKZU Vancouver BC	6160do				
2000	2100	China, China Radio Intl	5965eu	9840eu	11640eu	13640af	
2000	2100	Costa Rica, University Network	5030am	6150am	7375am	9725do	
		11870am	13750na	17645as			
2000	2100	Ecuador, HCJB	17660eu				
2000	2100	mtwhf Eq Guinea, Radio Africa	15185af				
2000	2100	Germany, Voice of Hope	6175eu	15715me			
2000	2100	vi Ghana, Ghana BC Corp	3366do	4915do			

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2000	2100	Indonesia, Voice of	9525do	11785al	15150as				
2000	2100	Kenya, Kenya BC Corp	4885do	4935do					
2000	2100	Kuwait, Radio	11990va						
2000	2100	ireg Liberia, ELWA	4760do						
2000	2100	Liberia, R Liberia Intl	5100do						
2000	2100	Malaysia, Radio	7295do						
2000	2100	Namibia, NBC	3270af	3290af					
2000	2100	Nigeria, Radio/Enugu	6025do						
2000	2100	Nigeria, Radio/Ibadan	6050do						
2000	2100	Nigeria, Radio/Kaduna	4770do	6090do	9570do				
2000	2100	Nigeria, Radio/Lagos	3326do	4990al					
2000	2100	Nigeria, Voice of	7255af						
2000	2100	Russia, Voice of Russia	7330eu	7350eu	9775eu	9820eu	11980eu		
		15735am							
2000	2100	S Africa, AWR	9745af						
2000	2100	mtwhf Spain, R Exterior Espana	9570af	15290af					
2000	2100	Uganda, Radio	4976do	5026al	7195al				
2000	2100	UK, BBC World Service	3255af	5975ca	6005af	6190af	6195eu		
		9410eu	9630af	11835af	11955eu	12095eu	15400af	17830af	
2000	2100	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb			
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb		
2000	2100	USA, KAJI Dallas TX	13815va						
2000	2100	USA, KJES Vado NM	15385na						
2000	2100	USA, KTBN Salt Lk City UT	7505na						
2000	2100	USA, Voice of America	6095va	6160va	9770va				
2000	2100	USA, WBCQ Kennebunk, ME	7415na	9335na	17495na				
2000	2100	USA, WEWN Birmingham AL	11530na	11550na	13615na	15745eu			
		17595eu							
2000	2100	USA, WHRA Greenbush ME	17650va						
2000	2100	USA, WHRI Noblesville IN	5745va	9495am	13760va				
2000	2100	USA, WINB Red Lion PA	13570am						
2000	2100	USA, WJIE Louisville KY	7490am	13595am					
2000	2100	USA, WMLK Bethel PA	15265eu						
2000	2100	USA, WRMI Miami FL	15725am						
2000	2100	USA, WRNO New Orleans LA	7395am	15420am					
2000	2100	USA, WTJC Newport NC	9370na						
2000	2100	USA, WWCR Nashville TN	15685na	9475na	12160na	13845na			
2000	2100	USA, WWRB Manchester TN	9320va	9400va	12172va				
2000	2100	USA, WYFR Okeechobee FL	3230eu	15195eu	17725do	17845af			
		18980eu							
2000	2100	vi Vanuatu, Radio	4960do	7260do					
2000	2100	Zambia, Christian Voice	4965af						
2000	2100	vi Zambia, Radio ZNBC	4910do	6265al					
2000	2100	vi Zimbabwe, ZBC Corp	5975do	6045al					
2000	2115	as Russia, Bible Voice BC	11645eu						
2000	2100	USA, WSHB Cypress Creek SC	15665eu	18910af					
2005	2100	vi Syria, Radio Damascus	12085eu	13610eu					
2010	2030	Vatican City, Vatican Radio	9660af	11625af	13765af				
2025	2045	Italy, RAI Intl	6185af	9760af	11880af				
2030	2045	vi Libya, Voice of Africa	15435irr	17750irr					
2030	2045	Thailand, Radio	9680eu						
2030	2057	Vietnam, Voice of	7145eu	9730eu					
2030	2100	t Belarus, Radio Belarus Intl	7105eu	7210eu					
2030	2100	Cuba, Radio Havana	13660usb	13750eu					
2030	2100	Ecuador, HCJB	21455usb						
2030	2100	Georgia, Georgian Radio	11760eu						
2030	2100	vi Solomon Islands, SIBC	5020do						
2030	2100	Turkey, Voice of	9525va						
2030	2100	f UK, Wales Radio Intl	7325eu						
2030	2100	USA, Voice of America	6035af	7375af	7415af	11975af	15410af		
		15455af	15580af	17745af	17895af				
2030	2100	as USA, Voice of America	4950af						
2030	2100	Uzbekistan, Radio Tashkent	5025eu	9545eu	11905eu				
2045	2100	India, All India Radio	7150eu	9650eu	11620eu	11715eu			
2051	2100	New Zealand, Radio NZ Intl	17675do						

2100 UTC - 4PM E / 3PM C / 1PM P

2100	2130	Australia, ABC NT Katherine	2485do						
2100	2130	Australia, ABC NT Tennant Crk	2325do						
2100	2130	Australia, Radio	7240do	9580do	9660do				
		11880do	12080do	17715do	21740do				
2100	2130	Canada, Radio Canada Intl	5850va	7235va	13690va	15325va			
		17870va							
2100	2130	Cuba, Radio Havana	13660usb	13750eu					
2100	2130	Hungary, Radio Budapest	3975eu	6025eu					
2100	2130	Kenya, Kenya BC Corp	4885do	4935do					
2100	2130	Nigeria, Radio/Ibadan	6050do						
2100	2130	South Korea, R Korea Intl	3955eu	15575eu					
2100	2130	Turkey, Voice of	9525va						
2100	2145	Germany, Deutsche Welle	9670as	9765as	9830af	11865af			
		11915as	15135af						

2100	2156	North Korea, Voice of	13760eu	15245eu					
2100	2200	Anguilla, Caribbean Beacon	11775am						
2100	2200	Austria, AWR	15355af						
2100	2200	vi Botswana, Radio	3356do	4820do					
2100	2200	Bulgaria, Radio	9400eu	11900eu					
2100	2200	Canada, CBC Northern Service	9625do						
2100	2200	Canada, CFRX Toronto ON	6070do						
2100	2200	Canada, CFVP Calgary AB	6030do						
2100	2200	Canada, CKZN St John's NF	6160do						
2100	2200	Canada, CKZV Vancouver BC	6160do						
2100	2200	China, China Radio Intl	5965eu	9840eu	11735eu	13630af			
2100	2200	Costa Rica, University Network	5030am	6150am	7375am				
		9725do	11870am	13750na	17645as				
2100	2200	Ecuador, HCJB	17660eu	21455usb					
2100	2200	mtwhf Eq Guinea, Radio Africa	15185af						
2100	2200	vi Ghana, Ghana BC Corp	3366do	4915do					
2100	2200	Guyana, Voice of	3290do	5950do					
2100	2200	India, All India Radio	7150eu	9650eu	11620eu	11715eu			
2100	2200	Japan, Radio	6035do	6055eu	6180eu	11830eu			
		11855af	17825na	17860do	21670do				
2100	2200	ireg Liberia, ELWA	4760do						
2100	2200	Liberia, R Liberia Intl	5100do						
2100	2200	Malaysia, Radio	7295do						
2100	2200	Namibia, NBC	3270af	3290af					
2100	2200	New Zealand, Radio NZ Intl	17675do						
2100	2200	Nigeria, Radio/Enugu	6025do						
2100	2200	Nigeria, Radio/Kaduna	4770do	6090do	9570do				
2100	2200	Nigeria, Radio/Lagos	3326do	4990al					
2100	2200	Palau, KHBN/V O Hope	9985as						
2100	2200	mtwhfa Papua New Guinea, NBC	4890do	9675al					
2100	2200	Romania, R Romania Intl	9510eu	9725eu	11740eu				
		11940eu							
2100	2200	vi Solomon Islands, SIBC	5020do						
2100	2200	as Spain, R Exterior Espana	9570af	9840eu					
2100	2200	vi Syria, Radio Damascus	12085eu	13610eu					
2100	2200	Taiwan, R Taipei Intl	15600eu						
2100	2200	UK, BBC World Service	3255af	3915as	6005af	6190af	6195eu		
		9410eu	11675va	11835af	11945as	12095do	15400af		
2100	2200	Ukraine, R Ukraine Intl	5905eu	6020eu	9950eu	11705eu			
		11950eu							
2100	2200	USA, Armed Forces Network	4319usb	4993usb	5765usb				
		6350usb	6458usb	10320usb	10940usb	12579usb	12689usb		
		13362usb							
2100	2200	USA, KAJI Dallas TX	13815va						
2100	2200	USA, KTBN Salt Lk City UT	7505na						
2100	2200	USA, Voice of America	6035af	6040va	6095va	7375af	7415af		
		9530va	9705va	9760va	11870va	11975af	13765va		
		15185va	15410af	15455af	15580af	17740va	17820va		
		17895af							
2100	2200	USA, WBCQ Kennebunk, ME	7415na	9335na	17495na				
2100	2200	USA, WEWN Birmingham AL	11530na	11550na	13615na				
		17595eu							
2100	2200	USA, WHRA Greenbush ME	17650va						
2100	2200	USA, WHRI Noblesville IN	5745va	9495am	13760va				
2100	2200	USA, WINB Red Lion PA	13570am						
2100	2200	USA, WJIE Louisville KY	7490am	13595am					
2100	2200	USA, WMLK Bethel PA	15265eu						
2100	2200	USA, WRMI Miami FL	15725am						
2100	2200	USA, WRNO New Orleans LA	7395am	15420am					
2100	2200	USA, WSHB Cypress Creek SC	15665eu	18910af					
2100	2200	USA, WTJC Newport NC	9370na						
2100	2200	USA, WWCR Nashville TN	15685na	9475na	12160na	13845na			
2100	2200	USA, WWRB Manchester TN	9320va	9400va	12172va				
2100	2200	USA, WYFR Okeechobee FL	15120af	15770eu	17725do				
		17845af	18980eu						
2100	2200	vi Vanuatu, Radio	4960do	7260do					
2100	2200	Zambia, Christian Voice	4965af						
2100	2200	vi Zambia, Radio ZNBC	4910do	6265al					
2100	2200	vi Zimbabwe, ZBC Corp	5975do	6045al					
2130	2157	Czech Rep, Radio Prague Intl	11600va	15545af					
2130	2200	mtwhfa Albania, Radio Tirana Intl	7130eu	9540eu					
2130	2200	Australia, ABC NT Alice Springs	4835do						
2130	2200	Australia, ABC NT Katherine	5025do						
2130	2200	Australia, ABC NT Tennant Crk	4910do						
2130	2200	Australia, Radio	7240do	9660do	11880do	12080do			
		17715do	21740do						
2130	2200	mtwhf Austria, Radio Austria Intl	5945va	6155eu					
2130	2200	Guam, AWR	11850as	11980as					
2130	2200	Iran, VOIRI	9570as	13655eu					
2130	2200	South Korea, R Korea Intl	3955eu	15575eu					
2130	2200	Sweden, Radio	6065va	15255va					
2130	2200	Uzbekistan, Radio Tashkent	5025eu	9545eu	11905eu				

Shortwave Guide



2200 UTC - 5PM E / 4PM C / 2PM P

2200	2205	vi	Syria, Radio Damascus	12085eu	13610eu				
2200	2230		Azerbaijan, Voice of	6110as					
2200	2230		Canada, Radio Canada Intl		6175sam	9590am	11920am		
			13670am 15170am	17695sam	17880am				
2200	2230		India, All India Radio	7150eu	9650eu	11620au	11715au		
2200	2230		Iran, VOIRI 9570au	13655au					
2200	2230	as	USA, Voice of America	5855saf	6035saf	7375saf	7415saf		
			11975saf						
2200	2230	vi	Zambia, Radio ZNBC	4910do	6265sa				
2200	2230	vi	Zimbabwe, ZBC Corp	5975do	6045sa				
2200	2300		Anguilla, Caribbean Beacon	6090am					
2200	2300		Australia, ABC NT Alice Springs	4835do					
2200	2300		Australia, ABC NT Katherine	5025do					
2200	2300		Australia, ABC NT Tennant Crk	4910do					
2200	2300		Australia, Radio	13620as	15240as	17715do	17795va		
			21470do						
2200	2300		Canada, CBC Northern Service	9625do					
2200	2300		Canada, CFRX Toronto ON	6070do					
2200	2300		Canada, CFVP Calgary AB	6030do					
2200	2300		Canada, CKZN St John's NF	6160do					
2200	2300		Canada, CKZU Vancouver BC	6160do					
2200	2300		China, China Radio Intl 7170eu						
2200	2300		Costa Rica, R for Peace Intl	7445va	15039va				
2200	2300		Costa Rica, University Network	5030am	6150am	7375am	9725do		
			11870am 13750na	17645as					
2200	2300	mtwhf	Eat Guinea, Radio Africa	15185af					
2200	2300	vi	Ghana, Ghana BC Corp	3366do	4915do				
2200	2300		Guyana, Voice of	3290do	5950do				
2200	2300		Liberia, R Liberia Intl	5100do					
2200	2300		Malaysia, Radio	7295do					
2200	2300		Namibia, NBC	3270af	3290af				
2200	2300		New Zealand, Radio NZ Intl	17675do					
2200	2300		Nigeria, Radio/Enugu	6025do					
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do	9570do			
2200	2300		Nigeria, Radio/Lagos	3326do	4990al				
2200	2300		Palau, KHBN/VO Hope	9965as	9985as				
2200	2300	vi	Solomon Islands, SIBC	5020do					
2200	2300		Taiwan, R Taipei Intl	15600eu					
2200	2300		Turkey, Voice of	11960va	12000va				
2200	2300		UK, BBC World Service	3915as	5965as	5975sam	6195as	7105as	
			9580eu 9740as	11685as	11945as	11955as	12095af		
			15390ca 15400af						
2200	2300		USA, Armed Forces Network	4319usb	4993usb	5765usb			
			6350usb 6458usb	10320usb	10940usb	12579usb	12689usb		
			13362usb						
2200	2300		USA, KAU Dallas TX	13815va					
2200	2300		USA, KTN Salt Lk City UT	7505na					
2200	2300		USA, KWHR Naalehu HI	17510as					
2200	2300		USA, Voice of America	7215va	9770va	11760va			
			13765va 15185va	15290va	15305va	17740va	17820va		
2200	2300		USA, WBCQ Kennebunk, ME	7415na	9335na				
2200	2300		USA, WEWN Birmingham AL	9975eu	11530na	11550na			
			15745eu 17595eu						
2200	2300		USA, WHRA Greenbush ME	7580eu	17650af				
2200	2300		USA, WHRI Noblesville IN	5745va	9495sam	13760va			
2200	2300		USA, WINB Red Lion PA	13570am					
2200	2300		USA, WJIE Louisville KY	7490am	13595sam				
2200	2300		USA, WRMI Miami FL	15725am					
2200	2300		USA, WRNO New Orleans LA	7395am	15420am				
2200	2300		USA, WSHB Cypress Creek SC	13770eu	15285do				
2200	2300		USA, WTJC Newport NC	9370na					
2200	2300		USA, WWCR Nashville TN	7435na	9475na	12160na			
			13845na 15685na						
2200	2300		USA, WWRB Manchester TN	6890va	9320va	9400va			
			12172va						
2200	2300		USA, WYFR Okeechobee FL	11740na	15695af	15770eu			
			17845af						
2200	2300	vi	Vanuatu, Radio	4960do	7260do				
2200	2300		Zambia, Christian Voice	4965af					
2205	2230		Italy, RAI Intl	11900as	15625as				
2230	2255		Belgium, RVI Flanders R Intl	15565na					
2230	2257		Czech Rep, Radio Prague Intl	11600na	15545na				
2230	2300		Canada, Radio Canada Intl	6175na	9590na	13670na			
			17695na						
2230	2300		Cuba, Radio Havana	9550am					
2245	2300		India, All India Radio	9705as	9950as	11620as	13605as		

2300 UTC - 6PM E / 5PM C / 3PM P

2300	0000		Anguilla, Caribbean Beacon	6090am					
2300	0000		Australia, ABC NT Alice Springs	4835do					
2300	0000		Australia, ABC NT Katherine	5025do					
2300	0000		Australia, ABC NT Tennant Crk	4910do					
2300	0000		Australia, Radio	9660do	12080do	13620as	15240as		
			17715do 17795do	21740do					
2300	0000		Bulgaria, Radio	9400na	11700na				
2300	0000		Canada, CBC Northern Service	9625do					
2300	0000		Canada, CFRX Toronto ON	6070do					
2300	0000		Canada, CFVP Calgary AB	6030do					
2300	0000		Canada, CKZN St John's NF	6160do					
2300	0000		Canada, CKZU Vancouver BC	6160do					
2300	0000		China, China Radio Intl 5990na	13680na					
2300	0000		Costa Rica, R for Peace Intl	7445va	15039va				
2300	0000		Costa Rica, University Network	5030am	6150am	7375am	9725do		
			11870am 13750na	17645as					
2300	0000		Egypt, Radio Cairo	9900na					
2300	0000	vi	Ghana, Ghana BC Corp	3366do	4915do				
2300	0000		Guyana, Voice of	3290do	5950do				
2300	0000		India, All India Radio	9705as	9950as	11620as	13605as		
2300	0000		Liberia, R Liberia Intl	5100do					
2300	0000		Malaysia, Radio	7295do					
2300	0000		Namibia, NBC	3270af	3290af				
2300	0000		New Zealand, Radio NZ Intl	17675do					
2300	0000		Palau, KHBN/VO Hope	9965as	9985as				
2300	0000		Romania, R Romania Intl	9570eu	11740na	11775na			
			15105na						
2300	0000		Singapore, SBC Radio One	6150do					
2300	0000		Sn Lanka, SLBC	4940do					
2300	0000		UK, BBC World Service	3915as	5965as	5975sam	6195as	7105as	
			9580eu 9740as	11685as	11945as	11955as	12095af	15390ca	
			15400af						
2300	0000		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
			6458usb 10320usb	10940usb	12579usb	12689usb	13362usb		
2300	0000		USA, KAU Dallas TX	13815va					
2300	0000		USA, KWHR Naalehu HI	17510as					
2300	0000		USA, KWHR Naalehu HI	17510as					
2300	0000		USA, Voice of America	7215va	9770va	11760va	13765va		
			15185va 15290va	15305va	17740va	17820va			
2300	0000		USA, WBCQ Kennebunk, ME	7415na	9335na				
2300	0000		USA, WEWN Birmingham AL	9355na	9975eu	15745na	17595eu		
2300	0000		USA, WHRA Greenbush ME	7580eu					
2300	0000		USA, WHRI Noblesville IN	5745va	9495sam	13760va			
2300	0000		USA, WINB Red Lion PA	12160am					
2300	0000	smtwhf	USA, WJIE Louisville KY	7490am	13595sam				
2300	0000		USA, WRMI Miami FL	7385am					
2300	0000		USA, WRMI Miami FL	9955am					
2300	0000		USA, WRNO New Orleans LA	7355am					
2300	0000		USA, WSHB Cypress Creek SC	13770eu	15285do				
2300	0000		USA, WTJC Newport NC	9370na					
2300	0000	as	USA, WWBS Macon GA	11900na					
2300	0000		USA, WWCR Nashville TN	5070na	7435na	9475na			
			13845na 15685na						
2300	0000		USA, WWRB Manchester TN	6890va	9320va	9400va	12172va		
2300	0000		USA, WYFR Okeechobee FL	5895do	11740na	11855do			
			15255do 17750do						
2300	0000	vi	Vanuatu, Radio	4960do	7260do				
2300	0000		Zambia, Christian Voice	4965af					
2300	2230		Mexico, Radio Mexico Intl	9705am	11770am				
2300	2330		Cuba, Radio Havana	9550am					
2300	2330		Nigeria, Radio/Enugu	6025do					
2300	2330		Nigeria, Radio/Kaduna	4770do	6090do				
2300	2330		Nigeria, Radio/Lagos	3326do	4990al				
2300	2330	vi	Solomon Islands, SIBC	5020do					
2300	2330		USA, Voice of America	7190va	7200va	9545va	11925va	13755va	
2300	2345		Germany, Deutsche Welle	9815as	12000as	17560as	21790as		
2303	2310		Croatia, Croatian Radio	9925na					
2330	0000		Canada, Radio Canada Intl	6175na	9590na	13670na			
			17695na						
2330	0000		Lithuania, R Vilnius	9875eu					
2330	0000		Netherlands, Radio	6165na	9845na				
2330	0000	a	Russia, Radio Ezra	17665na					
2330	0000		Switzerland, Swiss R Intl	9885do	11905do				
2330	0000		USA, Voice of America	7190va	7200va	7225va	7260va	9545va	
			11805va 11925va	13735va	13775va	15205va			
2330	2345	vi	Libya, Voice of Africa	15435irr	17750irr				
2330	2357		Vietnam, Voice of	9840as	12020as				
2345	0000	vi	Pakistan, Radio	11580as	15455as				

Notes regarding BBCWS Listings:

- BBCWS stream abbreviations:** (am)=Americas; (eas)=East Asia. At print deadline for this listing, the BBCWS had not yet released details of its schedule for the B02 season. Therefore, BBCWS listings this month are educated predictions based on seasonal changes the service has made previously.
- Listings for the BBCWS this month also are limited to those recommended by the station to listeners in North America. Other than the Americas stream (am), the East Asia (eas) stream is recommended to listeners in western North America.
- The editor of this listing is attempting to catalog reception of the BBCWS in North America and would appreciate input from readers as to the frequencies on which they are hearing the BBCWS at their listening locations. Please e-mail johnfigliozzi@monitoringtimes.com or write c/o this magazine with the following information: times of day (in UTC) heard, frequency or frequencies monitored, listener's location, radio and antenna used. Thank you. Results of this survey will be reflected in future editions of this Shortwave Guide.

0000 UTC / 7pm E / 4pm P - Page 43 Freqs

Newscasts (*extended)

0000 BBCWS(am)	S	News Summary
	M	World Briefing*
	T-A	News
R. Australia	D	World News
R. Canada Int.	D	News
R. Japan	D	World News
R. New Zealand Int.	D	News
Spanish Foreign R.	T-A	Ibero-American News*
VOA News Now	T-A	News*
0030 BBCWS(am)	M	The World Today*
VOA News Now	T-A	News Headlines

Current Affairs Magazines/Features

0005 BBCWS(am)	T-A	Outlook
R. Canada Int.	T-A	As It Happens (from 2330)
0010 R. Australia	H	Background Briefing (documentaries)
0015 R. Japan	T-A	44 Minutes
		VOA News Now
0032 Spanish Foreign R.	T-A	Focus (one story in depth) Press Review

Business/Economics (also in Newscasts & Current Affairs)

0000 R. Netherlands	A	A Good Life (development issues)
0005 R. New Zealand Int.	A	Your Money
0030 R. Netherlands	W	A Good Life
0032 VOA News Now	T-A	Business News

Science/Technology (incl. Health & Environment)

0000 R. Netherlands	T	The Research File
0005 R. Canada Int.	S	Quirks and Quarks
0010 R. Australia	T	The Science Show
0030 R. Netherlands	F	The Research File
0034 R. Australia	S	Ockham's Razor

Arts & Culture

0005 R. New Zealand Int.	S	At the Movies
0010 R. Australia	M	Away! (Aboriginal culture)
0030 R. New Zealand Int.	S	Bookmarks

Local Lives & Views

0000 R. Netherlands	M	Dutch Horizons
0010 R. Australia	W	The National Interest
	F	Hindsight (social history)
	M	Weekend Square
0030 R. Australia	A	Country Breakfast (rural Australia)
R. Netherlands	T	Euroquest (Europe in context)
	H	Dutch Horizons

0034 VOA News Now	T-A	Coast to Coast
Informational Features		
0000 R. Netherlands	H	Documentary
	F	Sound Fountain (soundscapes)
0005 R. Australia	S	The Europeans
0030 R. Netherlands	M	Sound Fountain
	A	Documentary
0045 BBCWS(am)	W	Heart and Soul (religion)
	F	What's the Problem? (advice)
0047 Spanish Foreign R.	T-A	Spanish Language Course
Music		
0000 R. Netherlands	S/W	Music 52-15 (world/folk)
	A	WBCQ(7415kHz)
	A	Last Discs Radio Show
0005 R. Canada Int.	M	Global Village (world/folk)
	M-F	Padenzza (light classics)
0030 R. Netherlands	S	Dutch Classics
Entertainment		
0000 WBCQ	M	Le Show
0001 BBCWS(am)	S	Play of the Week (radio theatre)
	T/A	Westway (drama serial)

SWL, Media & Communications
(see Programming Spotlight)

Listener Contact/Interactive

0005 R. Australia	A	Feedback
0010 R. Japan	S	Hello from Tokyo
0030 R. Australia	A	Feedback
	S	R. for Peace Int
0035 Spanish Foreign R.	A	Radio Club
0045 BBCWS(am)	T	Write On
0047 Spanish Foreign R.	M	Radio Club (rpt.)

Sport

0020 BBCWS(am)	M	Sports Roundup
0023 VOA News Now	T-A	Sports

0100 UTC / 8pm E / 5pm P - Page 43 Freqs

Newscasts (*extended)

0100 BBCWS(am)	S/M	The World Today*
	T-A	News
China R. Int.	D	News
Deutsche Welle	D	News
HCJB	T-A	Latin American & World News
R. Australia	D	News
R. Habana Cuba	T-S	International News
R. Netherlands	S/M	News
R. New Zealand Int.	D	News
R. Prague	D	News
VOA News Now	T-A	News and Analysis*
	D	News
0110 R. Habana Cuba	T-S	National News
0130 R. Habana Cuba	T-S	News Bulletin
	T-S	RTE, Ireland
	T-S	The News at Six*
VOA News Now	T-A	News Headlines
VOA Spec. Eng.	T-A	News

Current Affairs Magazines/Features

0100 R. Netherlands	T-A	Newsline
0105 Deutsche Welle	M	Talking Point (journalists)
	T-A	Newslink
R. Australia	A	Asia Pacific Weekend Edition
R. Netherlands	M	Wide Angle (week in review)
0110 China R. Int.	S	Report on Developing Countries
	M-F	Current Affairs
	A	Global Review
R. Australia	M-F	Asia Pacific
R. Habana Cuba	M	Weekly Review
0115 R. Habana Cuba	T-S	Viewpoint
0130 BBCWS(am)	S	Agenda (trends)
	S	Deutsche Welle
	T	Insight
0140 R. Habana Cuba	A	Weekly Review
	A	In the News

0145 VOA News Now	T-F	Dateline
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Business/Economics (also in Newscasts & Current Affairs)

0115 Voice of Vietnam	F	Vietnam Economy
0120 R. Prague	F	Economic Report
0130 China R. Int.	T	Biz China
0132 VOA News Now	T-A	Business News
0140 VOA Spec. Eng.	T	Development Report

Science/Technology (incl. Health & Environment)

0105 R. New Zealand Int.	A	Eureka!
0130 Deutsche Welle	W	Man and Environment
R. Australia	M	The Health Report
R. New Zealand Int.	A	Health or Environment
0140 VOA Spec. Eng.	W	Agriculture Today
	H	Health Report
	A	Environment Report
0145 VOA Spec. Eng.	W	Science in the News
	H	Explorations
0150 R. Habana Cuba	M	Breakthrough

Arts & Cultural

0105 BBCWS(am)	T	Meridian-Masterpiece (ideas)
	W	Meridian-Screen (cinema)
	F	Meridian-Writing (books)
	A	Arts in Action
	S	Readings from Czech Literature (biweekly)
	M	The Arts
0110 R. Prague	M	Arts on the Air
0115 Deutsche Welle	M	Culture and Society
	W	In the Spotlight
C120 China R. Int.	S	Literature and Arts
	A	RA Arts
0130 R. Australia	A	American Stories
0145 VOA Spec. Eng.	A	The Making of a Nation
	H	

Local Lives & Views

0105 R. Netherlands	S	Europe Unzipped
R. New Zealand Int.	M-F	In Touch with New Zealand
R. Prague	M	Letter from Prague
T-A		Newsview
	D	Current Affairs
0110 HCJB	T-A	Studio 9 (Latin America)
0115 Deutsche Welle	S	Inside Europe
	S	Spotlight (Czech places)
	T	One on One (interview)
	H	Czechs in History or Profile
	T	Vietnam: Land and People
	A	Rural Vietnam
0120 R. Prague	W	Talking Point or Central Europe Today
0130 BBCWS(sas)	A	People and Politics (Parliament)
	M	People in the Know
	W	China Horizons
	F	Life in China
	H	Living in Germany
0140 R. Habana Cuba	T/H/F	Caribbean Outlook
0145 VOA Spec. Eng.	T	This is America
	F	Making of a Nation
	A	American Mosaic

Informational Features

0105 Deutsche Welle	M	Religion and Society
	S	Changing feature or series
0130 China R. Int.	H	Voices from Other Lands
	A	German by Radio
	T	The Low Report
	W	The Religion Report
0140 VOA Spec. Eng.	F	Education Report

Music

0100 WBCQ(7415 kHz.)	S	A Different Kind of Oldies Show
0105 BBCWS(am)	H	Meridian-Music
0110 HCJB	A	Musica del Ecuador [within 'Studio 9']
	S	Saturday Music (classical/folk/jazz)[biweekly]
0120 Voice of Vietnam	S	Music
0130 BBCWS(am)	T	Charlie Gillett (world)
	W	UK Top 20

Shortwave Guide



	H	Revolver (artist's choice)
	F	Jahn Peel (eclectic)
	A	Jazzmazz
R. Australia	S	Oz Sounds
Entertainment		
0100 WBCQ(7415 kHz.)	M	Radio NY International (to 0400)
	A	Allan Weiner Worldwide
0110 Voice of Vietnam	S	Sunday Show
0145 BBCWS(eas)	M-F	Off the Shelf (readings)

SWL, Media & Communications (see Programming Spotlight)

Listener Contact/Interactive

0100 HCB	M	Musical Mailbag
0115 Voice of Vietnam	H	Letterbox
0120 China R. Int.	A	Listeners' Garden
R. Prague	M	Mailbag
0130 HCB	S	Saludos Amigos
R. far Peace Int.	W	RFPI Mailbag
0140 R. Habana Cuba	M	Mailbag Show

Sport

0105 R. Australia	S/A	Grandstand (live sport)*
0120 BBCWS(am)	M	Sports Roundup
0123 VOA News Now	T-A	Sports Report
0130 Deutsche Welle	F	Hard to Beat: The World of Sport
R. Australia	F	The Sports Factor
RTE Ireland	S/M	Sportsnews
0135 R. Habana Cuba	T-A	Time Out
0135 R. New Zealand Int.	S/A	Live Sport (in season)

*special service on 9660, 12080, 17580, 21725 kHz.

0200 UTC / 9pm E / 6pm P - Page 43 Freqs

Newscasts (*extended)

0200 BBCWS(am)	S	The World Today*
	M-A	News
R. Australia	D	News
R. Budapest	D	News
R. Canada Int.	D	News
R. Habana Cuba	T-S	International News
R. Korea Int.	D	News
R. New Zealand Int.	D	News
R. Prague	D	News
R. Taipei Int.	D	News
Voice of Russia	D	News
0230 R. Habana Cuba	T-S	News Bulletin
Voice of Russia	D	News in Brief
Voice of Vietnam	D	News

Current Affairs Magazines/Features

0205 R. Australia	A	Background Briefing (documentaries)
0210 R. Australia	M-F	The World Today
0211 Voice of Russia	S	News and Views
	T-A	Sunday Panorama
	T-A	Commonwealth Update
0215 R. Korea Int.	T-A	Seoul Calling
0230 R. Austria Int.	D	Report from Austria
R. Sweden	T-A	60 Degrees North
0235 R. Canada Int.	S/A	Canada in the World
	T	Media Zone

Business/Economics (also in Newscasts & Current Affairs)

0205 R. Canada Int.	S	Business Sense
0210 R. Budapest	M	Europe Unlimited (trade-monthly)
R. Prague	F	Economic Report
0235 R. Canada Int.	F	Business Sense
0245 R. Sweden	H	Money Matters
Voice of Vietnam	F	Vietnam Economy

Science/Technology (incl. Health & Environment)

0205 BBCWS(am)	T	Health Matters
	W	Go Digital
	H	Discovery (research)
	F	One Planet (ecology)

0245 R. Sweden	A	Science in Action
	F	Greenscan (ecology-2nd wk.)
	F	Heartbeat (health-3rd wk.)

Arts & Cultural

0205 R. Prague	M	The Arts
0210 R. Budapest	M	Spotlight (monthly)
0215 R. Taipei Int.	T	Culture Express
0230 R. Sweden	S	Spectrum (3rd wk.)
0235 R. Canada Int.	M/H	Spotlight
0245 Voice of Vietnam	W	Culture and Society
0250 Voice of Vietnam	F	Literature and Arts

Local Lives & Views

0205 R. Budapest	S	Insight Central Europe
	M	Heading for Hungary (monthly)
	T-A	Hungary Today
R. Canada Int.	T-A	Canada Today
R. New Zealand Int.	M-F	In Touch with New Zealand
R. Prague	S	Insight Central Europe
	M	Letter from Prague
	T-A	Newsview
0215 R. Prague	T	One on One (interview)

H Czechs in History or Profile		
R. Taipei Int.	S	Great Wall Forum (mainland issues)
	W	Taiwan Today
	H	Discover Taiwan

F Taipei Magazine

0224 Voice of Russia	M	Russia in Personalities
0230 R. Sweden	S	Weekend (Europe magazine-1st wk.)
		Sweden Today (2nd wk.)
		Studio 49 (topical discussion-4th wk.)
Voice of Vietnam	D	Current Affairs
0232 Voice of Russia	S	Moscow Yesterday and Today
0235 R. Austria Int.	S	Insight Central Europe
	M	Network Europe
Voice of Vietnam	S	Weekly Review
	T/W/F/A	Press Review
	H	Talk of the Week
0245 R. Sweden	F	Nordic Report (1st wk.)
		The S-Files (things Swedish-4th wk.)
	A	Review of the Newsweek
Voice of Vietnam	T	Vietnam: Land & People
	A	Rural Vietnam
0254 Voice of Russia	H	Russia: People and Events

Informational Features

0230 BBCWS(am)	T	Everywoman (magazine)
	W	Omnibus (documentaries)
	F/A	Documentaries
0232 Voice of Russia	A	Christian Message from Moscow
0235 R. Habana Cuba	S	The World of Stamps
0245 R. Taipei Int.	M-F	Let's Learn Chinese

Music

0200 HCB	S	Rock Solid (Christian rock)
0205 R. New Zealand Int.	S/A	Music feature or series
0210 R. Habana Cuba	M	From Habana
0215 R. Taipei Int.	M	Jade Bells and Bamboo Pipes (traditional)
0230 BBCWS(am)	S	Music Review (classical)
R. Habana Cuba	M	The Jazz Place
R. Sweden	M	Sounds Nordic (exc. 1st wk.)
0232 Voice of Russia	T	Folk Box
	W	Jazz Show
	H	Russian Musical Highlights (history)
	F	Yours for the Asking
0246 Voice of Russia	F	Music At Your Request
0250 Voice of Vietnam	S	Music (Vietnamese)

Entertainment

0200 WBCQ	S	Marion's Attic (vintage recordings)
0205 BBCWS(am)	M	Wright Around the World (pop requests)
R. Australia	S	Margaret Throsby Interview
0230 BBCWS(am)	H	Pick of the World (BBC's best)
0232 Voice of Russia	M	Timelines
0240 Voice of Vietnam	M	Sunday Show

SWL, Media & Communications (see Programming Spotlight)

Listener Contact/Interactive

0205 R. Canada Int.	M	Mople Leaf Mailbag
0210 R. Budapest	M	And the Gatepost (monthly)
0220 R. Prague	M	Mailbag
0230 R. far Peace Int.	A	RFPI Mailbag
R. Sweden	M	In Touch with Stockholm (1st wk.)
0235 R. Canada Int.	W	Maple Leaf Mailbag
0245 R. Taipei Int.	S	Mailbag Time
Voice of Vietnam	H	Letterbox

Sport

0200 R. New Zealand Int.	S/A	Live Sport (in season)
0205 BBCWS(am)	H	Sports International (magazine)
R. Australia	S/A	Grandstand (live sports action*)
0245 R. Sweden	T	Spartscan

(*special on 9660, 12080, 17580, 21725 kHz. only.)

0300 UTC / 10pm E / 7pm P - Page 44 Freqs

Newscasts (*extended)

0300 BBCWS(am)	D	The World Today*
China R. Int.	D	News
Deutsche Welle	D	News
R. Australia	D	News
R. Habana Cuba	T-S	International News
R. New Zealand Int.	S/A	News
	M-F	Pacific Regional News
R. Taipei Int.	D	News
Voice of Russia	D	News
0310 R. Habana Cuba	T-S	National News
0330 R. Budapest	D	News
R. Habana Cuba	D	News Bulletin
Voice of Russia	D	News in Brief
Voice of Vietnam	D	News

Current Affairs Magazines/Features

0305 Deutsche Welle	S/M	Weekend Review
	T-A	Newslink
R. New Zealand Int.	W	Pacific Report
	F	Dateline Pacific
0310 China R. Int.	S	Report on Developing Countries
	M-F	Current Affairs
	A	Global Review
R. Habana Cuba	M	Weekly Review
0315 R. Habana Cuba	T-S	Viewpoint
0330 BBCWS(am)	M	Assignment
Deutsche Welle	T	Insight (international affairs)
R. New Zealand Int.	F	Pacific Correspondent
R. Sweden	T-A	60 Degrees North
0340 R. Habana Cuba	M/F	Caribbean Outlook
	M	Weekly Review
0345 BBCWS(am)	M	Letter from America (comment)
	TWFA	Analysis
	H	From Our Own Correspondent

Business/Economics (also in Newscasts & Current Affairs)

0311 Voice of Russia	W/A	Newmarket
0315 R. Taipei Int.	M	Taiwan Economic Journal
0330 BBCWS(am)	T-A	World Business Report
BBCWS(am)	S	World Business Review
China R. Int.	T	Biz China
R. New Zealand Int.	W	Tradewinds
0340 R. Budapest	M	Europe Unlimited (trade-monthly)
0345 R. Sweden	H	Money Matters
Voice of Vietnam	F	Vietnam Economy

Science/Technology (incl. Health & Environment)

0311 Voice of Russia	T/F	Science and Engineering
0315 Deutsche Welle	S	Spectrum
0330 Deutsche Welle	W	Man and Environment
0345 R. Sweden	F	Greenscan (ecology-2nd wk.)
		Heartbeat (health-3rd wk.)
0350 R. Habana Cuba	M	Breakthrough

Shortwave Guide

Arts and Culture

0305	R. New Zealand Int.	M	Tagata o te Moana (Pacific culture)
0315	Deutsche Welle	M	Arts on the Air
	R. Taipei Int.	F	Taiwan Gourmet
0320	China R. Int.	S	In the Spotlight
0330	HCB	F	The Book & the Spode (archaeology)
	R. Sweden	S	Spectrum (3rd wk.)
0340	R. Budapest	M	Spotlight (monthly)
0345	Voice of Vietnam	W	Culture and Society
		A	Literature and Arts

Local Lives & Views

0305	R. Australia	A	Rural Reporter (outback)
0315	R. Taipei Int.	S	Great Wall Forum (mainland issues)
		H	Taipei Magazine
0330	China R. Int.	M	People in the Know
		W	China Horizons
		F	Life in China
	Deutsche Welle	H	Living in Germany
	R. Sweden	S	Weekend (Europe magazine-1st wk.)
			Sweden Today (2nd wk.)
			Studio 49 (topical discussion-4th wk.)
	R. Taipei Int.	F	Discover Taiwan
0332	Voice of Russia	M	This is Russia
		T	Kaleidoscope (events)
		H	Moscow Yesterday and Today
0335	R. Budapest	S	Insight Central Europe
		M	Heading for Hungary (monthly)
		T-A	Hungary Today
	Voice of Vietnam	D	Current Affairs
0345	R. Sweden	F	Nordic Report (1st wk.)
			The S-Files (things Swedish-4th wk.)
A	Review of the Newsweek		
	Voice of Vietnam	T	Vietnam: Land and People
		A	Rural Vietnam
0354	Voice of Russia	W	Russia: People and Events

Informational Features

0320	China R. Int.	H	Voices from Other Lands
0330	Deutsche Welle	A	German by Radio
0332	R. Australia	A	Educational series
	Voice of Russia	F	Russian by Radio
0345	R. Taipei Int.	M-F	Let's Learn Chinese

Music

0300	HCB	S	Inspirational Classics
0305	R. New Zealand Int.	T	Top 5 (pop/rock)
	A		Home Grown (NZ artists)
0315	HCB	T-A	Rendezvous (inspirational)
	R. Taipei Int.	T	Jade Bells & Bamboo Pipes (traditional)
0330	HCB	A	Walkin' in the Sunshine (country)
	R. New Zealand Int.	T	New Releases
	A		Musical Chairs (NZ artist profile)
	R. Sweden	M	Sounds Nordic (rock-ex. 1st wk.)
0332	Voice of Russia	S	Songs from Russia
		W	Russian Musical Highlights (history)
0340	R. Australia	M	Australian Music Show (modern rock)
		T	Music Deli (international)
		W	Blacktracker (Aboriginal)
		H	Country Style
		F	Jazz Notes
0345	HCB	W	Wonderful Words of Life (hymns)
0350	Voice of Vietnam	S	Music (Vietnamese)

Entertainment

0305	R. New Zealand Int.	S	Sunday Drama (radio theatre)
0310	R. Australia	M-F	Margaret Throsby Interview
0330	HCB	M	Unshackled (radio's oldest drama series)
0332	Voice of Russia	A	Audio Book Club
0340	Voice of Vietnam	M	Sunday Show

SWL, Media & Communications

(see Programming Spotlight)

Listener Contact/Interactive

0305	R. Australia	S	Feedback
	R. New Zealand Int.	H	Mailbox (biweekly)
0311	Voice of Russia	S/W/H	Moscow Mailbag

0320	China R. Int.	A	Listeners' Garden
0330	R. Sweden	M	In Touch with Stockholm (1st wk.)
0340	R. Budapest	M	And the Gatepost (monthly)
	R. Habana Cuba	H	Mailbag Show
0345	R. Taipei Int.	A	Mailbag Time
	Voice of Vietnam	H	Letterbox
0346	Voice of Russia	S	You Write to Moscow

Sport

0300	R. Australia	S/A	Grandstand (live action)*
	R. New Zealand Int.	S/A	Live Sport (in season)
0330	Deutsche Welle	F	Hard to Beat: The World of Sport
	R. New Zealand Int.	H	The World in Sport
0335	R. Habana Cuba	T-A	Time Out
0345	R. Sweden	T	Sportscen

(*special on 9660, 12080, 17580, 21725 kHz only)

0400 UTC / 11pm E / 8pm P - Page 44 Freqs

Newscasts (*extended)

0400	BBCWS(am)	S/M	World Briefing*
		T-A	News
	China R. Int.	O	News
	HCB	T-A	Latin American & World News
	R. Australia	D	News
	R. Habana Cuba	T-S	International News
	R. New Zealand Int.	D	News
	R. Prague	D	News
	R. Vlaanderen Int.	T-S	News
	Voice of Russia	D	News
0430	R. Habana Cuba	T-S	News Bulletin
	R. Netherlands	S/M	News
	Voice of Russia	D	News in Brief

Current Affairs Magazines/Features

0405	R. New Zealand Int.	M-F	Checkpoint
0410	China R. Int.	S	Report on Developing Countries
		M-F	Current Affairs
		A	Global Review
	HCB	T-A	Studio 9 (an Latin America)
	R. Habana Cuba	T-A	Spotlight on the Americas
0411	Voice of Russia	M	Sunday Panorama
		T-A	News & Views
0430	R. Netherlands	T-A	Newsline
0455	R. Netherlands	S	Insight (commentary)

Business/Economics (also in Newscasts & Current Affairs)

0413	R. Vlaanderen Int.	F	Economics
0420	R. Prague	F	Economic Report
0430	China R. Int.	T	Biz China

Science/Technology (incl. Health & Environment)

0413	R. Vlaanderen Int.	W	Green Society (ecology)
0430	R. Australia	A	The Buzz (technology)

Arts and Culture

0405	R. Australia	S	Pacific Focus-Arts
	R. Prague	S	Readings from Czech Literature (biweekly)
0410	R. Prague	M	The Arts
0413	R. Vlaanderen Int.	H/A	Around the Arts
0420	China R. Int.	S	In the Spotlight
0430	R. Australia	S	RA Arts
	Voice of Russia	W/F	Russian history/culture program

Local Lives & Views

0404	R. Vlaanderen Int.	T-A	Belgium Today
0405	R. Prague	S	Spotlight (Czech places)
		M	Letter from Prague
		T-A	Newsview
0408	R. Vlaanderen Int.	M	Tourism in Flanders
		T-A	Press Review
0413	R. Vlaanderen Int.	T	Focus on Europe
0415	R. Prague	T	One on One (interview)
		H	Czechs in History or Profile
0418	R. Vlaanderen Int.	H	Around Town
		A	Tourism in Flanders

0424	Voice of Russia	M	Russia: People and Events
0430	China R. Int.	M	People in the Know
		W	China Horizons
		F	Life in China
0432	Voice of Russia	S	Kaleidoscope (Russian events)
0435	R. Netherlands	S	Europe Unzipped

Informational Features

0418	R. Vlaanderen Int.	F	International Report
0420	China R. Int.	H	Voices from Other Lands
0430	BBCWS(am)	S	Reporting Religion
		T	World Learning
		H	Heart and Soul (spiritual matters)
		F	Who On Earth Are We?
		A	Patterns of Faith (belief systems)
0432	Voice of Russia	T/H/S	20th Century
0435	R. Habana Cuba	S	The World of Stamps

Music

0400	R. Vlaanderen Int.	S	Music from Flanders
		S	Zambo's Manda Record Party
0405	BBCWS(am)	T	Jazzmatazz
		W	Charlie Gillett (world)
		H	John Peel (eclectic)
		F	Composer of the Month
	R. New Zealand Int.	A	Home Grown (NZ artists)
0410	HCB	A	Musica del Ecuador [within 'Studio 9']
	R. Habana Cuba	M	From Habana
	R. Prague	S	Saturday Music (classical/folk/jazz)[biweekly]
0424	R. Vlaanderen Int.	M-A	Soundbox (Flemish rock)
0430	BBCWS(sas)	M	Music Mix*
		T	UK Top 20
		H	World of Music
0445	BBCWS(sas)	W	UK Album Chart
		F	Music X-Press

Entertainment

0405	BBCWS(am)	A	Brain of Britain (knowledge quiz)
0410	R. Australia	M-F	Margaret Throsby Interview
0430	BBCWS(am)	M	Westway Omnibus (drama serial)
		W/F	Westway (drama serial)
0432	Voice of Russia	M	Audio Book Club
0445	BBCWS(am)	T-A	Off the Shelf (book readings)

SWL, Media & Communications

(see Programming Spotlight)

Listener Contact/Interactive

0400	HCB	M	Musical Mailbag
0414	R. Vlaanderen Int.	M	Brussels 1043
0420	R. Prague	M	Mailbox
	China R. Int.	A	Listeners' Garden
0430	BBCWS(am)	W	Write On
	HCB	S	Saludas Amigos
	R. Habana Cuba	M	The Mailbag Show
0435	R. Netherlands	M	Sincerely Yours

Sport

0400	R. Australia	S/A	Grandstand (live action)*
0418	R. Vlaanderen Int.	T	Sports

(*special on 9660, 12080, 17580, 21725 kHz. only.)

0500 UTC / 12am E / 9pm P - Page 45 Freqs

Newscasts (*extended)

0500	BBCWS(am)	D	The World Today*
	China R. Int.	D	News
	Deutsche Welle	D	News
	R. Australia	D	News
	R. Habana Cuba	T-A	International News
	R. Japan	D	News
	R. New Zealand Int.	D	News
	Voice of Russia	D	News
0510	R. Habana Cuba	T-A	National News
0530	R. Habana Cuba	T-A	News Bulletin
	Voice of Russia	D	News in Brief

Shortwave Guide



Current Affairs Magazines/Features

0505	Deutsche Welle	S	Talking Point (journalists)
		T-A	Newslink
0510	China R. Int.	S	Report on Developing Countries
		M-F	Current Affairs
		A	Global Review
	R. Australia	M-F	Pacific Beat
0515	R. Habana Cuba	T-S	Viewpoint
	R. Japan	M-F	44 Minutes
0530	BBCWS(am)	A	Assignment
	Deutsche Welle	T	Insight (international affairs)
	R. New Zealand Int.	M	Letter from America
		F	The Pacific Report
0540	R. Habana Cuba	T/F	Caribbean Outlook
		A	Weekly Review

Business/Economics (also in Newcasts & Current Affairs)

0500	R. Netherlands	A	A Good Life (development)
0505	R. Australia	A	Pacific Focus-Business
0511	Voice of Russia	H	Newmarket
0515	Deutsche Welle	S	Money Talks
0530	BBCWS(am)	S	Global Business
	China R. Int.	T	Biz China

Science/Technology (incl. Health & Environment)

0500	R. Netherlands	T	Research File
0511	Voice of Russia	W/A	Science and Engineering
0530	Deutsche Welle	W	Man and Environment

Arts and Culture

0505	R. New Zealand Int.	M-F	What's Going On?
0520	China R. Int.	S	In the Spotlight

Local Lives & Views

0500	R. Netherlands	M	Dutch Horizons
0505	R. New Zealand Int.	S	Whenua (Maori magazine)
		A	Focus on Politics
0530	China R. Int.	M	People in the Know
		W	China Horizons
		F	Life in China
	Deutsche Welle	H	Living in Germany
	R. Australia	S	In Conversation
	R. New Zealand Int.	T-H	Today in Parliament

		F	Pacific Report
0532	Voice of Russia	S	Moscow Yesterday and Today
0546	Voice of Russia	W	Russia: People and Events

Informational Features

0500	R. Netherlands	H	Documentary
0505	Deutsche Welle	M	Religion and Society
0515	Deutsche Welle	M	Cool (youth magazine)
0530	China R. Int.	H	Voices from Other Lands
	Deutsche Welle	A	German by Radio
	HCB	W	The Book & the Spode (archaeology)
	R. Australia	A	Lingua Franca (about language)

Music

0500	HCB	S	Inspirational Classics
	R. Netherlands	S	Dutch Classics
		W	Music 52-15 (world/folk)
0510	R. Japan	S	Pop Goes Asia
0511	Voice of Russia	S/M	Russian Musical Highlights (history)
0525	R. New Zealand Int.	A	In a Mellow Tone (soft jazz)
0530	HCB	A	Walkin' in the Sunshine (country)
	R. Australia	S	Fine Music Australia (classical)
	R. Habana Cuba	M	The Jazz Show
0532	Voice of Russia	M	Jazz Show
		T	Yours for the Asking
		W	Russian Musical Highlights (history)
		H	Folk Box
0545	HCB	W	Wonderful Words of Life (hymns)
0546	Voice of Russia	T	Music At Your Request

Entertainment

0500	HCB	H	Adventures in Odyssey (stories)
	WBCQ(7415 kHz.)	M-A	Amos 'n Andy (classic comedy)
0532	Voice of Russia	F	Audio Book Club
		A	Timelines

0545	R. Australia	A	Short Story
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SWL, Media & Communications (see Programming Spotlight)

Listener Contact/Interactive

0510	R. Japan	A	Hello from Tokyo
0511	Voice of Russia	T/F	Moscow Mailbag
0520	China R. Int.	A	Listeners' Garden
0540	R. Habana Cuba	M/H	Mailbag Show

Sport

0500	R. Australia	S/A	Grandstand (live action)*
0505	R. Australia	A	Pacific Focus-Sport
0530	Deutsche Welle	F	Hard to Beat: The World of Sport
0535	R. Habana Cuba	T-A	Time Out
0550	BBCWS(am)	M-F	Sports Roundup

(*special on 9660, 12080, 17580, 21725 kHz. only.)

0600 UTC / 1am E / 10pm P - Page 45 Freqs

Newcasts (*extended)

0600	R. Australia	D	News
	R. Habana Cuba	T-S	International News
	R. Japan	D	News
	R. New Zealand Int.	D	News
0630	R. Habana Cuba	T-S	News Bulletin

Current Affairs Magazines/Features

0610	R. Habana Cuba	T-S	Spotlight on the Americas
0615	R. Japan	M-F	Asian Top News (region's radio)
0630	R. New Zealand Int.	M	Letter from America
		F	The Pacific Report

Science/Technology (incl. Health & Environment)

0605	R. New Zealand Int.	M	Eureka!
0630	R. New Zealand Int.	M	Health [or] Environment Matters

Arts and Culture

0605	R. Australia	S	Pacific Focus-Arts
0630	R. New Zealand Int.	H	Bookmarks

Local Lives & Views

0605	R. New Zealand Int.	F	Country Life
0610	R. Japan	S	Weekend Square (Japanese life)
0620	R. Australia	M-F	Pacific Focus
0635	R. New Zealand Int.	S	This Week in Parliament

Informational Features

0605	R. Australia	S	The Europeans
	R. New Zealand Int.	S	Future Indicative (for disabled)
0625	R. Japan	T	Let's Try Japanese
		H	Brush Up Your Japanese
0635	R. Habana Cuba	S	The World of Stamps

Music

0605	R. New Zealand Int.	W	Musical Choirs (artist feature)
0610	R. Habana Cuba	M	From Havana (Cuban musicians)
	R. Japan	A	Pop Goes Asia
0625	R. Japan	M	Japan Music Log
		W	Japan Musical Treasure Box
		F	Music Beat (pop)
	R. Australia	A	Oz Sounds
0640	R. Australia	M	Australian Music Show (modern rock)
		T	Music Deli (international)
		W	Blacktracker (Aboriginal)
		H	Country Style
		F	Jazz Notes

Entertainment

0605	R. New Zealand Int.	A	Saturday Night
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SWL, Media & Communications (see Programming Spotlight)

Listener Contact/Interactive

0605	R. Australia	S	Feedback
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Sport

0600	R. Australia	S/A	Grandstand (live action)*
0610	R. Australia	M-F	Sport (daily report)
0630	R. New Zealand Int.	F	Sports Story
0635	R. New Zealand Int.	S/A	Live Sport (in season)

(*special on 9660, 12080, 17580, 21725 kHz. only.)

1000 UTC / 5am E / 2am P - Page 47 Freqs

Newcasts (*extended)

1000	BBCWS(am)	S/A	World Briefing*
		M-F	World Update*
	BBCWS(eas)	M-F	World Briefing*
		A	News
	R. Australia	O	News
	R. New Zealand Int.	O	News
	VOA News Now	D	News*
1030	VOA News Now	D	News Headlines

Current Affairs Magazines/Features

1005	R. Australia	M-F	Asia Pacific
1015	VOA News Now	M-F	Focus (one story in depth)
1030	BBCWS(am)	S	Agenda (trends)
1034	VOA News Now	M	Press Conference USA
		T	Encounter (debate)

Business/Economics (also in Newcasts & Current Affairs)

1032	VOA News Now	M-F	Business and Economic Report
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Science/Technology (incl. Health & Environment)

1030	R. Australia	M	Health Report
		A	In Conversation
1034	VOA News Now	W	Our World

Local Lives & Views

1005	R. Australia	A	Pacific Review
	R. New Zealand Int.	M-H	Kim Hill (interviews)
1030	R. Australia	S	Rural Reporter
1034	VOA News Now	S/H/A	On the Line (US foreign policy)
1045	R. New Zealand Int.	A	Dateline Pacific

Informational Features

1005	R. Australia	S	Lingua Franca (about language)
1030	BBCWS(am)	A	Reporting Religion
	R. Australia	T	Law Report
		W	Religion Report

Music

1001	BBCWS(eas)	S	Concert Hall (classical)
1005	BBCWS(eas)	A	Jazzmatazz
1030	BBCWS(eas)	A	Greenfield Collection (classical requests)

Listener Contact/Interactive

1034	VOA News Now	F	Best of 'Talk to America'
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SWL, Media & Communications (see Programming Spotlight)

Sport

1005	R. New Zealand Int.	S	Sportsworld
		F	Sports Story
		A	The World in Sport
1020	BBCWS(am)	S/A	Sports Roundup
1030	R. Australia	F	Sports Factor
1045	BBCWS(eas)	M-F	Sports Roundup

1100 UTC / 6am E / 3am P - Page 48 Freqs

Newcasts (*extended)

1100	BBCWS(am)	D	World Briefing*
	BBCWS(eas)	S/A	World Briefing*
		M-F	News
	R. Australia	D	News
	R. Japan	D	News
	R. New Zealand Int.	D	News

Shortwave Guide



1105 R. New Zealand Int. M-F Late Edition*
 1120 BBCWS(am) D British News
 BBCWS(eas) S/A British News
 1130 R. Korea Int. D News
 R. Netherlands S/A News

Current Affairs Magazines/Features

1105 BBCWS(am) M-F Caribbean Morning Report
 R. Australia M-F Asia Pacific
 1115 R. Japan M-F Asian Top News (region's radio)
 1130 BBCWS(am) S Assignment
 BBCWS(eas) A Analysis
 R. Netherlands M-F Newslines
 1135 R. Netherlands S Wide Angle (week in review)

Business/Economics (also in Newscasts & Current Affairs)

1128 HCJB M-F Money Minute
 1130 BBCWS(am) M-F World Business Report
 BBCWS(am) A World Business Review

Science/Technology (incl. Health & Environment)

1105 BBCWS(eas) M Health Matters
 T Go Digital
 W Discovery (research)
 H One Planet (ecology)
 F Science in Action

Local Lives & Views

1115 BBCWS(am) M-F Caribbean Magazine
 1130 R. Australia S Country Breakfast
 R. New Zealand Int. S Sunday Supplement (NZ opinions)
 1135 R. Australia M-F Bush Telegraph (rural life)
 R. Netherlands A Europe Unzipped
 1155 R. Netherlands A Insight (commentary)

Informational Features

1125 R. Japan T Let's Learn Japanese
 H Brush Up Your Japanese
 1130 BBCWS(eas) M Everywoman
 T Omnibus (documentary)
 H/F Documentaries

Music

1105 R. New Zealand Int. A Deep Purple (relaxing)
 1125 R. Japan M Japan Music Log
 W Japan Musical Treasure Box
 F Music Beat (pop)
 1130 R. Australia A Find Music Australia (classical)

Entertainment

1130 BBCWS(eas) S Play of the Week (radio theatre)
 1130 HCJB M-F Morning in the Mountains

SWL, Media & Communications
 (see Programming Spotlight)

Listener Contact/Interactive

1110 R. Japan S Hello From Tokyo

Sport

1110 BBCWS(am) M-F Caribbean Sport
 1130 BBCWS(eas) W Sports International
 R. Australia M-F Sports Report
 1145 BBCWS(am) M-H/A Sports Roundup
 BBCWS(am) F Football Extra
 BBCWS(eas) S Sports Roundup

1200 UTC / 7am E / 4am P - Page 48 Freqs

Newscasts (*extended)

1200 BBCWS(am) D Newshour*
 BBCWS(eas) M-A News
 HCJB M-F Latin American & World News
 R. Australia D News
 R. New Zealand Int. M-F Late Edition*
 1210 BBCWS(am) M-F Caribbean Morning Report

1230 HCJB M-F Latin American & World News

Current Affairs Magazines/Features

1205 BBCWS(eas) M-F Outlook (magazine)
 1230 BBCWS(eas) S Assignment
 A Agenda (trends)
 R. Sweden M-F 60 Degrees North

Business/Economics (also in Newscasts & Current Affairs)

1200 R. Netherlands T A Good Life (development issues)
 1205 BBCWS(am) M-F Caribbean Business
 1230 R. Netherlands F A Good Life (development issues)
 1245 R. Sweden W Money Matters

Science/Technology (incl. Health & Environment)

1200 R. Netherlands H Research File
 1230 R. Netherlands M Research File
 1245 R. Sweden H Greenscan (ecology-2nd wk.)
 Heartbeat (3rd wk.)

Arts and Culture

1230 R. Sweden A Spectrum (3rd wk.)

Local Lives & Views

1200 R. Netherlands M EuroQuest
 W Dutch Horizons
 1205 R. Australia M-H Late Night Live (discussion)
 1230 R. Netherlands S Dutch Horizons
 R. Sweden A Weekend (Europe magazine-1st wk.)
 Sweden Today (2nd)
 Studio 49 (discussion-3rd)
 1245 R. Sweden H Nordic Report (1st)
 The S-Files (things Swedish-4th)
 Review of the Newsweek

Informational Features

1200 R. Netherlands S The Sound Fountain
 F Documentary
 1205 R. Australia A The Spirit of Things (spiritual matters)
 1224 HCJB M-F Mission Network News
 1230 R. Netherlands W Documentary
 A The Sound Fountain
 T Heart & Soul (spiritual matters)
 H What's the Problem? (advice)

Music

1200 R. Netherlands A Dutch Classics
 1205 R. Australia S Nocturne
 F Sound Quality (innovative)
 1230 R. Netherlands T Music 52-15 (international)
 R. Sweden S Sounds Nordic (rock-exc. 1st wk.)

Entertainment

1200 BBCWS(eas) S Play of the Week (from 1130)
 HCJB M-F Morning in the Mountains (from 1130)
 A Adventures in Odyssey (children's stories)
 1205 BBCWS(eas) A Brain of Britain
 1245 BBCWS(eas) W/F Westway (drama serial)

SWL, Media & Communications

(see Programming Spotlight)

Listener Contact/Interactive

1230 R. Sweden S In Touch with Stockholm (1st wk.)
 1245 BBCWS(eas) M Write On

Sport

1205 HCJB M-F Sports News
 R. New Zealand Int. S The World in Sport
 A Sports Story
 1245 R. Sweden M Sportscan

1300 UTC / 8am E / 5am P - Page 49 Freqs

Newscasts

1300 BBCWS(am) D News

BBCWS(eas) D Newshour*
 China R. Int. D News
 R. Australia D News
 R. Netherlands S/A News

Current Affairs Magazines/Features

1300 R. Netherlands M-F Newslines
 1305 BBCWS(am) M-F Outlook
 1310 China R. Int. S Report on Developing Countries
 M-F Current Affairs
 A Global Review
 1330 R. Sweden M-F 60 Degrees North

Business/Economics (also in Newscasts & Current Affairs)

'315 R. Australia M-F Dust & Dollars (market report)
 1330 China R. Int. T Biz China
 '345 R. Sweden W Money Matters
 1350 BBCWS(eas) M-F World Business Report

Science/Technology (incl. Health & Environment)

1305 R. Australia A The Science Show
 1345 R. Sweden H Greenscan (ecology-2nd wk.)
 Heartbeat (health-3rd wk.)

Arts/Culture

1320 China R. Int. S In the Spotlight
 1330 R. Sweden A Spectrum (3rd Sat.)

Local Lives & Views

1305 R. Netherlands A Europe Unzipped
 1330 China R. Int. M People in the Know
 W China Horizons
 F Life in China
 R. Sweden A Weekend (Europe magazine-1st wk.)
 Sweden Today (2nd wk.)
 Studio 49 (discussion-4th wk.)
 1345 R. Sweden H Nordic Report (1st wk.)
 The S-Files (things Swedish-4th wk.)
 Review of the Newsweek

Informational Features

1320 China R. Int. H Voices from Other Lands
 1330 BBCWS(am) S In Praise of God (religious service)
 HCJB M-F Family Life Today

Music

1305 BBCWS(am) S Composer of the Month
 R. Australia S Nocturne (from 1205)
 VOA News Now S/A Jazz America
 M American Gold (oldies)
 T Roots & Branches (folk)
 W Classic Rock
 H Top 20
 F Country Hits
 W WCCR(5070 kHz.) A Rock the Universe (Christian rock)
 1320 R. Australia M-F The Planet (international)
 1330 BBCWS(am) S The Music Feature
 HCJB S Rock Solid (Christian rock)
 R. Sweden S Sounds Nordic (rock/pop-exc. 1st wk.)

Entertainment

1300 Channel Africa S/A Channel Africa Extra (weekend variety)
 1345 BBCWS(am) M-F Off the Shelf (book readings)

Listener Contact/Interactive

1305 R. Netherlands S Sincerely Yours
 1320 China R. Int. A Listeners' Garden
 1330 R. Sweden S In Touch with Stockholm (1st wk.)

Sport

1305 BBCWS(am) A World Football (magazine)
 1310 R. Australia M-F Sport (daily report)
 1345 R. Sweden M Sportscan

1400 UTC / 9am E / 6am P - Page 49 Freqs

Newscasts (*extended)

Shortwave Guide



1400	BBCWS(am)	D	News
	BBCWS(eas)	S/A	News
	China R. Int.	D	News
	R. Australia	D	News
	R. Canada Int.	D	News
	R. Japon	D	News
	R. Prague	D	News
1430	BBCWS(eas)	M-F	British News
	R. Netherlands	S/A	News

Current Affairs Magazines/Features

1400	BBCWS(eas)	M-F	East Asia Today
1410	China R. Int.	S	Report on Developing Countries
		M-F	Current Affairs
		A	Global Review
1415	R. Japon	M-F	44 Minutes
1430	R. Netherlands	M-F	Newsline
	R. Sweden	M-F	60 Degrees North
1435	R. Netherlands	S	Wide Angle (week in review)

Business/Economics (also in Newscasts & Current Affairs)

1410	China R. Int.	T	Biz China
	R. Prague	H	Economic Report
1445	R. Sweden	W	Money Matters

Science/Technology (incl. Health & Environment)

1445	R. Sweden	H	Greenscan (ecology-2nd wk.)
			Heartbeat (health-3rd wk.)

Arts and Culture

1405	BBCWS(am)	M	Meridian-Masterpiece (ideas)
		T	Meridian-Screen (cinema)
		W	Meridian-Writing (books)
		F	Arts in Action
	R. Australia	S	Books and Writing
	R. Prague	S	The Arts
		A	Readings from Czech Literature (biweekly)
1420	China R. Int.	S	In the Spotlight
1430	R. Sweden	S	Spectrum (3rd wk.)

Local Lives & Views

1405	R. Canada Int.	S	The Sunday Edition (interviews/documentaries)
		A	The House (Parliament)
	R. Prague	S	Letter from Prague
		M-F	Newsview
		A	Insight Central Europe
		S	Weekend Square
1410	R. Japon	S	One on One (interview)
1415	R. Prague	W	Czechs in History or Profile
1430	China R. Int.	M	People in the Know
		W	China Horizons
		F	Life in China
	R. Sweden	A	Weekend (Europe magazine-1st wk.)
			Sweden Today (2nd wk.)
			Studio 49 (discussion-4th wk.)
1435	R. Netherlands	A	Europe Unzipped
1445	R. Sweden	H	Nordic Report (1st wk.)
			The S-Files (things Swedish-4th wk.)
		F	Review of the Newsweek
1455	R. Netherlands	A	Insight (commentary)

Informational Features

1405	BBCWS(am)	H	The Music Biz
	R. Australia	A	New Dimensions ("progressive" ideas)
1420	China R. Int.	H	Voices from Other Lands

Music

1400	R. Sweden	S	Sounds Nordic (rock/pop-exc. 1st wk.)
1405	R. Australia	M-F	The Planet (from 1315)
	R. Japon	S	Pop Joins the World
1430	BBCWS(am)	M	Charlie Gillett (world)
		T	UK Top 20
		W	Revolver (artists' choice)
		H	John Peel (eclectic)
		F	Jazzmatazz

Entertainment

1400	Channel Africa	S/A	Channel Africa Extra (from 1300)
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Listener Contact/Interactive

1405	BBCWS(am)(eas)	S	Talking Point (current events coll-in)
1420	R. Prague	S	Mailbox
1420	China R. Int.	A	Listeners' Garden
1430	R. Sweden	S	In Touch with Stockholm (1st wk.)

Sport

1405	BBCWS(am)(eas)	A	Sportsworld (live action)
1445	R. Sweden	M	Sportscan
	BBCWS(eas)	M-F	Sports Roundup

1500 UTC / 10am E / 7am P - Page 50 Freqs

Newscasts

1500	BBCWS(am)	D	News
	China R. Int.	D	News
	R. Australia	D	News
	R. Canada Int.	D	News

Current Affairs Magazines/Features

1505	R. Australia	M-F	Asia Pacific
1510	China R. Int.	S	Report on Developing Countries
		M-F	Current Affairs
		A	Global Review
1530	R. Austria Int.	D	Report from Austria

Business/Finance (also in Newscasts & Current Affairs)

1500	R. Netherlands	F	A Good Life (development issues)
1530	China R. Int.	T	Biz China
	R. Netherlands	T	A Good Life (development issues)

Science/Technology (incl. Health & Environment)

1500	R. Netherlands	M	Research File
1505	BBCWS(am)	M	One Planet (ecology)
		T	Science in Action
		W	Health Matters
		H	Go Digital
		F	Discovery (research)
1530	R. Australia	M	The Health Report
	R. Netherlands	H	Research File

Arts and Culture

1520	China R. Int.	S	In the Spotlight
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Local Lives & Views

1500	R. Canada Int.	S	The Sunday Edition (from 1405)
	R. Netherlands	S	Dutch Horizons
1530	China R. Int.	M	People in the Know
		W	China Horizons
		F	Life in China
	R. Australia	T	The Low Report
	R. Netherlands	W	The Religion Report
		M	EuroQuest
		W	Dutch Horizons
1540	R. Austria Int.	A	Network Europe

Informational Features

1500	R. Netherlands	W	Documentary
		H	The Sound Fountain
		S	Encounter (spiritual beliefs)
1505	R. Australia	S	Voices from Other Lands
1520	China R. Int.	H	Documentaries
1530	BBCWS(am)	M/T	Everywoman
		W	Life in China
		F	The Low Report
	R. Netherlands	S	The Sound Fountain
		F	Documentary

Music

1500	R. Netherlands	T	Music 52-15 (international)
		A	Dutch Classics
1505	BBCWS(am)	S	Concert Hall (performances)
	R. Australia	A	Nocturne

Entertainment

1505	R. Canada Int.	A	Vinyl Cafe (humor)
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SWL, Media & Communications

(see Programming Spotlight)

Listener Contact/Interactive

1520	China R. Int.	A	Listeners' Garden
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Sport

1505	BBCWS(am)	A	Sportsworld (from 1405)
1530	BBCWS(am)	F	Sports International (magazine)
	R. Australia	F	The Sports Factor

1600 UTC / 11am E / 8am P - Page 50 Freqs

Newscasts (*extended)

1600	BBCWS(am)	S	News Summary
		M-F	World Briefing*
		A	News
	R. Australia	D	News
	R. Canada Int.	S/A	News
	R. Netherlands	S/A	News
	Voice of Russia	D	News
1620	BBCWS(am)	M-F	British News

Current Affairs Magazines/Features

1600	R. Netherlands	M-F	Newsline
1611	Voice of Russia	M-F	Focus on Asia & the Pacific
1630	BBCWS(am)	M/T/W/F	News Analysis
		W	From Our Own Correspondent
	R. Austria Int.	D	Report from Austria

Business/Finance (also in Newscasts & Current Affairs)

1611	Voice of Russia	A	Newmarket
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Science/Technology (incl. Health & Environment)

1605	R. Canada Int.	A	Quirks and Quarks
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Local Lives & Views

1605	R. Australia	S	The National Interest
		T	The Comfort Zone (homes/gardens/food)
		W	Verbatim (oral histories)
		H	Hindsight (history)
		F	Away! (Aboriginal culture)
	R. Canada Int.	S	The Sunday Edition (from 1405)
	R. Netherlands	A	Europe Unzipped
1630	R. Australia	W	Street Stories (Australian voices)
1635	R. Austria Int.	A	Network Europe

Music

1605	R. Australia	A	Nocturne (from 1505)
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Entertainment

1605	R. Australia	M	Margaret Throsby (interviews)
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Listener Contact/Interactive

1605	R. Netherlands	S	Sincerely Yours
1611	Voice of Russia	S	Moscow Mailbox
1647	Voice of Russia	F	You Write to Moscow

Sport

1605	BBCWS(am)	S/A	Sportsworld (live action)
1645	BBCWS(am)	M-F	Sports Roundup

1700 UTC / 12pm E / 9am P - Page 51 Freqs

Newscasts (*extended)

1700	R. Australia	D	News
	R. Japon	D	News

Current Affairs Magazines/Features

1700	R. Africa Int.	D	Reports, features, music
1715	R. Japon	M-F	44 Minutes

Shortwave Guide



Local Lives & Views

1705 R. Australia M-F Bush Telegraph (rural life)

Informational Features

1705 R. Australia S The Spirit of Things
A New Dimensions

Music

1710 R. Japan A Pop Jains Asia
1730 VOA Africa S Music Time in Africa
M-F World of Music
A Hip Hop Connection

Listener Contact/Interactive

1710 R. Japan S Hello from Tokyo

2100 UTC / 4pm E / 1pm P - Page 53 Freqs

Newscasts (*extended)

2100 BBCWS(am) S/A Newshour*
M-F News
R. Australia D News

Current Affairs Magazines/Features

2110 R. Australia S-H AM (morning news magazine)

Science/Technology (incl. Health & Environment)

2105 BBCWS(am) M Science in Action
T Health Matters
W Go Digital
H Discovery (research)
F One Planet (ecology)
2130 R. Australia M Health Report
T Innovations

Local Lives & Views

2105 BBCWS(am) M-F Caribbean Report*
R. Australia A Australia All Over
2130 BBCWS(am) T/F Calling the Falklands ^
R. Australia H Rural Reporter

(*special service on 5975, 11675, 15190 kHz. only.)
(^ special service on 11680 kHz.)

Informational Features

2130 BBCWS(am) M/F Documentaries
T Everywoman
W Omnibus (documentary)
R. Australia S Educational series
W Religion Report

Music

2105 VOA News Now S/A Jazz America
M American Gold (oldies)
T Roots & Branches (folk)
W Classic Rock
H Top 20
F Country Hits
2130 R. Australia F Jazz Notes

Entertainment

2100 WBCQ(7415kHz) H-S Radio Caroline

Listener Contact/Interactive

2105 R. Australia F Feedback

Sport

2130 BBCWS(am) H Sports International (magazine)

2200 UTC / 5pm E / 2pm P - Page 54 Freqs

Newscasts (*extended)

2200 BBCWS(am) S/A The World Today*
M-F News
R. Australia D News
2220 BBCWS(am) M-F British News
2230 R. Vlaanderen Int. M-F News

Current Affairs Magazines/Features

2210 R. Australia S-H AM (morning news magazine)
F Asia Pacific
A Correspondents' Report
2230 BBCWS(am) S Agenda (trends)
BBCWS(am) A From Our Own Correspondent
2243 R. Vlaanderen Int. M Focus on Europe
2245 BBCWS(am) MTHF Analysis
W From Our Own Correspondent
2248 R. Vlaanderen Int. H International Report

Business/Finance (also in Newscasts & Current Affairs)

2205 BBCWS(am) M-F World Business Report
2243 R. Vlaanderen Int. H Economics

Science/Technology (incl. Health & Environment)

2243 R. Vlaanderen Int. T Green Society (ecology)

Arts and Culture

2243 R. Vlaanderen Int. W/F Around the Arts

Local Lives & Views

2234 R. Vlaanderen Int. M-F Belgium Today
2238 R. Vlaanderen Int. S Tourism in Flanders
M-F Press Review
2248 R. Vlaanderen Int. W Around Town
F Tourism in Flanders

Music

2230 R. Vlaanderen Int. A Music from Flanders
2240 R. Australia S Australian Music Show (rock)
M Music Deli (international)
T Blacktracker (Aboriginal contemporary)
H Jazz Notes
W Australian Country Style
2254 R. Vlaanderen Int. S-F Soundbox

Entertainment

2200 WBCQ(7415kHz) M Jean Shepherd
F Juliet's Wild Kingdom
2230 WBCQ(7415kHz) A The Pub Sungenis Project

SWL, Media & Communications

(see Programming Spotlight)

Listener Contact/Interactive

2244 R. Vlaanderen Int. S Brussels 1043

Sport

2230 BBCWS(am) M-F Sports Roundup
R. Canada Int. S Inside Track (anthologies)
2248 R. Vlaanderen Int. M Sports

2300 UTC / 6pm E / 3pm P - Page 54 Freqs

Newscasts (*extended)

2300 BBCWS(am) D The World Today*
China R. Int. D News
R. Australia D News
R. Canada Int. M-F The World at Six*
R. New Zealand Int. S-H MIDDAY REPORT*
F/A News
2330 R. Netherlands S/A News
R. Prague D News

Current Affairs Magazines/Features

2300 R. Canada Int. S/A The World This Weekend
2310 China R. Int. S-H Current Affairs
F Global Review
A Report on Developing Countries
R. Australia S-H Asia Pacific
2330 R. Australia M The Buzz (technology)
R. Canada Int. M-F As It Happens
R. Netherlands M-F Newslire

Business/Economics (also in Newscasts & Current Affairs)

2330 China R. Int. M Biz China

R. Australia M Innovations
2350 R. Prague H Economic Report

Science/Technology (incl. Health & Environment)

2305 R. Australia A Ockham's Razor (opinion)
2330 R. Australia S Earthbeat (ecology)
F In Conversation

Arts and Culture

2320 China R. Int. A In the Spotlight
2330 BBCWS(am) A Arts in Action
R. Australia T RA Arts
2335 R. Prague S The Arts
R. Prague A Readings from Czech Literature (biweekly)

Local Lives & Views

2312 R. New Zealand Int. F Focus on Politics
A This Week in Parliament
2330 BBCWS(am) F People and Politics
China R. Int. S People in the Know
T China Horizons
H Life in China
R. Australia W Rural Reporter (outback)
R. New Zealand Int. S Spectrum (life in NZ)
2335 R. Netherlands A Europe Unzipped
R. Prague S Letter from Prague
M-F Newsview
A Spotlight (Czech places)
2345 R. Prague M One on One (interview)
W Czechs in History or Profile
2355 R. Netherlands F Insight (commentary)

Informational Features

2305 R. Australia F Lingua Franca (about language)
2330 China R. Int. W Voices from Other Lands

Music

2330 BBCWS(am) S Composer of the Month
R. New Zealand Int. F The Sampler (latest CDs)
2340 R. Prague A Saturday Music (classical/folk/jazz)

Entertainment

2305 R. Australia F Book Reading
2330 R. Canada Int. A Madly Off in All Directions (comedy/satire)

SWL, Media & Communications

(see Programming Spotlight)

Listener Contact/Interactive

2320 China R. Int. F Listeners' Garden
2335 R. Netherlands S Sincerely Yours
2350 R. Prague S Mailbox

Sport

2330 R. Canada Int. S The Inside Track

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Harold Frodge, Midland, MI; Glenn Hauser, Enid, OK; Adrian Sainsbury, RZ Intl; Harold Sellers, *BBC On Air*; *BCL News*; *BCDXC*; *Cumbre DX*; *DXA*; *DX Listening Digest*; *DX Ontario*; *Fineware*; *Hard Core DX*; *HFCC*; *ILG*; *NASWA*; *RFPI*; *World of Radio*; *World-wide DX Club*.



MSG-1 Launch and WXSAT Status

We had our moment of launch excitement here in Europe when the new all-digital weather satellite (WXSAT) MSG-1 (Meteosat Next Generation) was launched in late October. The WXSAT will be commissioned for some months and then start parallel transmissions of the new digital data formats, Low Rate Information Transfer (LRIT) and High Rate Information Transfer (HRIT) next year. Current transmissions of Primary Data and weather satellite (Wefax) from Meteosat-7 will end in late 2005.

What do European amateurs think of MSG-1's potential offerings? I can't speak for others, but I suspect that many hobbyists view it as I do, with a mixture of positive anticipation and concern. The new LRIT transmission is likely to have a lot to offer the amateur market, but there are two significant factors against early take-up of reception from the new WXSAT when it goes live in about a year's time. New hardware – a new receiver and larger dish than we are used to with the present Meteosat WEFAX – is one concern. At the present time we can receive wefax on a standard 1m dish system, and it will work nearly anywhere in Europe, and across the US when pointed at GOES-E or GOES-W. This is because wefax is standard.

Secondly, from both GOES (Geostationary Operational Meteorological Satellite) and Meteosat-7 WEFAX is free-to-air. Not so MSG-1's LRIT. This is where there is a very regrettable break with tradition. MSG-1 imagery will be almost fully encrypted. The only unencrypted images will be those at synoptic hours – 0600, 1200, 1800 and 2400 UTC. To receive all MSG-1 LRIT images (the nearest equivalent to wefax) a user will require a license and decoder. To obtain a license, some form-filling will be required, followed – if approved – by the purchase of the decoder, called an MSU key unit, costing 400 Euros. It remains to be seen how popular an LRIT system will be!

◆ NOAA WXSATS

Europe has two operational geostationary WXSATS (Meteosats-5 and -7), but as yet, no polar WXSATS, though these are

under construction. Meanwhile, we all rely heavily on the NOAA orbiters. The operational status of these is shown at the end of this column. The Chinese WXSATS Fengyun-1C and -1D continue to provide reliable HRPT, but no APT.

◆ GOES WXSATS

The National Oceanic and Atmospheric Administration (NOAA) publishes a monthly status report on the NOAA polar orbiters and the GOES satellites, so I am including a summary here. GOES-8 through GOES-12 are positioned in geostationary orbit, though only GOES-8 and GOES-10 are actively transmitting imagery.

GOES-8 is, naturally, the oldest of the series, and is positioned over the East Coast in the GOES-E (east) position at 75° longitude from where wefax is transmitted. Almost all its instruments and sub-systems are in 'green' condition, with only the sounder, attitude and Orbit control, and some communications problems classed as 'yellow' (operational with limitations). The latter fault is identified as a power amplifier failure (and presumably there is a backup!)

GOES-9 is now in 'storage' mode, after a period in operational mode when problems with the imager, and attitude control, persuaded NOAA to revert its status to 'storage' because of the availability of GOES-10.

GOES-10 is operational as the GOES-W (west) WXSAT positioned over the West Coast at longitude 135° from where it transmits wefax. There are two fault conditions existing: communications and mechanisms, but neither are critical.

GOES-11 and GOES-12: Both are in 'green' condition throughout, and in 'storage' status.

This number of operational and 'in storage' WXSATS is an excellent asset that should ensure that continental USA remains able to monitor weather systems for many years to come.

◆ Internet site update

I rarely mention Internet sites because a few minutes of checking, using any of the well-known search engines, should turn up a multitude of sites for those interested, but occasionally I

come across a site that seems worthy of mention.

The Pearl Harbor Support Web:

<https://metoc.npmoc.navy.mil/index.shtml>

The main index page listed here has a number of links, and the Satellite Imagery one is of particular interest. Labeled National Pacific Meteorology and Oceanography Center/Joint Typhoon Warning Center, it offers various information types. Images are grouped by satellite and include selections from GMS (the Japanese WXSAT) and Meteosat (European). I checked selections over a few days and all were updated. The close-up of Hawaii showed me that the island does have occasional cloud cover!

The Japanese WXSAT GMS-5 is also positioned over the Pacific Ocean, but at 135° east, it is located nearer the longitudes of Australia. The

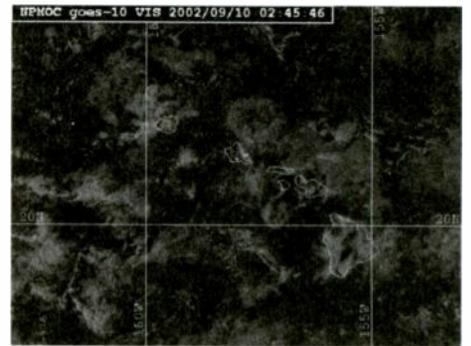


Fig 2: Hawaii Islands imaged by GOES-10 on September 10, 2002

GMS series satellites were developed by the National Space Development Agency of Japan (NASDA), and contribute fully to global weather monitoring. Images from GMS-5 can be found on a number of servers, including the one above, and also at the Meteorological Satellite Center of the Japan Meteorological Agency:
<http://mscweb.kishou.go.jp/>

Details about the GMS-5 satellite are given on this site, and recent images are found on the Hokudai Himawari server at:
http://gmsrvr.agr.hokudai.ac.jp/faq_en/index.php
Images are listed as being updated hourly.

Frequencies

(note - HRPT data next month):
NOAA-12 and -15 APT on 137.50 MHz
NOAA-17 APT on 137.62 MHz
Meteor 3-5 APT on 137.30 MHz possible when in sunlight
GOES-8 and GOES-10 Wefax on 1691 MHz

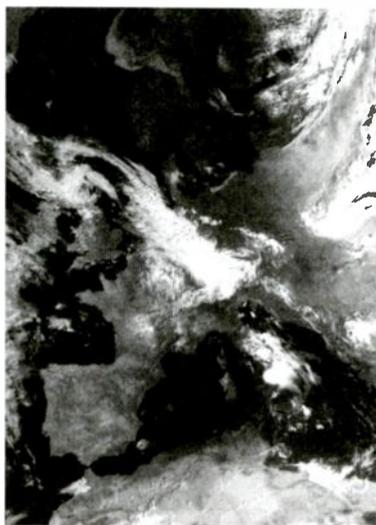


Fig 1: Fengyun-1D HRPT image over Britain on September 10 at 0849 UTC

Satellite Service Guide

Robert Smathers
 robertsmathers@monitoringtimes.com
 www.monitoringtimes.com/mtsg.html

All Frequencies MHz

SES Americom Americom-1

C-Band - 103 degrees West longitude		
1(H)	3720	Housing and Urban Development (HUD) TV (occasional) / Occasional video
2(V)	3740	Deutsche Welle Television / Deutsche Welle Radio channels 1, 2, and 7 (digital)
3(H)	3760	Public Broadcasting Service (PBS) (digital)
4(V)	3780	Fox Sports Net (digital)
5(H)	3800	Globecast Occasional video / LBC radio / PaxNet radio / Deutsche Welle Radio / La Gran Cadena radio (digital)
6(V)	3820	Occasional video
7(H)	3840	Pax Television / Worship Network / Praise Television / Faith TV (digital)
8(V)	3860	In-Demand Pay-Per-View (digital)
9(H)	3880	Occasional video
10(V)	3900	Occasional video
11(H)	3920	Univision feeds (digital)
12(V)	3940	Wisdom Television / Direct Shopping Network (digital)
13(H)	3960	In-Demand Pay-Per-View (digital)
14(V)	3980	In-Demand Pay-Per-View (digital)
15(H)	4000	Total Living Network (digital) / Xtreme Shopping Network (digital) / Occasional video
16(V)	4020	Telemundo / Telemundo International / Mun2 (digital)
17(H)	4040	Telemundo / Telemundo International / Mun2 (digital)
18(V)	4060	Fox Sports Net (digital)
19(H)	4080	Data Transmissions
20(V)	4100	MTV2
21(H)	4120	Telefuturo (digital)
22(V)	4140	(none)
23(H)	4160	TV Games Network (VC2+)
24(V)	4180	Data Transmissions

SES Americom Americom-1

Ku-Band - 103 degrees West longitude		
1(H)	11720	Data Transmissions
2(V)	11740	Data Transmissions
3(H)	11760	NBC Network feeds (digital)
4(V)	11780	Data Transmissions
5(H)	11800	Data Transmissions
6(V)	11820	Data Transmissions / Kentucky Educational TV (digital)
7(H)	11840	NBC Network feeds - Mountain and Pacific Time Zones (digital)
8(V)	11860	Data Transmissions
9(H)	11880	NBC Network feeds - East and Central Time Zones (digital)
10(V)	11900	Data Transmissions
11(H)	11920	(none)
12(V)	11940	Data Transmissions
13(H)	11960	Data Transmissions
14(V)	11980	Data Transmissions
15(H)	12000	NBC Network feeds - HDTV (digital)
16(V)	12020	Data Transmissions
17(H)	12040	NBC Satellite Newsgathering (digital)
18(V)	12060	Data Transmissions / America's Collectibles Network (digital)
19(H)	12080	NBC Satellite Newsgathering (digital)
20(V)	12100	Occasional video
21(H)	12120	NBC Satellite Newsgathering (digital)
22(V)	12140	Occasional video
23(H)	12160	NBC Satellite Newsgathering (digital)
24(V)	12180	FedEx Business TV (digital)

SES Americom GSTAR-4

Ku-Band - 105 degrees West longitude		
T01(H)	11730	Occasional video
T02(H)	11791	Occasional video
T03(H)	11852	Occasional video
T04(H)	11913	Occasional video
T05(H)	11974	Occasional video
T06(H)	12035	Occasional video
T07(H)	12096	Occasional video
T08(H)	12157	Occasional video
T09(V)	11744	Occasional video
T10(V)	11805	Occasional video
T11(V)	11866	Data Transmissions
T12(V)	11927	Occasional video
T13(V)	11988	Occasional video
T14(V)	12049	Occasional video
T15(V)	12110	Occasional video
T16(V)	12171	Occasional video

Telesat Canada Anik F1

C-Band - 107.3 degrees West longitude		
1A(H)	3720	Occasional video
51A(H)	3720	South-American beamed - Data Transmissions
1B(V)	3740	Data Transmissions
2A(H)	3760	CBC Television (digital)
52A(H)	3760	South-American beamed - Data Transmissions
2B(V)	3780	Musimax / Musique Plus / Radio Mutual / Magneothèque / RDS / Canal Nouvelle / The Green Network (digital)
3A(H)	3800	Data Transmissions
53A(H)	3800	South-American beamed - Data Transmissions
3B(V)	3820	Occasional video
4A(H)	3840	(none)
54A(H)	3840	South-American beamed - Data Transmissions
4B(V)	3860	Occasional video
5A(H)	3880	Occasional video
55A(H)	3880	South-American beamed - Data Transmissions
5B(V)	3900	Cancom services (digital) / Global TV (digital)
6A(H)	3920	Radio Canada (digital)
56A(H)	3920	South-American beamed
6B(V)	3940	Cancom services (digital)
7A(H)	3960	CBC feeds (digital) / CBC Radio (digital)
57A(H)	3960	South-American beamed
7B(V)	3980	Cancom services (digital)
8A(H)	4000	Occasional video
58A(H)	4000	South-American beamed - Data Transmissions
8B(V)	4020	Occasional video
9A(H)	4040	CBC feeds (digital)
59A(H)	4040	South-American beamed
9B(V)	4060	Meteo Medio / TV 5 USA / TV 5 France / Blue Bonnet / RDI / Radio Quebec / Canal Vie / Telemedio radio (digital)
10A(H)	4080	Data Transmissions
510A(H)	4080	South-American beamed - Data Transmissions
10B(V)	4100	CTV Red / CTV Green / CTV Blue / Newsworld International / The Weather Network (digital)
11A(H)	4120	Occasional video
511A(H)	4120	South-American beamed
11B(V)	4140	Occasional video
12A(H)	4160	CBC feeds (digital)
512A(H)	4160	South-American beamed - Data Transmissions
12B(V)	4180	McKibben Communications occasional video services (digital)

Telesat Canada Anik F1

Ku-Band - 107.3 degrees West longitude		
T1(V)	11714	Star Choice DBS (digital)
T2(V)	11744	Star Choice DBS (digital)
T3(V)	11775	Star Choice DBS (digital)
T4(V)	11807	Star Choice DBS (digital)
T5(V)	11836	Star Choice DBS (digital)
T6(V)	11867	Star Choice DBS (digital)
T7(V)	11897	Star Choice DBS (digital)
T8(V)	11928	Star Choice DBS (digital)
T9(V)	11960	Star Choice DBS (digital)
T10(V)	11990	Star Choice DBS (digital)
T11(V)	12020	Star Choice DBS (digital)
T12(V)	12051	Star Choice DBS (digital)
T13(V)	12081	Star Choice DBS (digital)
T14(V)	12113	Star Choice DBS (digital)
T15(V)	12140	Star Choice DBS (digital)
T16(V)	12172	Star Choice DBS (digital)
T17(H)	11725	Star Choice DBS (digital)
T17S(H)	11725	South-American beamed
T18(H)	11756	Star Choice DBS (digital)
T18S(H)	11756	South-American beamed
T19(H)	11786	Star Choice DBS (digital)
T19S(H)	11786	South-American beamed
T20(H)	11817	Star Choice DBS (digital)
T20S(H)	11817	South-American beamed
T21(H)	11850	Star Choice DBS (digital)
T21S(H)	11850	South-American beamed - Data Transmissions
T22(H)	11880	Star Choice DBS (digital)
T22S(H)	11880	South-American beamed
T23(H)	11910	CBC / SRC feeds (digital)
T23S(H)	11910	South-American beamed
T24(H)	11940	CBC / SRC feeds (digital)
T24S(H)	11940	South-American beamed
T25(H)	11971	Star Choice DBS (digital)
T25S(H)	11971	South-American beamed
T26(H)	12002	Star Choice DBS (digital)
T26S(H)	12002	South-American beamed
T27(H)	12033	Star Choice DBS (digital)
T27S(H)	12033	South-American beamed
T28(H)	12063	Star Choice DBS (digital)
T28S(H)	12063	South-American beamed
T29(H)	12094	Star Choice DBS (digital)
T29S(H)	12094	South-American beamed
T30(H)	12124	Star Choice DBS (digital)
T30S(H)	12124	South-American beamed
T31(H)	12155	Star Choice DBS (digital)
T31S(H)	12155	South-American beamed - Data Transmissions
T32(H)	12180	Star Choice DBS (digital)
T32S(H)	12180	South-American beamed - Data Transmissions

Satelites Mexicanos Morelos 2

C-Band - 109.1 degrees West longitude		
1W/L(H)	3720	(none)
1N(V)	3740	(none)
1W/U(H)	3760	(none)
2N(V)	3780	(none)
2W/L(H)	3800	(none)
3N(V)	3820	(none)
2W/U(H)	3840	(none)
4N(V)	3860	(none)
3W/L(H)	3880	(none)
5N(V)	3900	(none)
3W/U(H)	3920	(none)
6N(V)	3940	(none)
4W/L(H)	3960	(none)
7N(V)	3980	(none)
4W/U(H)	4000	(none)
8N(V)	4020	(none)
5W/L(H)	4040	(none)
9N(V)	4060	(none)
5W/U(H)	4080	(none)
10N(V)	4100	(none)
6W/L(H)	4120	(none)
11N(V)	4140	(none)
6W/U(H)	4160	(none)
12N(V)	4180	(none)

Satelites Mexicanos Morelos 2

Ku-Band - 109.1 degrees West longitude		
T01(K)	11764	(none)
T02(K)	11888	(none)
T03(K)	12012	(none)
T04(K)	12136	(none)

TeleSat Canada Anik E2

C-Band - 111.1 degrees West longitude		
1A(H)	3720	Data Transmissions
1B(V)	3740	Occasional video
2A(H)	3760	Data Transmissions
2B(V)	3780	Data Transmissions
3A(H)	3800	Data Transmissions
3B(V)	3820	Occasional video
4A(H)	3840	Data Transmissions
4B(V)	3860	Data Transmissions
5A(H)	3880	Data Transmissions
5B(V)	3900	Occasional video
6A(H)	3920	Occasional video
6B(V)	3940	Occasional video
7A(H)	3960	(Inactive transponder)
7B(V)	3980	Occasional video
8A(H)	4000	Occasional video
8B(V)	4020	Occasional video
9A(H)	4040	(Inactive transponder)
9B(V)	4060	(Inactive transponder)
10A(H)	4080	Data Transmissions
10B(V)	4100	Data Transmissions
11A(H)	4120	Data Transmissions
11B(V)	4140	Data Transmissions / SCPC audio services
	1036.70	63.30 Wal-Mart In-store Network (Canada)
	1037.00	63.00 Wal-Mart In-store Network (Canada)
	1037.50	62.50 Wal-Mart In-store Network (Canada)
12A(H)	4160	(Inactive transponder)
12B(V)	4180	(Inactive transponder)

Telesat Canada Anik E2

Ku-Band - 111.1 degrees West longitude		
T01(V)	11717	Data Transmissions
T02(V)	11743	Data Transmissions
T03(V)	11778	Data Transmissions
T04(V)	11804	Data Transmissions
T05(V)	11839	Data Transmissions
T06(V)	11865	Occasional video
T07(V)	11900	Occasional video
T08(V)	11926	Novanet (digital)
T09(V)	11961	Saskatchewan Communications Network (digital)
T10(V)	11987	Star Choice DBS (digital)
T11(V)	12022	Star Choice DBS (digital)
T12(V)	12048	Star Choice DBS (digital)
T13(V)	12083	Star Choice DBS (digital)
T14(V)	12109	Star Choice DBS (digital)
T15(V)	12144	Ground Loop Attitude Control System (digital)
T16(V)	12170	Star Choice DBS (digital)
T17(H)	11730	Data Transmissions
T18(H)	11756	Data Transmissions
T19(H)	11791	Data Transmissions
T20(H)	11817	Data Transmissions
T21(H)	11852	Star Choice DBS (digital)
T22(H)	11878	Star Choice DBS (digital)
T23(H)	11913	Data Transmissions
T24(H)	11939	Data Transmissions
T25(H)	11974	Star Choice DBS (digital)
T26(H)	12000	Star Choice DBS (digital)
T27(H)	12035	Star Choice DBS (digital)
T28(H)	12061	Star Choice DBS (digital)
T29(H)	12096	Star Choice DBS (digital)
T30(H)	12122	Ground Loop Attitude Control System (digital)
T31(H)	12157	Star Choice DBS (digital)
T32(H)	12183	Star Choice DBS (digital)

SoCal High Band Fed Frequency Update

One of the best Fed monitors in the country, T.K. "Ruff" Ruffzart in Southern California (SoCal), has been monitoring some major changes in the VHF federal high band. It would appear, based on what Ruff reports below, that the FBI has significantly increased their presence in the VHF-Hi band.

Ruff recently posted the following comment to the Fedcom newsgroup, "As I'm finding more and more of these digital encrypted channels, an interesting pattern has emerged. Many of them are 12.5 kHz up from current FBI frequencies.

"Whatever this new system is, it has voting repeaters on every mountain and tall building in the area. The controller for this system is on 164.8625 MHz which, interestingly enough, is always listed as the Federal Emergency Management Agency (FEMA)."

The frequencies that Ruff has monitored are as follows; my comments will be in brackets:

162.7000	Controller [first reported activity ever on this frequency nationwide]	166.9125	FBI repeater output [This is a Department of Interior nationwide frequency]	167.7250	New FBI repeater [first known FBI assignment in California this frequency]
162.7250	Controller [first reported activity ever on this frequency nationwide]	166.9500	INS repeater input	167.7875	New FBI repeater [reported in use by FBI in Los Angeles and San Francisco]
162.8250	INS (Immigration and Naturalization Service) repeater input to 163.625 and 170.625	167.1375	Repeater output	167.8250	FBI repeater output [repeater input 164.750]
162.9000	INS direct (simplex)	167.1500	New INS repeater output [I have seen FBI reported in other parts of the country on this frequency]	168.3375	FBI frequency [first reported activity ever on this frequency nationwide]
162.9250	INS repeater input to 163.675	167.2125	New FBI repeater [reported FBI Mt. Laguna repeater]	168.3500	FBI repeater output? Radia Techs? [This is a US Government nation-wide]
162.9500	INS repeater input [the INS reportedly uses this frequency in SoCal]	167.2250	New FBI repeater [first known FBI assignment in California this frequency]	168.3750	National Guard repeater output, input 172.700 MHz
162.9625	INS repeater input [this is a Department of Agriculture nationwide so we might have a new agency using this frequency]	167.2375	New FBI repeater [first San Diego area FBI assignment. Frequency has been reported in the San Francisco area]	168.5000	INS A6 repeater output, input 166.350
162.9750	INS repeater input [reported input to INS repeater output of 165.825]	167.2625	FBI A1 repeater [ECC Mt. Woodson repeater, repeater input is 164.350]	168.8000	Repeater output [This is a GSA nationwide primary assignment]
163.0500	INS direct (simplex) or repeater input [I show direct]	167.3250	New FBI repeater [first known FBI assignment in California this frequency]	168.8250	Repeater output, input is 165.925 [INS frequency]
163.2750	INS direct (simplex) or repeater input [This is a Department of Commerce nationwide allocation]	167.3375	FBI C1 direct (simplex) [reported in use in Los Angeles and San Francisco]	168.8500	Repeater output [Various agencies use this frequency including the FBI and INS]
163.3750	INS direct (simplex) or repeater input [I show direct]	167.3500	New FBI repeater [first known FBI assignment in California this frequency]	168.8625	FBI repeater input, output 164.550 D2?
162.6250	INS repeater output	167.3625	FBI direct (simplex) [new FBI simplex under the 12.5 kHz band plan reorganization]	168.8750	Repeater output
163.6500	INS repeater output? [The INS reportedly uses this frequency in Southern California]	167.3750	New FBI repeater (group two strongest signal) [first known FBI assignment in California this frequency]	168.9250	Repeater input or direct
163.6750	INS repeater output [repeater input is 162.925]	167.3875	FBI repeater [ECC A3 repeater, reported repeater locations Mt. Laguna, Mt. Woodson and Mt. Palomar, two inputs reported 163.9125 and 164.425 MHz]	168.9750	INS repeater input
163.7000	INS direct (simplex)	167.4000	New FBI repeater [first known FBI assignment in California this frequency]	169.3875	Repeater output
163.7250	INS repeater output [repeater input is 162.825]	167.4250	New FBI repeater [first known FBI assignment in California this frequency]	169.6375	INS repeater output [First reported activity ever on this frequency nationwide]
163.7750	INS repeater output [repeater input is 165.825]	167.4750	New FBI repeater [first known FBI assignment in California this frequency]	170.0125	Repeater input
164.8625	Controller [I show this is a FBI repeater input to repeater output of 163.200]	167.4875	FBI direct (simplex) [reported in use in Los Angeles and San Francisco]	170.0250	FBI repeater input or direct (simplex)
164.9750	Repeater input no clue [I show this is a US Forest Service in California frequency statewide]	167.5000	New FBI repeater [could this be a Lyon's Peak FBI repeater?]	170.0625	Customs repeater output [OTAR "over-the-air-rekeying" of encryption noted?]
166.8000	INS direct (simplex) or repeater input? [first known California assignment this frequency]	167.5125	FBI direct (primary) [This is a reported input to a San Diego FBI repeater on 171.175 MHz]	170.6250	INS repeater output, input 162.825
166.8625	FBI repeater output [first known FBI assignment in California this frequency]	167.5250	New FBI repeater (group one strongest signal) [first known FBI assignment in California this frequency]	170.7125	INS repeater output, input 173.4625 [first reported activity ever on this frequency nationwide]
166.8750	INS direct (simplex) or repeater input? [first known INS assignment in California this frequency]	167.5375	FBI nationwide hostage rescue team (HRT)	170.7250	INS repeater output ASU
166.8875	FBI repeater output	167.5500	New FBI repeater (separate, unidentified input) [first known FBI assignment this frequency]	170.7375	FBI repeater input or direct (simplex) [first reported activity ever on this frequency nationwide]
		167.5625	FBI direct (simplex) nationwide common	170.8250	FBI San Miguel repeater [ECC B4 - two reported inputs 162.6125 and 164.750]
		167.5750	New FBI repeater (separate, unidentified input) [first known FBI assignment this frequency]	170.8375	FBI repeater output [first reported activity ever on this frequency nationwide]
		167.6000	New FBI repeater [first known FBI assignment in California this frequency]	170.9000	FBI Desert repeater [reported location is Hot Springs with input of 164.600]
		167.6250	New FBI repeater [first known FBI assignment in California this frequency]	170.9125	FBI repeater output [first reported activity ever on this frequency nationwide]
		167.6375	FBI direct (simplex) [reported in use in Los Angeles and Sacramento]	170.9500	FBI direct (simplex)
		167.6500	New FBI repeater [first known FBI assignment in California this frequency]	171.1750	FBI repeater output [input is 167.5125]
		167.6750	New FBI repeater [reported in use in Sacramento]	171.5125	INS repeater input to 172.400 [this is a NASA nationwide so we have a new agency using this frequency]
		167.6875	FBI San Onofre repeater [ECC A6, repeater input 164.250 MHz]	171.5375	FBI repeater output? [this is a Department of the Interior nationwide so we might have a new agency using this frequency]
		167.7000	New FBI repeater [first known FBI assignment in California this frequency]	171.6125	FBI repeater output [first reported activity ever on this frequency nationwide]
		167.7125	FBI Mt. Palomar repeater [ECC A5 - interesting, I have	171.6250	Repeater input or direct
				171.6375	FBI repeater output [this is a NASA nationwide so we have a new agency using this frequency]
				171.7875	Repeater output [this is a Department of Agriculture nationwide so we might have a new agency using this frequency]
				172.2875	INS repeater output [this is a Department of Agriculture nationwide so we have a new agency using this frequency]

- 172.3125 INS repeater output
- 172.4500 INS repeater output [this is a Department of the Interior/National Park Service nationwide so I find it unusual for INS to be using this frequency]
- 172.5125 INS repeater output [this is a Department of Agriculture nationwide so we have a new agency using this frequency]
- 172.6250 INS repeater output [this is a Department of the Interior/National Park Service nationwide so I find it unusual for INS to be using this frequency]
- 172.7000 National Guard repeater input, output 168.375 MHz
- 173.1625 FBI repeater output
- 173.1750 FBI direct (simplex)
- 173.1875 FBI repeater output
- 173.4250 INS repeater output [this is a NASA nationwide so we have a new agency using this frequency]
- 173.4500 INS repeater output [first reported activity ever on this frequency nationwide]
- 173.4625 Repeater input [this was a US Army/Corps of Engineers nationwide frequency]
- 173.4750 INS repeater output [first reported activity ever on this frequency nationwide]
- 173.6625 [Various agencies use this frequency including the Army and NASA]
- 173.9750 INS repeater output [I have only seen the National Weather Service in Texas reported on this frequency]

Thanks, Ruff, and keep us abreast of any more changes you note. Are you monitors in other areas of the United States seeing any new frequencies similar to those Ruff notes? Let us hear from you. Why not use Ruff's frequency list as a starting point?

◆ Chicago Fed Profile

I have had a few pieces of email asking me what happened to the Chicago profile that was projected for the August *Fed File* column. Quite frankly, other material and editorial commitments bumped it to the back burner. We are running these profiles as time, research and space permit. Given the volatile world situation we are currently experiencing, I just can't make any promises, so please don't write to ask when a particular city will appear.

Also remember these area profiles are not meant to be complete, but they are a good representative survey of what frequencies are available in each area and are based on the best information we have from open sources. I strongly urge our readers in the areas we profile to please send us updates. We cannot personally visit every area we cover in this column, so I am relying on those of you who live in the areas we profile to update us on what you are hearing.

Lastly, we will not cover any Department of Defense (DoD) frequencies in these profiles. Complete nationwide coverage of those frequencies are now available for purchase on CD-ROM in the *Grove Military Frequency Directory*. You can find out more information about that product on the Grove website at <http://www.grove-ent.com>

So, without further ado, here are the promised frequencies from the third largest city in the United States, the Windy City of Chicago.

HF (frequencies in kHz and mode is USB):

- Coast Guard - 2103.0 2182.0 2261.0 2670.0 2678.0 3120.0 3123.0 3241.0 5320.0 5422.0 5692.0 5696.0 7629.0 8125.0 8980.0 8984.0 9278.0 10810.0 11195.0 11198.0 11201.0 13434.0 15081.0 15084.0 15087.0
- Federal Aviation Administration - 3353.0 4055.0 7475.0 8125.0 13626.0 27625.0

- Federal Bureau of Investigation - 2232.0 2810.0 5060.0 5390.0 6954.0 7905.0 9185.0 9240.0 9313.0 10500.0 10915.0 11075.0 11491.0 12140.0 14460.0 14495.0
- Federal Communications Commission - 2110.0 4483.0 7602.0 7790.0 10655.0 13830.0 13990.0 18050.0 19230.0 22964.0 23035.0
- Government Itinerant - 27575.0 27585.0

VHF/UHF (frequencies in kHz and mode is narrowband FM unless otherwise indicated)

- Alcohol Tobacco and Firearms - 165.2875 166.4625 414.700 418.175 418.200 418.225
- Coast Guard - 156.300 156.600 156.700 156.800 157.050 157.075 157.100 157.150 157.175 165.3375 166.075 243.000 282.800 381.700 381.800 383.900
- Customs Service - 165.2375 166.4375 166.5875 169.550 407.700
- Department of Energy - 164.375
- Department of Health and Human Services - 409.000 415.625
- Department of Housing and Urban Development - 409.500
- Department of Justice - 411.025
- Department of Labor - 406.200
- Department of State - 407.200 409.625
- Department of Veterans Affairs - 155.280 155.340 164.150 164.175 164.700 166.200 168.000 168.525 168.750 170.375 171.3875 171.525 409.050 409.325 412.125 414.325
- Drug Enforcement Administration - 408.375 416.050 416.200 416.325 418.625 418.675 418.750 418.900 418.950
- Environmental Protection Agency - 157.770 408.000
- Federal Aviation Administration - 162.300 165.6125 165.7125 165.7375 166.175 169.250 169.300 169.325 169.350 172.175 172.875 172.900 172.925 172.950 172.975 410.300
- Federal Bureau of Investigation - 163.8625 163.9875 164.025 164.050 164.425 164.475 164.525 164.550 164.800 165.4375 165.5625 167.2125 167.2875 166.3375 167.4375 167.4625 167.5125 167.5375 167.5625 167.6125 167.7625 168.125 168.325 168.725 169.950 170.350 170.625 170.675 170.725 170.900 170.950 173.050 173.100 173.125 173.150 173.175 408.100 408.175 411.350
- Federal Communications Commission - 41.060 167.050
- Federal Emergency Management Agency - 173.7875
- Federal Grain Inspection Service - 411.300 412.800 415.300
- Federal Reserve System - 414.725 415.250 419.700
- General Services Administration - 163.175 168.800 413.875 413.950 415.200 417.650
- Immigration and Naturalization Service - 162.825 162.925 163.625 163.675 163.775 165.925 168.825 170.650 170.875 170.925
- Internal Revenue Service - 163.125 166.000 166.4625 167.000 167.100 409.250 414.900
- Marshal Service - 162.7125 162.7875 163.200 163.8125 170.750 170.800 170.850 411.000 411.050 411.100 412.650 412.700 417.700
- NOAA National Weather Service - 162.550 410.875 416.175
- Secret Service - 164.650 165.2125 165.375 165.7875 166.400 166.4625
- Social Security Administration - 171.2375
- White House Communications Agency - 162.6875 171.2875
- U.S. Postal Service - 162.225 163.375 164.9875 166.225 169.000 169.850 170.125 170.175 170.400 171.000 406.225 407.175 407.725 407.775 408.025 408.050 408.125 408.475 408.625 409.275 409.375 410.000 410.200 410.325 411.400 411.450 411.500 414.750 414.050 416.425 416.775 416.975 417.775 418.100 418.300 419.125 419.650

◆ Chicago FAA Air Traffic Control Frequencies

As part of our metro profiles I will also include FAA Air Traffic Control allocated frequencies for the major airports in the area we

are covering. In the Chicago area there are two major airports: Chicago O'Hare and Chicago Midway Airport.

- Chicago O'Hare International Airport (KORD)
- ATIS - 135.400 269.900
- PTC - 121.60 (Primary) 119.250 (Secondary)
- Military Command Post - 252.100
- Weather ASOS - 124.200 124.800 132.750
- Clearance Delivery - 119.250 121.600
- Ground Control - 121.675 (Metering) 121.750 (Outbound) 121.900 (Inbound) 348.600
- Control Tower - 120.750 126.900 127.925 132.700 390.900
- Unicom - 122.950
- Emergency - 121.950 243.000
- VFR Advisory - 126.800
- Chicago Approach - 119.000 121.150 124.350 125.700 128.450 284.000 393.100
- Chicago Departure - 125.000 125.400 127.400 269.500 307.200 337.400
- Class B Airspace - 120.550 128.450 133.500 284.000 290.200 371.900

- Chicago Midway Airport (KMDW)
- Weather ASOS - 118.525 119.275 132.750
- ATIS - 132.750
- Pre-Taxi Clearance/Clearance Delivery - 121.850
- Ground Control - 121.650
- Control Tower - 118.700 226.300
- Unicom - 122.950
- Emergency - 121.500
- Chicago Approach/Departure - 118.400 126.050
- Class C Airspace - 119.450 (Primary) 135.200 (Secondary) 226.300

Additions and corrections for material in this column are always appreciated and can be sent to the email address in the masthead. And that does it for this month's *Fed Files*. Until next month 73 and good hunting.

Performance Upgrades

Kiwa offers performance upgrades to improve the performance of the following receivers:

- AOR AR7030
- CC Radio
- Icom R71 R75
- JRC NRD 525 NRD 535 NRD 301A
- Lowe HF150 AP/SP150
- Radio Shack DX390/392 DX394 DX398
- Sangean AT5909 AT5818
- Sony ICF2010
- Yaesu FRG7 FRG100

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The Quest for Interoperability

One of the lessons learned (or relearned) after the September 11, 2001, attack on the Pentagon is the need for interoperability. As we saw with the Oklahoma City bombing and other events requiring multiple public safety agencies, the ability to communicate quickly and efficiently is vitally important to saving lives and property.

First on the scene after a hijacked aircraft crashed into the Pentagon were units from four nearby fire departments: Arlington and Fairfax Counties, Virginia, and the cities of Alexandria, Virginia, and Washington, DC. Because of earlier regional planning, mutual aid agreements, and training, each of these departments used radio gear that could work with each other and experienced little difficulty in establishing communications. First responders already had Arlington County frequencies and talkgroups programmed in their radios, so they could immediately communicate with central dispatch and the on-scene commander.

However, when state and federal agencies and other second responders eventually arrived, things got much more complicated. These people brought radios that were not able to work with the existing fire department systems. As an interim solution, Motorola brought in 150 new radios, borrowed from a local warehouse where they were awaiting delivery to Montgomery County, Maryland. These radios were programmed and distributed to key members of the second responder agencies.

In the end, more than 900 individuals from 50 different agencies took part in the rescue, containment, and recovery operations.

The Arlington County trunked 800 MHz system served as the initial radio network for responders. The Motorola network is designed to handle 1,750 radios and has a daily average activity of about 500 radios. On the day of the attack the loading was about 900 radios. No system busy messages were received.

It is interesting to note that several after-action reports concluded that commercial networks simply couldn't handle the large number of call attempts made during such an event. At the Pentagon, the only reliable method of communications for rescuers was their own public safety radio system. Call volume on the local cellular carriers more than doubled – most local wireless systems were operating at maximum and many call attempts were rejected. The one exception to this at the Pentagon was Nextel's Direct Connect, an immediate two-way "walkie-talkie" feature that allowed Arlington County

to communicate directly with the Federal Bureau of Investigation. Because Direct Connect does not rely on commercial telephone service, it was relatively unaffected by the overloaded telephone network.

The success of the first responders in establishing communications, and the difficulties experienced by the subsequent responders, emphasized a lesson that was learned after the airliner crash in 1982 and the Oklahoma City bombing in 1995. Public safety two-way radios need a common set of standards and must be able to work with each other with very little effort. This drive for interoperability is slowly working its way from local groups up to the federal level.

◆ Federal Project 25 Network

In September of this year the Department of Justice and the Department of the Treasury announced six companies had been awarded contracts under a \$3 billion program to provide APCO Project 25 equipment to federal agencies. Three of the companies are familiar to *Monitoring Times* readers: E.F. Johnson Company, M/A Com Private Radio Systems, and Motorola. (The other three companies are Daniels Electronics, based in Victoria, British Columbia; Datron World Communications of Vista, California; and Thales Communication from Clarksburg, Maryland.) The contract has a five-year duration and covers portable and mobile radios, repeaters and base stations, and additional support equipment, including encryption modules and key loaders.

Federal agencies are looking for the same types of capabilities that make Project 25 systems attractive to state and local agencies: interoperability, efficient use of radio spectrum, and the ability to purchase equipment in a competitive marketplace.

The Departments of Treasury and Justice are working to create a single radio network for

seven federal law enforcement agencies: Bureau of Alcohol, Tobacco and Firearms, Customs Service, Drug Enforcement Administration, Federal Bureau of Investigation, Immigration and Naturalization Service, United States Marshals Service and the Secret Service. The hope is that common equipment and standards will make it easier for these agencies to work together. As cooperation and communication increase, perhaps infighting, information hoarding and interagency rivalries will decrease.

Under the terms of the contract, other agencies will also be able to purchase equipment.

Project 25 began in 1989 and has produced a common set of technical standards agreed to by public safety radio users and manufacturers. A number of federal agencies have backed Project 25 for future radio systems, including the Interior, Justice and Treasury departments as well as the Federal Emergency Management Agency.

A number of state and local governments have already begun the transition to Project 25 systems, as we've discussed in previous *Tracking the Trunks* columns. I welcome input from readers who are monitoring known or suspected Project 25 systems. Often articles in the local newspaper will mention a new radio system, or a scanner listener will hear what sounds like digital noise in the 450 or 800 MHz bands. If you happen to come across any of these new digital systems, please write and let me know!

◆ Colorado

The State of Colorado is working to replace their patchwork of VHF and UHF radio systems with a single statewide 800 MHz network. The goals of the \$78.9 million project are to make state and local agencies interoperable at the equipment level, improve radio coverage across the mountainous state, and to share costs among all of the participants. When finished, the system is expected to support as many as 25,000 radios using 125 towers in different parts of the state. At that time the state plans to remove the 150 MHz system they currently operate. The equipment build-out of the program was originally divided up into six phases.

The first phase was a pilot deployment in the metro Denver area, in all or parts of Arapahoe, Denver, Douglas and Jefferson counties. Phase II continued the Denver build-out by adding coverage in Adams, Boulder, Clear Creek and Gilpin counties.

Last year saw the completion of phase three, with additional coverage in eastern and north-





- 561 04-061 District 3 (Southeast) Dispatch
- 562 04-062 District 3 Car to Car
- 577 04-081 District 4 (Southwest) Dispatch
- 578 04-082 District 4 Car to Car
- 593 04-101 District 5 (Northeast) Dispatch
- 594 04-102 District 5 Car to Car
- 609 04-121 District 6 (Downtown) Dispatch
- 610 04-122 District 6 Car to Car
- 512 04-000 All Police Groups ("All Call")

Fire talkgroups

- 785 06-021 Fire Dispatch
- 786 06-022 District 2 Fireground
- 787 06-023 District 3 Fireground
- 788 06-024 District 4 Fireground
- 789 06-025 District 5 Fireground
- 790 06-026 District 6 Fireground
- 791 06-027 District 7 Fireground
- 792 06-030 Denver International Airport (Patched)

eastern portions of the state, including Cheyenne, Elbert, Kit Carson, Larimer, Lincoln, Logan, Morgan, Phillips, Sedgwick, Yuma, Washington and Weld counties.

Phase four, now only a few months away from being done, centers on southeastern Colorado in the counties of Baca, Bent, Chaffee, Crowley, Custer, El Paso, Fremont, Huerfano, Kiowa, Las Animas, Otero, Prowers, Pueblo and Teller.

Phase five is focused on northwestern Colorado, including Eagle, Garfield, Grand, Jackson, Lake, Mesa, Moffat, Park, Pitkin, Rio Blanco, Routt and Summit counties. This was supposed to be completed by the end of the year, but the state has put a hold on the required \$15 million due to the poor economy.

The final phase adds the southwestern area of Colorado, with the San Luis Valley and the counties of Alamosa, Archuleta, Costilla, Conejos, Detla, Dolores, Gunnison, Hinsdale, La Plata, Mineral, Montezuma, Montrose, Ouray, Rio Grande, Saguache, San Juan and San Miguel.

Originally scheduled to be complete by 2005, lack of state funding will delay the final phase until at least 2006. At present the State Patrol, Departments of Corrections, Wildlife and Transportation and a handful of local police and sheriff's departments are on the system, with a total of about 9,000 radios.

At least two major jurisdictions have so far declined to join the network and plan to continue using their existing radio systems. The Boulder County Sheriff's Department feels that the state network doesn't have enough coverage in the mountain areas of their county. Denver already has an operational communications network and does not plan to switch over to the state network.

◆ **Denver, Colorado**

Denver, both the city and county, currently share an EDACS (Enhanced Digital Access Communications System) system on the following frequencies (in logical channel order):

- 854.9875, 855.4875, 855.9875, 856.4875, 857.2375, 857.7375, 858.4875, 859.2375, 859.7375, 860.4875, 855.2375, 855.7375, 856.2375, 856.7375, 857.4875, 858.2375, 858.7375, 859.4875, 860.2375, 860.7375, 866.1875, 866.5875, 867.1250 and 867.6500 MHz.

Police talkgroups

- 529 04-021 District 1 (Northwest) Dispatch
- 530 04-022 District 1 Car to Car
- 545 04-041 District 2 (North Central) Dispatch
- 546 04-042 District 2 Car to Car

Talkgroups:

- 00016 Police Dispatch (West)
- 00048 Police Dispatch (East)
- 00080 Police Services (Clearance, etc)
- 00112 Police Tactical, West Primary
- 00144 Police Tactical, East Primary
- 00176 Police Tactical, West Secondary
- 00208 Police Tactical, East Secondary
- 03216 Fire Dispatch
- 03280 Fireground Tactical
- 03312 Fireground Tactical

Denver International Airport operates an EDACS trunked system in the 800 MHz band. Frequencies, in logical channel order, are 855.2125, 855.7125, 856.4625, 857.2125, 857.7125, 866.3625, 866.6625, 866.9375, 867.5375 and 867.8375 MHz.

Also at the airport is a Motorola Analog trunked system operated by United Airlines on the following frequencies: 853.4625, 854.8375, 856.8125, 856.8875, 857.8875 and 858.8875 MHz. Control channels have been noted on 859.8875, 860.8125, 860.8875 and 860.9125.

As you're programming your scanner, remember to include the national frequency assignments: Calling channel of 866.0125 MHz and four tactical channels, 866.5125, 867.0125, 867.5125 and 868.0125 MHz. Also, Colorado statewide tactical is 868.7875 MHz.

◆ **Aurora, Colorado**

Back in July, the city of Aurora, Colorado, contracted with M/A-COM to install an \$11 million EDACS trunked radio system for use by all city departments. Police, fire, emergency medical service, public works, transit, parks and recreation will make use of the system, as will the local airports. Four repeater sites will provide coverage for the city.

Currently, Aurora operates a Motorola Type 1 system on the following frequencies: 856.9875, 857.7625, 857.9375, 857.9625, 857.9875, 858.7625, 858.9375, 858.9625, 858.9875, 859.7625, 859.9375, 859.9625, 859.9875 MHz. Control channels have been noted on 860.7625, 860.9375, 860.9625 and 860.9875 MHz.

You can use preprogrammed Fleet Map setting E1, or directly with the following block settings: B0: S-0, B1: S-0, B2: S-0, B3: S-4, B4: S-4, B5: S-4, B6: S-4, B7: S-0.

- 03696 Med-Link to Aurora South Hospital
- 03728 Med-Link to Aurora South Hospital

◆ **Uniden Radios Certified**

Uniden's upcoming Project 25 scanners, the handheld BC250D and the mobile/base BC785D, have received certification from the Federal Communications Commission (FCC). With this in place, Uniden is legally able to offer them for sale. Uniden expects both of these scanners, plus the plug-in Project 25 card (BCi25D) to be shipping to dealers by late November.

Uniden also announced a software program called E-Scanner that will allow owners to program frequencies and talkgroups into scanners with data ports.

That's all for this month. I welcome your electronic mail about Project 25. Uniden scanners, or any other radio topic at danveeneman@monitoringtimes.com, and as always more information is available on my website at <http://www.signalharbor.com>. Until next month, happy monitoring!



NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

Full 800 MHz Scanners

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More VHF Marine Band Encryption

It seems that our small lead piece in the September column struck a nerve. I received quite a bit of email on this topic. Here is a sample of the many comments from our readers.

Cliff Watts in Dickinson, Texas, reports that encryption on marine channels by Coast Guard units is a common place in the Lone Star state. "It's nothing new here in the Galveston Bay area. I've heard it occasionally on marine channel 21A (157.050) for quite a while long before September 11, 2001, as I recall," Cliff said.

An anonymous contributor to this column reports that he has monitored encrypted communications from units at the Cape May Coast Station in New Jersey. This reporter has noted radio checks on marine channel 21A by shore and marine/aircraft units on many occasions. He indicates that he hears 12-k baud data radio digital voice transmissions by these Coast Guard units, which is indicative of older style Motorola format DES encryption and not the newer APCO-25 format.

Bob Kozlarek in Elmwood Park, New Jersey, says he hears encryption on both the LANT channels (more on that in a moment) and marine channel 21A.

Moving north up the Atlantic coastline, another anonymous contributor passes along these interesting observations.

"I'm up in Marblehead, MA, just north of Boston. A couple of years ago a CG cutter was offshore calling Group Boston on marine channel 81 (157.075). The cutter asked the Group radio man to shift to coded on 81. The initial response was 'we don't have that capability.' The fellow on the cutter was rather mad at this answer and demanded that the Group Boston radio man get his superior. Eventually they did go coded on 157.075, but it took some teeth pulling to make it happen. They use LANT 03 on 162.125 in this area quite a bit, both coded and clear. 157.075 has remained in the clear 99 percent of the time. However, while on vacation recently on the boat in Nantucket and Cuttyhunk, I heard a lot more coded traffic on channel 21 (157.050). This coincided with a lack of traffic on the LANT frequencies that I had in my scanner."

◆ Coast Guard LANT and PAC Designators

The piece above mentions the Coast Guard LANT designator. Recently a contributor who identified himself as "the researcher," passed along the following Coast Guard frequency/designator list that is programmed into their VHF

FM radios. It includes listings for both the Atlantic and Pacific areas. Thanks to "the researcher" for passing along this list.

ATLANTIC AREAS

Mode		
No.	Mode Name	Transmit/Receive
1	LANT 1	153.785 (simplex)
2	LANT 2	153.785/154.995
3	LANT 3	154.160 (simplex)
4	LANT 4	154.340/154.130
5	LANT 5	154.280 (simplex)
6	LANT 6	154.370
7	LANT 7	154.695 (simplex)
8	LANT 8	155.280 (simplex)
9	LANT 9	155.475 (simplex)
10	Marine Ch 16	156.800 (simplex)
11	Marine Ch 67	156.375 (simplex)
12	Marine Ch 09	156.450 (simplex)
13	Marine Ch 69	156.475 (simplex)
14	Marine Ch 10	156.500 (simplex)
15	Marine Ch 70	156.525 (simplex)
16	Marine Ch 11	156.550 (simplex)
17	Marine Ch 12	156.600 (simplex)
18	Marine Ch 13	156.650 (simplex)
19	Marine Ch 14	156.700 (simplex)
20	Marine Ch 74	156.725 (simplex)
21	Marine Ch 06	156.300 (simplex)
22	Marine Ch 18A	156.900 (simplex)
23	Marine Ch 21A	157.050 (simplex)
24	Marine Ch 81A	157.075 (simplex)
25	Marine Ch 22A	157.100 (simplex)
26	Marine Ch 23A	157.150 (simplex)
27	Marine Ch 83A	157.175 (simplex)
28	LANT 28	159.480 (simplex)
29	LANT 29	162.050/163.175
30	LANT 30	162.125 (simplex)
31	LANT 31	162.250 (simplex)
32	LANT 32	162.325 (simplex)
33	LANT 33	163.050 (simplex)
34	LANT 34	163.050/162.125
35	LANT 35	163.175 (simplex)
36	LANT 36	163.175/162.050
37	LANT 37	163.4125 (simplex)
38	LANT 38	163.5375 (simplex)
39	LANT 39	163.200/163.4375
40	LANT 40	164.550 (simplex)
41	LANT 41	164.775 (simplex)
42	LANT 42	165.1375 (simplex)
43	LANT 43	165.2375 (simplex)
44	LANT 44	165.2625 (simplex)
45	LANT 45	165.4625 (simplex)
46	LANT 46	165.975/164.775
47	LANT 47	166.225 (simplex)
48	LANT 48	166.4375 (simplex)
49	LANT 49	166.4625 (simplex)
50	LANT 50	166.5875 (simplex)

51	LANT 51	166.9375/165.2375
52	LANT 52	167.900 (simplex)
53	LANT 53	167.900/165.2625
54	LANT 54	168.8625/164.550
55	LANT 55	171.3375 (simplex)
56	LANT 56	173.5875 (simplex)

PACIFIC AREAS

Mode		
No.	Mode Name	Transmit/Receive
1	HON-City	154.220 (simplex)
2	Channel 38	154.280 (simplex)
3	HON-City	154.340 (simplex)
4	Channel 42	154.475 (simplex)
5	Marine Ch 06	156.300 (simplex)
6	Marine Ch 68	156.425 (simplex)
7	Marine Ch 09	156.450 (simplex)
8	Marine Ch 69	156.475 (simplex)
9	Marine Ch 10	156.500 (simplex)
10	Marine Ch 16	156.800 (simplex)
11	Marine Ch 11	156.550 (simplex)
12	Marine Ch 12	156.600 (simplex)
13	Marine Ch 13	156.650 (simplex)
14	Marine Ch 14	156.700 (simplex)
15	Mode 15	Blank
16	Mode 16	Blank
17	Marine Ch 18A	156.900 (simplex)
18	Marine Ch 21A	157.050 (simplex)
19	Marine Ch 81A	157.075 (simplex)
20	Marine Ch 22A	157.100 (simplex)
21	Mode 21	Blank
22	Marine Ch 23A	157.150 (simplex)
23	Marine Ch 83A	157.175 (simplex)
24	Marine Ch 26	157.300/161.900
25	Marine Ch 28	157.400/162.000
26	Channel 31	162.050 (simplex)
27	Channel 36	162.050/163.175
28	Channel 32	162.125 (simplex)
29	D11-LE-1	162.125/165.3375
30	Channel 35	162.325 (simplex)
31	D11-LE-2	162.325/167.900
32	Channel 31	163.175 (simplex)
33	Channel 37	163.175/163.050
34	D13-R-2	163.5125/171.150
35	Security	164.300 (simplex)
36	D13-PO-2	164.300/165.500
37	D11-LE-3	164.300/165.3125
38	D13-R-3	164.9125/171.150
39	D13-R-4	164.870/171.150
40	D13-PW-1	165.0375/168.500
41	CUST-1	165.2375/ (simplex)
42	D11-LE-4	165.3125 (simplex)
43	D11-LE-5	165.3125/164.300
44	D13-R-1	165.3125/168.500
45	D13-R-5	165.3125/171.150
46	D11-LE-6	165.3375/ (simplex)

47	D11-LE-7	166.3375/162.125
48	D11-LE-7	166.3375/162.125
49	D13-SIMP	168.500 (simplex)
50	WX-1	162.550 (simplex)
51	WX-2	162.475 (simplex)
53	WX-3	162.400 (simplex)
54	Mode 54	Blank
55	Mode 55	Blank
56	Mode 56	Blank

If anyone has any updates on this list I would appreciate hearing from you. You can contact me at the email address in the masthead.

❖ Coast Guard on HF ALE

Jack Metcalfe up in Kentucky has uncovered an extensive HF Automatic Link Establishment (ALE) network associated with the 9th Coast Guard District.

Frequencies (ALE): 5423.9 7530.0 7629.1 8126.4 9278.5 11199.0 13432.6

Station List:

CGD9	Coast Guard District 9, Cleveland, OH
CRNSIL	Rockwell Collins
NODK	Bramble (WLB-392)
NODW	Sundew (WLB-404)
NRKP	Unknown
NRLX	Kotmai Bay (WTGB-101)
NRLY	Bristol Bay (WTGB-102)
NRUU	Neah Bay (WTGB-105)

❖ More Southeast US Military Activity

Here are some active frequencies from monitoring in the southeastern part of the US. Mode is AM unless otherwise noted.

11.181	JStars ## calling Nightstar ## (USB)
13.909	JStars ## calling Nightstar ## (USB)
125.125	169FW/157FS Air-to-Air, McEntire ANG Airport, SC
141.600	Scar callsign air-to-air
141.750	Havoc 73 calling Norfolk ATOC
225.800	USAF AWACS-Fighter Control
234.925	NORAD CAP/AWACS over Cape Kennedy
235.100	Aerial refueling
257.500	USAF AWACS Voice Tel
276.000	Nail # # working Dark Cloud
295.575	JStars discrete
314.050	USAF AWACS Voice Tel
314.300	USAF AWACS Voice Tel
314.900	Spectre # # with Night Moves working Torch 01?
323.000	FAA Atlanta ARTCC
343.750	Bulldog MOA (GA) Pass/Kill Air Combat Maneuvering (ACM) discrete
381.000	Strikestar working aircraft to targets

❖ Space Coast Update

Longtime reporter Al Stern in Satellite Beach, Florida, passes along this fine update for monitoring activity on the Space Coast. Many thanks. Al, and good job.

Patrick AFB (KCOF)

118.400/289.400	Clearance Delivery
119.175/273.500	ATIS
124.350/335.800	Ground Control
124.575	Daytona Approach/Departure North
132.650/281.425	Daytona Approach/Departure South
133.750/269.375	Patrick Tower

134.950/239.275	Daytona Approach/Departure North
138.300/383.000	Command Post
138.475/251.900	JOLLY/KING aircraft air-to-air/air-to-ground 920RQG
139.300/372.200	Base Operations/Pilot-to-Dispatcher (PTD)
148.100	Flight Line Maintenance
149.300	Maintenance Operations Center
163.4875/173.025	Security
164.700/172.300	Crash Trucks/ Fire Dept
165.1375	Motor Pool
165.1625	POL
171.3875	Civil Engineers
173.125	Base Operations Mobile/Transient Alert
255.500/321.000	JOLLY/KING Rescue Aircraft — 920RQG Operations
257.750	New Jacksonville ARTCC frequency
344.600	PMSV:Metro (at CCAFS)
413.000	NAVAIDS Maintenance

Cape Canaveral Air Station (KXMR)

118.625/393.000	Skid Strip Tower
133.800/264.800	Thinker 1/Charlie (Eastern Test Range ETR, Range Safety Officer - For Restricted Area entry)

NASA-KSC Shuttle Landing Facility (X68)

128.550/284.000	Tower (relayed on 165.6125)
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Melbourne IAP (JSTARS):

118.200/257.800	Tower
121.900	Ground Control
123.200	Northrop-Grumman Operations

Al says that for military aircraft monitoring, his is one of the best areas in the country. NASA-KSC is up the street from Patrick AFB. JStars flies a few times a week, the Avon Park bombing range is busy seven days a week, and the offshore Air Defense Identification Zone (ADIZ) is bustling with dogfights, AWACS, etc.

❖ Frequency Changes

Regular Milcom reporter Jack NeSmith passes along these frequency changes in military frequencies.

Adm David L. McDonald Field/NS Mayport, FL (KNRB)

289.950	Metro (weather)
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Forrest Sherman Field/NAS Pensacola, FL (KNPA)

120.700	Commission Tower
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Fort Benning/Lawson AAF, GA (KLSF)

119.050	Tower (ex-126.200)
134.100	Pilot-to-Dispatcher (ex-128.150)
245.700	Pilot-to-Dispatcher (ex-372.200)
251.150	Clearance Delivery (ex-248.200)
254.250	Ground Control (ex-340.100)
257.200	GCA (ex-226.600)
269.525	Tower (ex-229.400)
288.275	Tower (ex-241.000)
307.325	GCA (ex-237.200)
343.200	Metro (weather) (ex-344.600)

Fort Campbell/Compbell AAF, KY (KHOP)

230.100	Pilot-to-Dispatcher (ex-356.400)
266.800	Ground Control (ex-261.250)
269.525	Approach Control (ex-255.600)
278.800	Tower (ex-241.200)
285.625	Eagle Radio (ex-242.400)

290.450	EOD Tower (ex-280.900)
307.025	Approach Control (ex-277.500)
343.300	Metro (weather) (ex-343.300)

Fort Drum/Wheeler-Sack AAF

Renegade Tower	248.650/142.475
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Fort Rucker/Hancey AHP, AR

289.175	Tabernacle
289.300	Skelly East
336.050	Tath North
391.800	Skelly West

Holloman AFB, NM (KHMN)

269.225	Approach Control (ex-324.300)
335.625	Arrival (ex-339.300)
346.550	PMSV (ex-344.600)

Savannah International, GA (KSAV)

RTR Frequencies	387.100 380.025 354.000
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William B. Hartsfield Atlanta International, GA (KATL)

268.700	RTR (ex-254.250)
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❖ Tip of the Month

One reporter in Connecticut reports that the National Guard in that state is making extensive use of FRS radio frequencies. A complete list of those frequencies can be found on the *Monitoring Times* website (<http://www.monitoringtimes.com>) in the Reference Library section.

❖ The Lighter Side of Milcom

Peter, KZ1Z, recently passed along this interesting exchange he monitored on GHFS primary 11175.0 kHz. He substituted asterisks for the plane's identification.

"Earlier today on 11175 kHz, a guy driving a big cargo plane out over the Atlantic was talking about his turnaround and return due to a partial hydraulic failure."

Puerto Rico asked, "What are you carrying?"

AF *** said, "Tanks."

Puerto Rico then asked, "Tanks of what, Sir? —Over."

AF *** said, "Tanks.. You know.. Rumble, rumble, boom, boom!"

Puerto Rico "Ahhhh... Understood, Sir."

AF *** "Good. Good. That's really very good."

"Tanks," Pete, for sharing that tidbit with our *MT* readers. And if you have something to share with our readers, I hope to hear from you. Until next time, 73 and good hunting.

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Moving Day

Over the last few months, many DXers have heard signals on new frequencies. WTME-790 Rumford, Maine, has moved to 780, and WEBS-1110 Calhoun, Georgia, has moved to 1030. This month, two more stations have joined the list. DXers report WDID-1560 Shelbyville, Illinois, is now on 870; and WWLG-1360 Baltimore is now on 1370. The latter change includes a change in city of license to Pikesville. A number of other stations have plans to move. These include WMET-1150 Gaithersburg, Maryland (to 1160); KTMG-1370 Deer Trail, Colorado (to 820); and WSIV-1540 East Syracuse, New York (to 720).

Why do stations move? To improve coverage, of course, but how? For the same power and antenna, coverage is much better on lower frequencies. A 1,000-watt station on 550 has better coverage than a 50,000-watt station on 1600. WTME, WEBS, and WDID all moved to lower frequencies – admittedly WTME's move was negligible, only one channel. Another reason for moving is to find a channel that's less congested. 790 is a "regional" channel, with 48 stations in the U.S. and Canada. 780, on the other hand, is a "clear" channel, with only 14 stations. WWLG is moving the "wrong" direction, but they also received a major power increase. From 5,000 watts daytime and 1,500 at night, they're going to 21,000 daytime and 6,000 at night. Sometimes, the spacing between existing stations on the same channel makes it possible to increase power with a change in frequency.

A Canadian station that's often heard here in the Nashville area has applied to move to FM. CHIN-1540 Toronto has operated a low-power FM relay station on 101.3. A recent Industry Canada decision has allowed for the creation of a new full-service station on that frequency, one which would "bump" CHIN's relay off the air.

In the interest of keeping that FM coverage, CHIN has filed three separate applications. One would give them the license for the new full-service station: the 1540 station and their existing full-license FM on 100.7 would continue as currently authorized. A second application would move the 101.3 relay to 91.9. A third would move the 1540 license to 101.3, taking the 1540 signal off the air. Six other applications have been filed for the 101.3 frequency. The 91.9 channel is not a sure thing either, with another

group having applied for 91.7 also in Toronto.

Staying in Canada for a moment, another AM station asking to move to FM is the CBC's Radio 1 station at Fredericton, New Brunswick. CBZ requests a move from 970 AM to 99.5 FM. This will be a shame: on a recent visit to Maine I noted CBZ was the only CBC station audible for many miles!

◆ New and Improved?

In Toronto, applications have been filed for three new AM stations. One would operate on 790 with 250 watts day, 50 watts at night, relaying a proposed new ethnic station on 105.1. A second ethnic station would operate on 1650 with 1,000 watts fulltime.

There are two applicants for 1610. One would also be ethnic with 1,000 watts fulltime; the other would be a Markham-based news/talk station with 10,000 watts daytime and 5,000 at night. Finally, two applications have been filed for ethnic digital stations in Toronto. These would be the first two standalone digital radio stations in Canada, i.e., the first ones not associated with an analog station.

Often, what seems to be a frequency change is actually two callsign and format changes. In the Boise, Idaho, area KFXD-580 had carried a

classic country format, while KIDO-630 was news/talk. KFXD's lower dial position (and more favorable directional pattern) gave it better coverage. In mid-August, the two stations swapped call letters and formats. KFXD is now on 630, and KIDO on 580. As far as the FCC is concerned, this was not a frequency change at all. KIDO on 580 is the same station that used to be KFXD on 580 – the only thing that changed were the call letters. Likewise for KFXD on 630: it is the same station that was KIDO-630!

◆ Bits and Pieces

Patrick Griffith near Denver forwarded an item from *Radio and Records On-line*, regarding digital radio tests. The story reports Ibiqity (the firm testing "IBOC" on-frequency digital radio), has applied for a second experimental station. The new station would operate from Frederick, Maryland, on 650, and would supplant an existing station on 1610 in Cincinnati. (The FCC database shows Ibiqity owns an experimental station there on 1650, it's unclear which frequency is correct.)

Patrick contacted Ibiqity and learned of a third station, W12XAM in Warren, New Jersey. W12XAM is on 1700 kHz and will operate intermittently as needed with 50 watts into a 35-ft vertical antenna with four radials. Patrick's contact, Russ Mundschenk, indicated W12XAM will probably not operate at night; Ibiqity VP Rick Martinson said the same thing about the Maryland and Ohio stations.

Reception reports of W12XAM can be sent to Mr. Mundschenk at Ibiqity Digital, 8865 Stanford Boulevard, Suite 202, Columbia, Maryland 21045. (I would guess this address would also work for the other two stations.)

It would appear KDJI-1270 Holbrook survived the recent wildfires in northern Arizona, as Patrick has received a verification from the station. KDJI was using daytime power at night during the emergency, as provided by 73.1250(f) of the FCC regulations. If you logged this station, you can send a report to Petracom Media, 3051 S. White Mountain Road, Show Low, Arizona 85901.

Are you logging any of these stations on their new frequencies? Write me at 7540 Hwy 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!



WMIX-940 Mount Vernon, Illinois has not changed frequency in its 55 years on the air.

Free Radio Network Back After Technical Trouble

All serious pirate DXers make frequent use of the Free Radio Network web site, found at the <http://www.frn.net> internet URL. Thus, many people were startled in early September when this resource suddenly disappeared. Webmeister John Cruzan said that the web site had "major server problems." At first, things looked grim, since Cruzan noted that the internet provider hosting the site had failed to back up the files, a major error in computer service circles. So, for a couple of weeks the world's leading pirate radio internet site vanished into vaporware.

Fortunately, Cruzan retained some old backups of the web site, and he invested considerable work toward restoring this standard information and communication resource. At press time for *MT*, reports of the death of the Free Radio Network proved premature, and it is open to pirate DXers worldwide once again. The revived site now sports a section that permits financial donations to keep the FRN movement alive.

◆ Clandestine Radio Watch

Martin Schoech, the key force behind the outstanding *Clandestine Radio Watch* newsletter, reminds us that this amazing information resource remains available at two places on the internet. Its coverage of the clandestine radio scene is so good that it is required reading by worldwide intelligence agencies. You can read the newsletter in progress direct from Martin's web site in Germany with <http://www.schoechi.de/crw-new.html> providing the latest material. Or, you can still check out material from CRW at the superb clandestine radio com web site, found at <http://www.clandestineradio.com/> on your internet dial.

◆ Radio DAT

Clandestine stations targeted toward Kazakhstan are not common fare in most DXers' logbooks. But, numerous DXers on a worldwide basis have reported signals from Radio DAT, a new clandestine service from the political opposition in Kazakhstan. Their 9775 kHz signal often suffers from interference in North America around their scheduled sign-ons of 1500 and 0100 UTC, but some persistent DXers have been hearing it.

◆ Unusual Pirate Tactics

Years ago when WRNO in New Orleans had a substantial audience with their 41 meter commercial broadcasts, their transmitter was sometimes subject to sudden interruptions. When such interruptions took place, sometimes in the middle

of relays of Glenn Hauser's "World of Radio" program, enterprising pirates such as Radio Clandestine used to broadcast suddenly on the frequency that New Orleans had just vacated. This was one way to increase the listening audience, by hijacking listeners who had tuned in to hear the WRNO signal.

Craig Pradarelli reports a similar tactic that was employed during the summer by an unknown pirate identifying himself only as Niemo. Craig was listening to WBCQ on 7415 kHz when that Maine licensed broadcaster temporarily lost its signal. Niemo came on to take the place of a scheduled Johnny Lightning show for several minutes. Unscheduled and unexpected pirate broadcasts like this are always entertaining because of the unusual circumstances. Craig's experience proves that it pays to tune around the bands, since you never know what you might hear.

◆ Winter Propagation Returning

During the summer months, with daylight lasting well past 0100 UTC in North American time zones, pirate stations propagate less well before 0000 UTC. But, during the winter, as darkness hours expand, pirate signals are normally well heard much earlier. As sunsets arrive well before 0000 UTC, the winter DX season normally permits considerably improved pirate reception. As an added bonus, summer static levels are now diminishing. In the past, major snowstorms have often brought pirate broadcasters out of the woodwork. So, even if it isn't snowing near your house, if you see weather forecasts of snow elsewhere in the country, you may want to tune your receiver to the area around 6955 kHz.

◆ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month. Most stations still transmit in the vicinity of 6955 kHz. Pirate broadcasting increases noticeably on weekends, and around major holidays.

Captain Morgan- Most pirates, including this one, emphasize rock music in their programming. Their announcer has been using a "party zone" slogan during the shows. (None)

Jean Chretien Worldwide- This station combines rock music with slogans from prominent Canadian politicians. (None)

KRMI- Radio Michigan International normally mixes rock music and comedy material. (Uses KRMI6955@hotmail.com e-mail)

Numbers Parody- The numbers station parodies that we mentioned last month are still around, including one apparently associated with WBNY and its rodent revolution clandes-

tine parody programs. The pirates inevitably use more creative "numbers" than the standard fare from the world's intelligence services. (None)

Oxycontin Radio- The old TV theme from "All in the Family" is sort of an interval signal on this rocker, which is among the stations unfortunately making fun of individual DXers in a nasty fashion. (None)

Pan Global Wireless- Somebody has resurrected classic broadcasts from this old-time pirate station. We see their old QSL from Mike Oxlone here this month. (Try Belfast)

"From Spark to Space"
Pan-Global
Wireless
"LUCKY" QSL #13

We are pleased to verify your recent reception report!

Date: 26 DECEMBRE 1992 Time: 0044-0108 U.T.C.
Frequency: 7415 KHz Mode: U.S.B

Radio Alpha Lima- This one remains one of the best heard European pirates in North America. Their latest shows that made it across the ocean were heard just below 15070 kHz. (Hoogeven)

Radio Cochiquaz- The best heard South American pirate still occasionally puts in an audible signal to North America, normally on 11440 kHz on some weekends. The station's <http://www.geocities.com/rcochiquaz> web site sometimes provides additional information. (Santiago, and uses radio_cochiquaz@yahoo.com e-mail)

Radio FCC- It's highly unlikely that the FCC is associated with the latest rock music pirate that has stolen the government agency's name. (None)

Radio Three- The "legitimate" pirate Radio Three normally transmits syrupy pop oldies, with Sal Amoniac at the microphone. But, various bogus versions of the station exist, and sometimes it can be fairly difficult to tell the real pirate from its imitators. (None, only QSL's loggings printed in *The ACE*.)

Radio Tornado Worldwide- It's been a long time since Dr. Tornado fired up his superpowered multi-kilowatt transmitter on Radio Metallica. Nevertheless, this parody of Dr. Tornado still makes fun of Metallica anyway. (Merlin)

Radio 510- DJ Stevie at this Swiss quasi-pirate announces that they have a new e-mail ad-

Continued on page 75

New Designations for Single-Letter IDs

In October, we mentioned that all single-letter Canadian aero beacons were being redesignated with 3-letter IDs. This change comes as the result of an ICAO (International Civil Aviation Organization) mandate intended to minimize the chance of confusion between beacons sharing the same ID – a mistake which apparently led to an air disaster in South America when a pilot followed the wrong navigation beacon. By changing single-letter beacons to 3-letter IDs, the chances of a duplicate ID (within a particular region, at least) will be virtually eliminated.

Table 1 lists the new 3-letter assignments for Canadian beacons as released by Nav Canada. My thanks to Larry Van Horn (NC) and Jacques d'Avignon (ON) for their assistance in obtaining this information. All changes are to be implemented by mid-2003.

Table 1. Redesignated Canadian Beacons

Freq.	Old ID	New ID	Location
254	E	ZYC	Calgary, AB
233	Y	ZCA	Calgary, AB
281	L	ZCL	Charlo, NB
400	G	ZYG	Charlottetown, PE
356	Q	ZYQ	Churchill, MB
257	Y	ZCH	Churchill, MB
399	D	ZHD	Dryden, ON
201	X	ZXD	Edmonton, AB
308	E	ZZD	Edmonton, AB
292	F	ZET	Edmonton, AB
379	G	ZEG	Edmonton, AB
215	K	ZAB	Edmonton, AB
201	M	ZMC	Fort McMurray, AB
246	X	ZXJ	Fort St. John, BC
364	G	ZHZ	Halifax, NS
385	J	ZNS	Halifax, NS
397	A	ZHA	Hamilton, ON
266	B	ZHM	Hamilton, ON
201	U	ZXU	London, ON
366	M	ZMN	Moncton, NB
304	F	ZQM	Moncton, NB
348	M	ZUL	Montreal, QC
201	U	ZDV	Montreal, QC
284	L	ZMT	Montreal, QC
317	I	ZMX	Montreal, QC
224	X	ZMB	Montreal, QC
266	J	ZMM	Montreal, QC
272	W	ZMR	Montreal, QC
407	H	ZHU	Montreal, QC
404	Y	ZYB	North Bay, ON
344	O	ZOW	Ottawa, ON
372	A	ZPA	Prince Albert, SK
260	X	ZXS	Prince George, BC
219	Q	ZRS	Regina, SK
414	Y	ZRG	Regina, SK

204	J	ZQR	Regina, SK
397	J	ZST	St. John, NB
248	Z	ZZP	Sandspit, BC
356	T	ZXE	Saskatoon, SK
201	X	ZSK	Saskatoon, SK
397	E	ZSS	Saskatoon, SK
354	Z	ZZV	Sept-Îles, QC
270	O	ZNF	St. John's, NF
246	S	ZYT	St. John's, NF
340	J	ZJT	Stepenville, NF
344	S	ZSB	Sudbury, ON
219	Q	ZQY	Sydney, NS
201	N	ZYD	Sydney, NS
276	H	ZTH	Thompson, MB
203	T	ZZZ	Thompson, MB
263	T	ZQT	Thunder Bay, ON
263	T	ZTS	Timmins, ON
368	L	ZYZ	Toronto, ON
385	X	ZDH	Toronto, ON
403	R	ZTO	Toronto, ON
341	T	ZLP	Toronto, ON
236	J	ZLB	Toronto, ON
317	R	ZTR	Trenton, ON
368	V	ZVR	Vancouver, BC
335	K	ZKF	Kitchener-Waterloo, ON
353	X	ZXY	Whitehorse, YT
398	G	ZQG	Windsor, ON
201	N	ZWN	Winnipeg, MB
201	H	ZHT	Winnipeg, MB
287	G	ZWG	Winnipeg, MB
215	W	ZWW	Winnipeg, MB

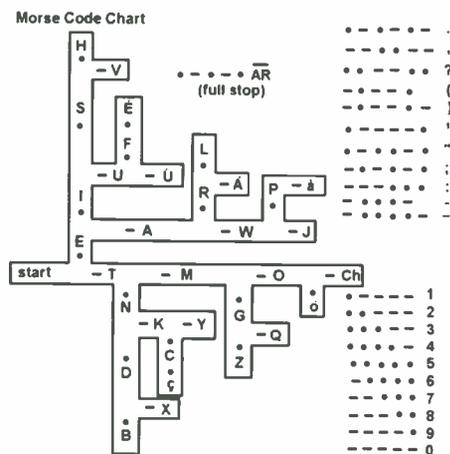


Figure 1. Morse Code Chart (Courtesy, Allen Lutins)

ing, but I live fully 40 miles from a LORAN transmitter. For a better test, I gave the filter to a friend in Auburn, NY, that has a line-of-sight path to a LORAN station. Prior to installing the filter, he could hear virtually nothing on longwave, except the clickety-clack pulses of LORAN. With the filter installed, LORAN signals no longer registered on his S-meter, and were barely audible from the speaker. He heard beacons for the first time!

The Canadian developer of the filter plans to make a commercialized version soon. If the new model passes muster – as we expect it will – he'll look into offering it for sale to hobbyists. Stay tuned to this column for more details.

◆ Euro-Broadcast News

The long-delayed Isle of Man LW broadcast station has suffered another setback. (See October longwave feature -ed.) In late summer, a request for judicial review of the offshore transmission facility was put on hold until January 2003. The hearing will likely take several days. When and if the station is approved, it is expected to operate on a frequency of 279 kHz and will use the name *MusicMann 279*, at least initially. Visit the station's website for updated information: <http://www.longwaveradio.com>.

According to industry reports, Ireland's powerhouse station Atlantic 252 (252 kHz) may return to its original pop music format, but under a new name and with a new operator. Former '252 broadcaster Chris Carey (no relation) plans to re-establish the station under the name **Radio Nova** and return it to a music format that he helped pioneer in the early 1980s. Updates on this station can be found on <http://www.radiowaves.fm>.

◆ Morse Reference Chart

MT reader Allen Lutins submitted the unique Morse reference chart shown in Figure 1. Allen used the chart as a youngster when he was first learning the code and has made a few refinements to it over the years. He offers the chart as a way for "Morse-challenged" DXers to decode beacon IDs with minimal fuss. With some practice, I suppose the chart could also be used to copy slow speed code on the ham bands.

To use the chart, place a convenient pointer, such as a pencil eraser at the **Start** point. As you hear each Morse element being sent (individual dits and dahs), move your pointer in the direction that corresponds to the sound you hear. When all of the elements of a particular letter have been sent, your pointer will be resting on the correct letter. Repeat the process for any characters that follow. Punctuation symbols and numbers are listed at the right of the chart. Have fun using this unique tool.

◆ LORAN Filter Update

Tests are continuing on the 100 kHz LORAN filter I mentioned a few issues ago. My own tests with the device were very encourag-

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Ham Radio Sans Computers



While looking for a column idea for this month, I found myself in a rather interesting situation. Due to some local weirdness with my area broad-band service, I found myself between Internet Service Providers (ISPs) for over a week. Being a techno-geek by nature, I knew of more than one way to skin this particular cat and wasn't too terribly inconvenienced in the interim. Like "Old Nick," tjarey@tjarey.com is known by many names in the Internet world.

But still, this situation led my mind to wandering down some interesting paths. My tangents sprouted tangents. I can remember a speaking engagement not too many years ago where I found it necessary to explain to a large roomful of radio hobbyists just what this new fangled Internet thingy was all about. Now, the Net is so pervasive the question even needs to be raised: "Are computers and Internet access necessities in Amateur Radio?"

Well, of course the short answer is no. I hang with one club full of "Old Timers" in which half the folks don't even own computers, let alone have Internet access. But it is an interesting question, given how many resources and services are now primarily Internet based.

❖ QSL?

Let me begin with the most glaring example of how difficult one aspect of the hobby has become without at least a computer. Amateur Radio Callbooks, as such, no longer exist in printed form. The now classic "Flying Horse" editions of the domestic and DX callbooks are only available on CD-ROM. Likewise Buckmaster's "HamCall" which used to be available in microfiche format. Without access to a computer you can neither make use of CD-ROM-based information nor surf the Internet for one of the various on-line QSL information sites. You are to a certain degree up the creek without a paddle.

Given this state of affairs, what are your options these days? I posed this very question to a couple of hams whose shacks are somewhat proudly computer free. There are a number of options, each with its limitations.

The most obvious solution here is to not even play the QSL game at all or to limit yourself exclusively to responding to hams who send you their card first. This leaves a bad taste in my mouth because I have always prided myself of QSLing 100%. But not everyone holds to that standard.

In trying to move cards around without knowing a station's address, it is actually a bit easier to deal with many DX stations than it would be

with domestic stations. This is because you can utilize the ARRL Outgoing DX QSL Bureau to get cards to DX stations without needing to know their mailing address. This is limited to those entities that participate in the mutual service (most countries do) and the DX station must also be a willing participant in the game. Still, I would venture to guess that a good number of cards will get through the system, although you do need to wait many months or even sometimes years for a card to get through the Bureau system.

Back when I was just starting out in the hobby the classic paper style callbooks were well out of the price range of a starving college student. (Note: one really positive aspect of the "Information Age" is that a lot of information has become much more affordable and often even free!) More than a few cards of mine went through the Bureau with little more than a callsign and a prayer.

There are some limited domestic QSL Bureaus. One example is the one run by and for members of FISTS, The International Morse Preservation Society. Club members can swap cards through this system and even qualify for a number of FISTS awards.

The remaining option is, as it has always been, to take the additional time to trade QSL address information on the air. Some folks are reluctant to do this, but I've heard it done often enough to count it as a viable option.

Interestingly, the callbook situation proved to be the toughest nut to crack in returning to ham radio's pre-PC roots. Now let's take a look at other options for those aspects of the hobby that have become dominated by computers and the Internet.

❖ Print Is Not Dead!

Since access to the World Wide Web became commonplace, folks have chosen this as the path

to fast and easy answers to almost any topic of information.

Of course it is a great resource, but there is another. Anybody remember the Public Library? I'll bet any kid who became a ham before the PC revolution probably used the world atlas at the library to figure out just where in the world these stations they were talking to actually were.

Even with the plethora of information that the Web has to offer, a regular reacquaintance with your local library will lead you down dozens of new pathways of inquiry. For example, after I had exhausted my search for information concerning setting up a solar powered ham station by way of resources on the Internet, I ended up finding exactly the solution to my particular situation in a long-out-of-print book on solar power written by one of my favorite radio hobby gurus: Ed Noll W3JQJ. A couple of nickels in the library's photocopy machine and I was well on the way to taking the better part of Amateur Radio Station N2EI "off the grid." This, of course, will be a topic of this column at some future time.

But let's also take some time to talk about a personal collection of resources. If you wanted to strand me on a desert island, I'd only require three books: The *Oxford NRSV* translation of the *Bible*, Robert A. Heinlein's *Time Enough for Love* and of course *The American Radio Relay League Handbook*. The first two would keep my spirits up while I used the last to build something to call for help. While *The Handbook* is currently available in a very handy CD-ROM format, it continues to be published in traditional printed format as well. For me there is nothing quite like the paper edition once it gets a few drops of solder stuck on a few of the pages.

If you augment *The ARRL Handbook* with the League's other two main resources, *The ARRL Operating Manual* and *The ARRL Antenna Book*, you'd have more than enough information to enjoy a majority of the aspects of Amateur Radio. (Remembering of course that some of the chapters will directly address the use of computers.) For more information on these texts go to <http://www.arrl.org>. OOPS, we're not using computers right now, are we? Not to worry, we didn't exclude telephones. Call them at 1-888-277-5289 for more information and for ordering. They also have dozens of other books that are well above the quality of much of the information the Internet can provide.



◆ Let's Do The Time Warp Again!

In my modern computer-dominated radio shack, I've chosen to store a lot of useful information on one or more of my PCs. Many hams today perform all of their logging and operation documentation utilizing database or spreadsheet programs or one or more of the commercially available products such as Win-EQF.

About the time the first Commodore 64 entered Amateur Radio Station WB2GHA (I wasn't N2EI yet), I already had a number of binders full of data covering contacts with literally thousands of stations. Initially, I tried to move this information into a database. It didn't take me long to realize that time spent doing data entry was time spent off the air. I decided to leave my old logs books as they were.

Since that time, on numerous occasions, I have enjoyed taking them down off the shelf and flipping through them, taking time to recall some of the contacts and their context. The information I put in my computer-based logging system these days is no less accurate and I am just as pleased and proud of the content. Still, my old paper logs give me a case of the "warm fuzzies" that my computer-based records can never match. Just as important: those paper logs are not subject to viruses, accidental deletion, hard drive crashes and even backup disk failures.

I've also talked in the past about my system of 3x5 cards that I use to check if I've previously had a QSO with a station. Sure, I could use my computer-based logs to give me the same information. But I usually do not have my computer turned on when I am on the air. If I were a more avid and competitive contester, I might opt for a computer-based "dupe-check" logging program. But even when I contest I am a bit of a Luddite. I got in the habit of using paper dupe check forms and they have always worked just fine for me. As they say: If it don't stink, don't stir it!

◆ Inquiring Minds Want To Know

I know that most folks who make use of our digital modes these days make use of computers and transceiver interfaces of some sort. But I remember back as late as the '80s, a lot of hams still used old Model 50 teletype machines to do RTTY. No computers needed. How many of you old timers remember scrounging 88 mh telephone toroids to build your interfaces? I wonder if any of those old units are still in use on the air? The point I am trying to make is that RTTY was around on the ham bands long before any ham could afford a personal computer. If you still use the old style RTTY machines, please drop me a line and send me a picture. I'd really enjoy hearing some of your experiences.

◆ It's A Hardware Problem

And this, of course brings us to the nature of modern amateur radio gear in general. If you glance over the ads in any ham publication you will be hard pressed to find a transceiver that does not have one or more microprocessors or microcontrollers built right in. Computers truly are everywhere. But they still are not a necessity to good ham radio fun. For example, my classic Heathkit HW-7, HW-8 and HW-9 have nary a

computer-controlled circuit, yet more enjoyable radios would be hard to find. I recently had a QSO with Ralph W2YQV. He was using a Heath DX-60B Transmitter and a Hammarlund HQ100 Receiver. You'd not find a transistor in that pair, much less a microprocessor. Older gear may not have all the bells and whistles of the latest DSP rigs, but that doesn't mean you'll run out of fun any time soon.

I'm not about to set my PCs out to the curb for the trash truck, but it was fun to reflect on how to continue to enjoy the hobby in spite of their presence in my shack.

Have fun! I'll see you on the bottom end of 40.

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Outer Limits continued from page 71

dress. (steve@rol3.com)

Shadow Radio- Stations using this ID have sometimes rebroadcast old radio dramas from "The Shadow" program, but the latest version concentrated on military music and programming. (Uses the _shadow6950@hotmail.com e-mail)

Sycko Radio- Since no QSLs have materialized from this by-now veteran pirate station, there remains some controversy about how to spell the station name, which is pronounced "Psycho." (None)

United Patriot Militia Bingo- This parody of Steve Anderson's former KSMR right wing clandestine is still around, despite the demise of the Kentucky State Militia's shortwave transmitter. The militia uses bingo for fundraising during the parodies. (Merlin)

WHYP- James Brownyard's replica of an old AM station in North East, PA, still provides parody shows, inaccurate weather reports, and coverage of the pirate scene. Their productions are among the most elaborate material heard on shortwave radio. (Providence)

WMFQ- All of their shows consist primarily of rock music. Their frequent identifications between songs always consist of chanting announcers who wonder where their QSLs are. (Providence)

WMPR- Their format remains techno dance music. As we saw last month, they occasionally respond to loggings of their station printed in pirate radio bulletins. (Still none).

◆ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 293, Merlin, Ontario N0P 1W0, Canada; PO Box 663, 7900ar Hoogeveen, the Netherlands, and PO Box 159, Santiago 14, Chile. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Best bets remain *The ACE* (\$2 US for sample copies via Belfast) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via yukon@tm.net.

◆ Thanks

Your loggings and news are always welcome via Outer Limits, c/o MT, 7540 Hwy 64 West, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Rich D'Angelo, Wyomissing, PA; Cachito, Santiago, Chile; Ross Comeau, Andover, MA; John Cruzan, Joplin, MO; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Harold Frodge, Midland, MI; Ted Gurley, Dallas, TX; William Hassig, Mount Prospect, IL; Larry Magne, Penn's Park, PA; Greg Majewski, Oakdale, CT; Bill McClintock, Avon Lake, OH; John Newby, Norcross, GA; Craig M. Pradarelli, Necedah, WI; Lee Reynolds, Lempster, NH; Martin Schoech, Merseburg, Germany; Bud Stacey, Setsuma, AL; DJ Stevie, Basel, Switzerland; Gayle Van Horn, Brasstown, NC; Ed Walsh; Niel Wolfish, Toronto, Ontario; and Joe Kenneth Wood, Gray, TN.

Tackling a Toughie

Most of the radios we've restored so far have started out in fairly decent shape cosmetically and were more or less intact both from a mechanical and an electrical point of view. But I think the real fun is in taking a set that looks like it is one step away from the landfill and turning it into something that will grace a display shelf and perform like new. Right now, I have a Zenith 6-S-229 that fits the landfill description. Let's see what it looks like after we finish working on it!

Warning: that might not take place immediately! After restoration work is completed up to a point, we'll probably have to turn our attention to other things while I find replacements for missing or defective parts. Once found and installed I'll come back to this project and report on it in the column. Remember, all of the projects on these pages are done in "real time." I don't finish them in advance and report on them later. So I don't know what problems I might find much sooner than you do. Most readers seem to enjoy looking over my shoulder this way; it lends a certain amount of freshness and immediacy to our efforts.

My main purpose in dealing with this particular radio is not to show you how to fix a 6-S-229 – though it is an interesting set and worth the effort it will require. Rather, I hope you will be encouraged to use the same approach on seemingly hopeless radios that *you* might run across. Sets that might otherwise be trashed and lost to us. It can be very rewarding work.

◆ Meet the 6-S-229

The 6-S-229 is a 1937 table model mounted in a good-looking "tombstone" style cabinet. (Are you familiar with the term? It refers to a table cabinet that is generally slab-like and squared off – as opposed to the round-topped cabinets known as "cathedrals.") Though it is a six-tube superheterodyne (five plus rectifier), its circuit is similar to that of the ubiquitous five-tube a.c.-d.c. sets so common during this period.

Referring to the schematic shown here, you'll see that it has an oscillator/mixer stage (labeled "det-osc" on the schematic because mixers are sometimes referred to as "first detectors") and a stage of i.f. amplification followed by a detector/avc tube, first audio amplifier and power amplifier. The diode detector/avc and triode first audio amplifier utilize separate tubes, while the usual 5-tube circuit combines these stages in a single multi-purpose tube (such as the 12SQ7).

Unlike the inexpensive a.c.-d.c. sets, this one is not powered directly from the line, but has a power transformer to supply heater and plate voltages; this is the first such radio we have worked on. As long as we use reasonable common sense and caution, we won't have to connect an isolation transformer to protect ourselves from power line shocks. Of course there are other features that separate the 6-S-229 from its low-end cousins. In addition to the broadcast band, this radio sports two shortwave bands: 1.8 to 5.2 MHz and 5.6 to 18 MHz.

Furthermore, the dial drive is mechanically quite sophisticated. An elaborate gear and pulley system moves both the frequency-indicating pointer and a longer vernier pointer, analogous to the second hand on a clock, that sweeps its own 0-to-60 logging scale on the outer periphery of the dial. In line with the clock analogy, the scale is labeled "split second."

The dial scale is silk screened in black on a translucent plastic material with all numbers and other markings left clear. A pair of pilot lights illuminate the dial from the rear, giving the markings an even, pleasant glow. This dial design is valued by collectors and sets fitted with it are known as "Zenith Black Dial" radios.

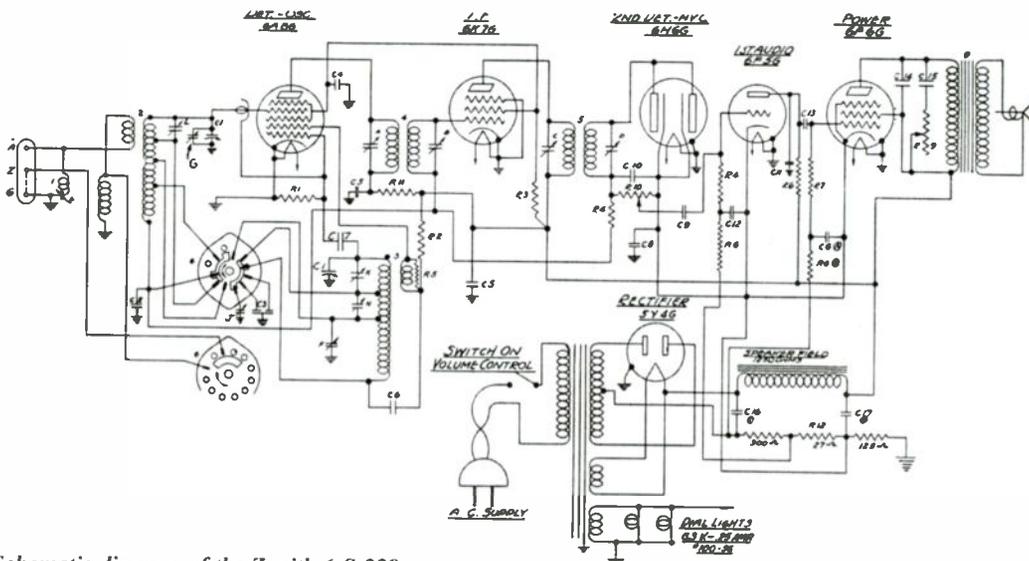
◆ Taking Stock

The first thing I noticed about this radio when I unpacked it (this is a purchase I made via an internet bulletin board) is that the chassis was covered with a thick layer of coarse gummy dust. So far I don't see much sign of corrosion, so I imagine that the set may have been forgotten for years in a corner of a dry basement rather than stored in a shed or garage. It was also obvious that the set had been previously owned by another collector who had done some exploratory work on it because the radio's model and chassis number had been neatly written on the back of one of the i.f. transformer cans.

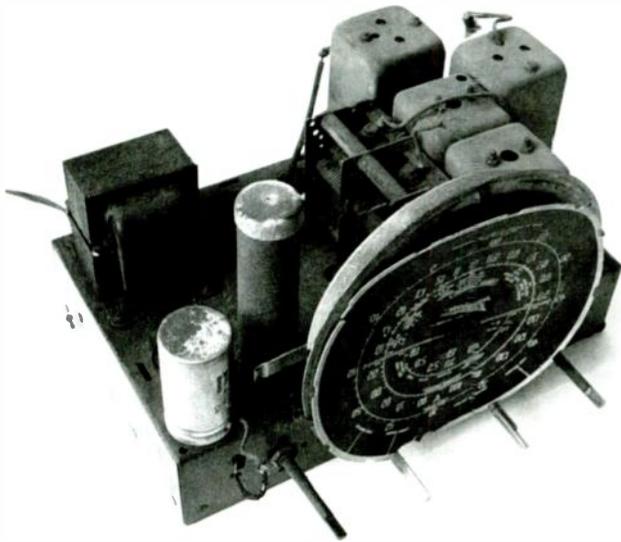
Other first impressions: One of the two pilot light sockets was missing, though its connecting lead (with the free end taped up) was still in place. The presence of spring fingers surrounding two of the tube sockets attest to a pair of vanished tube shields.

Apparently the former owner had removed the dial scale for some sort of inspection because it was now installed backwards (printing reading in reverse). It was also cracked and broken in a few places, probably through careless handling. The long "split second" hand was missing – likely lost or broken during the dial scale removal procedure. The spring-driven dial drive system was a mess. Gears and bearings were gummed up to the point of immobility and the idler pulley system over which the spring is supposed to run had been tampered with so that some of the hardware was bent and nothing lined up correctly.

On the rear apron of the



Schematic diagram of the Zenith 6-S-229.



Chassis with tubes removed for examination and cleaning. Everything is covered with a heavy, gummy dust. Note: previous owner installed dial scale backwards.

chassis are a non-original but neatly installed RCA phono jack and a d.p.d.t. switch. The switch may have been intended to cut off radio reception when the phono was being used, but its wiring configuration is quite strange. I expect I will take it all out and restore the original circuitry.

Other meddling seems to have been done to the receiver's B-minus circuit. In this receiver, the B-minus is not connected directly to chassis ground. Instead it "floats" above ground, passing through a resistor network that picks off negative cathode and grid bias voltages for set's audio stages. The network has definitely been tampered with and added to in some way. We'll figure it out later.

One of the set's two electrolytic filter caps is original and still has its cardboard protective sleeve. (Because of the bias circuitry just described, the capacitor cans are hot to ground and a shock hazard.) The other capacitor is a modern replacement – and I'm going to have to be convinced that it was installed properly, with its can insulated from ground. I also noticed that a lead from the top of the oscillator section of the main tuning capacitor had been cut and it is not obvious right now where the free end should be reconnected.

A careful visual inspection of the wiring under the chassis showed no other signs of wiring butchery or evidence (such as melted wax or charred resistors) of ancient short circuits. However, I did find that all controls were virtually immovable, being apparently clogged with sticky gunk, and that the chassis' rubber vibration-isolating washers had deteriorated into almost unrecognizable gummy masses.

◆ Initial Tests

After completing my little survey of the set's deficiencies and problems, I checked the power transformer, audio output transformer and speaker field. This set has a "dynamic" speaker – which means that its magnet is actually an electromagnet with field coil that must be connected to a d.c. source. That is accomplished by having the coil double as the power supply filter

choke. More modern speakers (known as "PM" speakers) are equipped with a strong permanent magnet that requires no d.c. excitation.

To check the power transformer, I first pulled the rectifier tube, thus preventing any high voltage from reaching the set's questionable wiring and no-doubt-leaky capacitors. Luckily, the volume control was already in the "power on" position because I really couldn't turn its shaft. Plugging the radio in (with a little bit of concern in spite of the conservative precautions I had taken), I saw the tubes light up along with the sole pilot light. So the 6.3-volt heater winding was ok. My DVM showed 5 volts across the rectifier heater winding and about

350 volts from each side of the HV winding to ground.

It appeared the transformer was still in business, which is great, because it is now very hard to find exact replacements for bad power transformers. The speaker field showed a resistance of about 1200 ohms, which agrees with the 1250-ohm value marked on the speaker frame. This is also fortunate. Dynamic speakers are also hard to replace with exact equivalents. Looks like the output transformer might have a problem, though. Its primary shows a d.c. resistance of 150k ohms. Seems unusually high. We'll see!

I'll definitely have more to say about this project next month, when I intend to remove the tuning capacitor for degumming, cleaning and lubricating. All of the i.f. transformer and r.f. coil shields will also come off for cleaning. The two electrolytic caps, which need to be replaced anyway, will also go. This will open up the top of the chassis (the filthiest part of the radio) for easier cleaning.



The Zenith's "tombstone" style cabinet (see text).

◆ VoltOhmyst Feedback

First, a couple of typos located by sharp-eyed readers. Harry Church, WOKXP, points out that in the right-hand column on p. 76, July 2002 issue, 5th line up from the bottom, I said "VOM" when I meant to say "VTVM." In a recent e-mail, Perry Crabill points out that I've consistently referred to the RCA VTVMs as VoltOhmists when the correct spelling is VoltOhmyst. As if there were any doubt, the meter scales of both of the restored instruments are labeled in accordance with Perry's information. Strange as the correct spelling looks to me, it is the correct spelling and I have to apologize for being sloppy about this!

Steve Goulart of the New Jersey Antique Radio Club sent along a good suggestion for replacing odd-valued precision resistors, such as the 18.9-ohm unit that was found open during the Senior VoltOhmyst restoration. Find a standard carbon resistor of a lower value than the resistance to be replaced but as close as possible to it. Then connect an accurate DVM across the resistor and monitor its resistance value as you remove material, cutting into the side with a small file. When you reach the required value, stop cutting and seal the nick with a waterproof lacquer, varnish or paint.

Sounds like a very workable plan to me, the only possible problem being that carbon resistors are known for slowly changing in value over the years (usually increasing). Perhaps more stability could be achieved if the entire resistor were coated with lacquer or varnish rather than just the cut portion.

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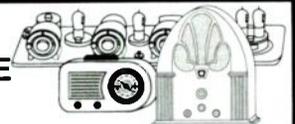
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The T²FD Antenna

Monitoring Times reader, Bob Kampe, has had considerable success with the T²FD antenna, and asked: "How about a real exposé on the history, past and current uses, and sources" on this antenna? The T²FD, or "terminated, tilted, folded dipole," is also known as the "TTFD," and "T-squared-FD."

For decades this antenna has seen use by hams, military and government installations, and SWLs. The T²FD is sometimes reported to outperform a dipole. On the other hand, various reports, including my own, indicate that a resonant dipole will usually function better for a single-frequency installation.

However, due to its terminating resistor, the T²FD gives remarkably wide banded performance. As you would expect, a portion of the power received by, or fed to the antenna, is lost as heat in that resistor. Nevertheless, many who use this antenna give it excellent reports, citing in particular its wide-band frequency response, and its low level of received noise.

◆ Concerning Broadbandness and Low Received Noise

It is well to keep in mind that, on HF and the lower frequencies, broadband performance in a

receiving antenna is a somewhat moot feature. For instance, for reception across the HF band, almost any wire reasonably high in the air will exhibit an "apparent broadbandness." That is, it will support reception across the HF band. This is because on the HF and lower bands received signal quality is determined not so much by the strength of the signal received as by the relative strength of that received signal when compared to the strength of received noise which accompanies it. Often antennas with greater gain, or those that maintain gain across a wider bandwidth, actually don't provide better reception than a random length of wire.

◆ Some T²FD Specs

The T²FD can be mounted horizontally, vertically, or as a sloper. Some reports indicate that this antenna is non-directional mounted as a sloper. However, when modeled by Cebik (see suggested web sites) and mounted at an angle of about 30 degrees to the horizontal, the T²FD shows a reasonably directional pattern. Its favored direction is the direction toward which it slopes downward. This directivity is consistent with that of other sloper-mounted antennas.

Mounting the antenna at a tilt means that only a single elevated mounting point is needed.

This can be convenient, but for the lower frequency versions the optimum point may be too high for most of us to provide.

Mounted vertically or as an inverted-V, the antenna should give essentially non-directional performance. One reference warns that the inverted-V mounting produces poor results. Barker and Williamson have success by feeding their inverted-V at one end, with the resistor at the other end. When mounted horizontally the pattern will likely have shallow nulls off the ends, but still be relatively non-directional in that orientation.

The T²FD is, in a sense, a loop antenna. Loops are known for low received-noise levels. And, as a directional antenna can reduce the level of received noise from its non-favored directions, the tilted T²FD's directionality can help it deliver quieter performance than many antennas.

Various reports put the T²FD's bandwidth at from 3 to 8 times the antenna's design frequency. Thus a T²FD designed for 7 MHz should work well from 7 to at least 21 MHz, and perhaps much higher. In addition, decent, though somewhat reduced performance, is commonly reported down to one half the design frequency.

Typically, the antenna is fed using a balun and coaxial cable. Regardless of the matching provided by the balun, an antenna tuner is often rec-

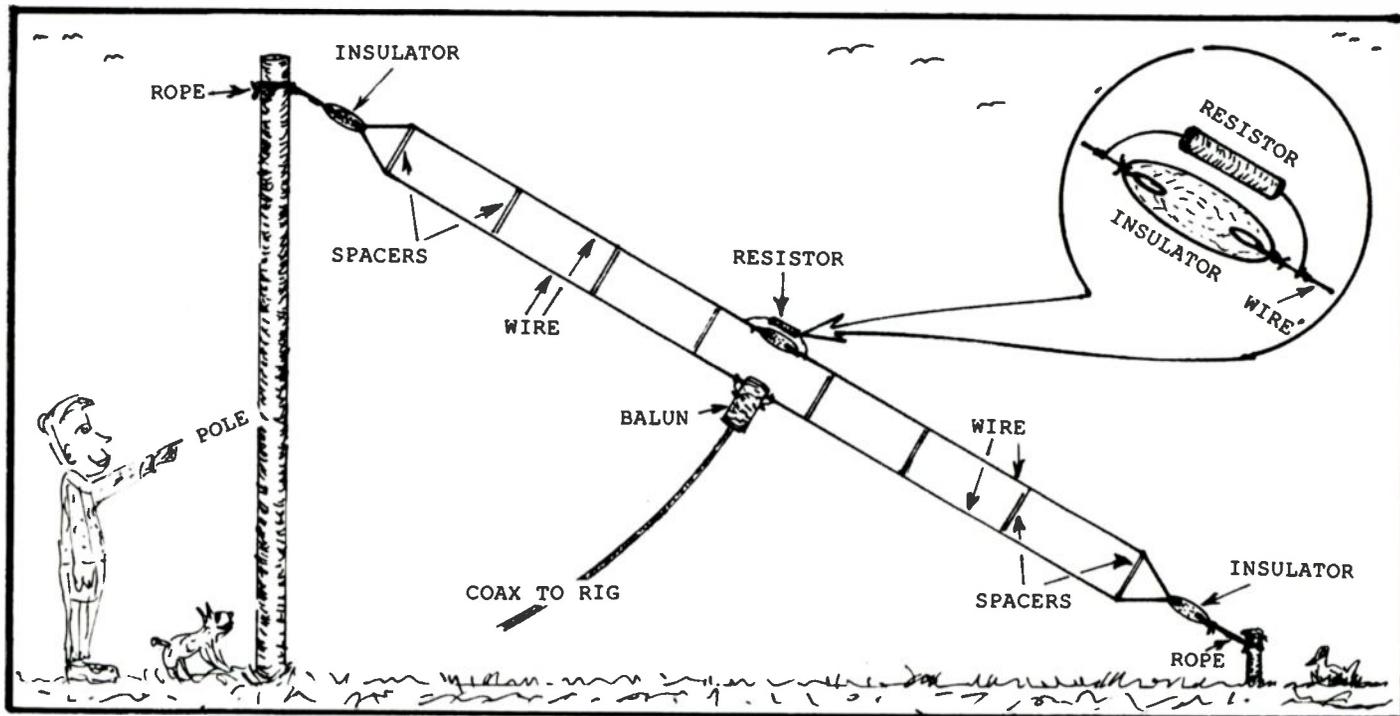


Fig. 1. A typical T²FD antenna. See text for dimensions.

This Month's Interesting Antenna-Related Web site:

For a good look at modeling the T²FD: <http://www.cebik.com/t2fd.html>. Another good discussion of T²FD is at <http://www.hard-core-dx.com/nordicdx/antenna/wire/t2fd.html>

Don't miss Kurt N. Sterba on <http://mywebpages.comcast.net/smithab11/t2fd.ht>, especially if you plan to use the antenna to transmit.

omended when transmitting. Other reports claim no tuner is needed.

Without a balun, 300-ohm twinlead or open-wire line can be used as feedline. In this case, matching with a balun or a balanced-line tuner may be desirable at the receiver/transmitter antenna terminals. More typically, coax feedline with a balun at the antenna is used: a 6:1 balun with 50-ohm coax, 4:1 with 75-ohm coax. Both of these baluns are covered well in Jerry Sevick's *Building and Using Baluns and Ununs*. The 4:1 balun is covered in the ARRL *Antenna Book*, and the RSGB's *HF Antennas for All Locations*.

◆ The Source

Arnie Coro of DXers Unlimited attributes the original idea for this antenna to amateur radio operator W3HH. Joe Carr reported that this design was tested by the U.S. Navy during World War II, and originally reported publicly by Navy Captain C. L. Countryman in 1949. It is reported that the Harris Corporation formerly made several models of this antenna which were used by both civilian and government agencies.

A popular version of this type of antenna was produced and patented by the Barker and Williamson Company for the U.S. Government over 20 years ago. Today B&W markets several different models of their antenna: a sloper, an inverted V, and a flat top. B&W customers using these antennas include amateur, CAP, MARS, FEMA, ARES, amateur, NATO, UN, international disaster relief organizations, emergency management operations, and commercial organizations around the world.

B&W points out that these antennas are useful for NVIS (near vertical incidence skywave), short haul, and long haul (DX) communication. As with most other antennas, height above ground and orientation with respect to ground are surely the major determinants of which of these propagation modes the antennas favor. Due to their broadbandness, these antennas should provide support for the frequency-agile and highly dependable ALE mode, as well as the broadband, spread-spectrum mode.

◆ Let's Make a T²FD

Antenna wire is probably best for this antenna due to its strength and durability. However, the antenna can be made of most any size copper or aluminum wire that will stand the strain when in the air. Spacers can be made of plastic, fiberglass rods, or other insulating material.

The resistor should be non-inductive, and, for this design, 390 ohms. For receiving applications the resistor can be small, 1/2 watt, carbon-film type. I seem to recall reading that smaller wattage values tend to be damaged by induced current from nearby lightning strikes.

For transmitting applications some recommend the resistor have a wattage rating of 35 percent the transmitter's output power. However, Cebik's data suggest that below 4 MHz or so a large majority of the transmitter's power must be safely dissipated by the resistor! Above 4 MHz only a small percentage of the power goes to the resistor. Cebik's data illustrate well the variability in the T²FD's performance at different frequencies.

Length and spacing between elements is found using the following equations. Here F is the lowest frequency, in MHz, on which operation is planned.

$$\text{Length (in feet)} = 328/F$$
$$\text{Length (in meters)} = 100/F$$

$$\text{Spacing (in feet) between elements} = 10/F$$
$$\text{Spacing (in meters) between elements} = 3/F$$

For example, at a lowest frequency of 10 MHz, length would be 10 meters, and spacing would be 0.3 meters.

◆ In Summary

In researching the T²FD I found conflicting information concerning both its construction and its performance. Various versions of the T²FD are to be found in the literature, many of them on the World Wide Web. The differences which exist in the various designs undoubtedly bring about performance differences between T²FDs made from those designs. Yet there seems to be a fair amount of agreement as to the antenna's low received-noise and broadband performance.

Conflicts arise mainly in reports of its performance compared to other antennas, resistor values, amount of RF loss in the resistor, whether the antenna's input impedance (and thus SWR) is relatively stable across its operating range, and dimensions for construction. Whatever the eventual resolution of these differences, it seems that the broadband coverage, sufficient gain to support decent reception, plus low received-noise nature of the antenna, are the basic reasons for this antenna's continued popularity.

Discussion in this month's column may seem inconsistent in that it seems to say that the T²FD is both a good antenna, and a not-so-good antenna. Both statements are true, not only of the T²FD, but of all antennas. Each antenna has both desirable features and limitations. When choosing an antenna we should consider the application which the antenna must support, and choose a design which

fits the requirements of the application as closely as possible.

RADIO RIDDLES

Last Month

I said: "We've talked about 'scanner antennas.' Now what is a 'scanning antenna?'" Hint: This is not just another name for antennas intended for use with scanner receivers."

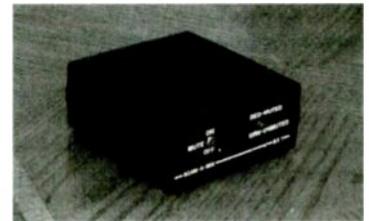
Well, when you visually scan an area you sweep your eyes over the area to inspect it. A scanning antenna does a similar thing – sweeping its radiation-and-reception pattern around an area. In fact, a radar antenna scanning an area actually results in images of what it "sees" in that area. Sometimes scanning is accomplished, as in most radar installations, by mechanically moving a beam antenna with a very narrow pattern. In other scanning antennas beam movement is accomplished by continuously varying the frequency of the signal utilized.

This Month

OK, you know what "T²FD" means; now what does "TCFTFD" mean? And, to you long-time readers of *Antenna Topics*, what do "TOTA," and "COCO" mean? You'll find an answer for this month's riddle, another interesting, antenna-related web site or so, and much more in next month's issue of *Monitoring Times*. Til then, Peace, DX, and 73.

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Tk150 Software for the Standard VR-150

The Standard VR-150 is a tiny 0.1 to 1300 MHz receiver which detects AM, NFM, and WFM signals. If the VR-150 photo looks familiar, that's because it is virtually identical in appearance to the Yaesu VR-120D sold in the USA. The VR-150 wears the Standard label and has an eye icon on the same key which is labeled "Mode" on the Yaesu VR-120. I reviewed the original Yaesu VR-120 in July 2001 *MT* and described tk120 open source software in the August 2002 issue.

The VR-150 is intended for sale in the Japanese market, but a few have found homes in other countries. It's not clear whether Yaesu plans to manufacture a frequency snipped version of VR-150 for the USA which would meet FCC requirements.

❖ A VR-120D on Steroids?

Though VR-150 looks like a VR-120D, it is more capable. The VR-150 boasts 1000 channels in 10 banks versus the VR-120's 640 channels. Even more enticing is the VR-150's CTCSS squelch, a feature enjoyed by ICOM IC-R2 users.

You can program one of 50 subaudible codes in each memory channel. If you don't know the proper tone, the VR-150 can try all CTCSS codes, looking for one which matches the CTCSS code used by the transmitting station.

Where the VR-120 provides 10 preprogrammed NOAA weather radio frequencies, the VR-150 substitutes Japanese television sound frequencies instead.

The VR-150 has 16 Japanese train frequencies preprogrammed in the 336 and 353 MHz ranges, accessible via a keypress sequence. A 2280 Hz idle tone is transmitted on the Japanese train frequencies in between voice transmissions. The VR-150 can

recognize the tone and ignore the idle frequencies. This reminds me of the "idle tone bypass" feature in the old Electra/Bearcat BC12 and Regency K500 scanners which recognized the mobile telephone idle tone and skipped over idle channels.

❖ Developing tk150 Software

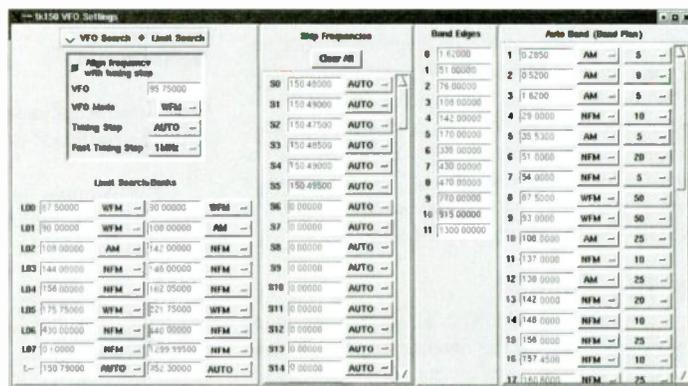
Kempes van Ruiswijk, a Dutch hobbyist living in Germany, read about tk120 software and asked if it could be changed to work with the Japanese VR-150. I don't own a VR-150, and as I mentioned in my tk120 article, developing software without actually having the radio is difficult.

Lee M. answered my solicitation for assistance and joined Kempes in testing tk150. Both testers were indispensable to this group project.

Tk150 is written in Tcl/Tk and works well on computers running Linux, Windows 98, Windows 2000, and Windows XP and I'm looking for beta testers willing to try it on their MacOS X systems. You may freely download tk150 from <http://parnass.com>.

Tk150 lets you change the VR-150's search limits, Preset frequencies, Dual Watch settings, and Skip frequencies. You can change the band plan which associates detection mode and tuning step with frequency range, a flexibility not afforded using the radio's keypad controls.

To change the memory channels, you export them to a csv (comma-separated values)



file, then use a spreadsheet or text editor program to make the alterations. Then, you import the updated csv file into tk150 and write the information to your radio.

Both the VR-150 and VR-120 have a bandstacking feature which remembers the last frequency to which the radio's VFO was tuned in a band. But, if the radios support continuous frequency coverage, then what is meant by a "band"? Band edge frequencies are defined within each radio and there are slight differences in the VR-150 and VR-120 family depending on which version you have.

The VR-150's Japanese language operating manual lists the band edges, but the VR-120 manual does not. Tk150 and tk120 software not only reveal the band edge frequencies, but let you redefine them to suit your needs.

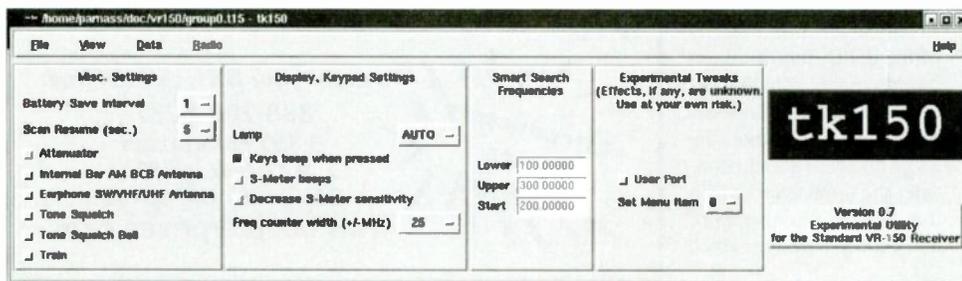
❖ Preparation

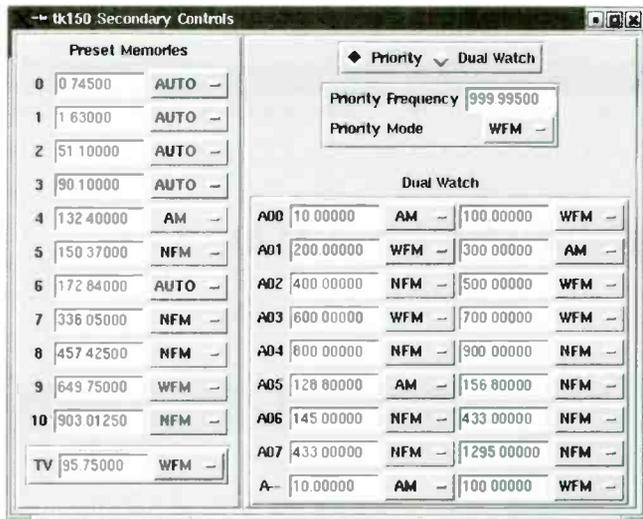
Before using tk150, you must connect your VR-150 to your computer's serial port using a suitable TTL-to-RS-232 level converter. A simple, direct connect cable won't work. You buy a CT29A cable from RT Systems, P.O. Box 12188, Huntsville, AL 35815; phone 1-800-750-9689 or visit their web page at <http://www.rtsars.com>. The CT29A works with the VR-500, VR-120, VR-150, and other radios.

Before using tk150 or any software with a portable receiver, make sure your radio's batteries are sufficiently charged. Low battery voltage interferes with the cloning process.

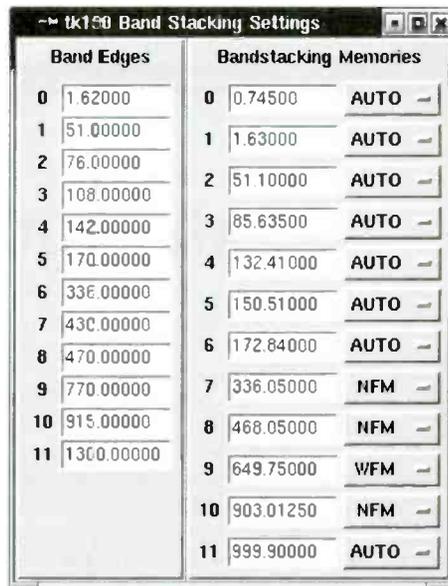
There is a Yahoo email group dedicated to the VR-150: <http://groups.yahoo.com/group/YaesuVR150> It provides a forum for swapping tips and frequency files.

There is no tk150 instruction manual or user guide documentation, but the software is simple to use.





els. from weak to strong). Forget about high quality SSB/CW shortwave reception in a portable scanner. Current portable scanners are not selective enough to separate SSB or CW signals in a crowded band. Most SSB and CW transmitters are low power compared with international broadcasters. The SSB/CW scanners don't receive low power shortwave signals well enough using the stock 7" antenna and are easily overloaded when connected to a full size, outdoor antenna.



❖ Forget About It

Not a week goes by without a newcomer to the hobby seeking advice on selecting a wide frequency coverage, portable scanning receiver. What follows are some tips to simplify the choices.

Forget about the "bug detector" feature found in a few scanners. It is a useless distraction.

Forget about the bandscope feature. As implemented in most portables, the sweep speed is too slow with extremely limited dynamic range (the ability to discern signal lev-

els. from weak to strong). Forget about computer control capability in a handheld scanner. Dragging a computer around tethered to a tiny scanner defeats portability. Computer control in real time is quite different than using a computer to clone (i.e., program the settings of) a scanner. Most of the modern handheld scanners have a cloning port but cannot be computer controlled.

Forget about buying a portable scanner until you can obtain cloning software and an adapter cable for it which will work on your computer. A computer cloning feature is important, especially in scanner models lacking

a full numeric keypad. Don't rely on promises or implications that suitable software will be available in the near future. It may not be.

Forget about spending \$20 for the scanner manufacturer's matching carrying case. There are dozens of cell phone and camera carrying cases on clearance sales in local stores which may be bought for under \$5. You can easily find one with a rugged belt loop, belt clip, or both, which fits a small scanner.

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How OCR Can Change Your Life

Last time we met I was converted from an OCR non-believer to a zealot! Last month we saw how easily frequency lists from magazines such as *Monitoring Times* can be converted into text files using the latest OCR (optical character recognition) programs such as Cuneiform and Textbridge. Why text files? Because, then we can import these text files into receiver control program files: It's that easy. Well, ...almost.

Where We Left Off

Starting with a very inexpensive Canon FB 620P optical scanner and a PC running the under-\$100 Cuneiform OCR 99 (or Textbridge), a page from a *MT* column containing lists of frequencies was optically scanned. A portion of the resulting text file from last month is shown in Figure 1.

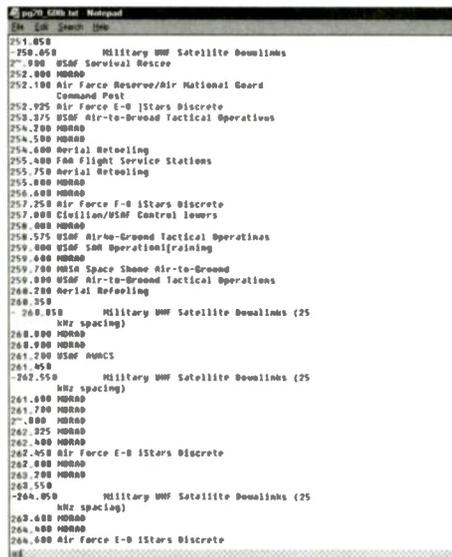


Figure 1 OCR Cuneiform Generated Text File From *MT* Frequency List

As you can see from Figure 1's first line, not all frequencies are properly aligned. You'll notice that the first line contained a range of frequencies, 251.850—258.650, not just a single frequency. Using a text editor you'll have to manually edit out the few format anomalies. The editing, which consisted of removing hyphens, blank lines, and spaces, took less than five minutes. But the real test – converting (or importing) the text frequency file into a file that receiver control programs can "understand" – lies ahead.

RadioMax Version 5.22

For a number of years RadioMax has been one of my favorite receiver control programs due its intuitively simple user interface and flexibility. Everything is right there on one screen, yet the program provides all the capabilities that most radio monitors will require – scanner or shortwave. Add to this its wide range of controllable receivers and a low price, and it's a winner in my book. But how easy will it be to import this frequency list text file into a format that RadioMax can use?

I have to admit that an earlier version of the program did not import/convert files well. But since all other functions worked so well this was a trivial problem ... at the time. So it was with a little trepidation that I tried to import a file using the latest version 5.22.

RadioMax version 5.22 is available on the Internet at their new address <http://www.datadeliverydevices.com>. A free demo is available for downloading. Installation of the new RadioMax version was very quick and simple.

Going to the "File" pull down menu at the top left on the Command line displays a number of file import choices. See Figure 2. Here you can see that we have chosen "Import an ASCII frequency file."

Directing RadioMax to the location of our OCR generated frequency file named RMCUNM2.txt, the program automatically converts it to a RadioMax readable frequency file.

I've tried a good many automatic file conversion programs that generated more problems than they were worth. So when the

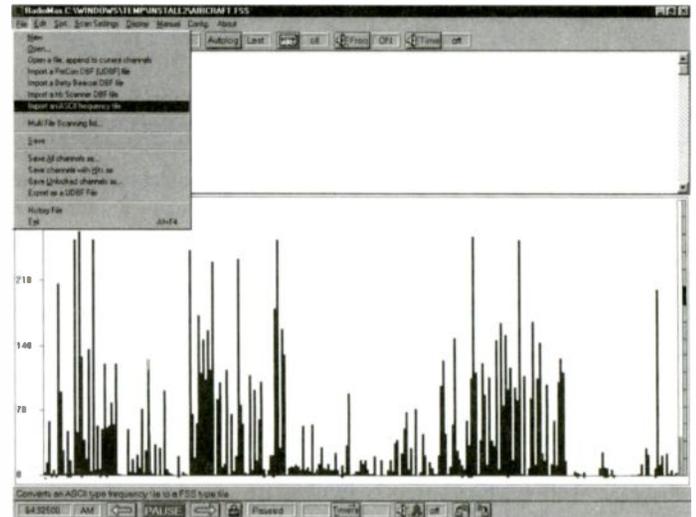


Figure 2 RadioMax First Step to Importing an ASCII File

screen announced that the file had been successfully converted I replied in the words of former US president Harry Truman, "Show Me!"

Well, Figure 3 does just that. This shows RadioMax happily scanning away on the OCR generated, RadioMax converted frequency file "RMCUNM2.FSS." Notice that the file extension, ".txt", has been changed by RadioMax during conversion to its frequency file format of ".fss". You can see, in the top section of RadioMax in Figure 3, the hit frequencies and their descriptions. This is a one-to-one copy of the frequency list and descriptions that appeared on page 20 of *Monitoring Times*' August 2002 issue. The com-

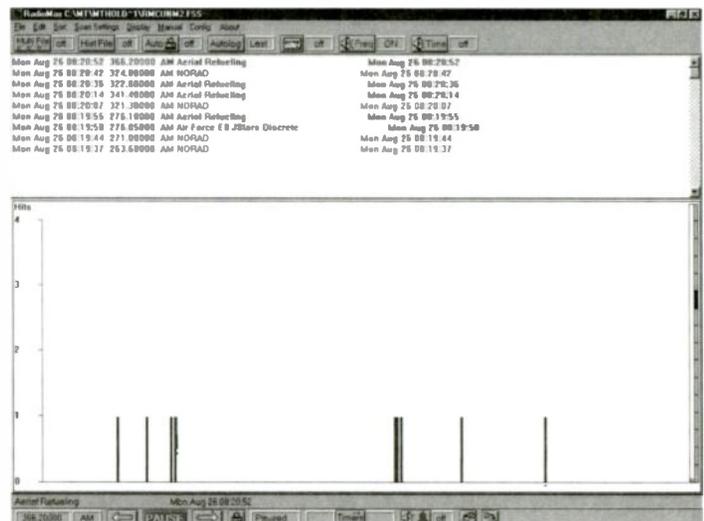


Figure 3 RadioMax Scanning Our Converted File

plete process. printed page to OCR to receiver control scanning, had been accomplished without a problem!

◆ What About The CAT?

Scancat is another popular receiver control/database program. In fact, as a DOS program it was one of the first receiver control programs, way back in 1990. Since that time Scancat users have seen many versions released. Check for their latest version and demo downloads at <http://www.scancat.com>.

Keep in mind that although we have converted the printed list into a "universal" text file, each receiver control program may have its own unique file format. As we saw above, RadioMax converted the file into an "FSS" file format. Similarly, Scancat has its own format "frq".

The opening screen of the version we used (Scancat Gold for Windows, version 8.0.2) is shown in Figure 4. Here, we begin the text file conversion process. You can see that the pull down menu for the Scanport feature has been opened and the "Ascii Text Conversion" command has been selected.



Figure 4 Scancat First Step to Importing an ASCII File

From this menu we choose the file we wish to convert to a Scancat Frequency file. Of course, we have chosen the same OCR scanned file that has been converted into a text file by Cuneiform and edited to remove empty lines and frequency "range" entries.

Scancat first asks us to define each column, or field width. This is performed by clicking and

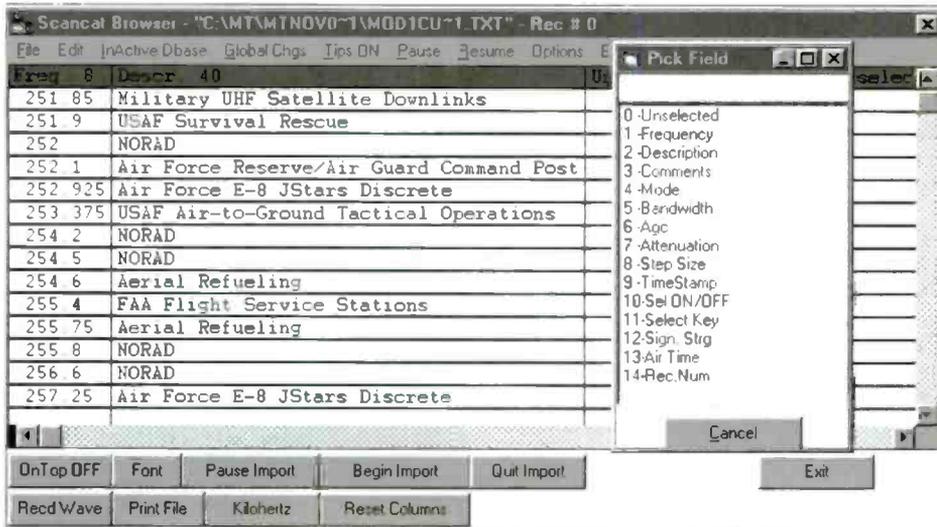


Figure 5 Defining Columns (Fields) in Scancat

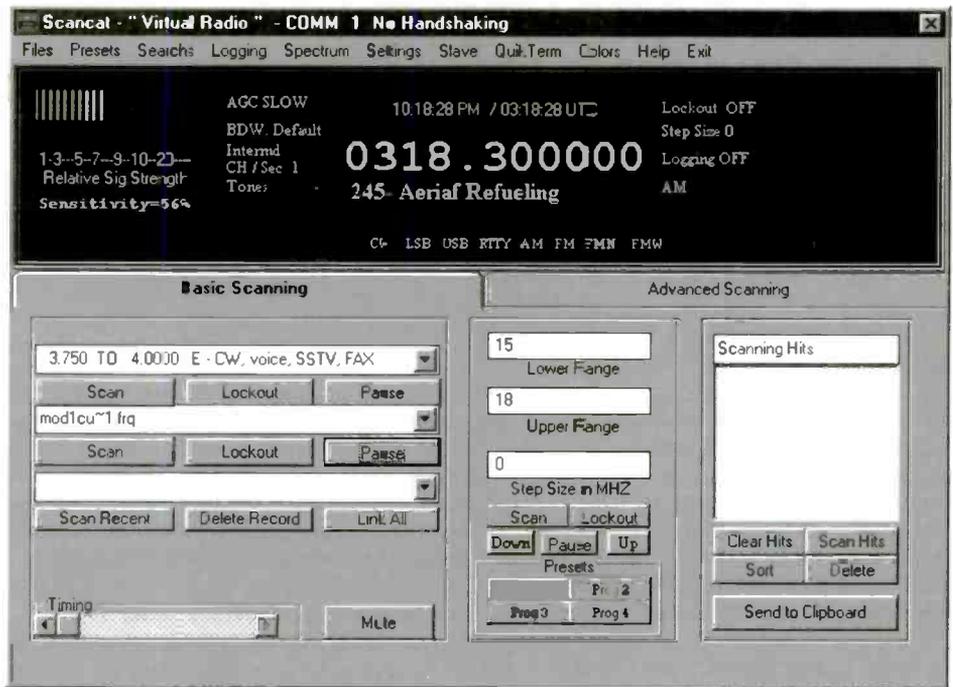


Figure 6 Scancat Scanning Our Converted File

dragging the vertical lines, seen in Figure 5, to their appropriate positions.

Next Scancat asks the user to define the type and size of column to be converted. This screen is shown in Figure 5. Here, by right clicking on the first column and using the popup "Pick Field" menu, we have defined it as Frequency. Now Scancat knows that this is where frequency data is found. The second column has been similarly defined as the "Description" associated with the corresponding frequency.

Once we pick all field types, the file is saved. The name we chose is MODICUNIFORM, which stands for "modified I Cuneiform converted." Due to Scancat's eight character file naming limitations, the file name becomes "Mod1cu~1.frq". Now we're almost ready to see if the Cat has done the conversion job.

◆ Another Winner!

Returning to the opening Scancat screen, Figure 4, and choosing "Scanning," then "Con-

ventional Scanning," Figure 6 results. On the left side under "Basic Scanning" our file name is displayed. Under it we have chosen "Scan." In the large top section we can see that the program is indeed successfully scanning the converted file!

◆ So What Do We Think?

One. The price of quality photo scanners have followed the way of all "electronic flesh" and dropped drastically in price.

Two. Relatively inexpensive OCR programs have developed to a level where they can reliably, and accurately, be used to convert printed frequency lists into computer readable text files.

Three. Armed with your favorite receiver control program, careful reading of the "Helpfile" and a little bit of practice, you will be able to convert hundreds of printed frequencies into receiver "scannable" files in a matter of minutes.

Give it a try. I know that I will use OCR as a regular part of my monitoring. My radio shack now has two types of scanners: radio and photo!

◆ A Quick Update

Finally, an email from Juan Segal indicates that My Vital Agent, a very useful Internet application from Lucent Technologies that we looked at a few months ago, is now available at a different address. I tried it and it works. It's a long one but here goes:

<http://www.qip.lucent.com/qip/spectra/invoke.cfm?id=FBAD6307%2D6CCA%2D4CC3%2D851F5042DB652AB2&Method=DisplayDetails>

◆ Till Next Time

Next we'll be looking at some new hi-tech products that may be worth spending your holiday money on to enhance your monitoring. But let's not forget the real meaning of the holiday season to the people of the world, no matter what religion or nationality.

Tuning Into Broadcast Satellites Part 1

By Ken Reitz

Despite its limited appeal and dwindling numbers, the world of big dish satellite TV is still alive and, if not exactly kicking, it's quietly providing interesting monitoring opportunities for those curious enough to try it. In this first of a two part series we'll look at a brief history of satellite TV, current state of the industry and what you can see and hear with a big dish C-band system.

❖ Big Dish Satellite's Roller Coaster Life

It's been almost 25 years since the first backyard satellite TV dishes began showing up on American lawns as icons of high tech savvy and big bucks. The very symbol of the space age, the cumbersome, white fiberglass dishes brought the burgeoning world of cable television to areas of the country still a decade or more from the most basic wired cable services. The satellites which beamed the cable fare were also the work horses of the broadcast industry, relaying news and sports feeds, as well as live network programming for both radio and TV. At a time when most cable systems offered a limited number of channels and poor service, home satellite systems could receive it all, and for free.

Throughout the mid-'80s C-band systems enjoyed a rise in popularity as prices fell and system numbers swelled nationwide. Even folks in town were installing the new black mesh dishes which were engineered for better reception and blended with most backgrounds. By the early '90s the big dish industry reached its peak of over 3 million subscribers. However, since 1994, with the introduction of the 18" digital dish, big dish numbers have declined to the point where the industry loses roughly 800 subscribers per day. Recent industry figures count only 700,000 current C-band subscribers.

You might imagine that at that rate there would be nothing left of this service in just two years, but industry insiders say they expect the numbers to level off at about 600,000 units. While just a tiny fraction of the small dishes' nearly 20 million subscribers, it remains a significant income producer bringing in around \$18 million per month.

There could be several hundred thousand more dishes in service which don't subscribe to any programming and therefore aren't included in the industry figures. These are the hardcore hobbyists who are interested in the technology of the big dish systems plus all of the things it brings which are simply not available on either small dish system nor on most cable systems.

There are nearly a thousand audio and video channels in analog and various digital formats on the C and Ku-bands, many of which are "in the clear," i.e. unscrambled. With a minimum of investment, a little determination and perseverance in maintaining the system, a world of entertainment and information is yours.

❖ What You'll Hear and See

A lot has changed in the last 10 years when C-band was in its prime; many of the unscrambled audio and video services are gone. But, there are many new ones on board using the new digital transmission modes. For starters, of course, there's the traditional cable fare, movie, news, and sports channels, pay-per-view, etc. These are all available in either analog (VideoCipherII encrypted) or digital (DigiCipherII encrypted and unencrypted) formats. Nearly every channel available to the small dish subscriber is also available on the big dish. The key difference is that it's possible to subscribe to these services on an *a la carte* basis, which is to say, choose only the channels you want to watch and pay for. This way it's possible to have a "cable" bill under \$10 month.

Then there are the other in-the-clear video attractions such as NASA-TV, Tech TV, C-SPAN I & II, as well as PBS. On the radio side there's BBC World Service, Yesterday USA (Old Time Radio), KKJZ (Jazz), WCPE (Classical) and several talk radio networks all operating 24/7.

In addition, there are dozens of channels of MPEGII digital video and audio services which are also in the clear or "Free To Air" (FTA). These signals require a separate MPEGII receiver, which is usually connected to your system through your main satellite receiver so that it can control the actuator motor which moves the dish. Keep in mind that all broadcast satellites, including the small dish birds, are lined up along the equator at some 23,000 miles in what's known as the Clarke Belt.

Among the FTA channels you'll tune in are dozens of ethnic video services from Asia to the Mid-East with many radio services such as VOA, World Radio Network (WRN) in separate English, French and Multilingual services, as well as three channels of Deutsche Welle. Among the digital video DCII channels you'll see are BBC America, all the Discovery Channels, several more PBS channels, several international services including channels from Mexico.

There are still quite a few analog Single Channel Per Carrier (SCPC) audio services on

Audio Service Satellite Channels

Here's a sample of analog, in-the-clear audio services you can hear on big dish satellite TV, no subscription required.

BBC World Service	Satcom F3 7
RAI (Italy)	Galaxy 11 14
WCPE (Classical)	Galaxy 5 7
WFMT (Classical)	Galaxy 5 7
KKJZ (Jazz)	Telstar 7 15
Cable Radio Network	Telstar 7 15
CNN Radio News	Galaxy 5 22
C-SPAN Radio	Satcom F3 7
Yesterday USA (Old Time Radio)	
Premiere Radio Network (Talk)	
Talk Radio Network	AMC 7 7
Talk America Network	AMC 3 7
Truth Radio Network (Talk)	Galaxy 9 2
Radio Reading Service	AMC 7 5

C-band which can be received using a special SCPC receiver such as Universal's SCPC-200.

In addition, news junkies will find that special news feeds from practically every network and TV station with an uplink truck can be found on dozens of random C-band and Ku-band channels. The number of feeds swells particularly during intense military activities, elections, or tragedies.

❖ How To Find Out More

There are a number of good sources for information about satellite TV, the equipment used, what's on the various satellites and more. Here are a few of the best:

The best source for information on audio and video related transponders is <http://www.lyngsat.com>. This is a very big web site which is updated daily and is most valuable for those seeking the reception parameters for those MPEGII transmissions. Note the "beam" column



in the table. It indicates the geographic area the signal is beamed to. If you're not in the beam you will likely receive no signal. Unfortunately, SCPC frequencies aren't listed here. SCPC channels are included in Monitoring Time's Satellite Services Guide, online at <http://www.monitoringtimes.com/html/mtsg.html>. Each satellite is updated at least once per year.

There are three excellent sources for MPEGII equipment: DVB Express at <http://www.dvbexpress.com> sells inexpensive complete MPEGII systems featuring their ST-7700 receiver; Global Communications offers Pansat and Astrotel MPEGII receivers and has a comprehensive web site for MPEGII information <http://www.global-cm.net>. Click on MPEG-2 Central.

Mail order catalog company Skyvision has the most complete line of satellite TV related equipment including big dish, C and Ku-band, little dish, parts, and accessories including many hard to find items. They periodically send out flyers offering discounts on many items. Check out <http://www.skyvision.com> or call for a catalog at 800-644-5705.

Another source for Big Dish, C and Ku-band gear is Dave's Web Shop at <http://www.daveswebshop.com>.

In the final installment we'll take a look at the hardware you'll need for broadcast satellite reception (including reception of international broadcasts) how to install it and how to maintain it. I'll also explore the most frequently asked question: How small a dish can I use to listen to satellite audio services?

UPDATE: Little Dish vs. Little Dish

In 1994 there were six small dish services slugging it out in the market place. A few short years later there were two: DirecTV and DISH Network. For the past year the two have been engaged in merger talks. But, before the merger can go through, the FCC has invited comment from interested parties and there's been a broadcast industry fire fight ever since.

Here are the basics: The two competing satellite companies see themselves as the only real competition to cable and see the merger as a way to provide one complete service instead of two smaller duplicated services. A better deal for the consumer, they say. For example, DISH says if they win the sweepstakes they'll use the available DirecTV transponder space to expand their local TV channel service to over 150 U.S. markets, not just the top 50 which they provide now.

Naturally, the cable industry is against the merger because they're afraid the expanded DISH service would be more than most cable subscribers could resist and they would lose significant shares in those additional 100 markets. Just as naturally, the National Association of Broadcasters (NAB), which represents the interests of terrestrially based TV stations around the country, is opposed to the merger because they don't want the tens of millions of non-cable and non-dish subscribing households to finally be tempted to go to the little dish and thereby have access to the hundred or so other services available on the same satellite TV system. Don't expect a decision soon.

Adding to the issues, DirecTV has been plagued for years with a never-ending piracy prob-

lem. Despite a rigorous electronic counter measures (ECM) program, it's estimated that as many as a third of the DirecTV systems sold are using hacked software to allow illegal viewing of all channels. This represents a significant monetary loss for DirecTV and is the main reason that the DISH Network's still un-hacked system will likely prevail following the merger.

In the meantime, what's the consumer supposed to do? Which service should you sign up for and under what conditions? During the fall and winter months both DirecTV and DISH have traditionally pushed their systems with deals many find hard to refuse. Advertising "free" systems and "free" installation, both seem determined to get you hooked. But, like many of the current cell phone deals on offer now, the devil is in the details and the commitments. So, take the time to read the fine print in each offer.

With either system you may still actually have to pay for the equipment and installation through complicated plans of credits, rebates, chargebacks and early termination fees. With DISH your system will come with one month of free programming on all channels. But, unless you call to change the subscription service to a lower tier, you'll be automatically enrolled at the \$72.99/month charge on your credit card. Consider a leasing plan in which you'll pay a flat \$49.99 installation charge and be billed \$5/month for the equipment in addition to whichever programming tier you've signed up for. The minimum program package to qualify for the DISH promotional offer is \$22.99/month, for DirecTV it's \$31.99/month.

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A Gotta-Have: C. Crane's QuickCharger

Looking back over the years, it's a little hard to determine exactly when it happened, but happen it did. Some place along the line, I became a beady-eyed raving addict. My drug of choice doesn't come from the poppy fields of Asia or the jungles of Colombia; nothing like that. Instead, the monkey on my back originates in the factories of Duracell®, Energizer®, and Rayovac®.

That's right: the shameful truth is that I am a battery junkie. When you write frequently about FRS, GMRS, GPS, and other cool gizmos like I do, you use batteries in prodigious quantities. Every time I test a new battery-powered device, or my son puts the arm on me for some juice for his GameBoy, or my wife wants power for her portable tape player, it's time for more fresh batteries.

It isn't very long before you've slipped over the edge. You look at common 4-packs and 8-packs of AA alkalines with distain – those are for the rank amateurs, the short-ball hitters. Nah, when you've got a habit like I do, you start seriously considering and comparing the bulk packs offered by various manufacturers. 'cause you know you'll blow through them like a twister through a Kansas wheat field.

Then a couple of months back, I purchased an Olympus D-550 digital camera. It takes four AAs or two fancier batteries. The family was on the way to Parc Safari in Hemingford, Quebec, so I grabbed a 16-pack of AAs, dropped it into the camera bag, and we were off. Parc Safari is one of those animal parks where you can drive through with your car, and the non-dangerous animals simply roam around you. It's a picture-shooter's paradise, and by early afternoon, I had already changed batteries twice. I was on my third quartet of AAs, and you don't have to be Einstein to figure out this could get expensive.

Now, you might rightly ask, "Why don't you try rechargeables?" The short answer is that I have, and they are mostly a pain in the, ah, cheeks. That is, until now. You see, the problem with most rechargeable batteries is that the charger isn't very smart. They tell you that the battery is charging, or that it has completed charging, but nothing else. I still have an Icom 2SRA that I bought some time ago, along with a couple of battery backs and a recharger. I soon found that managing the rechargeable batteries was an activity in itself. It wasn't very long before the NiCad batteries required almost constant recharging (despite my best efforts to discharge them

fully, then recharge), and eventually I switched over to a battery pack that took commercial AAs.

◆ Help for the Hopelessly Hooked

C. Crane's QuickCharger, however, offers new hope for battery junkies like me. It's specifically designed to recharge up to four AAA, AA, C or D size NiCad or NiMH batteries. (It doesn't work with alkalines, so don't try it.) The attractive gray plastic case measures 6" wide by 8" deep by 2.5" high. It's powered by a wall wart transformer that plugs into a jack at the back of the case.

Viewing the QuickCharger from above, at the very front of the unit is a liquid crystal display that provides the user with information about what the unit is doing. To the right of the LCD is a round red button labeled Discharge System Override. Next to that is an oblong red button labeled Battery Analyzer.

The entire back of the QuickCharger is occupied by a flip-up lid. Raise it, and inside you'll find four bays to hold batteries to be recharged. (Plus and minus symbols for battery orientation are molded into the bottom of the bays, but you have to look carefully to spot them the first time.)

At the front of each bay is a spring-loaded vertical rod. Pull the rod back, slip a battery into the bay, and allow the rod to hold it in place. Once a battery is loaded, the fun begins. With the lid up, press the Battery Analyzer button, and within 10 seconds the QuickCharger will display the battery capacity and voltage. If the battery is not suitable for charging, the Bad Battery symbol will be displayed. If you activate the battery analyzer with the lid up and more than one battery in the bays, the QuickCharger will give you the average voltage and capacity of all the batteries.

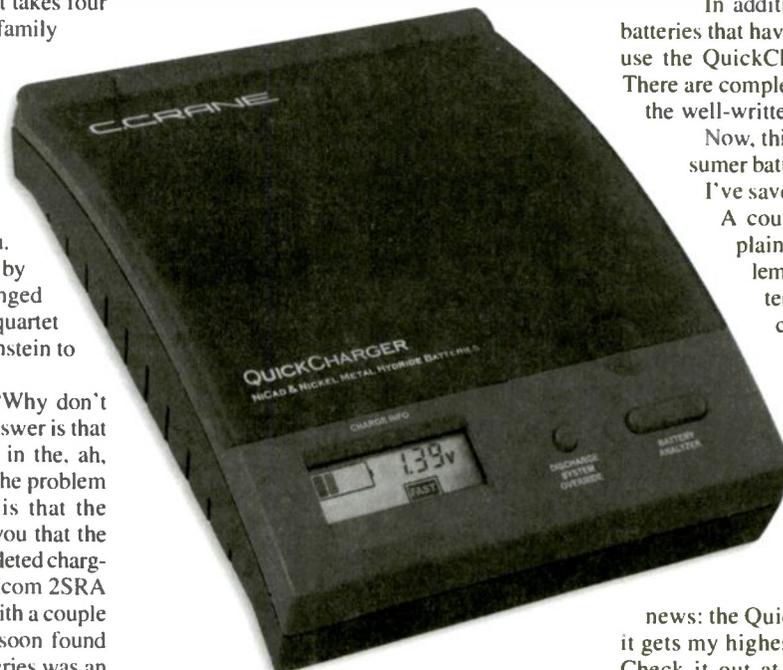
Close the lid, the charger will analyze the batteries, and activate the proper mode depending upon their condition. It may start discharging the batteries and, when that is completed, recharge them fully. Alternatively, the charger may go into Soft Start mode as it begins to charge the batteries, then Fast charging, followed by Top-Off/Trickle charge. What sets the QuickCharger apart from other chargers is that it is a "smart" charger. Its microprocessor assesses the condition of the batteries and does the right thing for them. It will completely discharge and recharge four AA NiCads in about 4 hours and completely recharge four AA NiMH cells in 2 hours, 40 minutes.

In addition, if you have some NiCad batteries that have acquired a memory, you can use the QuickCharger for revitalizing them. There are complete instructions for doing so in the well-written manual.

Now, this is hands-down the best consumer battery charger that I've seen. But I've saved the really good part for last.

A couple of years ago I was complaining to a buddy about my problems in managing rechargeable batteries. He was the head of radio communications for a huge electric utility in New York State. He explained that his shop had this incredible machine for charging and reconditioning batteries, but it cost around \$250. So when I saw what the QuickCharger can do, I figured "you're looking at a hundred dollar bill."

So, here's the good news: the QuickCharger is just \$39.95, and it gets my highest personal recommendation. Check it out at CCrane.com or call 1-800-522-8863. (They sell NiMH rechargeable batteries, too.)



The QuickCharger is, hands-down, the best battery charger I've seen.

What's Your Life Worth?

By Michel Berlie-Sarrazin

admit this title is rather provocative. It is chosen to enlighten a technical point in electrical measuring matters rarely mentioned and yet "deadly" important.

❖ The Issue

As you know, domestic mains carry alternating-current electricity with a voltage sufficiently high to cause your death if you touch the wires and the current passes through your body. At the minimum there are two contacts in any socket, one at voltage above ground (*hot* or *phase* wire), the other the *return* circuit (neutral wire) to your electricity company network. Normally there is also a third one labeled "ground wire."

The path of electricity is most easily visualized as traveling from power company alternators (generators) to your home meter (with the help of some transformers to reduce the very high voltages of the national power grid down to domestic levels of 120 or 240 volts), then through your circuit breaker panel to the

electrical accessories (lamps, TV set, SW receiver...), finally to return to its source. Add the missing element of a switch to be able to turn on or off the apparatus in question, and we have set the scene.

An electrocution may occur if electricity is present in nearly any part of the circuit with which you come in contact, and your body returns the path of the current to the source. So how can you be sure the wire you are going to touch is not "live?" You can turn off power at the breaker panel, and verify the apparatus or room switch is off. But how can you be *absolutely* sure?

You may think that you could probe the wire with a voltmeter, and if the needle does not move across the dial, all is well. Fatal error! First, the voltmeter may be defective. (Test it on a known live source to verify this point). Second, even an operational voltmeter may lie involuntarily.

Look at the circuit in the first example.

The phase (hot) wire is cut off by a switch, so the electrical circuit is open. The lamp is not lighting. The voltmeter says "0 volts" and this is correct. You can touch the phase wire on the right-hand part of the circuit after the switch, or the neutral one with no risk, but only if the neutral wire is truly neutral. This is not always the case. See the second example.

If the neutral (return) wire is not properly grounded (possibly floating without a ground connection), both the intentional phase wire and the neutral may be "hot!" Even though the lamp is not lighting and the voltmeter reads "0," you could be electrocuted if your body actually touches ground reference. A miswired wall switch or ignored third wire, or improperly selected ground wire can all contribute to this dangerous condition.

A voltmeter is only able to tell you if there is a potential difference between



the two points of measurement chosen, not what would happen if a possible third point – your body touching something) is brought into play.

❖ A Good Solution

The electrical neon tester is the better (and cheaper) tool to be sure you do not endanger your life. This may be a screwdriver with a transparent plastic body which houses the bulb,



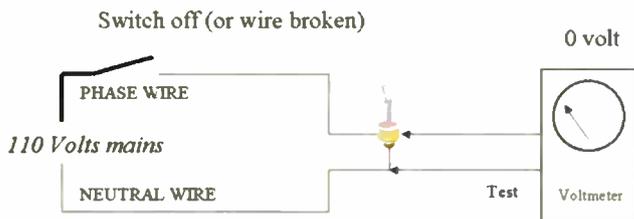
or a lamp with two short test leads. The screwdriver blade (or one lead of the lamp device) is connected to a small neon light, in series with a current-limiting resistor, to the other contact (the handle or other test lead).

The use is straightforward: you touch the wire or contact in question with the blade or test lead, and your finger(s) or thumb on the handle contact or other test lead. If dangerous voltage (typically above about 50 volts) is present, the neon light is illuminated. But don't try this neon bulb tester with very high voltages (above home power line levels)!

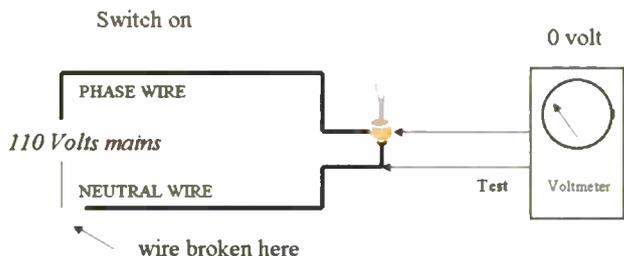
Another excellent device for testing power receptacles for correct wiring is a small tester shaped like a standard plug with several small, colored LED lamps. Available from electrical departments, it will instantly analyze your base plug receptacle and display any faults by a color combination.

❖ To Sum Up

Safety is a primary concern for all of us involved with hazardous voltages. The simple expedient of testing uncertain devices with a neon bulb apparatus, and checking the wall receptacle with the receptacle tester can reduce the likelihood of a serious shock.



FIRST CASE : the bulb is turned off, and the voltmeter indication is true. Only the thick part of the electrical circuit is live. (in a normal situation: with a true neutral wire).



SECOND CASE : the bulb seems always turned off, and the voltmeter indication is false. All the thick part of the electrical circuit is live. (including neutral wire)



What's NEW

Tell them you saw it in *Monitoring Times*

Four Bands for the Price of One?

The new Yaesu FT-8900R FM transceiver is a 10m/6m/2m/70cm quadband mobile transceiver capable of high power operation: 50 Watts on 29/50/144 and 35 Watts on 430 MHz. Several features, besides the higher power, make this a good unit for search and rescue ops. FM satellite and WIRES (Wide-coverage Internet Repeater Enhancement System) capability, ARTS (Auto-Range Transponder System), Smart Search, and a 1200/9600 bps Packet jack are also part of this sophisticated but affordable package.



Frequency ranges in the US model are (on transmit) 28-29.7/50-54/144-148/430-450 MHz in FM mode. Reception covers 28-29.7/50-54/108-180/320-480/700-958 MHz (Cellular blocked in the US) in AM and FM.

The radio has a large amber alpha-numeric display, crossband repeat, built-in CTCSS/DCS encode/decode, and over 800 memory channels. Hyper memory can store complete receiver configuration. The radio features twin receivers: the built-in duplexer allows dedicated volume and squelch controls on each side.

The FT-8900R comes with a mobile mounting bracket, DC cord and Up-Down, illuminated DTMF microphone. The front panel can also be mounted remotely for anti-theft or esthetic reasons. Dealers are selling the FT8900R in the \$439 to \$496 price range.

Icom IC-T90A Tri-band Handi-talkie

Icom also has a new transceiver out: the compact tri-band IC-T90A features a wideband AM/FM/WFM scanning receiver (495 kHz to

999.990 MHz) in addition to 50 MHz, 144 MHz and 440 MHz ham bands. Flexible scanning allows you to choose from 550 alphanumeric memory channels, including 50 band edges and 5 call channels in up to 18 banks.

Transmit power is 5 watts provided by the supplied lithium-ion battery pack. DTCS and CTCSS encode and decode capability, and DTMF encoder with 10 memories are standard. If you don't know what tone is used, tone-scan will find it for you. A beep will notify you if a message is received matching a tone you have specified, great for group operations.

The T90A is designed for easy one-hand operation, even for folks with large fingers, but it is also PC programmable to aid data entry. The unit includes preprogrammed weather alert scan for US versions, but even if it gets a little wet, it's designed for rugged use and splash resistance.

Look for the Icom IC-T90A at amateur radio dealers near you. List price is \$319.95 but you can find it for about \$50 less.



High Speed Internet for C-Band

Do your neighbors laugh at you because you've still got your big dish system? Well, here's a chance to get the laugh on them. High-speed Internet access is now available to C-and Ku-band customers. Skyvision, Inc. of Fergus Falls, MN, and Internet Satellite Platform Inc. (ISAT) of Orlando, FL, have teamed up to bring <http://www.cband.net> to



big dish enthusiasts. CbandNet will offer a complete line of Internet services, software, modems, satellite dishes, LNBs, cable, dish movers and accessories. SES-AMERICOM, who recently acquired 20% of ISAT, will provide the transponder space on satellites AMC-6 (Ku-band) at 72 degrees East and AMC-4 (C-band) at 101 degrees West.

Packages are either \$29.95 per month or \$44.95, depending on whether you use your own Internet connection. This fee is much lower than other high-speed Internet services and it downloads 10 to 20 times faster than standard dial-up Internet services.

Hardware required is an internal or external satellite modem, ranging from "free" to \$149 depending on the package. Free internal hardware (PCI kit) will be offered to subscribers who agree to a one-year service commitment. All customers who purchase any package before Dec. 31, 2002, will also get their first month of service free.

CbandNet is easy to install and use. Customers simply install the software, connect a special satellite modem to their computer, run a coaxial cable from the satellite modem to a splitter on the existing coaxial cable coming from their dish, and their high-speed connection is ready.

To order or for more information visit <http://www.cband.net> or call 1-800-500-9267.

You'll get a charge out of this!

Wired magazine reports that your clothes could one day recharge your cell phone, MP3 player or Palm. Scientists at the Institute of Physical Electronics at the University of Stuttgart have developed synthetic fibers that generate electricity when exposed to light. The fibers could be woven into machine-washable clothes and could recharge a cell phone every time the wearer is in a lighted room.

(Whew! For a minute there I feared we were going back to wearing polyester in order to harness static electricity!)

Put a Beeper on It!

If you're like me and your cordless telephone's "Pager" button is its most valued feature, you'll appreciate Sharper Image Design's universal pager system, "Now You Can Find It!"™

Attach one of the system's four RF receiver beeper discs to any of those objects that seem to wander off by themselves—keys, eyeglasses, TV remote, cell phone, PDA organizer, your child's favorite toy, etc. When an item is lost, just press its corresponding button on the system's portable radio-frequency transmitter base. Then carry the base from room to room, and whenever you get within 30 feet of the misplaced object its attached disc will emit a loud series of beeps to lead you to the wayward item.



Each beeper disc secures to virtually any object with its keyring or with a double-sided adhesive pad; write a name or apply a sticker for each object opposite its button on the base. The discs and buttons are color-coded and they're coded with Braille-like bumps so someone with limited vision can use the system.



What's NEW

Tell them you saw it in *Monitoring Times*

The base comes with a magnetic mounting bracket that attaches to a metal surface on a refrigerator or filing cabinet, for example. The base unit itself will start beeping if it hasn't been returned to the bracket within six minutes – so it won't be misplaced, too!

The base unit runs on two AA batteries. The thin receiver discs run on lithium coin-cell batteries (included). An extra set of four locator discs is available for \$19.95. The Now You Can Find It system comes with a one-year warranty, and two sheets of colorful stickers for different objects. Select light gray or translucent purple. The system is a product of Sharper Image Design, and is available from Sharper Image (<http://www.sharperimage.com> or call 1-800-344-4444) for \$49.95. A great Christmas gift.

Traffic Radar Handbook

by Donald S. Sawicki

Many long-time readers will remember the extensive coverage that Don Sawicki gave to traffic radar systems several years ago in his original handbook. But times have changed, and traffic speed detection devices have improved. Sawicki's latest volume is assembled in a 200-page, illustrated book, and covers all bands of radar, laser, Ladar, and radar detectors as well as countermeasures systems designed to defeat speed detection.

This book is not for the technically inept. Sawicki shows the math behind the systems, with algebra and trigonometry to back it up. But the diagrams and explanations are easy to understand, and anyone with a background in radio can follow the text thoroughly. This is unquestionably the consummate handbook for speed detection systems.

The *Traffic Radar Handbook* is \$28.95 in hard cover or \$17.50 in paperback from 1st Books Library, 2595 Vernal Pike, Bloomington, IN

47404; 888-280-7715; <http://www.1stbooks.com> or email bkorders@1stbooks.com.

– reviewed by Bob Grove

The FM Crystal Set Project

by Phil Anderson

Crystal sets, the earliest form of receiver in widespread use, still fascinates experimenters. Without batteries, without tubes or transistors, and with the smallest parts count, these listening devices bring in local radio stations with uncompromised audio clarity.

But traditional crystal sets only respond to amplitude modulation (AM) because of their broad selectivity; their tuned circuitry is nothing more than a coil and capacitor, defeating even slope-detection methods for frequency modulation (FM).

Sharp selectivity (high Q) is obtainable, however, from coaxial resonators, and Anderson shows us just how to do this with simple

hardware parts. His 40 page booklet is well illustrated, easy to follow, and very informative. This is a great way to spend a small amount of time building

an unusual, productive project. Additional schematics and projects are included for the experimentally inquisitive.

The *FM Crystal Set Project* is \$9.95 plus \$2 shipping from Xtal Set Society, PO Box 1625, Norman, OK 73070.

– reviewed by Bob Grove

The NRC AM Radio Log

This 23rd annual edition of the National Radio Club's *AM Radio Log* contains 325 pages in 8-1/2" x 11" size, 3-hole punched, loose leaf format. Radio station listings from the United States and Canada include last-minute information on the new stations in the Expanded

band (1605-1705). Each station listing consists of its location, frequency, call, format, network affiliation, station address, station slogan, day and night transmitter powers. There are cross references by city and by call letter.

The *Log* is \$19.95 in the US and \$23.00 in Canada to NRC or IRCA members. Nonmember prices are as follows: U.S. - US\$25.95; Canada - US\$29.00; Western Europe (except Italy), Australia, New Zealand & Japan - US\$29.00; All Others - Contact NRC via Mail or Email quick@a-znet.com

Send all orders to: National Radio Club, Publications Center, Box 164, Dept W, Mannsville NY 13661-0164 USA. NY residents add appropriate sales tax. Price is "postage paid" to your location. Checks should be made payable to National Radio Club, Inc.

For more information or online ordering (at slightly higher prices) visit <http://www.nrcdxas.org/>

Uniden BC250D - Certified or not?

For about a month, Uniden said yes, but the FCC said no. In a letter to *Monitoring Times* from Rich Fabina, chief of the equipment authorization branch of the Federal Communications Commission, he said, "I spoke with Uniden's Jim Haynes several weeks ago. Mr. Haynes is in charge of the engineering department where FCC compliance issues are handled. He asked ... Can a hand-held scanner and a base scanner be approved under one FCC ID number?"

"I told Mr. Haynes No, a different FCC ID number would be needed to approve a hand-held scanner than the FCC ID number used for a base scanner."

Uniden apparently made a mistake in their request for a permissive change and thought both the BC785D and BC250D were approved August 22nd. However, after *MT* and other sharp-eyed hobbyists, particularly Harry Marnell, started questioning the Uniden press release, the company requested and received the proper Class II permissive change. The BC250D was certified September 27th under the same FCC Identifier as the '785D – AMWUB316.

MetroWest bought by Scanner Master

MT reader Don Hallenbeck advised us that MetroWest, which supplied many handy scanner accessories such as chargers, earphones, replacement duck antennas, etc. has sold their business to Scanner Master. However, there is no promotion to that effect on the Scanner Master website. On the other hand, at presstime that same website still ran a banner announcing "Police Call 2002 is now available..."

G&G Communications

New contact numbers for used scanner sales and repair shop G&G Communications are: Phone 585-768-8151 / Fax 585-768-7175; E-mail - ggcomm@iinc.com or ggcomm@aol.com

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

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*- Charles (Chuck) Boehnke
Keaau, Hawaii*

"You and the MT staff that put this project together have done a FANTASTIC job. You would seem to be the leaders in the field presenting material in this manner so it can be archived so easily. This is the way to receive a magazine."

- Don Neuer

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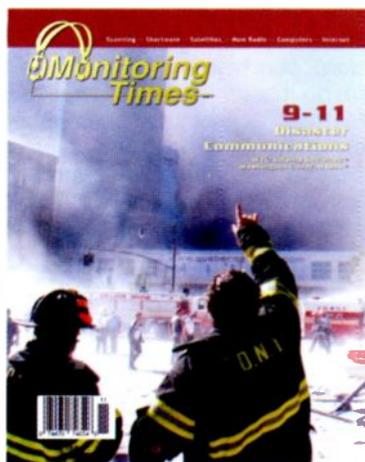
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Are Shortwave Broadcasters Failing Listeners?

A Guest Editorial by Harry Helms

In the June *MT*, Bob Zanotti of Swiss Radio International complained that too many listeners were writing shortwave broadcasters only to get QSL cards, and such letters devoid of program comments were jeopardizing continued government support for shortwave broadcasts. John Figliozzi echoed Bob's observations in the August *MT* when he noted, "And too many times, listeners write to stations only to obtain trinkets or score QSL cards, rather than offer intelligent comment on programs. . . ."

I agree with both Bob and John, but their observations raise an obvious question: Why is that? Are listeners indeed being derelict in some "duty" to provide program comments to shortwave broadcasters? For perspective, let me quote something I wrote over ten years ago in my book, *Shortwave Listening Guidebook*:

"Major international broadcasters are becoming increasingly interested in comments on their programming, judging from remarks of personnel at various international stations. Some of these remarks have seemed to imply that SWLs have favorable remarks and useful suggestions to make about programs, but don't in their haste to secure a QSL. Others. . . . have bluntly said they don't want to divert funds that could be used for programming production to answering reception reports and sending QSLs. (It never seems to occur to such station personnel that their programming might bore listeners stiff, and indeed the only rational reason for listening to the station would be to secure a QSL!)"

I realize that many international broadcasters would take offense at that paragraph, particularly the sentence inside the parentheses. But not only do I stand by that statement, I feel the situation has only worsened in the decade since I first wrote those words.

Why? Here is an explanation of the problem from later in my book:

"The improvements in transmitting facilities and SW radios have meant that the 'hardware' is no longer a problem in shortwave broadcasting. However, the 'software' – the programming – often still is. Too many countries have spent large sums of money on broadcasting equipment that will let you hear them without improving the programs enough so that people will want to listen. Programming all too often sounds as if it was produced by a committee using formulas. Too many programs have no relevance to listeners in target areas, and the broadcasters don't seem to realize that what works in their home country or culture doesn't necessarily work with overseas listeners."

Instead of complaining that too many listeners are only interested in QSLs, broadcasters should be asking themselves why their programming fails to attract listeners other than QSL seekers. Listeners are not failing shortwave broadcasters; instead, shortwave broadcasters are failing listeners.

Why do I say the situation has gotten worse over the past decade? Because in that decade the internet has become the most powerful method of international communication the world has ever seen, yet most shortwave broadcasters still operate as if it didn't exist. For example, a decade ago Swiss Radio International was the only way most for most of us in North America to get near-real time news and information about Switzerland. Today, the internet gives us official Swiss government sites, newspapers (and with the Google translation function we can read

German, Italian, and French sites), local Swiss radio stations, Swiss organizations (like the Swiss National Museum), and the web logs ("blogs") of ordinary Swiss citizens. We can even chat in real-time with residents of Switzerland.

And how has Swiss Radio International altered its programming to reflect this new reality? In the same way as almost other shortwave broadcasters – they haven't. Most shortwave broadcasters have continued on their merry way, operating as if there are no other sources of current news and information available about their country, and have either ignored the internet or treated it as some wacky fad that will eventually fade away.

Instead of complaining about listeners wanting QSLs, or station executives who are more interested in the internet than shortwave, the personnel at international broadcasters desperately need some self-examination. They must redefine themselves in light of the information revolution brought on by the internet and determine how to best integrate the internet into their audience communication and outreach efforts – For example, how many stations maintain e-mailing lists to alert their listeners of upcoming programs and schedule changes?

Those broadcasters who still think there isn't a viable audience in North America for streaming audio over the internet are simply out of touch with reality. I now do far more listening to non-local "stations" over the internet than I do shortwave – I usually have some interesting "station" playing in the background on my PC as I work. One can make a strong case that shortwave is the best way to reach people in many parts of the world, but to insist that shortwave is superior to the internet in reaching the United States and Canada is either fuzzy-headed nostalgia, butt-headed stubbornness, or both.

International broadcasters must decide whether their mission is operating shortwave transmitters or engaging in international communication. If it's the former, they're doing great. If it's the latter, they're failing.

It's not 1965, nor is it 1975, or even 1985. International shortwave broadcasters can't continue to operate in the same way they did back in those years, nor can the internet be ignored or treated as "the enemy." Instead of wasting time and money on genuinely dumb ideas like DRM (the digital HF broadcasting mode currently under development, which does nothing to address the real technical problem of shortwave: namely, the necessity to change frequencies throughout the day and year due to varying propagation), shortwave broadcasters need to determine what they can do better than internet-based media and how to integrate the internet into their efforts. Then they must re-shape program content to have greater meaning, relevance, and appeal to their target audiences.

Or shortwave broadcasters can continue just as they are now and slide further into irrelevance and, ultimately, silence.

This page is open to thoughtful opinions on radio-related topics. Submissions should be about 800 words in length and may be mailed or emailed to Closing Comments in care of this magazine. Contributions may be edited for clarity or length, and may be published in the Letters column if not used here. (editor@monitoringtimes.com)



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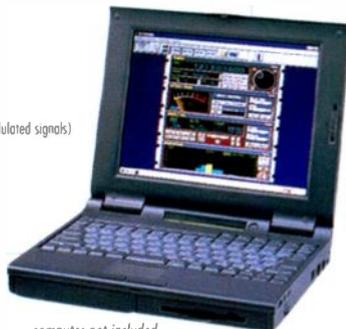
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