



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

Monitoring Times

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Exploring Papua New Guinea ...by Radio



**DXing from a
Hotel Monitoring Post**

Scanning Toronto

**Reviews:
Tivoli PAL AM/FM
Midland G-225 FRS**

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PERIODICALS W/RIDE ALONG ENCLOSED S7 P1
THOMAS SOKIRA
69 MANOR DR
CHESHIRE CT 06410-2615



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AOR SDU5600 Spectrum Display Unit

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*With sampling at up to six times per second,
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*The "waterfall display" function is a new
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The AOR SDU5600 is the "next generation" in spectrum display units. Using a five-inch TFT color display, DSP and FFT (Fast Fourier Transform), faster sampling rates and color imaging, the SDU5600 opens the door to new possibilities and applications.

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In today's dangerous world, attention is turning again to shortwaves; the only information medium which can quickly reach around the globe even if major infrastructure failures occur.

The innovative WiNRADiO G303i software-defined shortwave receiver has the performance and capability to bring shortwave monitoring to the higher level demanded by today's standards and to take advantage of new digital broadcasting technologies. A range of new options is now available to bring the most out of this exciting receiver, and to provide an integrated solution whose performance equals or surpasses that of conventional receivers costing many thousands of dollars more.



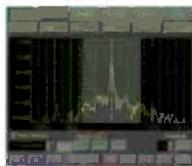
The G303i PCI-card receiver is designed with maximum reliability and performance in mind. Not a single tunable part has been used in its design. There are two high-performance DDS units, and thousands of ultra-miniature surface-mount components delivering a truly stunning performance.



The G303i control panel features no less than seven different methods to tune the receiver. There are additional features such as a real-time spectrum analyzer, three scanning options, a highly accurate S-meter displaying signal strength in absolutely calibrated user-selectable units, sweeping wide-band spectrum scope, powerful memory facilities, and many others.

Professional Demodulator Option

The Professional Demodulator introduces user-adjustable filter bandwidth and selectivity, additional demodulation modes, interactive demodulator structures, SINAD and distortion meters, bandwidth presets, user-definable audio AGC, and many other features.



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The Advanced AM Demodulator offers passband tuning, notch filter, noise blanker, RIT and recording facilities. The ability to record at the IF level, and so "re-receive" a signal with different filter and demodulation parameters, is the world's first in a receiver of this class.



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The WiNRADiO AX-05E Long Wire HF Antenna is a low-cost kit containing all the necessary components for a simple but effective shortwave antenna suitable for short wave, medium wave and long wave listening applications. An excellent accessory for the G303i receiver or any other shortwave receiver.

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The WiNRADiO LWA-0130 Long Wire Adapter employs a dual transformer design, making it more efficient than most conventional "longwire baluns". It is especially suitable for the AX-05E Antenna and the G303i receiver, but can be used with any third party HF radio to improve performance. A typical signal improvement using WiNRADiO Long Wire Adapter is 5dB, and in some cases up to 17dB.



Advanced Digital Suite Option

The WiNRADiO Advanced Digital Suite expands the power of the WiNRADiO G303i receiver with HF fax and NAVTEX decoders, a signal conditioner with numerous user-defined filters, audio spectrum analyzer and oscilloscope, audio recorder with pitch shift, and numerous others digital processing facilities.

Reviews

The G303i receiver has attracted numerous reviews world-wide.

On spurious signal rejection: "As far as I can remember I have never found any receiver, analogue or digital, which had such cleanliness, and the WR-G303i has set a new standard for others to emulate." *[Short Wave Magazine, SWM]*

On sensitivity: "... higher than necessary in a receiver of its type..." *[SWM]* - "Much of this sensitivity is contributed by the low phase noise of the oscillator, typically -148dBc/Hz @ 100 kHz. Clearly this radio meets or exceeds the competition head on..." "In short, the performance is superb. The sensitivity and selectivity surpassed my expectation, and there was no sign of intermod even in the presence of strong stations at night time." *[Radio & Communications, R&C]*

On variable IF bandwidth: "... a very useful feature and allows you to exactly match the filter bandwidth to the incoming signal ... once experienced never to be forgotten." *[SWM]* - "The experience of being able to finely tune selectivity to suit a particular signal you are listening to is truly incredible, especially if you have been used to having just a few fixed bandwidths on your old radio." *[R&C]*

On noise immunity: "Just in case you're curious, no, the location of the G303i inside the computer doesn't seem to result in a noise problem. I don't know how WiNRADiO did it..." *[Monitoring Times]*

The verdict: "If I had to choose between a Collins 95S-1 and the WR-G303i (ignoring the obvious fact that the 95S-1 tunes to 2 GHz), I would take the WR-G303i." *[SWM]* - "This receiver is a gadget-owner's dream! But it isn't fantasy; for the first time in consumer technology, the shortwave listener can tailor his receiver to his own requirements, independent of factory-set parameters." *[MT]* - "The WiNRADiO WR-G303 receiver, in addition to being an excellent receiver on its own right, has a certain exciting feeling about it. Perhaps this is because of the promise of a change of an entire paradigm which makes a difference between just another run-of-the-mill product and a truly innovative cult product, sparking an entirely new following." *[R&C]*

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Monitoring Times

Vol. 22, No. 10 October 2003



Cover Story

Exploring Papua New Guinea

By Gayle Van Horn

Many shortwave listeners consider the prospect of logging Papua New Guinea an impossibility, but think again. While West Coast listeners have a good chance of catching this small nation on the other side of the world, East Coast and Midwest DXers aren't left out, either. With persistence, patience, and planning, you, too, may hear a voice in colorful Pidgin English introducing country and western music, or a even rarer provincial station with local languages and music.

This article gives you the tools you need, including *when* to listen for the best propagation to your area, *what* frequencies to tune in for the various services, and *where* to send your report for a QSL card verifying your reception. Story starts on page 10.

On the cover and on the right: Buildings and ceremonies from a few of the many cultures of Papua New Guinea photographed in 1968 by Earl Brockelsby, published by permission of his nephew Joe Maierhauser.

Urban DXpedition 14

By Robert Bennett

We've all found ourselves in the author's position from time to time – stuck in a strange town with little to do in the evening but watch boring TV shows. Robert Bennett decided to do something about it, and he enjoyed fourteen years of "Making the Most of a Hotel Room Monitoring Post," as the subtitle says.

In this article Robert shares the benefit of what he learned through trial and error, so you can have a productive session first time out. He discusses both US and overseas travel considerations, and the equipment and techniques he used for shortwave broadcast listening and local area scanning.

Monitoring in the City of Toronto 20

By John Corby

Canadian resident John Corby paints a colorful view of this cosmopolitan city – home to several professional sports teams and venues, the world's tallest building, several airports, plus boats, trains, and streetcars. It's a bonanza for any scanner enthusiast who wants to keep up with the action in Canada's busiest city.





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Reviews:

Family Radio Service (FRS) walkie talkies are everywhere now that prices have plummeted; but what can you really expect from this low-power service? Is it worth the investment? Bob Grove checks out a pair of new **Midland G-225** radios against an older model, the Cherokee FR-465 (p.82).

Lee Lumpkin takes a look at an innovative little portable radio that can also double as a stereo radio tuner or auxiliary speaker – the **Tivoli PAL** (p.84).

If you own the tiny Icom R5 you'll be glad to know there is software that can be a big help to programming such

tiny radios. John Catalano reviews the **Icom CS-R5** cloning software and **IC-R5.com** version 2.3.4 (p.80).

Want an exact measure of the electromagnetic field emitted by appliances, power lines, computers, etc? The **Alphalab Field Strength** meter has the widest frequency coverage we've seen in an affordable meter (p.85).

Jock Elliott is walking on the wild side...and for an added measure of security he's looking into some survival tools – the **Navitool**, **1-Quip**, and a **Survival Staff** (p.86).

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Monitoring and the Law

All Eyes on California

California has perhaps one of the longest and most voluminous sets of laws dealing with monitoring and the scanner hobbyist. With all the attention the State has received with the recall election for the governor's seat in California, this month we turn our attention West to the Golden State and its listening laws.

◆ State Law

Most of its laws can be found under Chapter 1.5, Title 15 Miscellaneous Crimes, California Penal Code, Sections 630 to 637.9 and cover the gamut of eavesdropping violations. However, of all the sections one is of particular interest to the scanner listener – section 636.5 titled “Police Radio Communications; prohibited interceptions; penalty.”

Section 636.5 prohibits any person, who is not authorized by the sender, to intercept any public safety radio service communication, by use of a scanner or any other means (such as online scanner audio on the Internet), for the purpose of using that communication to assist in the commission of a criminal offense or to avoid or escape arrest, trial, conviction, or punishment. It also punishes those who divulge to any person he or she knows to be a suspect in the commission of any criminal offense, the existence, contents, substance, purport, effect or meaning of that communication concerning the offense, intending that the suspect avoid or escape arrest, trial, conviction, or punishment. Violations of Section 636.5 in California are considered a misdemeanor punishable by a fine or jail for less than one year or both.

Section 636.5 goes on to say that, “Nothing in this section shall preclude prosecution of any person under Section 31 or 32.”

Sections 31 and 32 of the California Penal Code are the state statutes that deal with and explain the liability of principals to a crime, those primarily involved in the planning and execution of criminal activity, and those who are mere accessories to a crime.

This provision in the law allows California to prosecute the scanner listener who helps others commit a crime, not just for the illegal scanner use, but also for his or her part in the actual crime that was being committed to the extent that the law would already consider them either a principal or an accessory. For example, say Billy Badguy (as he is often called in law school examples) decides to help

his buddies commit a robbery and offers to bring along his scanner to help. When he hears on his police scanner that the police are on their way and honks the car horn to signal his partners in crime, he not only violates Section 636.5 but may also remain guilty of his role in the robbery.

Section 636.5 defines “public safety radio service communication” as a communication authorized by the Federal Communications Commission to be transmitted by a station in the public safety radio service. This is a common definition used by other states as well.

◆ Listening in Los Angeles

Southern California scanner listeners also have local laws to contend with. The City and County of Los Angeles both have ordinances dealing with scanners. In Los Angeles County a 1944 law still on the books makes it an infraction to equip any vehicle with, or operate any vehicle equipped with, a short wave radio receiver. The ordinance defines a short wave radio receiver as any radio receiver or other device capable of receiving messages or communications transmitted on any radio transmission station operating on a frequency between 1600 kilocycles and 2500 kilocycles, or on a frequency between 30 megacycles and 40 megacycles, or between 150 megacycles and 160 megacycles.

Similarly, the City of Los Angeles in two local ordinances restricts the use of scanners within the city limits. First, SEC. 52.44 titled “Willfully listening to Police and Fire Departments portable radio messages prohibited” makes it unlawful for any person to willfully listen by means of any radio receiving device located in or upon any vehicle to any official message which is being transmitted by the Police Department or Fire Department of the City of Los Angeles or any law enforcement agency over a radio transmitting station owned or operated by such city or agency.

The City ordinance does not apply to persons to whom a permit to listen to such radio messages has been issued in writing by the Chief of Police of the City of Los Angeles. And those permits are completely discretionary, which means they *may* be issued after he determines that public interest will be served by the issuance of such permit but they don't *have* to be issued. The City law does not apply by its own language to any officer, agent, or servant of any government agency or public utility, the performance of

whose duty as such officer, agent or servant, requires that he listen to such messages.

The City of Los Angeles, like the State of California, also prohibits listening for financial or, most certainly, criminal advantage. Its Sec. 52.46 titled “Use of Short Wave Radios” provides that “[n]o person who intercepts, overhears or receives any message or communication transmitted by any radio transmission station operating upon a wave length or radio frequency assigned by the Federal Communication Commission for use by any police or law enforcement department shall, for the financial benefit of himself or another communicate such message or communication to another or directly or indirectly use the information so obtained.”

California also has state versions of many prohibitions we see at the Federal level in the Electronic Communications Privacy Act (ECPA). For example, Californians have their own state ban on listening to cellular radio telephones (Penal Code Section 632.5). Cordless phone listening is prohibited by Penal Code Section 632.6 which requires the interception be malicious and without the consent of all parties to the communication.

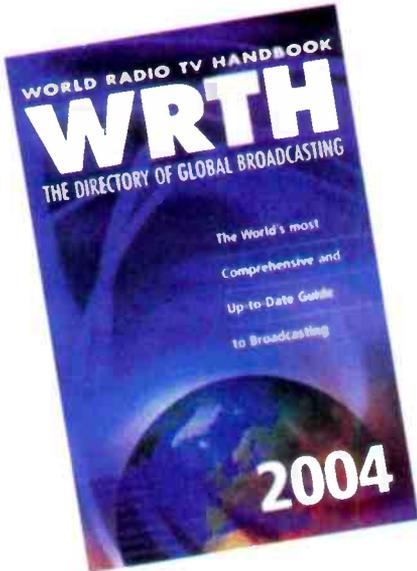
◆ One Recent Example

California authorities do prosecute people who violate their police radio laws as they did in the summer of 2000 when a ham radio operator received a five-year prison sentence for interfering with police frequencies. It took the combined effort of the FCC, California Highway Patrol, and several local agencies to arrest Jack Gerritsen of Bell, Calif., six months earlier. CHP officers caught him in the act as he made an illegal transmission. At the time of his arrest Gerritsen had a tape recording of the transmissions that had been heard on frequencies since the fall of 1999. A cassette with the recording, “You Rampart pigs are a bunch of a****s,” along with other recordings that had plagued many amateur, GMRS, law enforcement, and media radio systems was confiscated at the time along with several radios.

Disclaimer: The information provided in this column is for informational use only. Nothing here should be construed as specific legal advice. Persons wishing legal advice for their situation should consult an attorney licensed in their jurisdiction.

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LETTERS TO THE EDITOR

Mixed Emotions

Jean Baker surprises *MT* readers this month with two announcements: her marriage to Bob Hubbard (congratulations, Jean and Bob!), and her resignation from *Plane Talk*. Jean swears the two events are not connected, but that she has a lot of projects competing for her time, and maybe after 18 years, it was time to give the column a rest!

We'll really miss Jean, who has been one of *MT*'s most ardent supporters. She's also been a good teacher for beginning aero monitors via her correspondence, her columns, and through her tours and seminars at the old *MT* Conventions. Her enthusiasm for everything aeronautical has never dwindled. Jean, we wish you all the best in whatever you decide to do, and you're always welcome in the *MT* feature pages!

September Corrections

Upon checking the online Table of Contents for September, Victor Goonetilleke noted an incorrect identification of his HF log periodic antenna. It was changed before it went to print, but we still got it wrong, calling it a low band antenna! Our apologies, Victor. Let's see how many readers catch it!

An incorrect price was quoted in "What's New": *Getting Started in Electronics* retails at \$17.95 plus shipping from The W5Y1 Group.

Marine Beacons

"I was just wondering, are there any maritime beacons that I might be able to hear? I've been trying desperately to log one of the Greenland or Iceland ones, without success. Do you know if there are any out there that are closer?"

— Al Milano, Bronx, NY

Below 500 kHz columnist Kevin Carey responded, "Marine beacons have become very scarce. The U.S. Coast Guard decommissioned its network of LF beacons several years ago. Some were retrofitted for DGPS service, which improves the accuracy of GPS by sending out 'correction' signals for a particular area. There may still be some platform beacons in the Canadian Maritimes that you could try for. Some suggestions: 191/4U (Nova Scotia), 196/4Z (Nova Scotia), 209/2V (Nova Scotia), and 229/1M (Newfoundland/Labrador). These are located at gas and oil platforms and are used to allow helicopters to find them.

"As for the Greenland stations, don't feel bad. We had to struggle to hear just a few of them on our Miscou, NB, DXpedition last fall. That is a prime, low-noise location and we had very good antennas at around 1,000 feet long. Your best bet would be to try for

them in the middle of winter between sunset and say, 1 a.m. local time. The biggest problem you'll probably face in the Bronx is noise from household equipment. Check my September and October columns where we'll discuss noise and how it can be minimized."

— Kevin Carey

BBC Gone Again

"I am deeply saddened that my source of very high quality BBC World Service 24x7, through CSPAN, has been terminated without notice. I used this through my local Comcast Cable in the DC area, and through C-Band (Satcom C3, T7, 5.40 MHz audio) in the rural West Virginia mountains. BBC coverage was my primary reason for subscribing to cable.

"It was nearly impossible to find out why this service disappeared until I finally got some helpful answers from CSPAN. Since there no longer are BBC shortwave broadcasts to the US, the remaining choices are (1) internet (Real Audio) which requires a computer and a continuous perfect internet link – compared with CSPAN Audio 1, it is very poor quality – or (2) XM satellite radio (several hundred dollars for the receiver, \$10/month, and no guarantees for the future).

"International broadcasters used to WANT to get us to listen – now we have to pay for access?

"The BBC is really a superb alternate view of the world, with wonderful literate content – a refreshing contrast with US media and mediocre lowest common denominator content. I am so sorry to see access curtailed.

"CSPAN (otherwise) and *Monitoring Times* are wonderful assets!"

— "Bill" William T. Hole M.D.

Both Ken Reitz (*Beginners Corner*) and Robert Smathers (*Satellite Services Guide*) agree that there are no sources of free BBC broadcasts on satellite. However, it is available via satellite. Ken Reitz says BBC audio is available via XM or Sirius satellite audio systems.

"I recommend Sirius because in addition to BBC WS it also has the complete World Radio Network line-up as well as 3 channels of Public Radio, a more balanced political channel selection; has the Weather Channels split into 4 time zones; is willing to take programming risks (it has a full time channel for gays and lesbians); a bigger character LCD display giving listeners more information (than XM): is willing to re-transmit terrestrially broadcast radio stations like WSM-AM Nashville, TN which gives us nationwide coverage of the Grand Ol' Opry; and has secured the rights to broadcast League Championship and World Series games for starters.

"This reminds me of when C-band cable programmers began encrypting their previously "free" programming on the big dish. If

BBC WS really means that much you'll pay a monthly fee with a smile on your face. I got the XM SkyFi for \$69 including the home kit. Car kits are \$50 at Circuit City. There are deep discounts on subscriptions. The more you subscribe to it the less it costs. Sirius even has a deal where you can get a life-time subscription for \$400 (life-time of

POWER LINE COMMUNICATIONS

Gregory L. Smith
Chatham, NJ

Reference: ET Docket 03-104

I would like to express my views regarding the FCC ET Docket 03-104 proposal regarding BPL Technology.

Since 1984 as an EMI Professional, I have had the responsibility of designing products containing digital devices to meet FCC and the EC community regulations for two major corporations in the state of New Jersey. Both of these companies sell domestically and export to the foreign market place. I have witnessed first hand the results of products that do not comply and how they interfere with receiving devices and other sensitive electronic equipment.

Specifically, I have designed many products complying with FCC Class A, Part 15, Sub-part J that specifies amplitude limits on both conducted and radiated RF emissions. On conducted RF emissions, much effort and finances have been exercised to meet these guidelines to provide interference free operation of RF receiving devices including communications receivers.

Quoting from, "Electromagnetic Compatibility Handbook" ISBN 0-442-28903-0, page 683; "The performance of conducted emissions testing is to assure that harmful emissions below 30 MHz do not conduct onto long power lines and eventually radiate."

It is totally ludicrous for the FCC to consider such a technology as BPL that will result in such broadband interference that will affect so many services. It would be a poor decision to approve BPL and negate all the work that the FCC has done to date regarding "conducted emissions".

I encourage readers of *Monitoring Times* magazine to reference the article written in the August 2003 Issue on page 72 titled "Power Line Communications An Editorial Comment," by T.J. Arey, N2EI and file "comments" on the negative effect it will have on the communications community.

The enjoyment of your hobby is in your hands. Please take the time to respond to this important issue.

the radio that is!). Days after BBC WS went down on C-band I bought a SkyFi system and have been enjoying the BBC WS and another 99 channels for about \$100/year. I challenge cable viewers to get that much enjoyment out of that same cost.”

– Ken Reitz

When Better is Bad

“Reading the article concerning Digital Radio Mondiale in the April *MT*, and then contrasting it to the mini-essay on old-time radio listening – “Radio In My Life” (in the April *Letters* column) – I have one major worry about all of this: If SWLing becomes popular with the average person because of improved audio quality, and if the marketing types take over the management of the stations because of increased listenership (and therefore appointment of these marketing types by cost-conscious governmental bean counters), will the shortwave bands just become another forum for mediocre programming, as now occurs with domestic radio, TV and cable stations? (The Jeff Zucker effect, you might call it.)

“Of course, it will! And as with all these other deregulated and monopolistic media, they will boom and bust, and what we’ll be left with is junk. What happens after that, I don’t know, but in the meantime, if these people could find a way of internationally following car chases or other non-educative drive, they will (on radio).

“I hope I’m wrong. But recent history concerning this matter is not encouraging. It seems, within a certain range, the more improved media technical quality becomes, the less programming quality becomes. It’s a zero-sum game.”

P. S. “Perhaps the DRM people should consider leaving some distortion on the signal. No joke!”

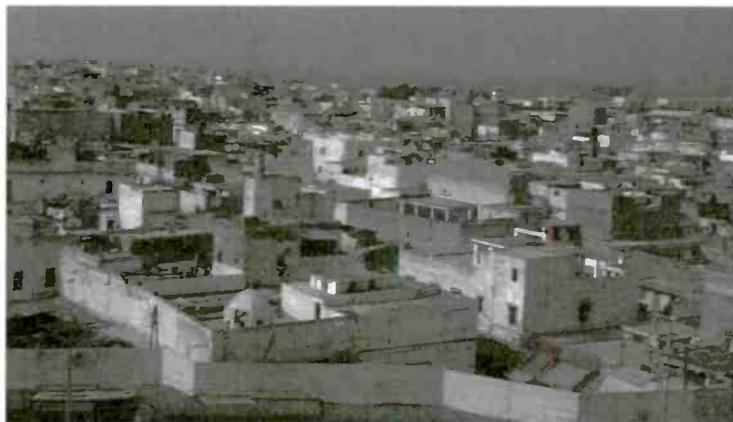
– Sincerely, Kevin R. Crouch, WA6BAB

Radio Brings Us Closer

“I’ve always been convinced that radio makes our world a little smaller and contributes to understanding. It’s also fun to read the QSL reports in *MT* from MW stations right in my backyard: CJGX 940 kHz in Yorkton (*MT* Aug/2003) 200 miles away, CBK 540 in Watrous (I think this was June/03, oh where’d I put that mag) just 80 miles away. And now the shameless plug: I’m listening on my Icom R75 bought from Grove and just renewed my *MT* subscription for another year.”

– Jim Arnold, Saskatoon, Saskatchewan, Canada

MT columnist Dan Veeneman, recently returned from a trip to Morocco, says, “It’s a really strange sight: every building – new or old, clean or dirty, rich or poor, intact or crumbling – every one of them has a satellite dish.”



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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

Nextel, NASCAR and Scanners

Major changes may lie ahead as NASCAR announced in June that RJ Reynolds Tobacco was being replaced by Nextel as title sponsor of its top stock car series after 33 years. The concern for many fans is how Nextel's agreement will affect the use of popular scanners. Fans bring their own radios or rent pre-programmed scanners at the track so they can listen live to conversations between drivers and crew chiefs.

The introduction of a communications company has prompted speculation that those devices could be phased out when Nextel's deal commences next year. Especially since Nextel's own digital protocol cannot be decoded by a scanner.

Internet on the Grid in Manassas

A few Virginia families and one business have been serving as test subjects for a program in which internet access is provided via electric power lines. The director of the Manassas utility, said the program has been successful enough that the service is ready to be offered to all homes and businesses that use city power.

The system is cheap and simple because it uses existing power lines and grid instead of cables or phone wires. Manassas is one of 16 municipalities in the state that operate their own electric systems, and with only 14,000 customers in a 10-mile area, the city's utility grid is compact enough to offer the system.

Users would plug their computers into a converter box the size of two cigarette packs and then plug the converter into any electric outlet in Manassas. That connects users to the city's fiber optic network and then the Internet. The Manassas City Council will decide this fall whether to go forward with the program, which is highly controversial among hams and radio hobbyists.

Roy Neal, 1921-2003

Retired NBC News space correspondent, producer and executive Roy Neal, K6DUE, died August 15 in High Point, North Carolina. He was 82. Recognized as a leading news expert in space-flight and science, Neal – born Roy N. Hinkel – covered all of the Mercury missions for NBC and later reported the Gemini and Apollo missions and the space shuttle flights. Capitalizing on his space news experience, Neal became involved with the Space Amateur Radio EXperiment Working group (SAREX) – now Amateur Radio on the International Space Station (ARISS).

THE BIG BLACKOUT

Not All Bad News

When the electricity distribution grid went haywire August 14, taking out power for several states in the eastern US, it was the ultimate test for emergency communications preparedness. Going by the small number of negative reports found in the media, it appears that more things went right with emergency systems and procedures than went wrong. In the New York City area, failure of a backup diesel generator in Brook-



A HOAX! This fake satellite photo claiming to show the power-grid blackout area was widely propagated on the Internet.

lyn caused problems for ambulance central command; the police and fire departments experienced problems with hand-held radios; batteries for repeaters ran down sooner than expected; and other limited dispatch problems were reported.

In Ottawa, some police resorted to pay phones when they had trouble with cell phones and computers. CHU (the Canadian equivalent of US time station WWV) was off the air due to failure of their back-up generator.

Consumers dependent on the Internet and cell phones got a good lesson on how fragile their communications systems are. Cordless phones that needed electricity to operate didn't work. Cell phones worked sporadically. In the days following the blackout, local stores reported brisk sales in batteries, portable radios and – no surprise – corded phones.

Hams a Bright Spot During Blackout

Many Amateur Radio operators were ready and able to provide whatever assistance they could. Hardest hit were metropolitan areas like New York City, Detroit and Cleveland.

"It was a good drill," said New York City-Long Island Section Emergency Coordinator Tom Carrubba, KA2D. But, he adds, it was a cautionary tale, too. "The lesson is that everybody gets a little complacent," he said. "Have emergency power backup and make sure it's working!"

By and large, Carrubba said, the system worked according to plan, and Amateur Radio Emergency Service (ARES) members did what they were trained to do. "It's going to show the worth of Amateur Radio," he said of the blackout response.

Amateurs provided communications support for Red Cross operations, fire departments, police departments, emergency management agencies – the problems were different for each community. In addition to handling messages, amateurs relayed useful information, such as which stores or filling stations were open and operating. Many radio and TV stations went dark as a result of the power failure, and hams were able to help fill the information void. Amateur radio operators were active throughout the affected areas of New York, New Jersey, Connecticut, Massachusetts,

Michigan, and Ohio.

"It seems that the amateurs were better prepared than the government sector," said Ken Davis, KB2KFV, president of the Rensselaer, New York, County ARES/RACES Club. "Amateurs in this area were up and on the air before there was any response from local government."

Ham radio's importance won renewed recognition after the terrorist attacks of Sept. 11, 2001. The Amateur Radio Relay League won a federal Homeland Security grant of nearly \$182,000 to train amateur radio operators in emergency operations to help during terrorist attacks.

"It's incredible the differences you're seeing, the large cadre of people who know what they're doing," said Allen Pitts, a ham operator in New Britain. "It's making a major difference." (Based on an ARRL report)

Personal Views on the News

Monitoring Toronto in the Dark

(a sidebar to the feature on page 14)

by John Corby

Thursday August 14th, 2003, was a typical, otherwise uneventful, summer day in Toronto when, late in the afternoon, the lights went out throughout Ontario and a large swath of the US Northeast.

This writer was on Canada's West Coast when it happened; a routine phone call home revealed the news that my whole neighborhood was without power. Within an hour or so my roaming cell phone rang with the news that the blackout affected a much wider area. Fifty million people shared the grief of a total, unexpected and extended interruption of the electricity supply.

In Toronto, the subway stopped, trapping riders in underground tunnels; the "Red Rockets" (streetcars) stopped dead in their tracks on the streets above and elevators skidded to a halt in the office towers of the downtown core. Hundreds were trapped; the Province of Ontario declared a state of emergency and emergency services swung into action.

BULLETIN BOARD

Oct 5: Queens, NY
Hall of Science ARC Hamfest at the New York Hall of Science parking lot (Flushing Meadow Corona Park, 47-01 111st St), 9a.m., \$5 donation; talk-in 444.200 PL 136.5, 146.52 simplex. VE exams 10a.m. (info LMenna6568@aol.com). Free parking, door prizes, food. For more info <http://www.qsl.net/hosarc> or Stephen Greenbaum (night) 718-898-5599, wb2kdg@arrl.net.

Oct 19: Sellersville, PA
RF Hill ARC hamfest at Sellersville Fire House, (Rte 152 5 mi S of Quakertown and 8 mi N of Montgomeryville), 7a.m.-1p.m., Talk-in 145.310, admission \$5. Indoor/outdoor spaces, grand prize, refreshments, VE session 10am-12pm all elements. Information: Creed Freeman KA3MOP (215) 230-7728; KA3MOP@comcat.com; <http://www.rfhill.ampr.org>

On a local level, my home town ARES (Amateur Radio Emergency Service) group was called up by the local Red Cross. Landlines, cell phones and pagers were out but my local club repeater (VE3PRC, 146.880 MHz) was holding as long as the backup power was working. Amateur radio volunteers were mustered to their stations at local Red Cross offices and began the task of coordinating communications between the national headquarters in Ottawa and regional offices around the country. Emergency nets were set up on many local amateur radio repeaters. Repeaters were linked so that ARES districts could relay messages beyond their boundaries.

Locally, my own club's repeater hosted a net and messages were relayed between another ARES group to the north (on VE3ZAP, 146.685 MHz) and to the west (VE3ADT, 444.125 MHz). The Western Lake Ontario ARES net hosted on two repeaters (VE3WIK, 443.675 MHz and VE3SNM, 442.850 MHz) coordinated all ARES activity from the Niagara frontier around the western end of the lake as far as the eastern end of the GTA (Greater Toronto Area).

Less well prepared was Canada's bankrupt national airline. Air Canada's national reservation center was knocked out by a failure of its backup systems. All of Air Canada's flights around the world were grounded. One day away from a long haul domestic flight from Vancouver back to Toronto. I began my own preparations for an extended stay on the West Coast. The preparations proved unnecessary, as service was quickly restored and my flight departed less than an hour after its scheduled departure time.

Forty eight hours later I was sitting in the committee room of my local regional government offices in suburban Toronto, attending the monthly meeting of my local ARES group. When called upon to present my report, I could only say that the big blackout was no trouble at all from my temporary station on the beach in British Columbia. Passing round a picture of myself lying on the beach operating 40 meters using an emergency wire antenna and gel cell battery, I brought a big round of laughter from the other hams present at the meeting.

Most of Toronto's power came back up within 24 hours and the city recovered from the disaster very well but, dare I say, we all learned a "powerful" lesson from the experience.

What Blackout? by Skip Arey

Another MT staffer missing in action was New Jersey resident Skip Arey. Although he had a ringside seat, he wasn't suffering a bit ...

We were sitting on the deck of the *Carnival Victory* still docked in NY harbor. I was starting my second Guinness, and Reg was well into some pink drink with an umbrella in it. I couldn't help noticing that the traffic on the roads was starting to behave strangely and thousands of people seemed to be flocking to the ferry boat pier next to our dock. Someone flipped open their cell phone and we found out that the lights went out all over the region.

Ours didn't. The reggae band on deck didn't even turn their amps down. I popped down to the room for my Sangean portable, found a local AM outlet and listened to the craziness as everyone tried to sort out what happened. We were only delayed in getting out of port by about an hour as they had to wait for a couple of primary crew to hoof it on back to the ship.

How often can you sit in a deck chair and watch a minor disaster unfold without your beer even getting warm?

Cruising is fun. A nice quiet four days on the water, a nice day wandering Halifax Pier during their annual "Busker's" Festival. Didn't do too much radio listening as the intent of the adventure was to celebrate our 25th anniversary. Besides, I was too busy either eating or riding the gym bikes to pull the calories back off. I commend the activity to anyone!

Talk about luxury living off the power grid...! ed.

"Communications" is compiled by Rachel Baughn KE4OPD from newscippings and stories contributed by our readers. This month's star reporters are (via snail mail) Anonymous, Ballston Spa, NY; Mike Gaukin III, North Olmsted, OH; Ira Paul, Royal Oak, MI; Brian Rogers, Melvindale, MI; (via email) Mark C KB4CVN, Michael Coppola, Chanel Cordell, Patrick Griffith, Jim Hackett, Henry LaViers, Robert Margolis, Harry Marnell, Joe Moell, Jerry None, Ken Reitz, Gary Saffer, Doug Smith, Larry Van Horn, Barry Williams, George Zeller. Remember, if your story doesn't appear this month, it may be used in future editions.

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Exploring Papua New Guinea by Radio

by Gayle Van Horn

PNG photography by Earl Brockelsby, Courtesy of Joe Maierhauser

Shortwave radio listeners who think they've worked the Pacific by adding Radio Australia to their logbook have some interesting alternatives on the air that are far more challenging. And one of the toughest Oceania countries to hear is Papua New Guinea (PNG).

In some hobby circles the mere mention of trying to log a station in Papua New Guinea strikes fear in the hearts of DXers who consider hearing any of the country's shortwave broadcast stations an impossibility.

Logging a station from the country of Papua New Guinea is for the early-riser here in the United States and it requires some planning, patience, and consistent, persistent monitoring of the shortwave tropical bands. These stations won't be regular visitors to your shack; in most cases you are going to have to listen through a wall of noise and static crashes in your headphones before you will catch an identification. While it is true that West Coast neighbors have an advantage over those of us who live in the central and eastern United States, any radio hobbyist who

is persistent can add this exotic country to the logbook.

But first, before we dig into the PNG radio scene, let's take a brief look at the geography of this fascinating country. This will help the radio listener understand why, on some DX country counting lists, the country of Papua New Guinea counts as six separate countries.

PNG History/Geography

The nation of Papua New Guinea, with a population of over 5.3 million, embodies over six hundred islands and is located in the far western Pacific, west of Australia and east of Indonesia. It is a land of wild orchids and rhododendrons, amidst a country of unbelievably rugged terrain, dazzling beaches and rain forest. There appears to be no end to its variety of topographical features, of snowcapped peaks and treacherous swamplands. Much of the country remains undeveloped, prone to severe earthquakes and dotted with active volcanoes. It is also an anthropologist's dream, with areas so remote they encompass civilizations classified only decades ago as living in the Stone Age.

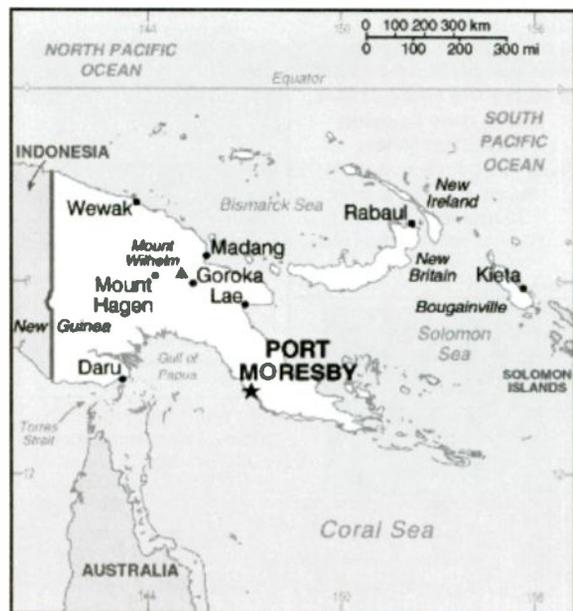
The largest land mass of Papua New Guinea is situated on the eastern half of the island of New Guinea – second largest island in the world. (West Papua comprises Indonesia's largest province.) Forty miles from the Sogerri Plateau in the Owen Stanley Range is the nation's capital city of Port Moresby. Situated on the magnificent Fairfax Harbor, it is the country's largest urban city and the hub of national cultural, economic and political activity. The administrative center is housed here at the National Parliament, as is the campus of the University of Papua New Guinea. Despite the city's contemporary advancements, it represents only a fraction of the nation's lifestyle.

The eastern half of New Guinea was divided between Ger-

many (north) and the United Kingdom (south) in 1885. The latter area was transferred to Australia in 1902, which also occupied the northern portion during World War I.

Between 1920 and 1942, Papua and New Guinea were administered by Australia as separate entities. During World War II, New Guinea was occupied by Japanese forces, but they were repulsed by American and Australian forces from Papua. In 1949, under unified administration, the country became known as the Territory of Papua and New Guinea. The northern territory comprised New Guinea, and the southern was the territory of Papua. In 1973, Australia granted the territory self-government. September 16, 1975, Australia withdrew its United Nations sponsored trusteeship, and Papua New Guinea became an independent nation. A nine-year secessionist revolt on the island of Bougainville ended in 1997, after claiming some 20,000 lives.

Today, New Guinea and Papua are gov-



erned as one country comprised of 20 provinces: Bougainville, Central, Chimbu, Eastern Highlands, East New Britain, East Sepik, Enga, Gulf, Madang, Manus, Milne Bay, Morobe, National Capital, New Ireland, Northern, Sandaun, Southern Highlands, Western, Western Highlands, West New Britain.

The languages spoken in Papua New Guinea are every bit as diverse as its landscape. Because it is difficult to travel around the country due to high mountain ranges, most of the villages are so isolated they have

developed their own languages. Some of these are so complex that neighboring communities cannot communicate. This has resulted in 715 indigenous languages spoken within the country. Of the hundreds of languages, those most widely used and heard on shortwave radio are English and Pidgin English (pronounced "Tok Pisin").

PNG's Radio Beginnings

For the people of Papua New Guinea, radio retains a vital role in providing education and entertainment to the nation. In the late 1970s it was estimated that nearly one million people had never heard a radio broadcast. But due to broadcasting advancements, that number has been considerably reduced.

PNG radio services have been active for over fifty years after being established by the Australian government. The Aussies devoted years to expanding and improving broadcast facilities and training the locals for their eventual takeover of the broadcasting system.

The National Broadcasting Commission of Papua New Guinea was created from the former Government District Radio Service which was the Papua New Guinea service of the Australian Broadcasting Commission. The NBC network was established in 1973, two years prior to independence, with a goal to reflect national unity and to meet the needs of the population.

Two years after NBC was established, nearly 90 percent of the programming was created within the country, an impressive milestone from its former dependence on imported programming. During the first two years, the number of languages in use dropped to 13, reflecting the station's progress toward the now attained goal of three primary languages.

NBC Today

The first station you will probably log and the easiest to hear is from the National Broadcasting Commission (NBC) network headquarters, broadcasting from Port Moresby on 4890 kHz using 100 kW. Occasionally, you may hear them on 9675 kHz. The station identifies as "Voice of Papua New Guinea" and "Voice of the Nation." Depending on your location and propagation, you should be able to hear them anytime from their sign-on at 0730-1400 UTC. Most listeners begin to log NBC prior to their local



sunrise. The quieter conditions during autumn and winter and spring equinox tend to be most advantageous; however, don't let the sum-

NATIONAL BROADCASTING COMMISSION



mer static scare you off next year!

NBC broadcasts in English and Pidgin English, with an easy to follow format. Programming ranges from friendly interviews, to regional and national news on the half-hour with identifications. Country and western music has been a favorite staple for years on PNG stations, a sure-bet should you hear it fade up in signal.

The NBC network includes three programming services: Radio Kunda, Radio Karai and Radio Kalang. The latter is a commercial service featuring advertising, sports and pop/rock music. Radio Karai features programs on culture, development and education. The Kunda service is mostly current affairs and news, and makes up the provincial stations. The multi-task staff of NBC is involved from engineering to research and development and announcing, as well as producing programs. The staff is also involved in on-the-scene recording of village cultural activities in order to encourage and preserve those traditions.

As seems to be the norm with today's industry, NBC in recent years has had to compromise with the demands of increasing expenses. Unfortunately, this has made it difficult to maintain and upgrade equipment. For now, NBC's future remains sound, despite recurring rumors of privatizing the service.

Earlier reports in *DX Listening Digest* indicated that NBC was considering 24 hour operation in the 41 meter band, but no final plans have been released at press time.

DXing PNG

A portion of the NBC network are the provincial stations under the Kunda service. These stations are the most interesting and challenging for DXers to hear. The provincial service involves nineteen low-powered 10 kW stations scattered throughout the country. All of them broadcast in the 120 (2300-2498 kHz) and 90 (3200-3400 kHz) meter bands. Programming is mostly in Pidgin and ethnic languages, targeted to their provincial audience. Occasionally you may hear brief segments of English.

Local programming offers personal re-

quests, messages to friends and radio plays. Regional "island music" on bamboo instruments are played, plus country and western, and pop favorites. Stations do not always identify themselves regularly on the hour and half hour, and may run a few minutes early or late, so stay tuned. The station ID is usually in Pidgin or English and easy to identify.

Provincials stations can fade in as early as 0800 UTC and most sign-off around 1200 UTC, except during festivals or national events. Don't be discouraged if you don't hear them. Con-

tinue to check the frequencies, for these stations tend to fade in and out regularly. A few of the provincials list programming from 1900-2200 UTC for listeners in that area of reception.

The staffs at the provincial stations are smaller than their parent NBC network; however, most maintain a daily schedule of radio broadcasting. Some of the station staff make occasional "recording patrols" to remote villages. Some expeditions have been reported to last several days, traveling long hauls up river over hazardous territory, in order to get to an isolated village and record special events.

DXers may occasionally read notices in hobby newsletters of PNG stations leaving the air, only to return in a few months. This appears to be ongoing due to budgetary problems, or intermittent downed equipment due to "lack of parts."

One station currently reported off the air is Radio New Ireland on 3905 kHz. Requests to repair their broken transmitter have gone unheeded, as has the promise of a second-hand transmitter from Radio East New Britain.

Radio East New Britain, itself, usually heard on 3385 kHz, tends to be inactive from time to time. The station, formerly Radio Rabaul began operations in 1961 and is the oldest station in the country. Its studio is situated in the heart of Rabaul, a town that gained a place in history during World War II. Radio Gulf from Kerema operates on 3245 kHz, and identifies as "the Voice of the Seagull." Radio Northern from Popondetta on

3345 kHz may also be suffering a similar fate as some of the other apparently inactive stations. At present, however, most stations appear to be active and have been logged by DXers in recent months. Check the *PNG Frequency List*, and follow the hobby newsletters and *MT* for the latest news on PNG station activity.

Letting Propagation Work for You

An excellent rule of thumb to apply when searching for the provincials is to use one of



the more powerful PNG stations as a "propagation-indicator/beacon." If you hear NBC on 4890 kHz at arm-chair quality, that should be indicative of favorable conditions into PNG. Tune around the 120 and 90 meter bands. If you hear Radio West Sepik on 3205 kHz, other frequencies should be checked for audible signals.

Another idea you might want to try is to conduct a daily check of your PNG propagation beacon/broadcast stations before you leave for school or work on Monday through Friday. During the week, the 75/80 meter ham bands where some of the PNG station operate are not as crowded as they are on weekends from amateur radio interference. In fact, my husband uses this technique in reverse. He looks for shortwave broadcasters operating inside the 40 and 75/80 meter ham bands and uses them as propagation beacons to let him know which direction ham DX might be coming from.

All propagation between the United States and Papua New Guinea occurs via short path using total darkness or gray line techniques. Consequently, winter months will provide a longer potential listening window than the noisier summer months. During December, which has the longest days of the year, West Coast listeners have a window of 9.5 hours (East Coast 7.5 hours) of listening time into Papua New Guinea. Compare that to the short days of summer in June: West Coast - 7 hours, East Coast - 4 hours.

Since most of the PNG stations operate between 3.2-40 MHz, I have provided Table 3 with propagation predictions for the East Coast, Midwest, and West Coast of the U.S. Keep in mind that the 4 and 9 MHz PNG stations will have longer openings (i.e. the 4/9 MHz bands will open earlier and close later than the 3 MHz frequencies). Likewise, the Radio Enga on 2410 kHz will have a shorter window than the 3 MHz stations illustrated in Table 3.

Equipment Needs

One recurring question that is normally posed by new shortwave listeners involves equipment. Do I need a high dollar, deluxe table model receiver to hear the Papua New Guinea provincial stations? And the answer is quite simply, no.



The most valuable equipment you need to be a successful PNG listener is to stay informed and use a good external antenna. A modest receiver with good sensitivity should certainly be adequate for pulling in PNG, but you do need to install the best antenna your budget will allow.

An Independent Voice

Clandestine activity from Papua New Guinea has been monitored by DXers in Asia and Canada. Radio Independent Makumui ("holy land") has been active for the past year, broadcasting on 3850 kHz. RIM uses equipment from the former clandestine, Radio Free Bougainville. The station operates from the self-declared Republic of Mekamui National Congress, near the Panguna copper mines in Bougainville. They appear to fear that the government will reestablish control over central Bougainville, so have declared this a "No Go Zone." RIM broadcasts from 0845-1100 UTC in English, Pidgin and ethnic languages. If you log RIM, please report your results. At 80 watts, it would indeed be an excellent catch!

A New Ministry?

In addition to the NBC network, you may soon hear a new voice from the islands. In July, the president of Life Radio Ministries Inc., Joe Emery, and his colleagues met with the PNG government to finalize plans to begin a religious shortwave station from somewhere in Papua New Guinea. Partner religious station, KBBN (Krai Bilong Baibel), is based in Mt. Hagen and is active on FM. Plans are to expand their voice to listeners over the entire nation via shortwave. As of now, no frequency assignments have been released, but *MT* will bring you the latest when it becomes available.

Look Out Country Counters

For the DXer who counts countries logged, there's more to Papua New Guinea than you may think. It is indeed one country, but according to the leading shortwave radio club in the United States, NASWA (North American Shortwave Association), for radio hobby purposes PNG counts as six separate countries!

If you log NBC in Port Moresby, that counts as the Papua Territory. Log Radio East Sepik on 3275 kHz and you've nabbed New Guinea, another new country on the NASWA list. Radio Manus on 3325 kHz counts as Admiralty Islands. When Radio New Ireland is active, you will be able to add the NASWA country of New Ireland to your totals. The *PNG Frequency List* below includes a listing

of countries you may add to the country chasing.

There is an added bonus for logging and verifying PNG stations. NASWA has some very attractive 8.5" x 11" award certificates to reward you for your efforts. You can earn the Senior Papua New Guinea DXer certificate by logging and verifying ten shortwave broadcast stations in at least three countries controlled by Papua New Guinea. The Master Papua New Guinea DXer certificate is awarded by logging and verifying 15 stations from at least five broadcast countries controlled by Papua New Guinea.

For additional information on membership in NASWA and their Awards Program, write them at: North American Shortwave Association, 45 Wildflower Road, Levittown, PA 19057 or stop by their website at <http://www.anarc.org/naswa/>. You'll find their current *Awards Country List* in PDF format to begin your DXing pursuits.

QSL Tips

Hopefully your early-morning sessions have been successful, so now it is time to write a reception report (details of what you heard, frequency, time and date) and send it off to the station you heard to obtain their confirmation card or letter (QSL). Thankfully,

RADIO EAST NEW BRITAIN "Maus Bilong Tavurvur"



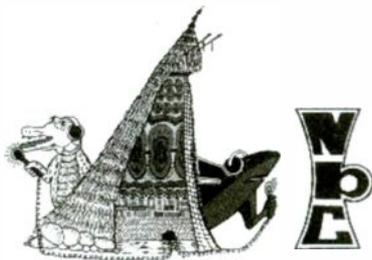
here is one time when an English report will suffice when writing to all of the NBC stations.

Letters to any of the provincial stations may be sent to the Port Moresby NBC headquarters, or they may be sent to the individual address. Both methods have verified my reception reports. Considering that mail is not delivered by carriers and must be deposited and picked up at area post offices, it appears to move quite regularly. The majority of the stations verify within a month or two. Some may require a friendly reminder in a follow-up letter.

Enclosing mint PNG stamps with your letter works the best, especially for the provincial stations. You can also send two IRCs (International Reply Coupons) to NBC's Port Moresby station, but they are useless to the other stations. Sending currency also should not be an option.

Here's another time when enclosing a self-addressed-envelope is vital. All of my verifications have returned using Self Addressed Envelopes (SAE) and mint Papua New Guinea stamps. You can find more on this technique by referring to the September 2003 *MT* and my *QSL Report* column on the





SASE Method. In that column you will also find a source for mint stamps to send with reception reports. Keep your cover letter friendly and upbeat. Tell them a bit about yourself and the radio hobby and it couldn't hurt to mention your diligence and persistence in logging their station!

Most of the PNG stations reply with the standard yellow NBC map card, but some of the provincial stations include personal letters. Correspondence is always friendly, as one of mine from A.L. Rumina, Provincial Manager of Radio East New Britain. His comments were, "It is amazing to know that there are people there on the other side of the globe who in fact are interested enough to listen to our broadcast." Mark Auhova, station Manager of Radio Gulf called me his "Wantok Bilong Mi," which translates to "my friend." The station staff always enjoy a letter and appear amazed we can hear them!

Ready for Early Mornings?

DXing Papua New Guinea involves far more than just working another Pacific rim country. It does require planning and patience. There is plenty to hear from Papua New Guinea and when you start snagging stations from this country you're likely to find that it is one of the most enjoyable countries to monitor and verify. The Papua New Guinea shortwave broadcast stations are fascinating DX targets to try for and nabbing one of them is a great way to begin your day.

Table Two - Papua New Guinea Station Addresses

National Broadcasting Corp. (NBC), P.O. Box 1359, Boroko 111 NCD, Papua New Guinea
Radio Bougainville, P.O. Box 35, Buka, North Solomons Province, Papua New Guinea
Radio Central, P.O. Box 1359, Boroko, NCD, Papua New Guinea
Radio Eastern Highlands, P.O. Box 311, Goroka, Eastern Highlands Province, Papua New Guinea
Radio East New Britain, P.O. Box 393, Rabaul, East New Britain Province, Papua New Guinea
Radio East Sepik, P.O. Box 65, Wewak, East New Sepik Province, Papua New Guinea
Radio Enga, P.O. Box 300, Wabag, Enga Province, Papua New Guinea
Radio Gulf, P.O. Box 36, Kerema, Gulf Province, Papua New Guinea
Radio Madang, P.O. Box 2138, Madang, Papua New Guinea
Radio Manus, P.O. Box 505, Lorengau, Manus, Papua New Guinea
Radio Milne Bay, P.O. Box 111, Alotau, Milne Bay, Papua New Guinea
Radio Morobe, P.O. Box 1262, Lae, Morobe, Papua New Guinea
Radio New Ireland, P.O. Box 140, Kavieng, New Ireland, Papua New Guinea
Radio Northern, Voice of Oro, P.O. Box 137, Popondetta, Oro, Papua New Guinea
Radio Sandaun, P.O. Box 37, Vanimo, Sandaun Province, Papua New Guinea
Radio Simbu, P.O. Box 228, Kundiawa, Chimbu, Papua New Guinea
Radio Southern Highlands, P.O. Box 104, Mendi, Southern Highlands Province, Papua New Guinea
Radio Western, P.O. Box 23, Daru, Western Province, Papua New Guinea
Radio Western Highlands, P.O. Box 311, Mount Hagen, Western Highlands Province, Papua New Guinea
Radio West New Britain, P.O. Box 412, Kimbe, West New Britain Province, Papua New Guinea

Table 3 - PNG Propagation Openings to the United States

Receiver locations:

East Coast (Brasstown, NC)	Short path distance 8721 miles at 287.6 degrees bearing
Midwest (Omaha, NE)	Short path distance 7981 miles at 282.3 degrees bearing
West Coast (California)	Short path distance 6717 miles at 265.4 degrees bearing

	East Coast	Midwest	West Coast
January	0700-1430 (0900-1300)	0730-1530 (0900-1330)	0730-1630 (0830-1530)
February	0730-1400 (0900-1230)	0730-1500 (0900-1300)	0730-1600 (0830-1500)
March	0730-1330 (0830-1200)	0730-1400 (0830-1230)	0800-1530 (0830-1430)
April	0730-1200 (0830-1100)	0730-1300 (0900-1130)	0730-1430 (0830-1330)
May	0730-1200 (0800-1030)	0730-1230 (0830-1100)	0730-1430 (0800-1300)
June	0730-1130 (0800-1000)	0730-1200 (0830-1030)	0730-1430 (0800-1300)
July	0730-1200 (0830-1030)	0800-1230 (0830-1030)	0730-1430 (0800-1300)
August	0730-1230 (0900-1100)	0730-1300 (0830-1130)	0730-1500 (0800-1330)
September	0700-1300 (0830-1130)	0730-1330 (0830-1200)	0700-1530 (0830-1400)
October	0700-1330 (0830-1130)	0700-1430 (0830-1230)	0700-1530 (0800-1430)
November	0700-1400 (0830-1200)	0700-1500 (0830-1300)	0700-1600 (0800-1500)
December	0700-1430 (0830-1230)	0700-1530 (0830-1330)	0700-1630 (0800-1530)

Table One - Papua New Guinea Frequency List

Freq	Station	Location	Radio Country
2410	Radio Enga	Wabag	New Guinea
3205	Radio Sandaun	Vanimo	New Guinea
3220	Radio Morobe	Lae	Papua
3235	Radio West New Britain	Kimbe	New Britain
3245	Radio Gulf	Kerema	New Guinea
3260	Radio Madang	Madang	New Guinea
3275	Radio Southern Highlands	Mendi	Papua
3290	Radio Central	Port Moresby	Papua
3305	Radio Western	Daru	New Guinea
3315	Radio Manus	Lorengau	Admiralty Islands
3325	Radio Bougainville	Rabaul	New Britain
3335	Radio East Sepik	Wewak	New Guinea
3345	Radio Northern	Popondetta	New Guinea
3355	Radio Simbu	Kundiawa	New Guinea
3365	Radio Milne Bay	Alotau	New Guinea
3375	Radio Western Highlands	Mt. Hagen	New Guinea
3385	Radio East New Britain	Rabaul	New Britain
3395	Radio Eastern Highlands	Goroka	New Guinea
3805	Clandestine. Radio Independent Mekamui	Bougainville	
3905	Radio New Ireland	Kavieng	New Ireland
4890	NBC	Port Moresby	Papua
9675	NBC	Port Moresby	Papua

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Urban DXpedition

Making the Most of a Hotel Room Monitoring Post

By Robert Bennett

At first glance, the title "Urban DXpedition" seems to be a contradiction in terms. After all, most radio hobbyists know that one conducts a DXpedition to get away from the problems associated with monitoring in urban areas (cluttered RF environment, man made noise, restriction on antennas, and so on). One envisions a DXpedition as being held in a remote area that is free of noise, interfering signals and other distracters, so why would anyone contemplate monitoring from a hotel room in the middle of a major urban area?

Background

I have been a shortwave listener (SWL) for almost 50 years and scanner listener for 25 years. As I climbed the career ladder and moved into higher level positions in my organization, I found that I was spending increasingly more time away from home on business trips (and my monitoring post). By the mid 1980s, I had reached the middle management level and was spending about a week each month away from home, mostly in the larger cities of the world. Also, I am not a party person by nature, so I ended up spending most of my free time watching very boring TV shows in my hotel room.

Being very unhappy with the above situation and not wanting to change jobs, I started looking for interesting things to do while away from home. So, I hit upon the idea of continuing my monitoring hobbies while on business trips. Thus was born my idea of an urban DXpedition. I use the term DXpedition because I have to go through the same basic planning steps to conduct a DXpedition to a hotel room that I would to a remote area.

I have monitored from hotel rooms on a regular basis from 1986 until my retirement in 2000. I have found hotel room monitoring to be a challenging undertaking and have derived much enjoyment from it. Table One gives some of the locations from which I practiced hotel room monitoring.

Locations and durations of Hotel Room

Monitoring

Location	Duration of Stay
US Locations	
Washington, DC	12 days
Leavenworth, KS	5 days
Killeen, TX	10 days
San Francisco, CA	6 Days
Monterey, CA	6 days
Baltimore, MD	4 days
Albuquerque, NM	8 days
Kings Island, OH	3 days
Libertyville, OH	4 days
Foreign Locations	
Ottawa, Canada	7 days
Adelaide, Australia	14 days
Brussels, Belgium	6 days
Copenhagen, Denmark	5 days
Madrid, Spain	6 days
London, UK	20 days
Paris, France	6 days
Den Hague, Netherlands	5 days
Berlin, Germany	7 days

Planning

In any radio-monitoring activity, the key to success is careful planning. Monitoring from hotel rooms has some unique challenges that must be considered. I learned, often through unpleasant experience, that the following things must be considered and planned for.

1. The first is whether to attempt monitoring from the destination or not. First, I will not attempt hotel room monitoring if my wife is accompanying me.

The other main considerations are length of stay and where I am going. I have found that three nights at the same location is my minimum requirement for attempting monitoring. I use "nights" as my criteria because I cannot monitor during the day; after all, I am

on a business trip. Any shorter stay would be too busy for monitoring.

I also consider the language spoken. I prefer that English be in use, but just because English is not the primary language doesn't mean I won't attempt monitoring.

2. Legal Issues. I am not a lawyer and am not giving legal advice. However, it is my experience that laws in many countries are more restrictive than in the US. It appears that scanners are legal to own in most of the countries I normally visit; however, it is only legal to listen to broadcast stations, amateurs, standard time stations and so on. Everything else is more or less illegal to monitor and what is illegal varies from country to country. I can usually find out what is legal by careful internet searches. I don't recommend conducting illegal monitoring under any conditions.

As extra insurance against coming to the attention of the authorities and having to prove I am not doing anything illegal, I practice what I call "discrete monitoring." That is, be discrete; don't tell anyone what you're doing, don't be obvious about it and be careful with intercept logs and especially audio recordings. In some countries of the world, traveling around with radio equipment, camera, notepad, maps and so on can be considered "spying." This is the reason I will not attempt to monitor in the Middle East or in some parts of Eastern Europe. An American in these regions is often viewed with suspicion and the possession of equipment that can be used for intelligence purposes might lead to charges of espionage.

3. Mode of Travel. Approximately

90 percent of my business travel is by airplane and the other 10 percent by auto. For car travel, I can take just about anything I want and so this mode of transport doesn't impose many restrictions. For air travel, the size and weight of the equipment is a major constraint. Basically, everything has to fit into checked luggage except for a few items placed in the hand carried cabin baggage.

As my trips are all business related and I have to wear a suit most of the time, I have to check a large suitcase. I want to be able to handle my own baggage without help, so I limit myself to three items of luggage: a large suitcase, a small overnight bag and a briefcase.

Thus, there is not a lot of room available for radio related items. I reserve a small area in the middle of the large suitcase for radio items. It is in the middle, because I pack clothes on all sides of the radio stuff for padding. I normally place the scanner and short-wave receiver in my brief case.

4. US Airport Security. The following is based on my experiences with domestic and international flights in the US. Generally, airport security personnel couldn't care less about what a traveler has in his luggage as long as it's not a weapon or dangerous. I make sure that I don't attempt to take any items through airport security that may resemble a weapon. Also, I expect the carry-on bag with the radios in it to be inspected and if asked about the radio equipment, I will give a simple and brief explanation of what they are.

5. US Customs. If leaving the US, I will ask customs to register my expensive items (the shortwave receiver, Optoelectronics Scout, scanner and my camera) to insure that I don't have trouble getting them back into the country. I cannot overstate the importance of this.

On one occasion I carried my Yupiteru scanner out of the country and had the Dallas, TX, customs note its serial number on a form 4457 (Certificate of Registration for Personal Effects Taken Abroad). On returning through customs in New York, the agent inspected my brief case and asked if the scanner was capable of "picking up phone calls." The inspector's body language and the way he operated the scanner controls led me to believe that he knew the answer to the question and was trying to see if I would lie about the radio's capabilities. I answered that the scanner was capable of picking up cellular phone calls if it were programmed to so; however,



Monitoring post set up in a hotel in Copenhagen, DM. This photo was taken early Saturday morning and shows the clutter from a late night monitoring session. The Scout, AR8000, recorder, headphones, and logs are visible on the desk. A long wire antenna was used but had been removed before this photo was taken. Note the AC adapter on the coffee table in front of the desk.

mine was not so programmed and I used it for amateur radio purposes. A discussion ensued between the agent, his supervisor and me about seizing the scanner, as it was "contraband." I produced the form 4457 and this was enough for the customs supervisor to send me on my way with the scanner. I have not taken this scanner out of the country since then.

6. Reference material. I don't normally take reference material such as books and frequency lists with me. I usually cannot justify their weight, and printed frequency lists could be suspicious to a foreign inspector. Instead, I research the area or city I am visiting and make handwritten notes about possible interesting frequencies and bands before I leave. If I am visiting a foreign country, I will try to find a band plan for the country. A good source of information for foreign locations is WUN (World Utility News, <http://www.wunclub.com>). For US locations, I like SCAN-L (<http://listserv.uark.edu>). I will often look for members of these lists that live in the areas I will be visiting and email them asking for pointers on frequencies to monitor.

7. Meeting with Hobbyists in US and foreign countries. I sometimes arrange to meet with radio enthusiasts in the cities I am visiting. The key issue here is, will I be available over a weekend? Normally, most radio hobbyists work and are only available on weekends or evenings. If time permits, I will attempt to arrange a meeting, lunch or dinner with a local radio hobbyist. I find discussions with them to be very enjoyable and informative. If you are meeting with a hobbyist in a foreign country and the individual does not know you, expect the individual to be a little cautious and wary, see above discussion of legal issues.

8. Presetting frequencies in Scanners and Short-wave Receivers. If I am visiting a US city, I will always pre-program my radios with "interesting" frequencies before I leave home. If I am going abroad, I will make sure all radio memories are either preset to local broadcast frequencies or else are cleared. I once had an inspector in London turn on my AOR AR8000 and check what was stored in a few of the memories. The man was very knowledgeable about the AR8000 and had no trouble checking the content of memories and search bands.

9. Foreign Customs and Security Services. In my 30 years of foreign travel (mostly to Europe, Mid East and Pacific Rim), there have been several times I've had my luggage searched on entry and sometimes on exit from the country. They normally look for weapons, drugs, banned items and so on, and infrequently ask about the radio equipment. When asked, I would answer their questions accurately but not volunteer any information. Again, a US Customs form 4457 is very helpful.

Hotel Considerations and Arrival

On arrival at the destination airport, I will normally use public transport (my employer encourages it) and will get a rental car only if public transport is inadequate (normally the case for most US cities). On the way from the airport to the hotel (assuming I am not driving), I pay special attention to the tops of buildings, water tanks, towers, etc. for the presence of antennas. I have learned over the years to judge the probable operating frequency band of most common antennas based on their dimensions. I will note (in my pocket notebook) the approximate location of any unusual or HF antenna facilities and later will try to determine their location on a city map. I also pay attention to the radio equipment in the taxi, train or bus I am traveling in.

I have little latitude about the hotels I stay in. My employer has discount arrangements with many major hotel chains and I am usually told where I will stay. Normally the hotels are in the mid-price range, and usually located in the city center or else near the facilities I will be visiting.

Before I depart on the trip, I review the city map for my destination and determine the direction from the hotel that might offer the best radio monitoring. When I check into the hotel, I will request a room whose window is oriented toward the direction I previously determined, and as high as possible but not on the top floor. The roof of many hotels will have heavy equipment such as air conditioners that create vibrations. A room directly under them

is noisy and this makes sleeping difficult. Also, the roof area might contain cellular, paging and other transmitters and it helps reduce interference to get a floor or two below the roof.

Also, when I check in I will request an extension cord, a multi-outlet power strip and a fan if it is summertime. If I don't have AC adapters for my radios that will operate from the local power grid, I will go to a store and buy one or two wall warts. In foreign countries, these things tend to be expensive but are well worth the cost. For my set-up, I only need two types of units, a 9 VDC and 12 VDC supply.

After I check in to the hotel and unpack, I do a quick reconnaissance of the area surrounding the hotel. First, I walk around as much of the hotel as possible and try to locate my room window and note its orientation. I also look for power lines and transformers near my room window. I continue walking in an increasing circle until I cover several blocks or get tired. I carry an Optoelectronics Scout to determine if there are nearby transmitters in operation. I also look at the tops of all nearby buildings for antennas and look for microwave towers, cell towers and so on. Again, I will note their location on a map after I return to my room.

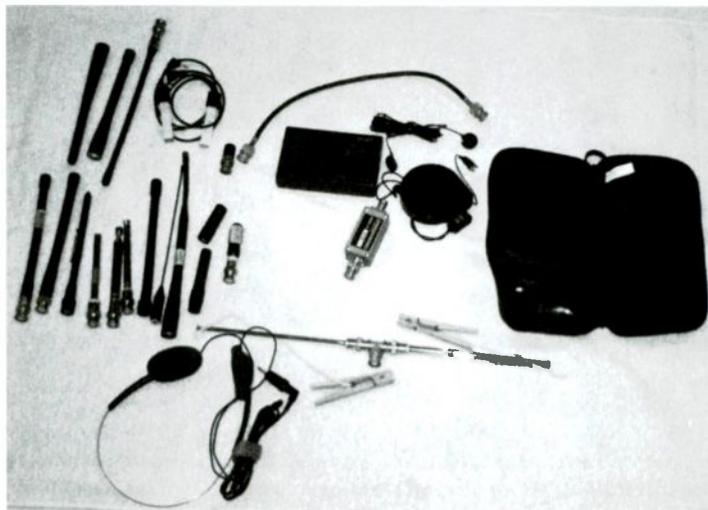
Monitoring Equipment

My monitoring equipment has evolved over the years. I started hotel room monitoring with a Zenith Transoceanic R-7000 in 1986. After a few trips and lugging the beast on airplanes and through security, I realized I needed something smaller. I tried several smaller radios including a Yacht Boy, PRO42 and a Yupiteru MVT7100, and by 1995 had arrived at my current setup, described below.

My monitoring kit fits nicely into a Tool-Pak brand cloth tool bag. The bag is always packed and ready to go except for the two or three radios. This bag fits nicely into the center of my large suitcase and is sturdy enough to withstand rough handling. Photo-1 shows the bag contents. The contents are summarized in Table Two.

My radio equipment consists of a Sony SW100 for shortwave monitoring that also doubles as an alarm clock. For HF/VHF/UHF I use an AOR AR8000. I chose this radio because of its broad coverage and the fact it can be reaction tuned by the Scout. In addition to the Scout, I normally carry the Optoelectronics APS105 preselector. I find the APS105 very helpful in reducing interfering signals into the Scout. I also use it to eliminate strong nearby signals (such as paging transmitters) that are causing interference to the AR8000 in the hotel room. If I am going to a US city that has trunked systems, I will sometimes carry a Bearcat Trunk Tracker (BC245).

I carry a selection of whip antennas plus two longwire antennas. I also carry two band rejection filters, one for the FM broadcast band



Some of the antenna accessories that I use for hotel monitoring. Note that many of the antennas have a label stating the frequency they cover. The homemade dipole is the item with the clothes pins on it near the bottom center of the photo.

and another for the paging band. I might also carry a small cassette recorder, depending on where I am going.

Table Two, Equipment List

These go in the tool bag

- * Sony AN100 active antenna
- * Sony longwire antenna (10 meters of thin insulated wire on a reel, supplied with the SW100).
- * 30-foot length of 22 ga, stranded, insulated hook-up wire on a spool (another longwire antenna)
- * Four telescoping whip antennas
- * Home made adjustable dipole
- * 10-foot length of RG-58 with BNC connectors
- * One-foot length RG-58 with BNC connectors
- * Rubber Duck antennas for 27-100 MHz, 100-600 MHz, 440-480 MHz, 800-900 MHz, and 800-1300 MHz
- * Two Optoelectronics model DB32 stealth antennas
- * Two Mono shielded audio cables with 1/8 inch plugs
- * Two stereo shielded audio cables with 1/8 inch Plugs
- * Interface cable, Scout to AR-8000
- * Sony M-909 Miniature cassette recorder
- * Four blank cassette tapes
- * Mic and earplug for recorder
- * Radio interface cable, scanner to recorder.
- * Assortment of coax adapters
- * Assortment of audio adapters
- * Band reject filter for 88-108 MHz
- * One lightweight stereo headset with mono adapter
- * Leatherman multi-purpose tool
- * Small flashlight
- * Box of 12 AA alkaline batteries
- * Box of 4 AAA alkaline batteries
- * Small roll of masking tape
- * Note pad and mechanical pencil

Placed in carry-on luggage

- Sony SW100 receiver
- AOR AR8000
- Optoelectronics Scout
- APS105 active preselector
- Uniden BC245 trunking scanner (only to US destinations)

The Hotel Room Monitoring Post

I normally locate the monitoring post on a table near the window. Usually I have to move furniture around a bit to get a table close to the window.

Next, I check the location of all electrical outlets in the room and try to find one that is unused. This can be a major problem as hotel rooms are critically short of outlets and often all are used. If this is the case, I will unplug a lamp to free an outlet. Be careful of unplugging the TV set and refrigerator. Some hotels have an alarm system to prevent theft and unplugging these appliances can trigger the alarm.

While arranging the room, I will carefully check all the room lights. If they are the modern low wattage florescent types, then I

check them for RF noise by holding the scanner in search mode without an antenna under the light. I usually place one of the room lamps on the monitoring table and this one needs to be RF quiet. A few times, I have gone out and bought a standard incandescent bulb to replace the long life, low wattage bulbs normally used by the hotels. I route the extension cord and multi-outlet power strip I requested on check-in to the table.

The next consideration is RF interference. I use the Scout to perform an initial test. I attach the small DB32 antenna to the Scout and walk around the room noting the readings on the signal level bar graph. I pay special attention to the area around the window. If the bar graph has none or only one segment lit occasionally, things are good. If three or more segments are lit continuously and the Scout either doesn't capture any frequencies or captures seemingly random single hits, then there are interfering transmitters nearby. This signifies the need to use the APS-105.

The final consideration is antennas. First, I check the window and determine if it can be opened and if it has a removable screen. If so, then I will open the window and insure there are no power lines or other wires for 20 feet or so in any direction. As a safety feature, many hotel windows have locks fitted to either prevent their being opened or to limit the width of the opening. Sometime these locks can be removed, but if you do this, be sure to replace everything before the housekeeping people come in. They will report the fact that a window has been tampered with.

If the window is clear of power lines and can be opened, I will deploy a long wire antenna (about 30 feet of insulated wire) out the window and let it hang down toward the ground. I only deploy the long wire at night. This way it will be less likely to be seen by other guests and hotel staff. If a guest sees a wire hanging across their room window, they might report this to the hotel management. I use the long wire for shortwave reception and sometimes for VHF coverage.

If the window cannot be opened, I will route the longwire around the room and secure it to the

walls and room furnishings with masking tape.

I use either a telescoping whip or band specific rubber duck for the scanner and Scout. I try to locate the scanner and Scout antennas as close to the window as possible for better reception. I have a dipole constructed of two telescoping antennas and a BNC "tee" connector that I mount in the window (using tape) for directional VHF/UHF coverage. I adjust the telescoping sections to the correct length for the band I am working.

General Monitoring Guidelines

I have developed the following guidelines for monitoring.

1. The monitoring post set-up varies a little from trip to trip depending on the items I decide to take. The simplest will have just the AOR-8000 and a set of headphones. I normally try to set up a post that has the SW100 for HF monitoring and the AOR-8000 for VHF/UHF monitoring. I usually set up the Scout and allow it to run all the time my monitoring post is deployed. If there is a problem with strong interfering signals, I will connect the APS-105 to the Scout and use the 105 in the scanning mode. This lowers the probability of detecting short duration signals but does save the Scout from being overloaded by many signals.

If I am searching for frequencies, I will connect the AOR-8000 to the Scout and allow the Scout to reaction tune it. This is a quick way of finding the nearby paging, cellular and other digital emissions that are of little interest and can be locked out during search. Sometimes when I am trying to work a weak signal and there is a lot of interference, I will use the APS-105 as a preselector for the scanner. I will normally use the longwire with the SW100, band specific rubber duck with the Scout and AOR scanner when searching. If I am scanning with the AOR-8000, I will either use a broadband antenna or the adjustable dipole.

2. On my first night, I will spend an hour or so checking out what I can hear on shortwave. I almost always listen to VOA and sometimes BBC news broadcasts each night and a first order of business is to find the best frequencies. After this, I just search the HF band to see what I can hear. If shortwave reception and band conditions are good, I will devote an hour or so to HF.

3. Also on the first night, I always

check the VHF/UHF frequencies detected by the Scout during the walk-about reconnaissance. I also search until I locate the hotel frequencies, and search for the local police frequencies, if I have not already loaded them into my scanner. I will store the hotel and local police frequencies in the scanner and scan them whenever I am not searching for new frequencies. This gives me a warning if something is going on in the vicinity of the hotel. (Note, I do not recommend trying to monitor police and security service frequencies in foreign countries.)

4. Hotel room walls are usually thin and not sound proof. Neighbors, if they have their TV sets off, can hear a radio at my monitoring post. To prevent this, I normally listen to the radio that I am using for search with a headset. If I have two radios going at the same time (which is sometimes the case), I will turn on the TV set to some random channel at a low volume level to act as background noise. Then I will adjust the volume of the second scanning radio at the moni-



Picture of the skyline of London near my hotel. Note the presence of many antennas on the building tops. The Scout captured many frequencies in the 400 and 800 MHz regions.

toring post to a level sufficient for me to hear it. This way, even though one radio is using a speaker, it won't be heard outside the room due to the TV set masking it.

5. To aid in identifying who is using a given channel, I will often connect a VOX capable recorder to the scanner and let it record transmissions on one channel overnight. The next time I get a chance, I will play back the tape and see if I can determine the users.

6. I have found that the best times to monitor are weekdays from about 6:00 to 12:00pm, Friday evening until very late (possibly all night), all day Saturday and Saturday night until around 10:00pm. The worst time to

monitor is Sunday; generally there is little activity on the bands.

7. I attempt to monitor each evening from about 7:00pm local time to about 11:00-11:30pm. This gives me three to four hours of monitoring per night.

8. When I get ready to retire at night, I will retract the long wire, if I deployed it, and hook up the radios that have rechargeable batteries to their chargers. I will usually connect the Scout and the APS105 to AC power and allow them to search for frequencies the rest of the night.

9. In the morning, I normally rise about 6:30am and immediately check the Scout for intercepts and do a quick listen to any recording I made overnight. Next, I tear down the monitoring post and place all the equipment and logs in my luggage, which I lock. I will leave the lamp and power strip on the table; this makes it look as if I am using the table for a laptop computer. I never leave any radio related items in plain view in the room when I am absent.

What can be heard?

I have found that I basically pick up a subset of the same types of communications that I monitor at home. I have little trouble monitoring HF broadcasts, SSB voice communications (air and marine related), and amateurs. I often hear FAX, and various data modes, but have never attempted to decode these in a hotel room.

As for VHF/UHF frequencies in foreign countries, I usually hear air traffic control traffic in English even in non-English speaking countries. Police, security and military users can often be recognized by their unique patterns and terminology. If there is a US military presence in the area, I search the

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North American Treaty Organization (NATO) bands for activity. I often find and monitor US security communications for US military elements in the area.

In US cities, I have very little trouble finding the local police, and several different security related channels. Taxis, delivery services, and other business users are abundant although it is often hard to determine exactly who they are. Of course the amateur channels are often very busy. If close to an airport or air base, air related frequencies are usually detected.

In US cities, I have attempted to monitor trunked systems with a trunk tracker scanner. This usually works out if I have preprogrammed the scanner with the frequencies and talk group information. However, I find trying to discover the details of a trunked system too time consuming for me and will not attempt it. I only monitor trunked systems if I have all the info available.

Monitoring Post Security Considerations

Thought needs to be given to security of the monitoring post, especially in some foreign countries.

Be very discrete about monitoring activities and it is very important NOT to allow anyone, especially the hotel staff, to view the operating monitoring post. There are two reasons for this. First, the radio equipment, Scout and pre-selector are expensive items. Allowing them to be seen increases the chance of theft. Also the monitoring post setup will look suspicious to hotel staff and in some countries, they might be required to report suspicious activity to the security services.

I always take down and secure all equipment before I leave the hotel in the morning. If I have opened the window and removed a safety lock, I will close the window and replace the lock. I place all my monitoring equipment either in my luggage and lock it or if the room has a small safe, I will secure the equipment in the safe.

When I leave, the room will look as though I was using a portable computer at a table by the window. (That is, a room lamp, the extension cord, multi-outlet power strip and some wall warts will be visible).

Secure all intercept notes and logs, don't leave them lying around. Also, I don't recommend trying to keep recordings made from the scanner. If a recorder is used for overnight recording, the resulting tape should be erased as soon as possible. I normally keep my notes, logs and business papers locked in my briefcase.

Considerations on using the Scout

I find the Scout to be a very valuable tool for finding frequencies. I will usually carry it with me

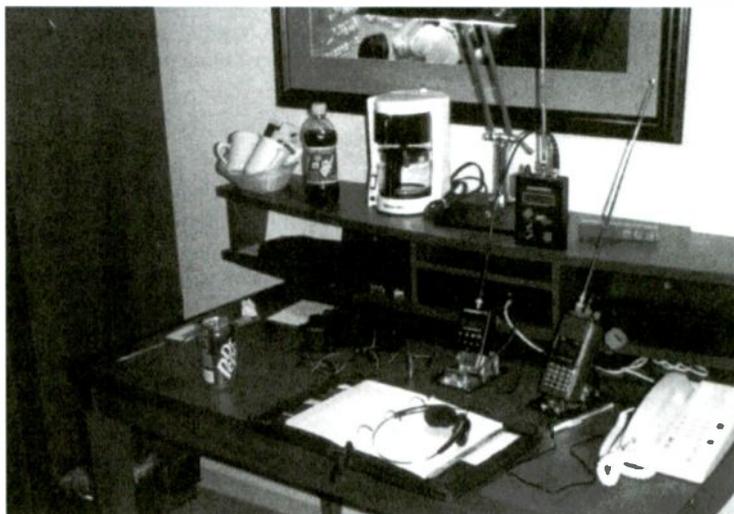


Hotel monitoring post in Berlin, Germany. The window would not open to deploy a long wire but did provide a good view. The AR8000 was being used when this photo was taken.

whenever I am out of the hotel room. I never carry the Scout in plain view. The Scout is too obvious if worn on a belt and will draw curious looks. Also, too many people know what the thing is for. I always keep it in my briefcase, in a shopping bag or in the pocket of my jacket. I also operate it in the silent mode. There are several other issues concerning the care of the Scout.

Getting too close to a transmitter can easily damage the Scout. I have burned out the Scout's RF amplifier two times by being too close to a transmitter. On one occasion, I was about three feet from a man using a hand-held transceiver. He keyed the transmitter and the Scout stopped working. On a second occasion, I was about 20 feet from a vehicular transceiver (about 100 watts output) and this also burned out the Scout.

The Scout is designed to be recharged from a power source supplying 9 to 12 Volts at about 300 MA. I once bought a 12-volt wall wart from a store in London to charge the Scout. The charger was not regulated. Well, the output volt-



A hotel monitoring post in Washington, DC. This post is devoted to VHF/UHF monitoring. The interference from nearby paging transmitters was so strong that the APS-105 was used with the Scout to reduce interference. The Scout was used to reaction tune the AR8000.

age was over 14 volts at 300 MA load and this burned out two surface mount resistors in the Scout; back to the factory it went.

I have experienced two battery pack failures with the Scout while using it in my travels. The battery pack is not easy to replace, and requires disassembly of the Scout plus soldering battery leads to small circuit board pads. This is not something to try in a hotel room. As an emergency repair, I disassemble the Scout and cut the battery leads. This way, the Scout is still operable with the AC power supply.

Perhaps this is a good place to talk about one of my interesting experiences with the Scout. I was attending a Meeting in Berlin, Germany, and had a Scout in my briefcase. I was attempting to determine local train frequencies as I commuted to the meeting site by

train. Before lunch one day, the host announced that they needed to discuss some sensitive research findings and would be having the afternoon session at a different location. When I arrived at the new location, I was greeted by security guards who insisted on inspecting my briefcase for prohibited items (cell phones, pagers, recorders, computers, and cameras).

On seeing the Scout, a discussion took place between the guards and someone on an internal phone. I was told that the chief of security wanted to talk to me and was escorted to another building. The security chief had several Scouts setting on his desk, each with a different custom antenna. He stated that they had just finished "sweeping" the meeting room for listening devices and assured me the room was clean. However, if I wanted to check for myself, that would be OK. This is the first time that I found someone using the Scout to locate "Bugs."

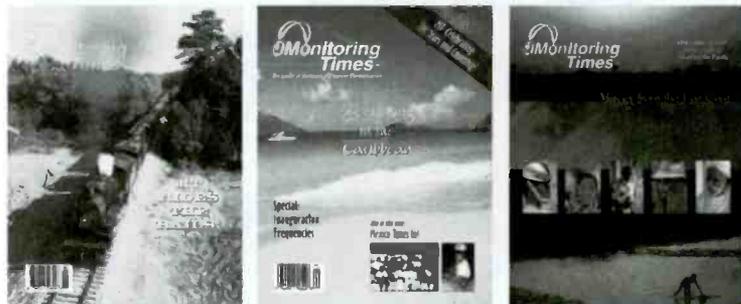
Conclusions

I have been monitoring from hotel rooms for over 14 years. I find it an enjoyable way to practice the radio-monitoring hobby when away from home on extended business trips. I have practiced this in both US and foreign countries. In foreign countries, care must be exercised to protect your equipment and not do anything illegal.

There are more challenges to hotel room monitoring than one normally faces at home, including restrictions on equipment and antennas, limited space, many interfering signals, high noise levels and constrained hours to monitor, to name a few. However, I have been successful in working around most of these problems. This is a challenging and fun activity and I recommend it to anyone looking for education and entertainment away from home.



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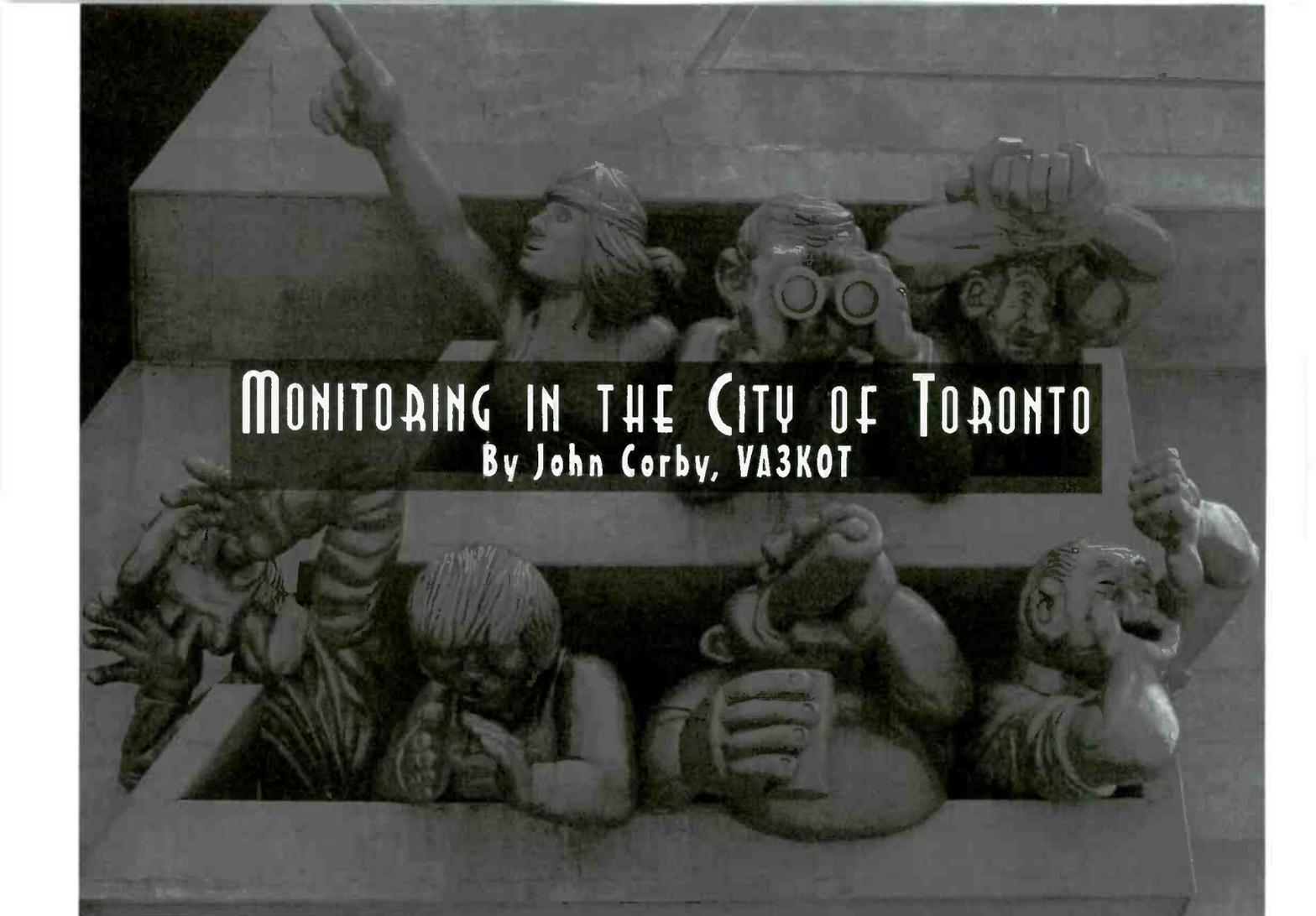
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MONITORING IN THE CITY OF TORONTO

By John Corby, VA3KOT

Baseball Crowd at Toronto's Skydome

Two hundred years ago a British military fort on the northern shore of Lake Ontario – in what was then called “Upper Canada” – marked the spot where a modest settlement and trading post grew into what has now become the largest city in Canada. Twenty-first century Toronto is an amalgamation of several adjacent municipalities with a population of about two and a half million people, or nearly double that of the surrounding suburbs and nearby communities which are included.

Our Toronto is a sprawling cosmopolitan conurbation. Immigration from all four corners of the globe has brought about a multi-ethnic society that has fundamentally changed the Canadian character. Descendants of Canada's two founding nations (England and France) are rapidly becoming a minority in this city. Their legacy is being replaced with a tapestry of cultures that gives Toronto a decidedly diverse and complex character. Visitors can dine in restaurants representing a whole world of cuisine.

Spinning the AM radio dial quickly reveals the diversity of languages spoken in our city. That same diversity can be found on the TV screen and in the downtown and suburban neighborhoods where people of similar backgrounds have gathered together to celebrate and preserve their heritage.

Canada's largest city is a smorgasbord of radio activity. From the Port of Toronto on Lake Ontario, to its four airports; from the subway

system to Union Station – Canada's largest rail terminal. From the Provincial Legislature at Queens Park to the stunning architecture of City Hall, and from the World's tallest free-standing structure – the CN Tower, to the Skydome – Toronto's retractable roof baseball stadium. The five million people who call the City of Toronto and its suburbs home generate more activity to scan than anywhere else in Canada.

Toronto's Major League Sports Teams

NHL:

Toronto is a major league sports city. We are very proud of our Toronto Maple Leafs hockey club of the National Hockey League. The Leafs (newcomers to the city quickly get over the apparent grammatical error in the name) are said to be the most successful team in the NHL.

Unfortunately that success comes not on the ice, but in the boardroom and at the bank. Despite raising, then dashing, ardent fans' hopes of another long-awaited Stanley Cup win, year after year the Leafs sell every seat in their home at the downtown Air Canada Center for every game. Leafs tickets are like gold dust in this city.

NBA:

The Air Canada Center also hosts Toronto's National Basketball Association franchise (the only one north of the border) – the Toronto Rap-

tors. A few years ago, the Leafs were searching for a new home to replace the aging, but much loved, Maple Leaf Gardens. At the same time the new NBA franchise, having played its first season dwarfed in the inappropriate Skydome, was also seeking new quarters for its hoops. The Leafs had the bigger purchasing power and tried very hard to persuade the Raptors to share a new home. The Raptors resisted and, contrary to the picture that is conjured up by their nickname, the Raptors were swallowed by the Leafs and the matter was settled.

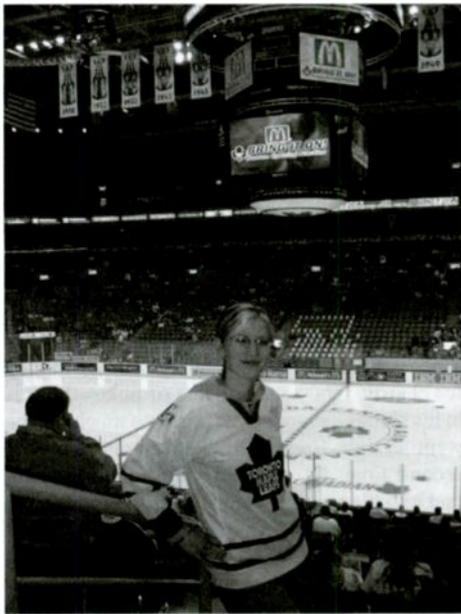
Air Canada Center Frequencies

Maple Leaf Sports and Entertainment - 896.2625
896.2750 896.2875 896.3000 896.3125
935.2625 935.2750 935.2875 935.3000
935.3125

Baseball:

Just down the road, within a grand slam homer's range of the Air Canada Center, is another major sports venue. Toronto also hosts the American League's only team north of the border. The Toronto Blue Jays Baseball Club won back-to-back World Series titles in the 1991/92 and 1992/93 seasons.

The Jays play in the highest technology stadium in the world, Toronto's Skydome. Opened in 1989, the Skydome has a giant retractable steel roof that can be opened at the flick of a control room switch to let the sunshine in, or can be closed to keep the rain out. You can



Leafs Fan Poses at the Air Canada Center

monitor the control room on your scanner. The umpires on the field call the shots on whether to close the lid and the call is passed to the control room for action.

Skydome Frequencies

Skydome Roof Control - 457.5250 460.9250
 Toronto Blue Jays Baseball Club - 813.0250
 813.2750 813.5250 813.7750 814.0250
 Skydome Food Services Corp. - 813.0250
 813.2750 813.5250 813.7750 814.0250
 Skydome Sportsco International - 813.0250
 813.2750 813.5250 813.7750 814.0250
 858.0250 858.2750 858.5250 858.7750
 859.0250

Planes, Trains, Boats and Automobiles

Toronto's status as the largest city in Canada brings with it a need for a multitude of transportation facilities. The city has grown so quickly that its infrastructure development has hardly been able to keep pace. Most travel into and around the city still depends on roads, while public transportation takes a disappointing back seat in the priority list for public funding. Toronto's subway system is a distant poor relation to the subway systems of many of the world's other major cities.

In compensation, Toronto has retained its streetcars. These relics of a bygone era rumble along rails in the downtown streets, picking up power from overhead wires and creating a very high level of static on the airwaves. Affectionately known as "Red Rockets," they are kept in service by a nostalgic group of politicians in City Hall, but wreak havoc on radio reception in the downtown core.

The subway, buses and streetcars are operated by the Toronto Transit Commission (TTC). Disgruntled local transit riders prefer to interpret the initials as "Take The Car."

Pearson International Airport

Lester B. Pearson International Airport is Toronto's gateway to the world. An unsuccessful bid to host the 2008 summer Olympic Games

spurred a major redevelopment of the terminal buildings and approach highways. Construction still continues with the promise of another huge new terminal building with streamlined approach ramps directly linked to major highways.

Redevelopment work also includes construction of two additional runways for a total of six. Construction of the fifth runway forced the temporary closure of a hotel in the final approach path while the upper levels were shaved off the building. Construction of the sixth runway has brought about the demolition of the hangars from which Canada's aborted, world-class jet fighter aircraft – the Avro Arrow – was rolled out in the late 1950s.

Unfortunately, construction of the sixth runway also forced the closure of a popular viewing area for aviation enthusiasts. This area has not been replaced and the daily lunchtime scanner crowd is now scattered around the airport periphery in parking lots and at roadside pull-overs. Regular patrols by airport groundside security vehicles move most vehicles parked on airport roads all too quickly. Post 9/11 caution keeps a high profile here.

Pearson Airport Frequencies

Remote Communications Outlet - 126.7
 Automatic Terminal Information Service (ATIS) - 112.15 120.825
 Clearance Delivery 121.3
 Apron Terminal 1,2 - 122.075 122.275
 Terminal 3 - 122.875
 Ground - 121.9 121.65 275.8
 Tower - 118.35 118.7 236.6
 Arrivals - 125.4 124.475 358.1
 Departures - 128.8 133.4 253.1
 Visual Flight Rules Advisory - 119.3 133.4 253.1

VHF Omnidirectional range Test facility (VOT) - 114.8
 VOR/DME "YYZ" - 112.15
 "YTP" - 116.55
 Distance Measuring Equipment - "IJS"109.1
 "INV" - 109.3
 "ITO" - 110.95
 Instrument Landing System "IJS" - 109.1
 "ILP" - 110.95
 "INV" - 109.3
 "ITO" - 110.95
 "ITX" - 109.7
 "ILE" - 110.3
 "IRW" - 110.5
 "IYZ" - 111.5

NDB "L" - 368 kHz (located at 43 37 10N, 79 32 52W)

NDB "J" - 236 kHz (located at 43 36 58N, 79 41 18W)

NDB "R" - 403 kHz(located at 43 44 18N, 79 42 11W)

NDB "T" - 341 kHz (located at 43 37 40N, 79 43 52 W)

NDB "X" - 385 kHz (located at 43 44 17N, 79 34 17W)

Note: The Non-Directional Beacon (NDB) IDs are scheduled to be changed to three characters very soon.

Toronto City Center Airport

Toronto City Center Airport sits on the edge of the Toronto Islands just a world's shortest ferry ride across the western gap from the shoreline of downtown Toronto. Closer to the heart of the city than Pearson, it provides short hop turboprop service to major cities in central Canada and the northern states. TCCA is also

the base for the annual Canadian National Exhibition Air show held on Labor Day weekend.

Toronto City Center Airport Frequencies

Automatic Terminal Information Service - 133.6
 Ground - 121.7
 Tower - 118.2 119.2 226.5
 Aerodrome Traffic Frequency - 118.2
 Arrivals - 133.4 358.1
 Departures - 133.4 363.8
 VHF Direction Finder - 118.2 119.2 121.7
 VHF Omnidirectional range Test facility (VOT) - 110.4
 Distance Measuring Equipment "ITZ" - 110.15
 Instrument Landing System - 110.15
 Localizer "XTC" - 110.15
 NDB (Gibraltar Point, Toronto Island, 43 36 46N, 79 23 08W) "TZ" - 257 kHz

Downsview Airport

Strangely enough, Downsview, despite being Toronto's least busy airport, may also be its most well known airfield. A former Canadian Forces base, it has achieved world fame since the military moved out. There are no scheduled flights using Downsview and the runway is rarely challenged with the assault of heavy landing gear. However, during the past year alone, the tarmac has twice received the pounding of a million feet.

His Holiness the Pope preached to half a million worshippers here during World Youth Day in July 2002, then the Rolling Stones painted the venue black with their sympathy for the devil in the SARS relief concert in July 2003. Officially called "Toronto Rocks," this one day event boasted more attendees than the original Woodstock festival and became unofficially known as "SARSstock."

Downsview Frequencies

Unicom - 126.2 295.6
 Arrivals - 133.4 358.1
 Departures - 133.4 363.8
 NDB "YZD" - 356 kHz(located at 43 45 15N, 79 28 41W)

Buttonville Airport

Buttonville is primarily a businessman's airport. Busy, but serving mostly turboprop and light aircraft, it sits alongside a major highway linking downtown Toronto to northern satellite cities. The airport lies in the heart of one of the high technology parks that surround the Greater Toronto Area. It is has also been used by politicians on the campaign trail. I monitored the departure from Buttonville of a former Ontario Premier as he headed out of town on a whirlwind tour of campaign stops in a successful bid for re-election a few years ago.

Buttonville Frequencies

Radio -123.15 126.7
 Automatic Terminal Information Service - 127.1
 Ground - 121.8
 Tower - 124.8 119.9
 Mandatory Frequency - 124.8
 Arrivals - 133.4 358.1
 Departures - 133.4 363.8
 VHF Direction Finder - 119.9
 NDB "KZ" - 248 kHz (located at 43 56 01N, 79 19 45W)

Toronto's Railways

Toronto is a major railway hub for tracks running across Canada. Amtrak trains crossing



Union Station Tracks

the border at the Niagara frontier carry passengers from Toronto's classically styled Union Station to Grand Central in New York City. The complete list of North American railroad frequencies has been printed many times in the pages of *MT* so it will not be reproduced again here. Instead, the following is a condensed list of the most common frequencies to monitor in the vicinity of Union Station.

Union Station Frequencies

- CP Rail - 159.885 161.115 161.175 161.475
- CN Rail - 160.365 160.665 160.785 161.415
- Toronto Terminals Railway Company - 459.2250 461.2125
- VIA Rail - 461.2125
- GO Transit - 453.7250

Toronto Harbor

Toronto sits on the shore of Lake Ontario almost directly opposite Niagara Falls. The part of the Province of Ontario that wraps around the western end of Lake Ontario is called "the Golden Horseshoe," and ends at the border with New York State. Great Lakes shipping passes



Toronto Harbor Police



Toronto Island Ferry

Toronto on its way from the Welland Canal to the St Lawrence Seaway. Many giant freighters call in at the Port of Toronto in the east end of the city and provide both an exciting visual sight, as well as an interesting marine band monitoring target.

A series of small islands shelters Toronto harbor from the main body of Lake Ontario. Ferries carry passengers from the waterfront out to the islands for recreation. The islands are the home of the Toronto City Center Airport and Gibraltar Point NDB beacon transmitter.

Toronto Harbor is filled with boats in the summer months. Large passenger vessels carry guests on dinner cruises in the beautiful sunsets on the water (well, that's how the promos bill it, anyway). Many hundreds of smaller boats fill the harbor and lake surrounding Toronto and its suburbs. Check the VHF marine band frequencies for radio traffic.

Toronto Harbor Frequencies

- Harborfront Marina - 156.425 156.575 156.675
- Rees St Police Station Harbor Marine Traffic Control - 156.500 156.600 156.700 156.800 157.100

Automobiles

There is one aspect of the scanning hobby that I personally find very interesting. Large cities like Toronto suffer the usual traffic problems associated with commuting into and out of the city during the morning and evening rush hours. Toronto's highways carry huge volumes of road traffic to the city core and, despite road widths of up to twenty lanes, traffic grinds to a halt every day in rush hour.

While sitting sucking in bad air surrounded by thousands of fellow sufferers, some relief is to be had listening to the traffic aircraft operated by the city's broadcasters. The slick, professional voices heard on-air sometimes degenerate into hilarious exchanges with studio controllers off-air. It is easy to receive these signals on a scanner inside your car because the source is often line of sight from a position in the sky over the city.

A couple of airborne traffic reporters that can be monitored every weekday in Toronto are to be found on: 151.790 (air to ground), 150.800, 150.670 (ground to air) for CFTO ("680 News") shared with FM music station CHFI, and 162.330 CFRB.

TV station helicopters usually operate out of Pearson Airport, while the aircraft of a couple of popular radio stations call Buttonville Airport their home. VHF radio traffic will usually only be heard during peak commuting hours in the morning and early evening. You will learn a lot more by monitoring the traffic aircraft on your scanner than you ever will by listening to the broadcast band.

CN Tower

Currently the world's tallest free standing structure (ratified by the *Guinness Book of World Records*), the CN Tower is also a major tourist

attraction and a huge transmitter site hosting multiple TV and radio stations, Environment Canada's weather radio service, and many other signals. The tower saturates the local air waves over a wide frequency range. Even the author's remote vehicle locking device failed to operate in the vicinity of the tower.

The CN Tower dominates the city's skyline. At the equivalent of 115 stories it stands clear above the tallest office building in the city (First Canadian Place—72 stories). The height is officially recorded as 1,815 ft, 5 inches to the tip of the antenna structure at the top. Some hardy types actually run up the stairs to raise money for charity. One acquaintance of mine—who is in his sixties—enjoyed the climb so much that he went straight back to the bottom and ran up a second time. Of course I would love to share that experience, but being always so busy...

If you would like to get a real sensation of standing at a height of over eleven hundred feet above the ground inside a narrow, concrete, needle-shaped structure, step onto the glass floor on the main pod level and look down. If that isn't enough to get your adrenalin flowing, sign



on to join the team that will hang suspended from the main pod on the outside of the tower, while they replace the radome protecting many of the tower's antennas. Work begins this October and the weather forecast is for cool temperatures, rain and wind. The temperature at the top is 14 degrees Celsius colder than at the bottom. The tower has been struck by lightning over 500 times and the top sways about six feet. Good luck!

If, like me, you prefer to refrain from such activities (to avoid risk to your valuable radio equipment, of course) you can still enjoy the exhilaration of a high speed ride up in one of the elevator pods on the outside of the tower.

CN Tower Frequencies

Roger Broadcasting Limited - 150.670
 CFTO-TV - 151.220 152.090
 Pasword Communications - 151.850
 Bell Canada - 152.510 152.540 152.570
 152.630 152.660 152.690 152.720
 152.750 454.6750 454.9750
 Canadian Broadcasting Corporation - 152.870
 172.875
 CHUM (broadcaster) - 153.350
 CP Rail - 159.885
 CN Rail - 161.235
 CFRB (VHF freq is traffic aircraft) - 162.330
 450.2375
 Environment Canada - 162.400 163.995
 Canadian Automobile Association - 169.980
 Maple Leaf Taxi - 170.550
 Radio 1540 CHIN - 172.770
 GO Transit - 410.0625 411.5625 934.8125
 Neumann Communications Ltd. - 411.5875
 413.6125 413.9125
 Toronto Transit Commission - 412.0375
 412.0625 412.1125 412.5875
 412.612500 413.9375
 Toronto Hydro Electric System Ltd. - 413.6375
 Pasword Protection Services - 414.0625
 419.0625
 TrizecHahn Tower Ltd (commercial) - 452.0500
 Digital Mobile Systems Inc.4 - 53.4125
 463.9375
 CityTV - 453.7875
 Telecor Inc. - 454.6125
 Amherst Crane Rentals Ltd. - 461.0125
 Armbro Construction Limited - 461.8125
 463.6875
 City of Toronto (MCS System) Parks & Recreation - 469.6750
 Bell Mobility Paging - 933.3875 933.5625
 Mobile Business Communications Ltd -
 937.1625 937.1750 937.1875 937.2000
 937.2125 937.2250 937.2375 937.2500
 939.5750 939.5875

Broadcasters

Many of Canada's largest broadcasters are headquartered, or have significant operations in Toronto. The Canadian Broadcasting Corporation (CBC, also known as *Societe Radio Canada* [SRC] in French) maintains its largest studio complex right in the heart of downtown. Several large studios were constructed inside a custom-designed new building. Specially engineered seismic insulation prevents traffic vibrations from interfering with radio and TV production in the studios. For radio history buffs there is a museum at the CBC Broadcast Center (located at 250 Front Street - across the street from the CN Tower) and admission is free.

The CTV Television network's Toronto affiliate CFTO has studios on Channel Nine Court in Scarborough, while back in the down-



Off The Wall Toronto TV Station CityTV

town core, the unique and independent CityTV operates out of a large free-standing building on Queen Street West. The accompanying picture of the CityTV building gives a flavor of the style of programming popular with CityTV.

Younger readers may wish to sample the street level studio concerts and sidewalk interviews frequently conducted by the station. For a loony (a one Canadian dollar coin - so called because of the loon [Canadian bird] image on the coin) you can record your own personal video message to the world in an outdoor booth. CityTV puts these video clips on the air - apparently without regard to the quality of the content.

Canada's oldest radio station, CFRB, operates out of studios in the city and maintains a transmitter site on the lakeshore west of the city (at Clarkson). CFRB is, in the opinion of this listener, no longer distinguished by the quality of its programming, but it does maintain the distinction of having operated one of Canada's few shortwave stations, CFRX, since 1937. Broadcasting on 6070 kHz from a single 50 ft tower, CFRX puts out an omnidirectional signal with an output power of 1000 watts, 24 hours a day and CFRX QSLs reception reports.

VHF/UHF frequencies

used by selected broadcasters in Toronto:
 CBC - 453.8375 454.2250 463.8500
 CityTV - 453.7875
 CFRB/CFRX - 455.4875
 CHUM - 153.350
 CHIN - 172.680 172.770 455.3875
 CILQ-FM / CHOG-AM - 455.3375
 Rogers Broadcasting Limited - 455.7375
 958.7500 433833

Tracking Down Toronto's Broadcast Transmitter Sites

I suffer from a compulsive behavior that leaves me incapable of seeing an antenna tower without identifying its purpose. This applies

particularly when it comes to the many AM/FM broadcast transmitter sites in the Toronto area. Armed with a scanner and GPS, I set out on weekends to track down the towers from which these signals originate. The coordinates for AM transmitter sites are published as an aid to navigation for pilots. By punching these coordinates into my GPS I can navigate my car to the transmitter towers.

The signal on a car radio sounds no different at the transmitter site than it does anywhere else in the city. You could drive right by the transmitter without being aware of it. However, the harmonics of the AM or FM broadcast band frequency fall into scanner range. By tuning to the harmonics of the fundamental frequency within a kilometer or two of the tower you can identify which broadcaster is using that facility.

Most of Toronto's AM broadcasters operate transmitter sites along the lakeshore between Toronto and St Catherines. Propagation conditions are enhanced by the high water table close to Lake Ontario and, of course, by the lake itself. Many TV stations and FM radio stations transmit from the CN Tower, but many more have facilities outside the city that are worth tracking down, too.

SARS?

Finally, no report on the City of Toronto would be complete without a further mention of SARS. From March until July this year, that little bug put our city in the limelight and challenged a military skirmish in the Middle East for the world's headlines.

Here is a late-breaking update; there was a terrible misunderstanding. It was actually a bug caught by the local hams called "Severe Amateur Radio Syndrome." If anybody tries to tell you anything different, you tell them you read the truth right here in the pages of *Monitoring Times!* "Hi-hi" as we hams say, or, rephrased in the parlance of the Internet ;-) However you prefer to say it, it is time to smile and move on. Toronto is alive and vibrant and very, very radio active!

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- Intelligent Discharge Revitalizes NiCads

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Five Tips for Monitoring Beginners

Sometimes when we start a hobby we all can use a little nudge here and there to keep moving. Here are five tips for keeping up your interest in the radio hobby and perhaps avoid making a few common mistakes.

◆ Never Turn Down a Freebie

Once friends and relatives realize you're hooked on radio you may be the recipient of all manner electronic gizmos, books and periodicals which somehow came into their possession and, just seconds before they heaved them in the trash, they thought of you. Ordinarily you wouldn't be flattered by such a chain of thought but here you welcome it. Now, in some cases you'll just be the intermediary between your friend and the local dump, but in other cases you may actually be saving an item of some value from disappearing forever.

Over the years I've been offered numerous satellite dishes and receivers along with everything from radio related books to a 1920s vintage crystal radio set. I never turn anything down. If it's something I just can't use, I'll call around and try to find a home for it. Other people appreciate being given a chance to get a freebie too! And, remember, you can always throw it out yourself.

Similarly, if you ever find yourself with surplus gear or back issues of a magazine you're not going to use, before you take it to the local hamfest to sell, consider giving it away to someone interested, but not yet active, in the hobby. That's how you get to be an "Elmer" in ham radio parlance: someone who helps newcomers into the hobby. You may not think you know a lot about the hobby, but you know more than someone else who's just starting.

The subchapter to this is: start your own junk box. With the freebies you'll be able to scavenge all manner of parts to file away in your junk box, drawer or closet. These are exactly the things that other people will tell you to throw out. "What in the world are you keeping this thing around for?" This is a refrain often heard in the homes of many a radio hobbyist. Don't pay any attention. Just make sure you can find the thing when you really need it. Try to keep your junk box organized and you'll avoid buying something you already have.

◆ Don't Expect Miracles

Many beginners are looking for the best receiver they can buy. While all-band, all-mode

radios are very popular, they have drawbacks: they're usually expensive, not necessarily great performers on all bands, and, most importantly, leave you without any receiver in the event of a breakdown. Yet, buying the cheapest radio you find might be really disappointing. You've got to do the research: read the reviews in this and other radio magazines and read the on-line comments from users.



JRC NRD 545 Full featured top-of-the-line receiver. But, at \$2,000 list is this a good beginner's radio? (Courtesy <http://www.rigpix.com>)

A good philosophy regarding buying radio gear is "Drool now, buy later."

Who wouldn't want to have a JRC NRD-545, with its 100 kHz to 2 Hz tuning range setting on their desk? But, the \$2,000 list price is more than beginners should shell out. In the event that you end up bailing out of the hobby after six months or a year, you're likely not to recoup anywhere near the full price. But, keep the rig in mind. As you get deeper into the hobby, do a little research, check out the reviews on this product and watch for deals.



The Yaesu VR-500 is tiny and tunes 100 kHz- 1.3 Hz, but, is it really what you need? (Courtesy: <http://www.rigpix.com>)

Similarly, the Yaesu VR-500 is an all-band all-mode receiver the size of a handie-talkie (HT) which tunes from 100 kHz to 1.3 MHz. It's about a third the price of the NRD-545, but don't expect it to have the features and the capabilities found on the more expensive model. Ask yourself what it is you need. Do you really need to have a hand-held receiver with that much capability? Are you actually going to be leaving your house to do your monitoring? You may be better off buying a used HF receiver and a used desktop scanner instead.

Go to a hamfest, check out the on-line auctions and remember: caveat emptor. Best selec-

tion at a hamfest is found in the first hours of the event, but the best prices are found at the very end as vendors are more willing to dump what they've got rather than cart it all back home.

◆ Join the Club – Read a Book

In the Dark Ages before the Internet, everything was done by mail and it was excruciatingly time consuming. Information about the radio hobby was a lot harder to come by and it was expensive. Our local library had subscriptions to all the major radio magazines and I used to go in each week and pore over anything new. I would make copies of interesting articles and file them away for future use. Today, it couldn't be easier. For those with Internet access, huge volumes of information are just a click away. Even those without computers at home can do the same Internet searching through computers at their local library.

Many web sites, such as the ARRL (<http://www.arrl.org>) have an extraordinary amount of useful radio related articles and reviews available free on-line. They have even more available to ARRL members (\$39/year). In addition to the free web access you also receive *QST* magazine each month and a number of other perks.

Other sites which require no membership are also worth visiting regularly: <http://www.dxzone.com>, and <http://www.qrz.com>. All three sites have long lists of links which will lead you to other sites which will keep you mining the web for information for a long time.

For real in-depth study of any aspect of the hobby, though, you really need to hit the books. Among the best sources for books on the radio hobby are the Grove catalog which fea-

Reference publications are valuable for getting the most out of your hobby. The 2003 Police Call books are "must haves" for scanner enthusiasts and the MT Anthology series gives you all the articles, reviews and frequency lists of this magazine from the previous 3 years. (Courtesy: Grove Enterprises)



tures the well indexed *Monitoring Times Anthology* for the years '99, '00, '01, and '02; the Universal Radio catalog has no fewer than 18 pages of book titles; the ARRL and Tiare Publications both specialize in communications related books and are worth looking into (see chart).

◆ Wake Up and Smell the Solder Fumes

The best way to learn about electronics is to actually get up close and personal with resistors, capacitors, and p.c. (printed circuit) boards. They look exotic, mysterious, and completely indecipherable. What are all those components for? How do you know which belongs where or if one of them is not working right? One of the easiest ways to try to understand electronics is to put together a kit. But, here's a tip: start cheap and easy!

There's been a resurgence of kit building in the radio hobby over the last 5 or 10 years with many different companies offering all manner of devices from little projects of lights that just blink at you to full featured HF transceivers. As you might expect the smallest, easiest to build kits are also the cheapest. Start there.

Radio Shack has a number of small and inexpensive kits which are of interest to all beginners. The "Comprehensive Soldering Course Kit" for \$30 is designed to introduce newcomers to soldering techniques, electronic theory, and component identification. You won't have much more than a "...fun blinking LED project" at the end but the point is to make your soldering mistakes where it doesn't matter.

They have lots of other kits at the Shack including an FM stereo transmitter, regenerative shortwave receiver and a signal generator. These, while tempting for the beginner, may prove more than you're ready for. Better do a couple of the cheap'n'easy projects first.

A great place to find a buffet of electronic kits is Ramsey Electronics. Their kits are labeled as to degree of difficulty and are reasonably priced. You can get as simple or as complex as you like at Ramsey.

If you get stumped in the building process most kit companies have a help desk to get you back on the right track. And, if all else fails, most will allow you to send the kit back for expert repair at your expense. It's a last resort and a little humbling, but, it's better than throwing the whole thing away. Just remember that you won't be the first person to have trouble putting a kit together.

◆ Build Your Own Antennas

Everyone's looking for an antenna that's hot from HF to microwave, fits in a shoebox and costs under \$50. But, you're going to find that you'll need more than one antenna if your monitoring tastes range throughout the spectrum. "Homebrewing" antennas is a great way to expand your radio hobby. There are many books on antenna construction, from simple wire dipoles easily strung up to complex UHF antennas you can make by modifying inexpensive TV antennas. Most antenna materials (wire, connectors, baluns, etc.) are not expensive.

Making your own antenna cables and radio accessory cables is another place to get a little D-I-Y satisfaction. Working with various radios and dealing with different frequencies you'll need to make up long and short cables. You can buy these ready made, but you can make them cheaper, especially if you're using surplus cable. Some will require soldering; others, simply crimping. You'll be working with RG/58 and RG/8Mini for most HF, RG/6 for TV, and RG/8 for UHF and up.

Sometimes you'll just have to suck it up and buy an antenna. If you do, it will help to learn what the specs in the catalog are talking about, and that's where the antenna books really come in handy. Remember, too, that you don't need a fancy tower with an expensive rotator to get started. Often you can just install your antenna in your attic. If you have enough room in the attic you can put it up on a TV antenna rotor. Just imagine, out of the weather it could last a lifetime!

When installing antennas in trees, towers or on rooftops you've got to keep safety in mind. Watch for overhead power cables: one touch and you could be fried! Always secure ladders, use safety harnesses and have someone on the ground assisting. Tie tools to your work belt with string. If you drop it, it won't go far and it protects your friend on the ground.

◆ Last Word

The best thing to remember as a beginner is that this is a hobby for a lifetime. I've known hams who have been into radio for more than 70 years. Take your time exploring this electronic universe; the slower you go the more you'll actually be able to see and do.

Don't be afraid to expand your horizons and try to get someone else involved. If you've got young kids they'll naturally be interested in doing what you're doing. If you've got a close friend or neighbor, bring them into the hobby, too. It's so much more fun when you're learning with someone else.

Books & Publications of Interest to Radio Hobbyists

American Radio Relay League
(<http://www.arrl.org>)
225 Main Street Newington, MA 06111 888-277-5289

Grove Enterprises
(<http://www.grove-ent.com>)
7540 highway 64 West Brasstown, NC
28902 800-837-9200

Radio Shack (<http://www.radioshack.com>)
800-800-442-7221

Ramsey Electronics
(<http://www.ramseyelectronics.com>)
590 Fishers Station Victor, NY 14564 800-446-2295

Tiare Publications (<http://www.tiare.com>)
P.O. Box 493 Lake Geneva, WI 53147 262-248-4845

Universal Radio
(<http://www.universal-radio.com>)
6830 Americana Parkway Reynoldsburg, OH
43068 800-431-3939

Another Radio-Tag Monitoring Opportunity

Scanner enthusiasts and ham radio operators are continuing to support wildlife researchers by listening for radio tags on species under study.

This year, volunteers have assisted in two projects in Texas, one for bats and another for Great Horned Owls. The newest project gets under way this fall, a migratory study of the American Woodcock encompassing a 16-state area. The study leader is Nick Myatt, a graduate student at the Arkansas Cooperative Fish and Wildlife Research unit.

According to Myatt, American Woodcock are a small, migratory game bird that inhabits young forest and thickets of eastern North America. Researchers know roughly when woodcock leave their breeding grounds and when they arrive on the wintering grounds, but virtually nothing is known about what happens during migration. The study objectives are to determine the routes and habitat that woodcock use during fall migration in the Central USA.



About 360 woodcock in Minnesota, Wisconsin, and Michigan are being captured and outfitted with 4.4 gram radio transmitters in the 150-151.999 MHz range. Most of the searching for these radio-marked birds will be done from a fixed wing aircraft, but the entire area cannot be covered due to the expense of aircraft operations. Myatt believes that the availability of volunteer monitors would greatly increase the chances of finding more of the radio-marked woodcock after they leave their summer grounds.

The radio tags will be active from mid-September until late January. A majority of these birds leave the breeding grounds around the last two weeks of October, but a few take off as early as late September, or delay until late November. From what is known, the majority of woodcock have reached the wintering ground by mid to late December. Most likely locations to copy the tag signals are Southern Minnesota, Southern Wisconsin, Southern Michigan, Iowa, Illinois, Indiana, Kentucky, Missouri, Eastern Kansas, Eastern Oklahoma, Arkansas, Tennessee, Mississippi, Alabama, Louisiana, and Eastern Texas.

Woodcock migrate during the night and spend their days feeding on earthworms to replenish their energy reserves. The best time to scan for the tags is during the first few hours of the evening. At that time, the woodcock are usually flying, so range of detection will be greatest. If you live in the northern half of the Central USA, your best opportunities will be from mid-September until early December. If you live in the southern half of the Central USA, the best period will be from early November until late January.

More information on this project, including exact frequencies and regular updates during the migration period, will be posted on the "Homing In" Web site (www.homingin.com) as it is received. The site also has information on special scanning techniques for these short-pulse signals, suitable receivers, and methods of distinguishing wildlife radio tags from similar-sounding signals heard in the same frequency range.

— Joe Moell K0OV

Q. *There are serious plans to allow computer data and Internet service to be sent over power lines. Won't this simply add to the hash interference we now have from electrical power lines? (Russell Cabe, K4LIA, Andrews, NC)*

A. There is always a potential for additional interference anytime you put RF into a power line, but there are many practical factors which must be considered—and demonstrated—before a conclusion can be drawn:

- What is the frequency band generated by the data rate?
- What are the actual power levels?
- Is the power line going to be an unbalanced radiator, or a balanced transmission line?
- Will there be incidental radiation limits imposed on the sender to minimize such interference?
- Who will get primary consideration and protection, the licensed service (including hams) who are affected by interference, or the ISP connected to the power line?
- Will it be regulated just like power lines are now, requiring any interference be attenuated to prevent consumer interference?

Q. *I noticed a hospital electrical outlet marked "self grounded"; what does this mean? (Mark Burns, Terre Haute, IN)*

A. It indicates that the metal mounting screw makes electrical contact with the metal yoke of the electrical fixture, thus assuring that there is no potential hazard of a shock potential between the screw and other grounded items in the room.

Q. *Are the time signals from WWV on 2500, 5000, 10,000, 15,000 and 20,000 kHz broadcast worldwide, or just to particular areas? Is it transmitted from Ft. Collins, Colorado, because that is the geographical center of the U.S.? (Donald Michael Choleva, Euclid, OH)*

A. WWV, a department of the National Insti-

tutes for Science and Technology (NIST, formerly the National Bureau of Standards), is maintained as a scientific service for our country. Signal propagation being what it is, the transmissions are heard worldwide when skip conditions are favorable.

Many other countries also offer standard time and frequency services, including Canada's often-reported CHU from the Dominion Observatory on 3330, 7335 and 14670 kHz.

The official geographical center of the U.S. is in the middle of Kansas, not Colorado.

Q. *I understand that the 60 kHz WWVB time and frequency signal has had a power boost to 40 kilowatts. What is the power of HF WWV and WWVH? (Doug Robertson, Oxnard, CA)*

A. WWV is located at Ft. Collins, Colorado, north of Denver, and radiates 10,000 watts on 5, 10, and 15 MHz; and 2500 watts on 2.5 and 20 MHz. WWVH is located at Kauai, Hawaii, and radiates 10,000 watts of power on 5, 10, and 15 MHz, and 5000 watts on 2.5 MHz. Each frequency is broadcast from a separate transmitter.

Q. *The subject of baluns is confusing; the internet is full of opinions. Physics is amazing, apparently; does anyone understand this topic? (Joe Ciarrocca, email)*

A. Radio attracts hobbyists who know nothing about antennas. There is no magic, no unknowns about *any* kind of antenna or matching system. We don't see such "opinions" in other areas of physics because there are very few hobbyists who play with quantum physics! Scientists know what they are talking about.

A balun (contraction of "balanced to unbalanced") transformer can do two jobs: assure that a balanced antenna (dipole) doesn't lose power which could be radiated by its directional elements, but is radiated uncontrollably instead by currents produced on the outer shield of an unbalanced feedline (coax); and, if it has a step-up turns ratio, a balun can match the antenna's feedpoint impedance to that of the transmission line for low VSWR.

Do you need one? Rarely for receiving, because even if you lose a little signal level from impedance mismatch, the only thing you will notice is a slight reduction in your S-meter reading.

But that doesn't mean weak signals will be lost because you will also reduce the background noise. You'd do the same thing by simply reducing slightly the volume control (or, more accurately, the RF gain control if you have one on your receiver).

Once you have a reasonable-size antenna in the air, the only thing that better matching gives you is higher signal transfer efficiency, resulting in higher signal *and* higher noise, so the signal still doesn't increase above the background noise. But since the S-meter goes up, or the sound gets louder, folks interpret that as a better signal level.

Q. *I've attached a 40-ft wire to my portable shortwave radio, running the wire through an aluminum-frame window to the outdoors. There seems to be no improvement over the radio's indoor whip. Have I done something wrong? (Tom Risher, Perris, CA)*

A. If you don't live in an aluminum mobile home, you don't have aluminum siding, and there's no metalized Mylar insulation surrounding your walls, then signals can get into your house and to your radio's whip with little problem. Therefore, your outdoor antenna might not help all that much.

The aluminum-frame window won't do a thing to signals coming in your antenna provided that the wire is insulated so it doesn't touch the frame.

A better antenna would be at least 40 feet long outdoors, elevated at least 15 feet above ground, and as far as practical from the house and any electrical wires. It should be fed by coax cable with an appropriate plug, not just a simple wire, to your radio's external antenna jack, not attached to the whip.

If your portable is typical, it has poor dynamic range; this means that a large antenna can overload it with signals, bringing up the background noise which actually blocks any improvement from the outdoor antenna.

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

Gary Webbenhurst

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You are really going to like this month's column. But it will cost you a trip to the office supply store, and a few dollars. (Well, the kids got their back-to-school supplies. Now it is time for your back-to-monitoring office supplies.) Let's try to keep this under \$40, so check under those sofa cushions and in the cookie jar.

Here is my checklist. Cross out what you already have, and use a highlight pen to note items that you need to pick up.

- ___ A three ring binder to hold everything related to your monitoring activities. Frankly, I must have a dozen for different subject areas. I prefer binders with the clear plastic cover for personalized cover sheets. They are cheaper in the twin packs!
- ___ Special pen with built-in pop-up flag strips to mark the pages in *Police Call*, and other monitoring resources.
- ___ Sticky Post'em Notes. Dozens of uses: how can you succeed without them?
- ___ Pen style highlighters, and regular fluorescent pens for marking important information.
- ___ Self laminating plastic sheets.
- ___ Legal sized clipboard that will accommodate those mini cheat sheets on the extra space at the bottom of the board. You will need a separate clipboard, and paper pad for the car.
- ___ Plastic see thru parts bin for all those little parts, and office supplies like paper clips.
- ___ Regular 3.5 disk, writeable CD ROM, or Zip disks for backing up your time valued frequency lists, or related precious data. You do backup your data weekly, right?
- ___ Plastic Avery page protectors. Used for protecting soft cover books like *Police Call*, and often-used lists of frequencies, or 10 codes, etc.
- ___ Variety pack of colored (even fluorescent) paper. I find many uses for these. I have retrofitted all my radios, batteries, and accessories with brightly colored labels. It ensures that I will get my property back after a chaotic field day, or emergency radio operation. I also need to know what battery packs are 12 volt, as opposed to 9.6, 7.2 or AA battery trays. Color coded labels did the trick.
- ___ Avery sheet labels. They come in many sizes. Reader Allen Lutins has an alternative suggestion to my labeling methods. He buys "full sheet labels" which consist of 8-1/2" x 11" sheets that are a single large label. Then print labels of any size (including outline box) onto the sheet, and then cut them out. There can be a bit of waste involved, but formatting conventional labels (precisely centered, etc.) can be quite tricky, and you can always print a few projects worth of labels on a single sheet. Thanks Allen.
- ___ Clear scotch tape for protecting, and sealing small labels.

In future columns, I will give you more ideas as to how to use these office supplies to maximize your enjoyment of the hobby.

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As I wandered around the office supply store, I was magically drawn to the display of office chairs (*not* a part of the aforementioned \$40 budget). My 10 year old office chair had just died. I leaned back a bit too far, and, well, the chair just could not hold my svelte 240 pounds. (Alright, let's keep down the laughter.)

I sat in every floor model at least twice. I finally found one that fit like a glove. Though one of the cheaper chairs, it was still \$109, but I reasoned it was well worth it, considering that I spend 3-5 hours *every day* in the computer/radio room. I brought it home, and I am really happy with the purchase.

How about you? How many hours a day do you spend in the "radio chair?" Hey, a new chair that gets used every day for radio work is one of the best ideas I have had in a long time.

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While shopping at Wal-Mart, I found a new battery charger. The "Ever Start" Battery Charger, and Maintenance Conditioner was irresistible. It can be permanently plugged into your 12 volt emergency backup Marine/RV battery. It comes with brackets for mounting on a wall or other surface. I installed mine next to an AC receptacle right where I usually store the batteries. It automatically keeps the battery charged at the optimal level. See PHOTO



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The new radio-to-radio network over the internet (Echolink) is creating quite a buzz in the ham radio community. I see great potential for ARES/RACES use. Imagine operating in your local area, and being able to link thru an internet connected radio to your regional or state headquarters (CP). This would allow management folks in the affected area to talk directly to those in the know, and get instant answers to questions and requests. For example, the local Red Cross communicators could speak directly via their HT with others at the National Red Cross HQ on the east coast.

However, you need to set up this procedure now, before the big one hits. Then make certain everyone on both sides of the link knows exactly what the details are. Then get those frequencies programmed into the radios. This is going to change how we do business during emergency events. Can this work for other non ham radio systems? Can you say Nextel™?

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We end the column with a few notes about the 2003 wildland fire season. Unfortunately, it was just as bad as the 2002 record-setting year. A bright idea that I have mentioned before is to keep a bank of "watch and listen" mystery frequencies running in an extra scanner. This summer it paid off with several new catches.

The Spokane International Airport finally put up a repeater with their newly allocated VHF narrow FM pair of 154.1075 with an input of 158.8575 and the PL Tone of 167.9. (Please note, I am not giving out sensitive information here. This repeater is used by airport maintenance.)

The Washington State Department of Natural Resources (DNR) finally used their special VHF FCC assigned frequencies as a repeater pair of 172.375 (RX) and 170.575 (TX) with no PL tone.

I also had my Pro 2067 programmed with several hundred VHF federal forest fire frequencies. I caught 168.150 with a PL 156.7. This channel was clearly tied to other state DNR repeaters. I heard it referred to as "Tonasket," "Yankee Tactical," and "NE Dispatch." There were also several realignments of the DNR repeaters in northeastern Washington. I will forward the complete list to *MT's* frequency column in time for next summer's list of wildland fire frequencies.

Next month we have some really great Christmas gift suggestions for the radio hobbyist in your family. I think that means you!

A Definitive Guide to Southern Oregon

I always appreciate readers who support the scanning hobby, *MT* magazine, and this column. When a reader goes to the trouble of assembling a great frequency list for publication, I'll always try and recognize that effort as soon as possible, even if it means "bumping" another story or topic to a future issue.

Here's one example of a highly-motivated and knowledgeable group who wants to share their information for the benefit of others. While some of the following information is more oriented toward summertime scanning, it nevertheless represents a diverse list of monitoring targets for area residents and tourists alike. Assorted federal, aircraft, and business frequencies are also included to round-out the list. Speaking on behalf of his partners, here is Brian M. Bowie's excellent report:

"Hello, Robert. Here is my contribution to the *Scanning Report*. We monitors and radio enthusiasts here in Southern Oregon would really like to see our contribution published in *Monitoring Times* magazine - *Scanning Report!* I am submitting this and hoping to see it published soon as to share this info with your readers, especially if any of them are planning a trip to our area. There is a lot of fire activity here, so one needs to have this info ready at hand. Thanks," Brian M. Bowie, Medford, Oregon.

And without further ado, here is a definitive guide to Southern Oregon. Tourist information is readily available at the Southern Oregon Visitors Association website, <http://sova.org/>.

JACKSON COUNTY, OREGON

Sheriff's Office

155.6100 SO-Primary
155.4300 SO-Secondary
155.4900 JO-JAC Regional Police Common
155.4750 O.P.E.N. Statewide Police Common
155.8050 SAR 1 Oregon Search & Rescue
155.1600 SAR 2 National Search & Rescue
123.1000 AIR SAR Air Operations

JACNET - (Jackson County Narcotics Enforcement Team)

This agency utilizes the following DEA frequencies
418.750 & 418.250

Fire Protection Agencies

NORTH COUNTY FIRE

Fire District 1 - Rogue River
Fire District 2 - Medford Rural
Fire District 3 - Central Point / Eagle Point / White City
Fire District 4 - Shady Cove
Fire District 6 - Evans Valley
Lake Creek Rural Fire Protection District
Prospect Rural Fire Protection District
Butte Falls Rural Fire Protection District

154.1300 Primary Dispatch
458.0000 Remote Link North
453.0000 Remote Link Rogue River

SOUTH COUNTY FIRE

Fire District 5 - South County
Fire District 9 - Applegate
Jacksonville City Fire
154.3100 Primary Dispatch

COLESTINE RURAL FIRE PROTECTION DISTRICT

154.1750 DISPATCHED on Ashland Fire
154.2350 SECONDARY

FIRE TACTICAL -

JACKSON & JOSEPHINE FIRE AGENCIES

154.2800 RV TAC 1- Fire Marshal
159.2400 RV TAC 2- ODF NICS
153.8300 RV TAC 3
154.2200 RV TAC 4- Medford Fire
154.2500 RV TAC 5
154.0700 RV TAC 6
154.2050 Lake Creek Rural Fire

Emergency Medical Services

MERCY FLIGHTS AMBULANCE

155.2800 Primary Dispatch
458.1375 Remote Link- Base (Roxy)
453.1375 Remote Link- Mobile (Roxy)
155.2050 MEDCOM 1-Prospect/Butte Falls
155.2200 MEDCOM 2-Tactical
AMBULANCE - HOSPITAL
155.3400 MEDNET 1 Primary
155.4000 MEDNET 2 Secondary

Park Rangers

155.9250 Primary Simplex
157.6200 Secondary Simplex
150.9950 Roads John's Peak

CITY OF ASHLAND

Police Department
155.0100 Primary Dispatch
Fire Department
154.1750 Primary Dispatch
155.2200 Secondary AFR 2

CITY OF CENTRAL POINT

Police Department
156.2100 Dispatched on MPD
158.8650 Secondary Tactical
Fire Department
154.1300 North County Fire

CITY OF SHADY COVE

Police Department
155.6100 Dispatched On JCSO Primary
154.9800 Secondary Tactical
Fire Department
154.1300 Dispatched On North County Fire
154.0400 Secondary Tactical

TOWN OF BUTTE FALLS

Police Department
155.6100 Dispatched On JCSO Primary
Fire Department
154.1300 Dispatched On North County Fire
154.4300 Secondary Tactical

TOWN OF PROSPECT

Police Department
155.6100 Jackson County Sheriff's Office
Fire Department
154.1300 Dispatched On North County Fire

CITY OF PHOENIX

Police Department
155.6100 Dispatched On JCSO Primary
155.6700 Secondary Tactical
Fire Department
154.3100 Dispatched On South County Fire

CITY OF TALENT

Police Department
155.6100 Dispatched On JCSO Primary
155.5650 Secondary Tactical
Fire Department
154.3100 Dispatched On South County Fire

CITY OF JACKSONVILLE

Police Department
155.6100 Dispatched On JCSO Primary
153.9650 Secondary Tactical
Fire Department
154.3100 Dispatched On South County Fire
154.3550 Secondary Tactical

CITY OF EAGLE POINT

Police Department
155.6100 Dispatched On JCSO Primary
154.9800 Secondary Tactical
Fire Department
154.1300 Dispatched On North County Fire

CITY OF GOLD HILL

Jackson County Sheriff's Dept
155.6100 Dispatched On JCSO Primary
Fire Department
154.1300 Dispatched On North County Fire

CITY OF ROGUE RIVER

Police Department
155.6100 Dispatched On JCSO Primary
153.9200 Secondary Tactical
Fire Department
154.1300 Dispatched On North County Fire
154.1450 Secondary Tactical

CITY OF MEDFORD

Police Department
156.2100 Primary Dispatch
156.0900 Secondary Tac 2
156.5700 Tactical Tac 3
155.8500 Traffic Tactical
Fire Department
154.4450 Primary Dispatch
154.1600 Command Tactical

KLAMATH COUNTY, OREGON

Klamath County Sheriff
155.535 Sheriff (Dispatch F-1)
156.150 Sheriff
Klamath County Fire
154.070 Dispatch (Ch 1)
155.820 South County (TAC-5) (Ch. 2)
154.175 North County (TAC-1)
153.950 Central County (TAC-2)
154.355 South County (TAC-3)

- 153.890 East County (TAC-4)
- 154.400 Fire District
- 154.415 Fire District
- 154.445 Fire District
- 33.980 Fire District old low-band freq

KLAMATH FALLS

- Police Department
 - 155.535 Klamath Falls PD / County Sheriff Dispatch (Ch 1)
 - 155.970 PD (Ch 2)
 - 155.010 PD (Ch 3)
 - 155.070 PD / Sheriff TAC
 - 155.730 PD / Sheriff / Other city PD's multiple agency use
 - 155.700 Klamath Falls PD
 - 155.850 Klamath Falls PD
- Fire Department
 - 154.3550 Klamath Falls FD
 - 453.7125 Klamath Falls FD
 - 458.7125 Klamath Falls FD

OREGON STATE AGENCIES

- 154.695 Oregon State Police Klamath Falls
- 154.680 Oregon State Police Medford and Mt Ashland
- 155.475 Oregon State Police O.P.E.N. (statewide)
- 154.280 State Fire Marshall Statewide repeater system

- 151.175 Oregon Department of Fish & Wildlife
- 151.415 Oregon Department of Fish & Wildlife

OTHER POLICE, SECURITY, EMERGENCY

- 154.770 Siskiyou County Sheriff / Dorris City PD Northern California
- 155.745 Oregon Institute of Technology - Security OIT
 - 46.580 Klamath County Emergency Services
 - 156.150 Klamath County Emergency Services
 - 155.805 Klamath County Search & Rescue (SAR) (Statewide Use)
 - 156.800 Marine Call & Distress Frequency (Channel 16) Used by USCG Auxiliary

Local and Federal Channels

- Klamath / Lake Oregon Department of Forestry
 - 151.145 Ch. 1 Oregon Department of Forestry Repeater - Walker Range
 - 151.160 Ch. 2 Oregon Department of Forestry Repeater
 - 151.175 Ch. 3 Oregon Department of Forestry Repeater
 - 151.190 Ch. 4 Oregon Department of Forestry Repeater
 - 151.205 Ch. 5 Oregon Department of Forestry Repeater - Klamath Main
 - 151.220 Ch. 6 Oregon Department of Forestry Repeater
 - 151.340 Ch. 7 Oregon Department of Forestry Red Net
 - 151.310 Ch. 8 Oregon Department of Forestry White Net
 - 168.550 Ch. 9 National Incident Command System Call Up
 - 159.240 Ch. 10 National Incident Command System ODF TAC
 - 168.200 Ch. 11 National Incident Command System USFS TAC
 - 166.150 Ch. 12 National Incident Command System BLM TAC
 - 154.280 Ch. 13 National Incident Command System State Fire Marshal
 - 151.415 Ch. 14 National Incident Command System WDNR TAC
 - 154.070 Ch. 15 Klamath County 911 Dispatch (Fire Comm) Repeater
 - 154.070 Ch. 16 Klamath County 911 Dispatch (Fire Comm) Direct
 - 154.175 Ch. 17 Klamath County Fire District North County (TAC 1)
 - 153.950 Ch. 18 Klamath County Fire District Central County (TAC 2)
 - 154.355 Ch. 19 Klamath County Fire District South

- County (TAC 3)
- 153.890 Ch. 20 Klamath County Fire District East County (TAC 4)
- 155.820 Ch. 21 Klamath County Fire District South County (TAC 5)
- 172.350 Ch. 22 Fremont National Forest "Orange"
- 171.700 Ch. 23 Fremont National Forest "Yellow"
- 170.500 Ch. 24 National Forest TAC
- 169.925 Ch. 25 Winema National Forest "Channel 1"
- 169.925 Ch. 26 Winema National Forest Repeater
- 166.325 Ch. 27 Bureau of Land Management Repeater
- 151.325 Ch. 28 California Department of Forestry
- 158.895 Ch. 29 Fire Cache Relay
- 159.315 Ch. 30 Fire Cache TAC 1
- 169.435 Ch. 31 Fire Cache TAC 5
- 151.205 Ch. 32 Oregon Department of Forestry District (direct)

- Other Oregon Department of Forestry Channels
 - 159.2850 TAC 2
 - 159.4050 TAC 3
 - 159.3750 TAC 4
 - 122.8500 Aircraft (also USFS)
 - 122.9500 Aircraft
 - 125.2750 Aircraft

AIRPORTS

- Medford/Jackson County International Airport
 - 119.4000 Tower
 - 121.4000 Seattle Center
 - 121.5000 Emergency - Elt
 - 121.8000 Ground Control
 - 122.9500 Medford UNICOM
 - 123.5000 Air Show Ops ["Air Boss"]
 - 124.3000 Approach/Departure
 - 124.8500 Seattle Center
 - 127.2500 ATIS
 - 151.6550 Jet Center-Fuel Service
 - 154.0550 Operations-Security/Fire
 - 154.4450 Mfd Crash/Rescue
- Medford U.S. Forest Service Tanker Base
 - 119.8500 Primary
 - 122.8500 Helicopter Operations
 - 122.9250 Air / Ground
 - 122.9750 Air / Air
 - 123.0250 Air / Ground
 - 123.0500 Helicopter Heli Spot
 - 123.0750 Helicopter Operations
 - 135.6250 Air / Air
 - 135.9750 Air / Air
- Kingsley Field
 - 115.900 Klamath Falls VORTAC
 - 118.500 Kingsley Field Tower
 - 121.500 International Emergency Frequency
 - 121.900 Ground Control
 - 122.600 Kingsley Field Airport Advisory
 - 126.500 ATIS
 - 127.600 Kingsley Field Approach Seattle Center ATC

FEDERAL CHANNELS

- Federal Lands Administration and Management Channels
 - 170.425 Fremont National Forest Repeater (Hogsback Mt.)
 - 171.700 Fremont National Forest "Yellow"
 - 172.350 Fremont National Forest "Orange"
 - 164.175 Klamath National Forest
 - 415.425 Klamath National Forest
 - 163.925 Winema National Forest
 - 169.1750 Rogue River National Forest Ch 1 Operations North
 - 169.9750 Rogue River National Forest Ch 2 Operations South
 - 170.3750 Rogue River National Forest Ch 3 Engineers
 - 170.5000 Rogue River National Forest Ch 4 Forest Work

- 169.5500 Crater Lake National Park
- 170.1000 Crater Lake National Park Ch 1 Direct
- 152.2700 Crater Lake Lodge Ch 1 Primary -Repeater
- 151.7750 Crater Lake Lodge Ch 2 Secondary-NPS

- 171.750 Lava Beds National Monument
- 172.450 Lava Beds National Monument

- 164.5000 Army C.O.E. Rogue River Basin Project, Lost Creek / Applegate Dams Ch 1 Primary
- 163.4125 Army C.O.E. Rogue River Basin Project, Lost Creek / Applegate Dams Ch 2 Secondary

- 166.3500 Bureau Of Land Management Medford District Primary

- U.S. Forest Service - Region 5
 - 164.175 U.S. Forest Service - Region 5 Repeater (Hamaker Mt.)
 - 164.975 U.S. Forest Service - Region 5 Repeater (Hamaker Mt.)
 - 168.150 U.S. Forest Service - Region 5 Klamath Falls
 - 168.750 U.S. Forest Service - Region 5 Klamath Falls

- U.S. Forest Service - Region 6
 - 168.025 U.S. Forest Service - Region 6 Repeater (Hogsback Mt.)
 - 168.625 U.S. Forest Service - Region 6 Repeater (Hogsback Mt.)
 - 169.925 U.S. Forest Service - Region 6 Repeater (Hogsback Mt.)
 - 170.525 U.S. Forest Service - Region 6 Chiloquin
 - 409.150 U.S. Forest Service - Region 6 Chiloquin

Air Tankers

- 129.600 Air to Ground Link
- 122.925 Interagency Coordination
- 168.625 U.S. Forest Service - Air Net
- 168.025 U.S. Forest Service - Air Net

Other Federal Agencies

- 167.4650 FBI - MEDFORD [check 167.4625]
- 167.8250 VETERAN AFFAIRS - WHITE CITY - CH 1 POLICE
- 169.1125 VETERAN AFFAIRS - WHITE CITY - CH 2 ADMINISTRATION
- 166.2250 VETERAN AFFAIRS - WHITE CITY - CH 3 EMERGENCY

MILITARY CHANNELS

- Kingsley Air National Guard Frequencies
 - 163.4650 ISM / VM [check 163.4625]
 - 163.4850 Kingsley Field Security [check 163.4875]
 - 163.5250 Kingsley Field Disaster
 - 163.5900 AGE / ENG / Radio Maintenance [check 163.5875]
 - 165.0150 Maintenance Control [check 165.0125]
 - 165.1150 Disaster Preparedness / Medical Net [check 165.1125]
 - 165.1400 Fuel Trucks [check 165.1375]
 - 165.1650 Munitions [check 165.1625]
 - 173.4400 Civil Engineering / R&G [check 173.4375]
 - 173.5400 Operations Net [check 173.5375]
 - 173.5850 Kingsley Field Fire & Crash [check 173.5875]
 - 257.800 Kingsley Field Tower
 - 351.700 Kingsley Field Approach Seattle Center ATC
 - 348.600 Ground Control
 - 243.000 International Emergency Frequency
 - 257.800 Kingsley Tower
 - 263.000 ATIS
 - 348.600 Ground Control
 - 351.700 Kingsley Field Approach Seattle Center ATC
 - 143.900 Civil Air Patrol (Ch 6)
 - 148.150 Civil Air Patrol (Ch 7)

More Analog Police Frequencies

Reader Nicholas Robinson wrote to *Scanning Canada* recently to pass on his compliments on the column and to offer some more analog police frequencies for the Maritimes region. Nicholas wrote:

"I just picked up this month's copy of *Monitoring Times* and read your column with great interest, so I thought I would pass along some of the analog frequencies I have for New Brunswick."

Rothsay Regional Police: 412.6375
Bathurst: 154.6500
Woodstock: 155.9700-Repeater, 155.2800-simplex
Miramichi: 154.7700
Sackville: 159.0600 (this department is to be taken over by the RCMP shortly)"

Nicholas also told *Scanning Canada* that the RCMP in New Brunswick is still using its old 155 MHz repeater system which he reports is still not digital. Northern New Brunswick is linked to Canada's smallest province by the new Confederation Bridge and Nicholas told *MT* that a special frequency is used by the RCMP in both provinces for controlling the bridge area.

One of the national RCMP frequencies, 422.1375, is used by the Fredericton-Oromocto Joint Forces Drug Team which is composed of Fredericton City police, Oromocto RCMP, and Canadian Forces Base Gagetown military police. Activity on this frequency is associated with local drug busts and is a mixture of analog and digital signals. Another interesting frequency is 411.1875. This is the local EMO repeater used by the Fredericton-Oromocto joint Haz-Mat team.

"Thanks for the great article and I hope I have helped you" wrote Nicholas. Well, thank you for the great contribution Nicholas; you certainly have helped *Scanning Canada* keep track of the airwaves in your part of the country. Please keep up the great monitoring job in your region and advise *MT* if those analog frequencies go off the air like so many others across Canada.

◆ Unusual Coast Guard Antenna Tower

ScanCan was driving through the eastern extremes of the Greater Toronto Area recently,

on a totally non-radio-related trip to a large garden center. The purpose of the trip was compensation to the green-thumbed She-Who-Must-Be-Obedied, for all the other weekends spent on scanning trips. Unknown forces must have been directing my wheels because I chanced upon a highly unusual looking antenna tower. Apologizing to my spouse for the diversion from the primary mission of transporting a car full of plants back to the home QTH, I pulled over and headed up a bumpy laneway to the base of the tower.

I had recognized the familiar shape of an Adcock VHF antenna at the top of the tower. These antennas are a giveaway for a Canadian Coast Guard service station that I have seen on many previous occasions. This time *ScanCan's* attention was drawn to a strange array of wires extending out in three groups at about 45 degrees from the base of the Adcock. I thought at first that it might be some kind of beacon antenna, but it was too high to see enough detail to get a firm indication of its possible purpose.

Fortunately, there was a sign at the base of the tower directing inquiries to the Coast Guard's Prescott Radio Station. I drove home and immediately made e-mail inquiries with Prescott about the purpose of the tower. The very next day I received a very informative reply from a technical supervisor at Prescott. He explained that the facility is the Brougham VHF Direction Finding site in Pickering, Ontario. *MT* readers in the southern Ontario area will find the tower just west of Brock Road on Highway 7 in Pickering, in the village of Brougham.

The strange array of sloping wires that I saw is the lightning protection system, and the Adcock antenna is used for locating VHF marine-band signals (using the Watson-Watt technique). The Brougham installation is a receive-only site used in support of search

and rescue activities. Refer to this month's picture for an example of another Canadian Coast Guard Adcock antenna (the Adcock is the basket-like antenna at the top of the tower). This one is at the Coast Guard Telecommunications Maintenance Depot in Oakville, Ontario.

◆ A Mari Usque Ad Mare

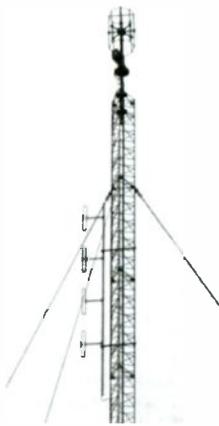
ScanCan would like thank readers for responding so well to requests for frequency information from across our great nation. *Scanning Canada's* base station is in the Toronto area, but travels have taken your columnist all across Canada. I have stood on top of Signal Hill in Newfoundland with scanner in hand, watching and listening to the boats entering the narrows of St Johns harbor. On other occasions I have walked the streets of Victoria, BC, monitoring the local frequencies near the Inner Harbour and the road out to Swartz Bay.

Just once, I had the opportunity to travel to Canada's High Arctic and I stood on the frozen seas of the North West Passage (on mid-summer's day) with scanner in hand at Resolute Bay, Nunavut. I would dearly love to repeat that trip; the Arctic is surely Canada's finest jewel.

Canada's motto is "A Mari Usque Ad Mare" meaning "from sea to sea." The words are taken from Psalm 72:8 "He shall have dominion also from sea to sea." In this case the word "Dominion" was used to denote the "Dominion of Canada," a title that has been largely forgotten following the repatriation of Canada's constitution from Great Britain in 1982. Our nation's motto neglects Canada's other "mare" – on which Canada has an extensive coast – the Arctic Ocean.

No matter which coast, mountain, prairie, Great Lake, or Seaway province you live in, your contributions are always welcome here. Without your support one lonely writer in a vast land could not succeed. Thank you to those who have already sent their contributions; more *MT* reader provided material is piling up on *ScanCan's* desk and will appear in upcoming columns. Many thanks in advance to those who are still working on their own contributions. Remember that pictures are also welcome. If you send me your snail mail address, too, a colorful *Scanning Canada* thank you card will come back to you in the mail.

Best wishes and 73 till November.



Canadian Coast
Guard Antenna
Tower

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Bearcat® 785DGV APCO P-25 Digital Ready with free deluxe scanner headset
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Bearcat® 895XLT Trunk Tracker
Manufacturer suggested list price \$499.95
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Frequency Coverage: 29,000-54,000 MHz., 108,000-174 MHz., 216,000-512,000 MHz., 806,000-823,995 MHz., 849,0125-868,995 MHz., 894,0125-956,000 MHz.

The Bearcat 895XLT is superb for intercepting trunked analog communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel Indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning pleasure, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **PS002** DC power cord - enables permanent operation from your vehicle fuse box \$14.95; **MB001** Mobile mounting bracket \$14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. **CAT895** Computer serial cable \$29.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.



Bearcat® 245XLT Trunk Tracker II
Mfg. suggested list price \$429.95/CEI price \$189.95

300 Channels • 10 banks • Trunk Scan and Scan Lists
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10 Priority Channels • Programmed Service Search
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Bearcat BC125D APCO Project 25 digital software card.....	\$299.95
Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner.....	\$139.95
Bearcat 250D 1,000 ch. TrunkTracker III handheld scanner.....	\$339.95
Bearcat 245XLT 300 ch. TrunkTracker II handheld scanner.....	\$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.....	\$84.95
Bearcat Sportcal 200 alpha handheld sports scanner.....	\$159.95
Bearcat Sportcal 180B handheld sports scanner.....	\$139.95
Bearcat 80XLT 50 channel handheld scanner.....	\$99.95
Bearcat 60XLT 30 channel handheld scanner.....	\$74.95
Bearcat BCT7 information mobile scanner.....	\$139.95
AOR AR16BQ Wide Band scanner with quick charger.....	\$199.95
Sangean ATS909 306 memory shortwave receiver.....	\$209.95
Sangean ATS818 45 memory shortwave receiver.....	\$139.95
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AOR8200 Mark IIB-A wideband handheld scanner/SPECIAL \$539.95
1,000 Channels • 20 banks • 50 Select Scan Channels
PASS channels: 50 per search bank + 50 for VFO search
Frequency step programmable in multiples of 50 Hz.
Size: 2^{1/2}" Wide x 1^{3/8}" Deep x 6^{1/8}" High
Frequency Coverage:
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The AOR AR8200 Mark IIB is the ideal handheld radio scanner for communications professionals. It features all mode receive: WFM, NFM, SFM (Super Narrow FM), WAM, AM, NAM (wide, standard, narrow AM), USB, LSB & CW. Super narrow FM plus Wide and Narrow AM In addition to the standard modes. The AR8200 also has a versatile multifunctional band scope with save trace facility, twin frequency readout with bar signal meter, battery save feature with battery low legend, separate controls for volume and squelch, arrow four way side rocker with separate main tuning dial, user selectable keypad beep/illumination and LCD contrast, write protect and keypad lock, programmable scan and search including LINK, FREE, DELAY, AUDIO, LEVEL, MODE, computer socket fitted for control, clone and record, Flash-ROM no battery required memory, true carrier reinsertion in SSB modes, RF preselection of mid VHF bands, Detachable MW bar aerial. Tuning steps are programmable in multiples of 50 Hz in all modes, 8.33 KHz airband step correctly supported, Step-adjust, frequency offset, AFC, Noise limited & attenuator. Wide and Narrow AM in addition to the standard modes. For maximum scanning pleasure, you can add one of the following optional slot cards to this scanner: **CT8200** CTCSS squelch & search decoder \$89.95; **EM8200** External 4,000 channel backup memory, 160 search banks. \$69.95; **RU8200** about 20 seconds chip based recording and playback \$69.95; **TE8200** 256 step tone eliminator \$59.95. In addition, two leads are available for use with the option socket **CC8200A** personal computer control lead \$109.95; **CR8200** tape recording lead \$59.95. Includes 4 1,000 mAh AA ni-cad batteries, charger, cigarette lighter adapter, whip aerial, MW bar antenna, belt hook, strap and one year limited AOR warranty. For fastest delivery, enter your order on-line at <http://www.usascan.com>.

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ALE: Everyone's Getting Linked

Over the past few months, the use of Automatic Link Establishment (ALE) has greatly expanded throughout the Western Hemisphere. Ron Perron, a longtime utility listener in Maryland, has put a lot of good work into checking out some of the networks first identified in Mike Chace's excellent *Digital Digest* column, which immediately follows the *Utility Logs*.

Along with Ron's exhaustive research into the Venezuelan military, seen in last month's *DD*, he's heard some interesting activity from the Colombian phone patch network mentioned last September. This is where stations, possibly the Colombian Army, use ALE to initiate autopatches through a gateway identified as "1901." The headline number appears in the Automatic Message of the Day (AMD) text field, right after the terse instruction, "DIAL."

Transmissions are in lower sideband (LSB) mode, uncommon for ALE. Subsequent LSB voice conversations are on-channel, but apparently also 2-frequency duplex. Only one of the "other sides" is known.

Not all stations use the short ALE addresses any more. One of Ron's more frequent hits is MOCHUELO, or MOC. "Mochuelo" might refer to an isolated city south of Bogotá, or to a small mountain owl indigenous to that region. Another "long" address is PRF320, perhaps a Spanish acronym for "Border Radio Post."

Here are all known frequencies for this net, all LSB ALE, in kilohertz (kHz): 10142.0, 10706.0, 11426.7, 11430.0, 13530.0, 14000.0, 16037.5 (paired with 16278.0), and 16078.0 kHz. As always with ALE, it's best to put these in a scan.

◆ Mexican Army

One can always count on the Mexican military for some fun. They used to have that classic, breathless, Spanish radio procedure, with lots of whistling and machine-gun repetitions of calls. These, alas, vanished when Mexico installed a distinctive scrambling system, which sounds like a hoot owl on amphetamine. Fortunately for us, many of these contacts are now initiated by ALE, giving some identifiers in the clear.

Mexican call signs are colorful. There was always a "Zoo net" with fierce, predatory animals, like PUMA, TIGRE ("Tiger" in Spanish),



LOBO (Wolf), TIBURON (Shark), LEOPARDO (Leopard), ZORRO (Fox), and so on.

More recently, we've picked up some new groups. One is generally called the "Planets" net, with GALAXIA, UNIVERSO, MERCURIO, VENUS, TIERRA (Earth), MARTE (Mars), and URANO (Uranus). Another is the "Minerals" net, with JADE, BRONCE (Bronze), ORO (Gold), PLATA (Silver), DIAMANTE (Diamond), and ALUMINIO (Aluminum). A third simply goes by "RM" plus a Mexican military region number.

There are a number of other recurring ALE addresses, such as ARBOL (Tree), GOLANDRINA (?), ESPANA (Spain), 123 (possibly the headquarters), and ACERO (possible regional commanders).

A lot of frequencies have been found. We have 5590, 7666, 7777, 8047, 8050, 8084, 8281.6, 9024, 9060, 10135, 10444, 14400, and 14715 kHz, all USB.

◆ Maryland Bible College & Seminary?

Well, no, although that's where Internet searches went. Apparently someone at MBC&S got a good laugh when asked if their small Bible school in Baltimore was operating an ALE network.

The real operator is unknown. It's only heard on 6318.5 kHz USB ALE. Here, "BBCSMBSC" passes cryptic AMD strings to "AOA," "AOB," and "ABM." A control message? Order wire? "Numbers?" It's a rather odd thing to be hearing on an international maritime radio teletype channel, used by Lyngby Radio in Denmark, among others. Does anyone have a clue?

◆ Immortality, Utility Style

Here's one way to become immortal. Jane Barbe, voice of WWVH and "the telephone company," died in July at the age of 74. However, she's still heard by an estimated 20 million people a day.

Barbe (pronounced, and often misspelled, like the doll) spent many years working at ETC (Electronic Tele-Communications). Her voice was not completely unaccented, but she'd become extremely good at controlling the inflection so it would sound natural, and not humorously robotic, when some of the words were electronically spliced into different sequences.

She was used by 90% of US phone companies, and thousands of those voice menus we've all come to know and love.

WWVH, the US National Institute of Standards and Technology's Hawaiian standard time and frequency station, always uses a female voice. WWV, the NIST primary station in Colorado, always uses a male. This is so they can be distinguished when both are heard at once, as they often are.

Once when WWVH had to change the hourly announcement, the new one lost its cheerful, Hawaiian "Aloha." Such a thing is not to be allowed. When NIST came to its senses and reinserted the traditional greeting, it didn't quite match. These recordings are harder to do than one would think!

So far as history goes, WWVH started in 1948 on Maui. The ocean ate the site, so in 1971 it moved to the Barking Sands Military Reservation near Kekaha, Kauai. It's on 2.5, 5, 10, and 15 megahertz (MHz), same as WWV, except that the Colorado station is also on 20 MHz. WWVH does verify with an attractive card, and while this is no collector's item, it has a nice, Hawaiian design. Aloha.

2.5 MHz is 5 kilowatts (kW) to an omnidirectional tower vertical. The other bands use 10 kW into 90-degree-phased, vertical dipole pairs aimed westward, out toward the Pacific and Asia. Picture twin radio towers like the taller ones used by medium-wave broadcast stations. They're separated a quarter-wavelength, and in two halves, stacked, with large insulators in the middle.

With these patterns, the continental US does not get a lot of signal, and Europe gets even less. This makes WWVH a great propagation indicator for the Pacific. If it can be heard at all, especially through WWV, the band has to be working. WWVH announcements are staggered from those of WWV, and neither station will run an audio tone if the other one is "talking." The carrier frequencies, being tightly controlled standards, do not heterodyne. If both are running tones; however, they'll be at different audio frequencies. Propagation can produce some interesting-sounding audio mixes indeed.

No, there are no known cases of Barbe doing voices for "numbers" stations. Too bad.



ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
ARQ-E3	French ARQ teleprinting system
AWACS	Airborne Warning and Control System
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Coq-8	Coquelet; French/Algerian 8-tone printing mode
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
E3a	British intelligence English numbers, also called E4
E7	Russian intelligence numbers, weird English voice
E10a	Israeli phonetic numbers, callup-only or abnormal
EAM	Emergency Action Message
EOC	Emergency Operations Center
FAX	Radiofacsimile
FBI	US Federal Bureau of Investigation
FEC	Forward Error Correction teleprinting system
FEMA	US Federal Emergency Management Agency
HF-GCS	High-Frequency Global Communications System
LDOC	Long Distance Operational Control
LSB	Lower Sideband
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
MXC	Russian CW "cluster beacon" markers
NIPRNET	Non-Secret Internet Protocol Routing Network
FACTOR	Packet Teleprinting Over Radio
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
Selcal	Selective Calling
SHARES	Shared Resources, US interagency net
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
UK	United Kingdom
Unid	Unidentified
US	United States

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.

- 3167.5 "1-E-L"-US Navy Link-11 coordinating net in Jacksonville, FL area, working "E-9-H," "1-I-U," and "E-5-U," at 0105. (Mark Cleary-SC)
- 4213.7 IDR2-Italian Navy, Rome, RTTY channel availability broadcast at 2315. (Bob Hall-RSA)
- 4372.0 "L-7-T"-US Navy, Link-11 coordinating net, at 2359. (Cleary-SC)
- 4490.0 NCS-National Communications System, DC, calling NNN0ELA, Navy MARS SHARES Coordination Station Southeast, in ALE at 1534. (Ron Perron-MD) [Annual August SHARES exercise. -Hugh]
- 4721.0 Reach 9192-US Air Force C-17A, with ALE-initiated patch to Hilda Ops, at 0156. (Cleary-SC)
- 4780.0 441FEM-FEMA auxiliary station, calling TDLFEM, in ALE at 0039. (Perron-MD)
- 5091.0 JSR2-Israeli intelligence "numbers" callup only (E10a), at 2033. (Patrice Privat-France)
- 5550.0 New York-Atlantic air route control, selcal and position check with Getaway 234, at 0224. (Allan Stern-FL)
- 5616.0 Gander-Atlantic air route control, Newfoundland, working US Air Force Reach 5105, at 0710. Gander, handing Army 792 off to Shanwick, at 0852. (Stern-FL)
- 5684.0 OFFNPR-Offutt AFB NIPRNET gateway, NE, sounding in ALE at 0420. (Perron-MD)
- 5687.0 GAF293-German Air Force aircraft, announcing arrival to Dispatch, at 1524. (Privat-France)
- 5696.0 Coast Guard 1502-US Coast Guard aircraft, working CAMSLANT while assisting sailing vessel *Solstice*, at 0108. Coast Guard 2131, telling CAMSLANT that CG 6502 and CG 6038 are enroute to Freeport with survivors picked up in a search, at 2133. (Cleary-SC)
- 5860.0 FAAZNY-Federal Aviation Administration, New York, sounding in ALE at 0359, and on 8125 at 0606. FAAZFW, FAA, Ft. Worth, TX, sounding at 0907. (Perron-MD)
- 6318.5 BBCSMBCS-Unknown station, passing coded string to AOA (unknown), in ALE at 0301. (Perron-MD)
- 6491.5 LOR-Argentine Navy, Puerto Belgrano, RTTY coastal advisories at 0619. (Hall-RSA)
- 6637.0 Miami Radio-LDOC, FL, working Giant 711, aircraft leaving Colombia, at 0342. (Stern-FL)
- 6662.0 Gander-Atlantic air route control, NFD, handed off Northwest 543 to 3476.0, at C326. (Stern-FL)
- 6697.0 Space Card-US military, broadcasting a 28-character EAM, also on 8992 and 11244, just before Offutt broadcast same, at 0021. (Jeff Haverlah-TX)
- 6912.0 SYN-Abnormal Israeli intelligence "numbers" callup (E10a), with very strange loop of "SYN5, 4ZI, Zulu sending, Z1015" in AM at 0410, still going strong at 0455. (Barry Williams-AL)
- 7348.0 ME1FMA-Maine State EOC, Augusta, calling FC1FMA, FEMA Region 1, MA, in ALE at 1647. (Perron-MD)
- 7527.0 Foxtrot 33-US Coast Guard aircraft, setting up guard with CAMSPAC at 2346. Panther-DEA, Bahamas, working 25C at 2357. (Cleary-SC)
- 7633.5 Reach 9002-US Air Force, with patch request for AFA2CU, Air Force MARS, at 2136. (Cleary-SC)
- 7650.0 T12137-Ohio National Guard, Canton, sounding in ALE at 1331. (Perron-MD)
- 7903.5 AT1-FBI, Atlanta, GA, calling OM1, Omaha, NE, in ALE at 1753. (Perron-MD)
- 8012.0 453FEMAUX-Unknown FEMA auxiliary station, sounding in ALE at 2225. (Perron-MD)
- 8156.0 C6WWH- Royal Bahamas Defence Force, asking C6R2066 to raise 2067, at 2122. (Cleary-SC)
- 8181.5 ASF11L-US Army National Guard, Aviation Support Facility No. 1, IL, sounding in ALE at 0719. (Perron-MD)
- 8337.6 Shark 07-Unknown US, securing Falcon's radio guard, at 0006. Shark 11, passing traffic to Dolphin 76, at 2218. (Cleary-SC)
- 8764.0 NMN- US Coast Guard CAMSLANT, working cutter *Tampa* and distressed fishing vessel *Twilight*, at 0052. CAMSLANT, working V7C22, cable ship *Tycom Reliance*, at 0128. (Cleary-SC)
- 8807.5 3AC-Monaco Radio, sending traffic list in FACTOR-II, at 1715. (Day Watson-UK)
- 8864.0 Gander- Atlantic air route control, NFD, selcal and position with Evergreen 1110, at 0905. (Stern-FL)
- 8912.0 CAMSPAC-US Coast Guard, CA, working Service Center (US Customs?) and 15C, at 0007. Panther-DEA, Bahamas, working 23C, at 2332. (Cleary-SC)
- 8971.0 Pelican 712-US Navy, telling Fiddle (Jacksonville, FL) that they have raised Goldenhawk, and are transmitting imagery at 2028. Goldfinch 711-US Navy P-3C, called Fiddle, raised Cardfile 02, another P-3C, who relayed a message to Blue Star (Roosevelt Roads, PR), at 2146. (Cleary-SC)
- 8983.0 CAMSLANT Chesapeake-US Coast Guard, working Coast Guard Rescue 2118, enroute to a search, at 0214. (Stern-FL)
- 8992.0 CAMSLANT-US Coast Guard, diverting Coast Guard 1706 to attempt location of a small vessel reported hijacked from Cuba, at 1841. Coast Guard 1711-USCG HC-130, working CG Group San Juan, PR, at 2351. (Cleary-SC)
- 8992.0 Extension-US military, raised Puerto Rico HF-GCS for a patch at 0354. (Haverlah-TX) Reach 7019-US Air Force, patch via Puerto Rico for Keflavik weather, at 2351. (Cleary-SC)
- 9007.0 Canforce 4176-Canadian Forces aircraft, asking Trenton Military for weather in Zagreb, Yugoslavia, at 0004. (Cleary-SC)
- 9025.0 Reach 8217-US Air Force, in ALE-initiated patch to Hilda. at 0008. (Cleary-SC)
- 10135.0 123-Mexican Army, calling TIERRA in ALE, at 0244. (Perron-MD)

- 10242.0 25C-US Coast Guard, requesting CAMSPAC to contact Panther for a working frequency, at 0006. (Cleary-SC)
- 10444.0 PUMA14-Mexican Army, calling PUMA in ALE at 0046. (Perron-MD)
- 10530.0 T1Z137-Ohio National Guard, Canton, OH, sounding in ALE at 0255. Also sounding on 14757.0, at 0458. (Perron-MD)
- 10588.0 ME1FEM-Maine State EOC, Augusta, calling FC8FEM, FEMA Region 8, ALE at 1541. (Perron-MD)
- 10740.0 OPS171-US Air National Guard, GA, sounding in ALE at 1902. (Perron-MD)
- 10913.5 ME1-FBI, Memphis, TN, calling AT1, Atlanta, at 1716. (Perron-MD)
- 11018.0 SITIO19E-Colombian Army, working SITIO14E, in ALE at 2322. (Perron-MD)
- 11175.0 Andrews-US Air Force HF-GCS control, patching Reach 46 to Metro with Manitoba weather report, at 0233. Croughton-US Air Force HF-GCS, UK, patching Reach 423 to Ramstein Air Base, at 0309. Offutt-US Air Force HF-GCS, NE, with 28-character EAM simulcast on 8992, 13200, and 15016, at 2008. (Stern-FL) Executive One Foxtrot-US Air Force with President's family aboard, running several patches via Offutt, at 1500. (Haverlah-TX) Navy LF 98, a P-3C, patching Eagle Duty (Jacksonville) via Puerto Rico, at 2302. Air Force Rescue 978, working Puerto Rico at 2338. (Cleary-SC)
- 11181.0 Night Star-US military, asking Star Gate to join link, at 1912. (Cleary-SC)
- 11217.0 KGD34NCC-SHARES liaison, DC, sounding in ALE at 1518. (Perron-MD)
- 11220.0 Andrews-US Air Force HF-GCS, MD, radio check with unknown station at 1937. (Cleary-SC)
- 11226.0 Sentry 62-US Air Force E-3 AWACS, in ALE initiated patch to Raymond 24 (Tinker AFB, OK), at 2035. (Cleary-SC)
- 11232.0 Goliath Bravo-E-3 aircraft, patch via Trenton Military to South Control, at 1949. (Cleary-SC)
- 11244.0 Eye Goggle-US military, broadcasting a 28-character EAM, also on 8992, at 1636. (Haverlah-TX)
- 11396.0 USAir 1424-Flight giving position and selcal check at 2115. (Privat-France)
- 11430.0 1505-Colombian telephone net, passing "DIAL" plus a phone patch number to 1901, in LSB ALE, at 2326. (Perron-MD)
- 11466.0 ALG-Algerian oil net, Algiers, calling ALR (Alrar), in ALE at 1114. (Privat-France)
- 11494.0 Hammer-US military, position with "69" at 0048. (Cleary-SC)
- 11610.0 CLC22- Venezuelan Army, calling PRC2 at 0022, also on 10156 at 0113. (Perron-MD)
- 12191.0 SCLC512- Venezuelan Army Communications Logistics Service Center, 512th Jungle Infantry Battalion, working CLC51, 51st Jungle Infantry Brigade, in ALE at 2130. (Perron-MD)
- 12216.0 FC8FEM-FEMA Region 8, CO, calling UT8FEM, Utah State EOC, Salt Lake City, at 1635. (Perron-MD)
- 12601.0 "DESVO"-Unknown CW station, at 0525. (Williams-AL) [Could be the same as "DESUO" on 22387. -Hugh]
- 12965.0 USO- Izmail Radio, Ukraine, CW marker, then RTTY, then back to CW for a broadcast in Russian, at 0800. (Privat-France)
- 13089.0 CAMSLANT-US Coast Guard, working cutter Oak, at 2203. (Cleary-SC)
- 13155.0 Moonbeam-US military, broadcasting a 8-character EAM, also on 8992 and 11244, at 0308. (Haverlah-TX)
- 13188.0 UAT- Moscow Radio, with "Moskva" voice loop, at 1230. (Privat-France)
- 13200.0 Evac 67959-US Air Force, patch via Puerto Rico HF-GCS to McGuire, at 2141. (Cleary-SC)
- 13242.0 ADWNP-Andrews NIPRNET gateway, MD, sounding in ALE, at 0101. (Perron-MD)
- 13510.0 CFH-Canadian Forces, Halifax, NS, with FAX weather chart at 1628. (Watson-UK)
- 13524.0 JXA-Unknown US Army, working NTC, Army National Training Center, in ALE at 0037. (Perron-MD)
- 13527.9 "S"-Russian Navy, Arkhangelsk, CW single-letter marker beacon (MXC), at 1646. (Watson-UK)
- 13528.0 "C"- Russian Navy, Moscow, CW single-letter marker beacon (MXC), at 1645. (Watson-UK)
- 13530.0 CESYP-Colombian Navy, Special Command, calling CARIBE, Caribbean Command, in ALE at 0015. (Perron-MD)
- 13872.0 Unid-"The English Man," Russian intelligence, AM "numbers" (E7), short message ended "000 000," at 2020, then repeated on 11103 at 2040. (Privat-France)
- 13885.9 Unid-Moscow Meteo, Russia, with FAX synoptic weather chart at 1349. (Watson-UK)
- 13900.0 BMF-Taipei Meteo, with FAX weather satellite picture of the Philippines, at 1938. (Watson-UK)
- 13927.0 Bone 02-US Air Force B-1B over Alaska, sent to 20992.5 for a patch with AFA2CU, US Air Force MARS, at 0121. Teal 44-US Air Force Reserve 53rd Weather Recon "Hurricane Hunter," discussing Claudette with AFA2CU, at 1855. AFA2CU, relaying message to USAF Train 87 from Python 11 (in Middle East), at 2354. (Cleary-SC)
- 14352.0 HOODNTC-US Army, Ft. Hood, TX, working NTC, National Training Center, Ft. Irwin, CA, also on 15748, in ALE at 2225. (Perron-MD)
- 14451.7 Unid-Egyptian embassy, unknown location, with SITOR-A traffic for Cairo, at 1518. (Watson-UK)
- 14467.3 DDH8-Hamburg Meteo, Germany, with ship weather observations at 1957. (Watson-UK)
- 14493.5 LR1-FBI, Little Rock, AR, calling KC1, Kansas City, KS, in ALE at 1719. (Perron-MD)
- 14670.7 Unid-Weak ARQ-E3 station under CHU time station on 14670, with traffic in French, at 1040. (Watson-UK)
- 14926.7 RFTJ-French Forces, Dakar, Senegal, with ARQ-E3 control message at 1102. (Watson-UK)
- 14982.5 Unid-Tashkent Meteo, Russia, with FAX weather feature chart, at 1203. (Watson-UK)
- 14996.0 RWM-Standard time station, Moscow, Russia, with CW pips at 1214. (Watson-UK)
- 15016.0 Omni 16-US Air National Guard, patch via Offutt HF-GCS at 2035. (Cleary-SC)
- 15094.0 AAR7ALMARS-US Army MARS, Nebraska, and SHARES Regional Coordinating Station, working AAR1DDMARS, Northeast SHARES coordinator, in ALE at 2107. (Perron-MD)
- 15094.0 KGD34NCC-SHARES Master Control Station, DC, calling AAT3BFMARS, Army MARS SHARES Coordination Station, DE, in ALE at 1652. (Perron-MD)
- 15920.0 CFH-Canadian Forces, Halifax, with RTTY channel markers at 1400. (Watson-UK)
- 15988.0 DDK8-Hamburg Meteo, Germany, RTTY weather traffic at 1423. (Watson-UK)
- 16131.7 Unid- Egyptian embassy, unknown location, with SITOR-A traffic and chatter in Arabic, at 1428. (Watson-UK)
- 16241.6 Unid- Egyptian MFA, Cairo, SITOR-A chatter in Arabic, mentioned frequency 14451.7 kHz, at 1510. (Watson-UK)
- 16324.7 RGFJTJID-French Forces, Libreville, Ghana, ARQ-E3 markers at 1800. (Watson-UK)
- 16961.1 NMG-US Coast Guard, New Orleans, with FAX request for comments, then gone (no stop tone), at 2021. (Watson-UK)
- 17147.0 URL-Sevastopol Radio, Russia, working vessel Krivoi Rog in RTTY at 1708. (Hall-RSA)
- 18183.4 7RQ20-Algerian MFA, Algiers, relaying a Coq-8 message in French from Kinshasa, Congo, at 1631. (Hall-RSA)
- 18864.0 Cherry Ripe-UK intelligence (E3a/E4), musical tune and English "numbers" at 1304. (Privat-France)
- 19036.5 Unid-Algerian embassy, Nairobi, Kenya, with Coq-8 French traffic for Algiers, at 0955. (Hall-RSA)
- 19131.0 Atlas- DEA contract facility, IA, working 934, at 1503. (Cleary-SC)
- 19698.0 OST69-Oostende Radio, Belgium, CW identifier in ARQ marker, at 1226. (Hall-RSA)
- 19699.0 UFN-Navorossiysk Radio, CW identifier in ARQ marker, at 1231. (Hall-RSA)
- 19830.0 RFGW-French MFA, Paris, idling in FEC while the circuit comes up, at 1645. (Hall-RSA)
- 20400.0 OFM-Chilean Navy, LSB ALE sounding at 2315. (Perron-MD)
- 22389.2 NMN-US Coast Guard, CAMSLANT, VA, with ARQ marker at 1640. (Hall-RSA)
- 22475.5 PWZ33-Brazilian Navy, Rio de Janeiro, sending continuous alphanumeric code in fast RTTY (200/850), at 1600. (Hall-RSA)
- 22542.0 JJC-Tokyo Radio, with Japanese Kyodo News in slow FAX (60/576), parallel 16971.2 and 17069.5, at 1300. (Hall-RSA)

Mixed Bag: Maritime and MFA

Quite a mixed bag this month as we receive some feedback on the recent column featuring ocean sensing radar systems, take a look the Ecuadorean Navy's new ALE activity and welcome a few TWINPLEX transmissions for Denmark.

❖ CODAR Update

Reader David L. Wilson writes to Digital Towers via email about his recent visit to the CODAR sites operated by Rutgers University in New Jersey. Here's his message:

I thought you might like to know some actual current frequencies being used by CODAR to supplement those that were licensed.

In the case of Rutgers/WA2XXF confirmed by site visitation are the following (note that some of this is different than the FCC license info you posted in your column of July 2003).

Wildwood 4525-4550 kHz
Brigantine 25760-25860 kHz
Tuckerton 4524-4550 kHz
Brant Beach 24600- 24700 kHz
Loveladies 4525-4550 kHz
Seaside Park (no info)

Thanks for your message, David, and for taking the trip out to the wonderful Jersey Shore to investigate!

❖ MFA Copenhagen Still Operational on HF

A number of recent postings to the World Utility News (WUN) mailing list mentioned the return to HF of the TWINPLEX signals from MFA Copenhagen. The majority of traffic appeared to be operator chatter indicating the test of various links. Activity was welcome although short-lived, so perhaps their landline or satellite equipment was not operational and HF was used as a last resort?

Here's an extract from one of the transmissions on the once very active channel of 19511.8 kHz.

Wym juni kl. 10.15
hej kirsten,
jeg kan godt forsaa at i nyder det friske vejr
ovenpaal den varme og stoev.
Her har vi osse dejligt vejr- Blaesten har Lagt
sig og vi har sol og omkring
20 gr - Det er bare helt fint- Ogsaa for dem
der skal til roskilde festival -
For e plejer ellers og ha regn og mieeeeeee
mudder- Det er lidt mystisk med dine
aglbryger- Men jeg tror vejret er ved at aendre
sig globalt - For i ydeuropa

har de hedeboelge med nogle stedr op til 40
gr - Puha - Ellers alt vel i dk hvor
feriestemningen er vedat indfinde sig. A
en fortsat go dag dernede.

See u hilsen
jens h den 26.6. Kl qeri
endservice

Other (once regularly active) channels to monitor for the Danish Diplomatic Service are as follows:

7467.9 7468.9 11327.9 11341.9 11419.9
11437.9 13211.9 13274.0 13457.9 13486.9
16209.9 16284.9 16406.9 18513.9 18576.9
18583.9 19108.9 19230.9kHz

Although not unique to them, the Danes use the 400 Hz spaced TWINPLEX system which has four tones arranged around the center frequency at offsets of +400, +200, -200 and -400 Hz. Other distinctive features are the use of TPxx-series selcals and an encryption lead-in of "ssswwwwsssw". Look out for these guys before they disappear altogether.

❖ Ecuador's Navy Turns to ALE

Back in May of 2002 we detailed the operations of Ecuador's maritime command which comprises a number of organizational units covering the Navy, Ports Authorities, Coast Guard, and Fisheries Protection, among others. These stations used the very distinctive SITOR-B set-up of 109.5 baud and a 400 Hz shift.

The origins of the signals were given away by a number of place names and routing indicators that could be traced through various websites. For example: ESMAAR is the headquarters of the Maritime School; CAPBAQ is the Captain at the port of Puerto Baquerizo; COOPNA is the Naval Operations Command (Commando de Operaciones Navales).

These transmissions were heard extensively in the 12 MHz maritime band on 12323.5 kHz.

Listener Ron Peron recently came across the COOPNA routing indicator again in his monitoring, but this time as an ALE identifier on the frequency of 7900 kHz USB.

This channel has been used by the Colombian Navy in the past, and for a while, only the COOPNA identifier was heard. However, some more intensive listening revealed many more identifiers, each of which was relatively easy to associate with one of the Ecuadorean Navy ships.

Here are the ships heard so far:



Figure 1: Missile Launching Patrol Boat

CORESM is the Corvette "Esmeraldas"
CORORO is the Corvette "Oro"
CORGAL is the Corvette "Galapagos"
CORCUC is the Oiler "Cucaracha"
CORIOS is the Corvette "Rios"
LAMCUE is the Missile Patrol Vessel "Cuenca"

The appearance of these identifiers coincided with a large South American naval exercise, so perhaps this also explains the use of the usually Colombian frequency and only a small number of the total Ecuadorean Fleet.

❖ MFA Paris Goes High-Speed

Very little is now heard of the once very active 192bd FEC-A French diplomatic and military attache network. However, as in many previous cases documented in this column, this organization has also gradually migrated to high speed HF equipment.

The French are now equipping their embassies with Rohde & Schwarz 2400bd high speed modems and regular MIL-188-141A ALE for linking purposes. Some embassies also appear to be active using the Thomson Systeme-3000 STANAG4285-based system, although this system features its own proprietary linking protocol.

Here are some of the embassies in the new network and their ALE identifiers:

ABUDHABI	Abu Dhabi, UAE
BUJUMBURA	Bujumbura, Burundi
CER41	MFA Paris
KHARTOUM	Khartoum, Sudan
ISLAMABAD	Islamabad, Pakistan
LECAIRE	Cairo, Egypt

Frequencies used are: 9052, 10825, 12170, 15921, and 25310 kHz

Until next time, enjoy the digital DX.

Resources

Rutgers CODAR Project
<http://marine.rutgers.edu/mrs>
Ecuador's Naval Command
<http://www.armada.mil.ec>

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SHORTWAVE LIVES!

Who says shortwave is passé? Brand new services on SW have started up or are about to, from or to Afghanistan, Australia, Denmark, Latvia, Mexico, Papua New Guinea, Sudan. Long-silent stations were

reactivated in Brazil, Mongolia, Perú; China started doubling programming time in several languages; New Zealand expands to 24 hours. Cuba is installing new transmitters. Read on!

AFGHANISTAN [non] New US-based service is R. Amani from APA, Afghanistan Peace Association, 15615, Fri 1630-1730 in Dari and Pashto
<http://www.afghanistanpeace.com> (Bernd Trutenau, Lithuania, DX Listening Digest)

ANGUILLA Caribbean Beacon, a.k.a. 24/7 Dr Gene Scott, vanished at the beginning of August, later returned on night frequency 6090, with daytime 11775 still missing in late August; while 6090 was of it was clear for Brazil and others. Apparently CB was unable to change frequencies (gh)

ARGENTINA RAE, a great station. Listened to their English hour at 02 on 11710. The tango music is great. Good signal. Very nice mix of news, features and music. Checked my last log of them. It was 10/831 Received a "Malvinas" card. Doesn't seem so long ago. The joys of SWling (David Norcross, SLO CA, DX Listening Digest)

5241.00 LSB, feeder with FM HIT 105.5, Buenos Aires, at 0135-0300, pop music, ads, fair to good signal with harsh ute QRM from 5237 (Mark Mohrmann, Coventry, VT, DX Listening Digest)

5400.00, La 101, Buenos Aires, at 1030, also ID as "Canal 26" and "Power 101." Arnaldo Slaen says this is another new link (Björn Malm, Quito, Ecuador, SW Bulletin)

2380, tangos at 0040, probably 2 x 1190 from Radio Nacional in Tucumán (Christer Brunstrom, Sweden, SW Bulletin) Very strong here at 0155; also on 2540, Radio Provincia Buenos Aires, La Plata, at 0005 2 x 1270. And on 5650, Radio Nacional Buenos Aires, at 2110 poor with fútbol (Alfredo Locatelli, Uruguay, Conexión Digital)

AUSTRALIA An Aboriginal-run organization says a new SW service for northeast Arnhem Land in the Northern Territory will allow easy access to important information. The service started in early August, giving the 7,000 Yolgnu people living in the region the chance to gain information on issues, such as health, in their own language. Richard Trudgen from Aboriginal Resource and Development Services says listeners can also ring the studio and ask for information they want to be broadcast (ABC news via Kim Elliott, DXLD)

ARDS is from transmitter at Humpty Doo, near Darwin, on 5050. Uses concept developed in Africa called "Radio Browsing". Listeners can ring the studio to ask for information they want to hear over the radio. Radio staff research the information via the web and/or other sources and develop a program to put to air. It also allows listeners to be directly involved in the development of programs. According to ARDS, the Yolgnu suffer from one of the highest death rates in Australia, they have lost almost all of their traditional economic enterprises to English-speaking Australians, and they suffer extremely high levels of unemployment. They are losing control of their communities, substance abuse and suicides are on the rise, and education and training are failing. ARDS says that a radio service is the only way it can effectively deliver the information and community education necessary for the Yolgnu people to regain control over their own lives. More at <http://www.ards.com.au/> (© Radio Netherlands Media Network)

Per Dale Chesson, radio manager they are 24 hours using 400 watts of a 1 kW transmitter. Two-element array beamed 100 degrees from Darwin. As funding becomes available they will put MW transmitters in the major centers. Report welcome to dale@ards.com.au or to ARDS, Box 1671, Nhulunbuy NT 0881, Australia (Hans Johnson, Cumbre DX) Definitely a weak signal on 5050 in the 1000-1030 period; a challenging catch for those further away (Craig Seager, ARDXC) Weak on 5049.94 at 0935 Aug 9, with indigenous music and talk (Paul Ormandy, New Zealand, ZL4TFX, DX Listening Digest) Fading in around 0930, stronger after 1100 but mixed with China. Generally ARDS Radio was dominant, the some deep fading with light aboriginal rock music and talks in Gupapuyngu or another Yolgnu Motha language. After 1200 China more powerful (Rob Wagner, Vic., EDXP)

Fortunately WWRB is not using 5050 when we have a chance at ARDS after 0930, but WWRB site says that frequency is available for block programming as late as 7:55 am (EST? EDT?) (gh)

Transmitters are ex-Civil Aviation, manufactured by Commonwealth Electronics, model AM20. Humpty Doo is at S 12 34 05, E 131 04 35. Antennae are two fiberglass helical whips with a front to back ratio of -50 dB and a beam of 110 degrees centered on 100 degrees true from Humpty Doo. To get an idea of our programming and why we started with HF prior to an MF rollout then

check out <http://www.ards.com.au/cdrsframe.htm> (Station manager Dale Chesson, via Rob Wagner, VK3BVW, DX Listening Digest)

New webpages for HCJB Australia: <http://www.hcjb.org/Sections+index-req-viewarticle-artid-210-page-1.html> (Dave Yetman, Engineer, HCJB Pifo via Alokesh Gupta, India, DXLD)

AUSTRIA Radio Afrika Internationale SW broadcasts stopped in June due to expense, but continued on MW and internet (Alexis Neuberger, RAI via Jean-Michel Aubier)

BANGLADESH Much improved modulation makes it a bit easier to listen. However, some days modulation goes down. English at 1230-1300 and 1815 on 7185. Although announcing // 9550 and 15520, only the 7185 transmitter is operational. Maybe they used the 9 MHz for parts for the 7; 15520 was last heard at least two years back, not since. 4880 has also been off for a couple of years (Victor Goonetilleke, Sri Lanka, BC-DX)

BELARUS Military transmitter relays BR 1 from Minsk on 4982 and 5134 LSB+USB. Parallel 279 kHz. At 0400-0401 I heard on both frequencies some communication, a man reading codes (figures and letters) in Russian, then switched over to radio program again (Karel Honzik, Czechia, hard-core-dx)

BOLIVIA R. San Miguel heard at 0930 on 4734.8, presumably ex 4930v, with a science transcription program from Radio Nederland (Paul Ormandy, ZL4TFX, DX Listening Digest) 4734.4v at 2305, distorted (Rogelio Fontanelle Aragão, Quillacollo, Bolivia, hard-core-dx) Riberalta station moved from 4930.37, good strength but distorted audio announcing 4730 (Björn Malm, Quito, Ecuador, dxing.info) Two days later back on 4930 (Aragão, hard-core-dx)

BOUGAINVILLE 3850.00, Radio Independent Mekamui, presumed, from 0915, peaking at 0950, pidgin talk and tentative ID, time check near 1000 (Don Moman, Lamont, Alberta, 4 element 80m yagi, DX Listening Digest)

BRAZIL Rádio Clube de Marília (SP), 3235, reactivated July 25 at 0130, asking for calls and mail from distant listeners; I was the first to respond and was interviewed on the air for 3 minutes (Célio Romais, Porto Alegre (RS), Brasil, Conexión Digital) Seems to be on the air from 2100 to 1000 (Romais, Panorama, @tividade DX) But by Aug 9, Marília programming on 3235 had been replaced by R. Guarujá Paulista, at 0130-0300, announcing this frequency (Caio Lopes and Célio Romais, Panorama, @tividade DX)

Among the wealth of resources at the Nagoya DX Circle website is this page listing Brazilian stations by state, not only SW but also those with webcasts and direct audio links; and then a SW frequency list, researched by Shigenori Aoki: <http://www2.starcat.net.jp/%7Eendxc/br.htm> (Glenn Hauser, DX Listening Digest)

Another excellent site with links to several Brazilian stations: http://www.geocities.com/Colosseum/Park/3232/dxing_brazil.htm (Adiel Nunes Ferreira, São Paulo, radioescutas) That's part of the 1000 Lakes site, by Pentti Lintuярvi in Finland, home: <http://www.geocities.com/Colosseum/Park/3232/dx.htm> (gh)

CHINA In August, CRI revamped its schedule in many languages, doubling the amount of program time from half an hour to one hour, or from one hour to two; this affected at least French, German, Hindi, Italian, Portuguese, Spanish. And English to Australia, 0900-1100 on 15250, 17690, per Robert Wise, Hobart, Cumbre DX, but the English service told Dan Say, that the two-hour program only goes to S Pacific and part of Africa, not NAM (gh)

[non] World Falun Dafa Radio's Asian service is now via KWHR 9930, called "Dafa Hao" via KWHR per <http://www.falundafaradio.org> - 1500-1600 on Sat/Sun and 1600-1630 on Mon-Fri (Wokisaka, DSWCI DX Window) This relates to the KWHR schedule and antenna changes, swung further north to hit China. I'm somewhat surprised a "Christian" station would be open to broadcasting programs by this non-Christian "cult" (Glenn Hauser, DX Listening Digest) "Falun Dafa Hao" - Falun Dafa is good - is often mentioned in Falun Dafa literature and on their websites. Perhaps World Harvest Radio's desire to keep a low profile on their broadcast of a Falun Gong program has led them to simply list it as Dafa Hao (Wendel Craighead, KS, CRW)

COSTA RICA RFPPI was not evicted on Aug 4; negotiations with the University for Peace began on Aug 11, and were to continue until the end of October unless resolved sooner; unfortunately a gag order prevented both parties from making public statements during this period. RFPPI remained on the air on 7445, but 15039 was off due to technical problems. An additional website was established: check <http://www.saverfpi.org> as well as [http://](http://www.saverfpi.org)

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-03=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

www.rfpi.org (gh)

R. Universidad de Costa Rica, 6105: I suspect they are not using their SW outlet on a daily basis. I tried for them day after day, but most of the time not even a carrier was noted. On other days, reception was quite good at 0600* (Harald Kuhl, Germany, DSWCI DX Window)

CUBA RHC is not currently broadcasting on SSB. Old transmitters are being retired, and new ones are on the way. When they go on the air, SSB on one or two frequencies to NAM will resume (Arnie Caro, DXers Unlimited) RHC Spanish with excellent signal at 0405 on 11875, 40 over 9; new transmitter? (Adán González, Venezuela, DXLD) Testing 9600 with new transmitter in Spanish evenings; reports wanted (Arnie Caro, DXUL)

[non] In the wake of irregularities detected in the previous administration of Radio-TV Martí, a high official of the Bush government told the Herald anonymously that the White House is keeping a close eye on the station's new management under Pedro Roig. No problems will be tolerated, as promoting democracy in Cuba is a high priority of this administration. The previous director of the Office of Cuba Broadcasting, Salvador Lew, had to resign after a State Department Inspector General report concluded that there had been nepotism, contracts signed without fulfilling legal requirements, and poor administration in general (Ruy Ferreira, El Nuevo Herald via Oscar de Céspedes, FL, Conexión Digital)

DENMARK WMR, World Music Radio is planning to resume operation late 2003. Test transmissions were due in August on 15810 and a frequency in the 6 MHz range, says <http://www.wmr.dk> (Bernad Trutenau, Lithuania, World of Radio)

DOMINICAN REPUBLIC HIJQ, Super Q, 4959.86, is heard almost daily from 0130 to 0400 (Adán González, Venezuela, DXLD)

ECUADOR [and non] What happened to the DXPL website <http://dxpl.hcjb.org/index.php> — This has stopped working (Larry Nebron, CA, DX Listening Digest) Site was not complex enough, so they redesigned it; the DXPL page now has an URL 100 characters long so I did everyone a favor and created a Tiny URL for it: <http://tinyurl.com/j7g7> — You're welcome. August WWCRC schedule shows DXPL: Sat 1430 12160, Sun 0200 5070, Tue 0930 9475, Wed 0830 3210, Thu 2000 15825. On at least one occasion, we heard the first airing of a new DXPL, rather than the last repeat of a previous one, Thu at 2000 via WWCRC 15825 (Glenn Hauser, DX Listening Digest)

ERITREA [non] Clandestine via T-Systems, DTK, Germany: Voice of Democratic Eritrea: Sat 1400-1430 Tigrigna, 1430-1500 Arabic to WEu on 5925 Jülich, 100 kW, non-dir; Mon/Thu 1700-1730 Tigrigna, 1730-1800 Arabic to EAF on 15670 Jülich, 100 kW, 130 degrees (T-systems Aug via Observer, Bulgaria)

ETHIOPIA [non] Clandestines via T-Systems, DTK, Germany: Voice of Democratic Path of Ethiopian Unity in Amharic: 0700-0800 Sun, 21550 Jülich 100 kW, 145 degrees; 1830-1930 Wed, 15565 Nauen 125 kW, 135 degrees.

Voice of Oromo Liberation (Sagalee Bilisummaa Oromoo), Tue/Wed/Fri/Sun: Oromo 1700-1730, Amharic 1730-1800 on 15670 Jülich, 100 kW, 145 degrees.

Radio Rainbow/Kestadamena Radio, in Amharic: 1900-2000 Fri, 15565 Jülich 100 kW, 145 degrees.

Voice of Ethiopian Salvation, in Amharic: 1600-1700 Thu/Sun, 15670 Jülich 100 kW, 145 degrees (T-systems Aug via Observer, Bulgaria) Website of Voice of Ethiopian Medhin (a.k.a. Voice of Ethiopian Salvation): <http://www.medhininfo.com> (Bernad Trutenau, Lithuania, DX Listening Digest)

GERMANY Since July 19 all foreign language programming of Deutsche Welle originated from new headquarters at Bonn, joined by German from August 4. The skyscraper will be handed over to the municipal authorities of Cologne; any decisions about the fate of the building will be their responsibility. Some measures against the asbestos contamination were already taken, so it appears that there is a chance for this impressive landmark to remain (Kai Ludwig, Germany, DX Listening Digest)

GUYANA I spent some time in Guyana a few years back and listened to the VOG every day and also saw them in action at many public events. They have true grit and little else to work with, yet come up with some great programming. One has to love a station that broadcasts the national Parliament one hour and a children's cricket banquet the next. Guyana is in a state of constant political/racial tension and VOG has taken the high road remaining objective at all times. Sadly it's not only a tough catch here, but also a tough one there, too. We were with the Akawio Indians in the upper Mazaruni district where they scrimped to buy a few batteries for their flimsy little analog radios each week, deftly working the dial every night for the BBC, VOA, and Radio Netherlands, but no Voice Of Guyana — not enough money to get out that far. Even the tribal Yaesu transceivers and the Icoms owned by the traders couldn't pick it up. I tried and tried with the handheld Yaesu VR-500 I had with me (a great little travel radio if you ever need to travel very lightly and need a DC to daylight device), stringing wires in every way possible with little effect (Michael Lijewski, Maryland, DX Listening Digest) 3291.07, Voice of Guyana, 0927-0936 Hindi music, news, 0935 ID as "Good morning, this is the Voice of Guyana..." 0936 back to Hindi music. Signal was fair (Chuck Bolland, Clewiston, FL, DX Listening Digest)

HAWAII Jane Barbe, whose voice was familiar to millions of telephone users across the country who ever dialed a wrong number or had to "Please listen to the following options" in a voice-mail system, died July 18 in Roswell, GA, of complications from cancer. She was 74. Mrs. Barbe was the queen of telephone recordings. Her friendly but authoritative voice was heard an estimated 40 million times a day in the 1980s and early 1990s on everything from automated time-and-weather messages to hotel wake-up calls (Elaine Woo, Los Angeles Times via Seattle Times via Bruce Portzer) Also the voice of WWVH (Portzer)

HONDURAS R. Litoral, 4832.0, verification from Mario Eduardo Bonifacio Castillo, Gerente shows they broadcast daily 1100-1600, 2200-0500. Mainly in Spanish; other languages are: Miskito 2200-2400 daily, Garífuna 0000-0200 daily, English 0400-0500 weekends (Takeshi Sejimo, Japan, Radio Nuevo Mundo) Letterhead/card says: Radio Litoral, HRLW, 4830 kHz, Un Ministerio de la Misión Común Cristiana de Honduras, Apdo. 888, La Ceiba, Atlántida; radiolitoral@psinet.hn Tel.: 504-441 5973. The program schedule shows the English hour consists of: 10:00 pm Música en Inglés; 10:30 pm Searchlight. In Spanish, there is nothing resembling a newscast or anything to do with current events; but then this is

another station absolutely preoccupied with an afterworld (Glenn Hauser, DX Listening Digest)

2859.98 is HRSJ, Radio Futura, Tocoa at 0200-0300* with "Música de recuerdos" from 0230. Ex-Radio Mundial. Harmonic from 1430 (Björn Malm, Quito, Ecuador, DX Listening Digest) Fair to good three nights in a row at 0115-0300 (Mark Mohrman, VT, DX Listening Digest) Nat R. Cultura as thought last month

INDIA Prasar Bhoroti CEO K. S. Sarma said AIR, which doubled its revenue in the first quarter of FY 2003-04 against last year's corresponding period, was going to launch a 24-hour news channel on SW (India Times via Kim Elliott, DXLD)

ITALY What's going on with Rai? Caio Lapes sent a reception report to P O Box 320 in Rome and it was returned marked "cosello chiuso". Has their funding been cut so much that they had to close the box? (Célio Romais, Panorama, @atividade DX)

KOREAS North Korea will stop its anti-South Korean propaganda broadcasts that a radio station has aired for decades, Yonhap News Agency reported, quoting government officials. "The Voice of National Salvation," run by the Korean People's Democratic Front Radio, said that anti-Seoul broadcasts would be stopped from Aug. 1, Yonhap quoted a Unification Ministry official as saying on condition of anonymity (Kyodo News via Japan Today via Mike Terry) VONS had been running for 33 years (NY Times via Jilly Dybko) And called for the South to reciprocate (Korea Herald via Ullis R. Fleming, Cumbredx)

The South also broadcasts to the North, but Seoul says the content is mostly information about the South rather than criticism about the North (© Radio Netherlands Media Network) VONS indeed missing from 3480, 4120.5, 4450, 4557 at 1240 after July 31, but the South's Voice of the People, still heard at 1245 on 6600, 3912, as well as Echo of Hope on 3985 and 6348, both jammed (Hans Johnson, WY, Cumbre DX) Analysts in Seoul point out the North is seeking more effective propaganda tools, scrapping the old-fashioned media. According to the South Korea Joint Chiefs of Staff, North Korean authorities recently instructed their propaganda machine to make full use of the Internet to appeal to the youth (<http://www.korea.net> via Cumbredx) If to judge from the KBS home page, there is only one service left (24h): http://www.kbs.co.kr/radio/social_radio.html ILG lists 3930 (0000-2400) & 6015 (0400-2130), marks 6135 (former R. Liberty 2) as inactive (Bernad Trutenau, Lithuania, Cumbredx)

KOREA SOUTH RKI launched a special Web site http://rki.kbs.co.kr/50yers/e_index.html to mark its 50th anniversary on 15 August 2003 plus a special 50th anniversary animated logo (© Radio Netherlands Media Network)

LAOS Sorry, no more 7145 external service. Not heard for at least 3 months. Domestic Service still heard around 1300 on 6130 (Victor Goonetilleke, Sri Lanka, BC-DX)

[non] Hmong Lao Radio, St. Paul, MN via Uzbekistan, opened its own website: <http://www.laohmongradio.org> (Bernad Trutenau, Lithuania, BC-DX) 17540, 0100-0200 Fri only, 200 kW (Nikolai Rudnev, Russia, NASWA LN Update via Al Quaglieri)

LATVIA According to Latvian sources, the new frequency for the 100 kW Ulbroka SW station will be 9290 (ex 9520, ex 9535). This has been coordinated and was to be registered at the HFCC conference in August. It's beamed towards the UK (250 degrees) and open for customers, with Laser Radio UK one of the potential users (Bernad Trutenau, Lithuania, Cumbredx)

LIBERIA By July 28, the number of Liberian refugees seeking shelter at ELWA's facilities in Monrovia reached 2,100 as fighting among rebels and government forces continued to intensify. ELWA's schedule was reduced to about three hours each morning and evening (HCJB press) Still heard July 26 at 2015-2055 on 4760, English religious programs, hymns (Anker Petersen, Denmark, DSWCI DX Window) ELWA was the only station still on the air in Monrovia, as of Aug. 6, says Coral Wilson of SIM. Government and other private stations had all gone silent, and unfortunately ELWA's SW transmitter developed a problem and was also off, but still on FM (SIM via HCJB press)

At the old VOA facility at Careysburg, with the start of the rainy season, the shelter situation of internally displaced persons (IDPs) at the VOA refugee camp became appalling, the transit buildings leaking, causing extensive flooding inside. About 2,000 IDPs were residing at four of the VOA buildings, used as transit centers. IDPs forced to remain awake at night when it rains, likely many of them could fall sick. ICRC constructed a transit center at the camp, which has capacity to accommodate some 400 IDPs (Reliefweb via Kai Ludwig, DXLD)

MÉXICO XERMX finally has a new program grid at <http://www.imer.gob.mx/cartas/rmi/pdf> with a great many changes: no more French or Portuguese; no longer any DX or mailbag programs in English, the equivalents in Spanish have new names, and are not repeated at various times of day, just: DX 21, Tue & Fri 2030-2045, "espacio dedicado a los radioaficionados y diexistas del mundo"; Línea Abierta, Mon, Thu, Sat 2030-2045, "los comentarios y opiniones de los escuchas de RMI". Unless I missed something in the fine print, the only English blocks remaining are: Antenna Radio (translation of the main Spanish newscast), M-F 1400-1430, 2200-2230; Talking Mexico, Sat & Sun 2200-2230; Regional Roots & Rhythms, M/W/F 2000-2015. However, actual monitoring on the weak and undermodulated 9705 and 11770 fails to confirm anything in English! Apparent new mailing address: Mayorazgo #83, Colonia Xoco, CP 03330, Mexico DF. This is effective until Oct. 1, when we suspect DF will go off DST earlier than we, and shift all programming one UT hour later (Glenn Hauser, OK, DX Listening Digest)

R. Huayacocotla, 2390, website is: <http://www.sjsocial.org/Radio/huarad.html> DX propagation only around sign-on and sign-off, better in winter; Program grid: http://www.sjsocial.org/Radio/rh_prog.html Has two brief audio clips of national anthem in indigenous languages and two rustic singing IDs, neat: <http://www.sjsocial.org/Radio/ejemplos.html> (Glenn Hauser, DX Listening Digest)

6045, XEXQ Radio Universidad, during the 1200 hour, includes classical music, QRM from China; <http://www.ustlp.mx/rtu/> gives contact address and an idea of the programs on shortwave; phone 4 (8) 26-13-48; fax 4 (8) 26-13-88 (Hans Johnson, WY, Cumbredx) XE anthem right at 1200, talk until 1210, then classical music, peaking around 1225 in mid-July (John Wilkins, CO, ibid.)

The Zapatista rebel movement, noted for spreading its message over the internet, is turning to an older technology: shortwave radio. Subcomandante Marcos said the movement would begin shortwave broadcasts from Oventic,

Shortwave Broadcasting

Chiapas, August 9 on 5.8 megahertz, though in case of government interference, "move your dial in the same way you would your hips in a cumbio and hunt until you find us." (AP via Artie Bigley, Mike Terry, and Jilly Dybka) According to <http://www.fzln.org.mx/> of the Mexican opposition group Zapatista Army of National Liberation, "The famous (in the mountains of the Mexican southeast) and slippery (on the dial) Radio Insurgente, Voice of the EZLN, will soon begin operating on short wave, in its galactic transmission." Radio Insurgente has already been operating for two years on FM in Chiapas using several FM transmitters at different locations. Broadcasts are on the air between 0600 and 1800 local time in several indigenous languages as well as Spanish. The majority of the staff are female (© Radio Netherlands Media Network) The Zapatistas began broadcasting by shortwave radio in the afternoon, but the signal at 5.8 megahertz was so weak it was difficult to hear in nearby San Cristóbal de Las Casas (AP via Billings Gazette via Artie Bigley) More details at <http://www.ezln.org>

Much more, including audio files at <http://chiapas.mediosindependientes.org/>

Radio Insurgente "Voz del EZLN" on 5800 broadcast at 1900 UT, called "1500 Southeastern War Front Time", i.e. UT -4 (via Gabriel Iván Barrera, Conexión Digital) Possibly what I heard at 0317-0340 on 5800, poor with lots of tropical noise but what sounded like the frequency numbers in Spanish "...ocho cero cero..." (Gary Crites, Eureka, California, hard-core-dx)

MONGOLIA MR-1 domestic service reactivated on 4895 from *2055, and 4830 also on by 2130, IS same as on VOM external service. Good signal (Jari Savolainen, Kuusankoski, Finland, World of Radio) Used to be 12 kW transmitters in Altai on 4830 and Möron on 4895 (Bernd Trutenau, Lithuania)

NEW ZEALAND RNZI announced it would expand to 24-hour operation Sept 1 with a new extended news and current affairs service. A new daily regional current affairs program, *Dateline Pacific* is at 0808 UT M-F, repeated at 1108, 1308, 1508, 1815, 2015, 2215, 0308 and also via <http://www.mzi.com> The Bulletin service is also extended with extra hourly Pacific News at 0100, 1100, 1300, and 1500, in addition to 0300, 0800, 1700, 1800, 1900, 2000, 2100, 2200. During extended hours of broadcasting, will run a mix of RNZI-originated material and the best of New Zealand's National Radio (Adrian Sainsbury, RNZI) Some or all times may shift one UT hour earlier when DST begins in NZ, Oct 4 (gh)

NICARAGUA R. Nicaragua has not had a SW transmitter for several years, and there are no plans to obtain one, especially due to the Internet information highway. We have obtained a new transmitter for MW 620, which will soon be much better heard beyond our borders (Alfonso Moncada Cuéllar, Director General via Héctor García Bojorge, Conexión Digital)

PAPUA NEW GUINEA Life Radio Ministries, Inc. President Joe Emert visited here in June and July and published a series of journals about efforts to arrange for a new Wankot Radio Light tropical-band SW station in addition to a nationwide FM network: <http://www.wmv.com/png%20updates.htm> (DX Listening Digest)

PARAGUAY Radio América hoped to use as much as 5 kW, 24 hours on 7370, 9905, 15483; and also experiment with tropospheric scatter on UHF 326.4 MHz toward Buenos Aires (Adan Mur, via Arnoldo Slaen, Conexión Digital)

PERÚ Received a nice e-mail letter for my typed report from Radio Ilucán, Cutervo (5678 kHz), signed by José Galvez Salazar, Gerente, radioilucan@hotmail.com (Jyrki Hyytönen, Kannus, Finland, dxing.info) Alfredo "Spacemaster" reports the schedule is M-F 1000-1300, 2200-0200, Sat & Sun 24h (Célio Romais, @tividade DX)

One morning around 0945 to 1000 at exactly 4746.84, R. Huanta was coming in extremely well, with listenable programming of splendid native Peruvian music; a very chaty morning show. Most entertaining! My first logging of this, and great fun to hear. The next morning, not a trace (Steve Woldee, CA, DX Listening Digest)

R. Emisoras Cajamarca caught on 3391.5 at 2330-0030. WRTH listed as Radio Cutervo, OAX2R (César Pérez Dioses, Chimbote, Perú, DX Listening Digest)

A Quillabamba station has moved! 5121.11 varying to 5131.24, Radio Suroriente at 0035. New frequency ex-5067.11.

Reactivated after several years, Radio San Miguel, San Miguel de Cojamarca at 2350 on 5500.21. After 0000, "Buenas Noches Perú", request-music (Björn Molm, Ecuador, SW Bulletin)

ROMANIA/ARMENIA Both have a Sunday-only service of 0800 on 15270, a tremendous mess, surrounded by a number of empty channels (Wolfgang Büschel, Germany, BC-DX) Another ridiculous situation (Noel R. Green, UK, *ibid.*)

SERBIA & MONTENEGRO Slobodan Orlic, Director of the Serbia-Montenegro Council of Ministers' Information Directorate, has said that all state-owned print and broadcast media should be privatized. However, he argued that Radio Serbia-Montenegro [sic], formerly Radio Yugoslavia, should have a changed name but remain on a short-wave frequency with a state budget — "radio is not a big expense and the country must invest in its image". (B-92 via Kim Elliott, DXLD) At 2100 I was listening to English news from ex-Radio Yugoslavia on 6100. Their new name is The International Radio of Serbia-Montenegro. However, 2107 UT jingle: "Radio Yugoslavia" (Jouko Huuskonen, Turku, Finland, DX Listening Digest)

SOMALIA [non] Radio Huriyo, clandestine via T-Systems, DTK, Germany: Tue/Fri 1630-1700 on 15670 Jülich, 100 kW, 130 degrees (T-systems Aug via Observer, Bulgaria)

SUDAN [non] New "target radio" for Sudan (I would like to avoid the term "clandestine"), M-F: 1600-1700 on 17630, 1700-1800 on 17660. Provided by: US Agency for International Development, Bureau for Democracy, Conflict and Humanitarian Assistance, Office of Transition Initiatives, which says: The radio service will present a diverse mix of timely and relevant programming broadcast in Sudanese languages, by Sudanese presenters. Plans to expand from two to six hours/day (Bernd Trutenau, Lithuania, DX Listening Digest)

Mostly tinny music testing at first, changing from 17630 to 17660 at 1700 (Scott R Barbour Jr., Intervale, NH, DX Listening Digest) Same here, fair on both clear channels (Hans Johnson, WY, Cumbredx) I guess a VT Merlin brokered transmission, from Woolferton, England (Wolfgang Büschel, Germany, DX Listening Digest) With plenty of back-radiation toward us (gh) I wonder how well WOF

is heard in the Horn of Africa? That's not a location it was built to transmit to! (Noel R. Green, UK, BC-DX) Both excellent here; programming started 30 seconds before top of the hour, an old standard BBC procedure that strongly suggests a Merlin connection (Chris Greenway, Kenya, DX Listening Digest)

Sudan Radio Service included three minutes of African news in English at 1618 on 17630, and IDs in English between African language segments. Said they were financed by Washington, studios are in Washington, transmitters in UK (Bernie O'Shea, Ont., DX Listening Digest) Comments were welcome to: srs@edc.org English, Arabic, and Juba Arabic are carried every day, other languages once a week. News at 1615 starting in English (Hans Johnson, WY, Cumbredx)

"We will be bringing you a variety of interesting programs including programs on health, education and agriculture; independent and balanced news. One of the most important objects of this radio service is to provide you with accurate information about the search for peace in Sudan. We'll also be presenting you with cultural programs including music, stories and poetry, we'll be developing education programs and programs about your health, programs about agriculture and how to take care of your livestock, information about local market and the changing economy of Sudan and we will be bringing stories, music and dramas. If you are a musician, a storyteller, a poet or anyone with an idea for radio program for Sudan, please e-mail us at srs@edc.org Every day we will broadcast in the following languages: English, Goba Arabic and Arabic, on Monday you will hear program in Denka, on Tuesday Zandy, on Wednesday Noowher and Moro, Thursday Bary and Friday Sholuk." (via Mahmud Fathi, Germany, Cumbre DX)

Jeremy Groce, Radio Programming Advisor, told me that on 7th August they started their first regular broadcast; jgroce@edc.org or srs@edc.org (Björn Fransson, Gotland, DX Listening Digest) Due to unstable conditions in Sudan, EDC is establishing an office in Kenya in the interim. The SIRS will be transferred to Sudanese ownership once sufficient capacity is built and local conditions are favorable. As EDC works to establish its Nairobi offices, broadcasts are initially being produced in Washington DC (© Radio Netherlands Media Network) More at <http://www2.edc.org/mcl/projects/pr.asp?ID=23> (Kai Ludwig, DXLD)

USA GAO report on US International broadcasting, 56-page document: <http://www.gao.gov/new.items/d033772.pdf> Note especially: REDUCING THE NUMBER OF LANGUAGE SERVICES AND BROADCAST OVERLAP HAS BROAD SUPPORT; but: Senator Lugar, Chairman of the Senate Foreign Relations Committee, has expressed the view that the U.S. should not withdraw broadcasting services in certain countries until there is assurance of a free and fair press in those countries. In this regard, that Committee has approved S.925 which contains a provision that would prohibit the BBG from eliminating the foreign language broadcasts proposed for elimination in the BBG's fiscal year 2004 budget request (via gh, DX Listening Digest)

VOA says it plans to expand its 8-page English Program Guide for April/October to include information in ALL of VOA's languages on ALL VOA programming (quite a substantial magazine, I presume), to debut later this year. Request from VOA Audience Mail Unit, 330 Independence Ave SW, Washington, DC 20237, or at letters@voa.gov (Stefano Volionti, Italy, Southern European Report, BDXC-UK Communication)

R. Caroline returned to WBCQ July 21, M-F 2200-2300 on 5100 (Tony Christian, R. Caroline via Mike Terry, BDXC-UK) Later changed to 5105 (gh) Pirate John's "Radio DC" was cancelled by WBCQ after John apparently made insulting anti-Semitic remarks to station owner Allon Weiner during a business phone call in which John had called to complain about a problem with the broadcast of his show; had been 0415 UT Mondays on 7415, and World of Radio was moved back into that slot.

New on 5105 is "Area 51" Hosted by Tim Smith and/or Michael Ketter, Sun 2200-0400 Mon UT, featuring the best of WBCQ's entertainment programming, with an emphasis on shows that have been off of the schedule for a while, mixed with live talk and e-mail / phone in. Requests are definitely welcome and encouraged to area51@wbcq.us (Michael Ketter, WBCQ)

The final Spectrum program on WWCR was broadcast on July 26. Could be on Internet in the future (Barry, Radiowave Man, MT messageboard) Replaced by Cyberline for two hours at 0300 UT Sun on 5070; plus three hours from 0200 UT Mon on 3210 (Glenn Hauser, OK, DX Listening Digest)

WWRB has been carrying out extensive testing of new antenna to South America, azimuth 150. Patriot programming, and various other non-Christian programs are on the way out. We are removing this programming and sending to other stations. We are adding additional solid Christian programming in various languages such as Polish, Arabic, Spanish, Romanian. We are converting our shortwave operations to non profit 501 C3 tax exempt status (Dave Frantz, WWRB, DX Listening Digest)

In the June 2003 issue of the Assemblies of Yahweh publication, *The Sacred Name Broadcaster*, Elder Jacob O. Meyer mentions, "I have two Pennsylvania Dutch New Testaments; I will soon be speaking in this dialect (or language, if you please) over our newly enlarged WMLK shortwave radio transmitter." (Michael W. Enos, OH, DX Listening Digest) It's actually German; see <http://www.800padutch.com/amish.shtml> and <http://www.kerchner.com/padutch.htm> (Bill Matthews, OH, DX Listening Digest)

Whitley Strieber's talkshow *Dreamland* is now on WRAM, 7385, carrying Lou Gentile's Paranormal Radio Network, part of IBC, UT Sun & Mon 0300 and M-F 0700-0900 (from <http://www.ibcradio.com/radioschedule.htm>)

WPAD, Paducah, KY, 1560, heard on 2340 at 0945 (Ron Troto, IL, DX Listening Digest) A rare sesqui-harmonic! - 1.5 x 1560, probably due to transmitter generating 780, for doubling but also radiated at triple (gh)

VIETNAM [non] Voice of Hope/High Adventure Ministries via Jülich, Germany, 1330-1430 on 15775, 100 kW, 70 degrees daily to Vietnam in Vietnamese (T-systems Aug via Observer, Bulgaria) Chan Troi Moi, 15775, at *1327-1354, seemingly news with musical segments between features (Rich D'Angelo, PA, NASWA Flashsheet)

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

0000 UTC on 12040

UKRAINE: Radio Ukraine Intl. Interval signal to ID and frequencies. Ukraine Today program segment and update on Iraq. (William McGuire, Cheverly, MD)

0100 UTC on 5930

SLOVAKIA: Radio Slovakia Intl. Interval signal to station identification and frequency schedule. Political news and currents affairs report. (McGuire, MD)

0109 UTC on 6925 USB

PIRATE: Sunshine Radio. Station ID "you're on Sunshine Radio", into Motown, Soul and Disco music tunes. Blondie's *Call Me* at 0117 and *One Way or Another*. First log of Sunshine Radio in three months. (Joe Wood, Gray, TN) 0410-0419+ (Harold Frodge, Midland, MI) Pirates logged: **Undercover Radio** 6955 USB, 0128-0136; **Radio Free Speech** 6950 AM 0140-0201*; (Wood, TN) **United Militia Radio** 6925 USB, 0209-0229. (Tom Banks, Dallas, TX)

0110 UTC on 6150

BRAZIL: Radio Record. Portuguese soccer commentary under Costa Rica's Univ. Network. (SINPO 33333). Radio Anhanguera 11830, 2325; **Radio Nacional da Amazonia** 11780, 2040-2345. **Radio Brasil Central** 4984.9, 0741-0750; **Radio Cancao Nova** 6105, 0750. **Radio Tupi** 9565, 0110; **Radio Bandeirantes** 11925, 0112; **Radio Cultura** 17815, 01115. (Gayle Van Horn, NC) **Radio Educadora** 3375, 1019-1025; **Radio Guarujá** 5980, 0256-0306; **Radio Cultura** 3365, 0148-0153. (Nicholas Eramo, Argentina/HCDX)

0130 UTC on 6175

CANADA: Voice of Vietnam relay. Vietnamese. Station ID to national music and world newscast. (McGuire, MD) **RCI** 6140 at 2220 *World At Six*. (Bob Fraser, Cohasset, MA)

0250 UTC on 4910

ZAMBIA: Radio Zambia. Fish eagle interval signal to national anthem at 0251. English sign-on identification as "Zambia...Radio One" at 0253 to newscast and regional topics. (Van Horn, NC)

0335 UTC on 4976

PERU: Radio Del Pacifico. Spanish regional ads to religious text. Fair signal quality. (Banks, TX)

0505 UTC on 7195

MOROCCO: VOA relay. Discussion on Israel/Palestinians conflicts to newscast. **RFE/RL** -Morocco 9865, 0538 Arabic. (Stewart MacKenzie, Huntington Beach, CA) Morocco's **RDTV Marocaine** 7135, 2325-2335 in Arabic. (Van Horn, NC)

0655 UTC on 4845

MAURITANIA: Radio Mauritanie. Islamic prayers to Arabic music and Arabic service. Good-very good signal. (Wood, TN) Station logged 2335 in Arabic to 0001*. (Van Horn, NC)

0700 UTC on 9490

TIBET: Xizang PBS, Lhasa. English, "This is China's Tibet People's Broadcasting Company." Mentions of "Holy Tibet is the window into the life of Tibet." Mentioned reception reports would be verified if two IRCs are enclosed. Heard parallel weaker 9580. English repeated at 1100-1130 daily, // 4905, 4920, 6200 and 7385, whereas 5240 and 9580 were not heard. (Ronald Schulze, Philippines/DSWCI DX Window/DXLD) **Xizang PBS**, Lhasa 7170, 1433 with amateur radio QRM. (MacKenzie, CA)

0705 UTC on 15415

AUSTRALIA: Radio. Pacific national news of Northern Marianas and Solomon Islands. Station ID at 0709. (Wood, TN) 5995, 1415; 21740, 2135. (MacKenzie, CA)

0705 UTC on 15445

POLAND: Radio Marya. (Tent.) Newscast read by male/female duo, possibly in Polish. Partial ID audible as "Radio Marya..." lost in the static. Poor signal with heavy interferences. (Wood, TN)

0716 UTC on 15605

GABON: Radio France Intl relay. News on Liberia followed by item on French president's meeting with Malaysian Prime Minister. Today in France with fair-good signal quality. (Wood, TN) Gabon's **Afrique Numero Un** 9580, 1905 with French news, no sign of / / 15475. (Van Horn, NC) station logged 9580 at 0520; 155475 at 1815 French. (MacKenzie, CA)

0720 UTC on 15675

CLANDESTINE: Voice of Mesopotamia. (Tent.) Continuous Middle Eastern music without any announcements observed. Very faint, but clear signal. (Wood, TN)

0814 UTC on 4890

PAPUA NEW GUINEA: NBC. Program of island vocals to ID and English news, sports and weather commencing at 0900. Brief commercial into music program. Signal improved by tune-out from initial weak status. (Rich D'Angelo, PA/NASWA Flash Sheet)

0823 UTC on 5970

BRAZIL: Radio Itatiaia. Portuguese. Vocals to announcer's lengthy talk. Ad string of commercials to jingles and station ID at 0830. Regional time check at 0833 and brief musical intervals between talk segments. Fair signal quality. (D'Angelo, PA) Brazil's **Radio Nacional** 11780, 2200-2215. (Wood, TN)

1030 UTC on 15300

FRANCE: Radio France Intl. French newscast about Tony Blair with fair signal quality. (David W. Weronka, Benson, NC)

1418 UTC on 11715

GREECE: VOA relay. Station segments to VOA identification. **VO Greece** 12105, 1844-1857* SIO 333. (Harold Frodge, Midland, MI)

1435 UTC on 7155

PHILIPPINES: VOA relay. Vocal music to VOA identification mixing with Chinese station, possibly. **Radio Pilipinas** 17720, 1750, // 15190 (333) 11720 (232). (MacKenzie, CA)

1735 UTC on 13705

RUSSIA: Radio Rossii. Domestic service of regional folk vocals and opera. Russian text and identification to 1800*. (Van Horn, NC) **Voice of Russia's** French service 15535, 1812. (MacKenzie, CA)

1750 UTC on 15120

NIGERIA: Voice of. English newscast to sports update and ID. Station audible on subsequent rechecks at 2005 and 2130. World news at 2250 recheck, monitored to 2300*. (Van Horn, NC) Monitored 2242-2300* with SIO 454. (Frodge, MI) 1822 with Africa Now. (MacKenzie, CA)

1820 UTC on 15130

CHINA: China Radio Intl. German programming to ID. China's Xinjiang PBS audible 17740, 2150. (MacKenzie, CA)

1904 UTC 11630

VIETNAM: Voice of. Clear station identification during English service. SINPO 33343. (Jerry Brookman KL7CMN, Kenai, Alaska)

1940 UTC on 11995

NORTHERN MARIANAS: Radio Free Asia. Announcer duo's Chinese including mentions of Taiwan and China. (MacKenzie, CA) Station observed 13690, 1733; via **Palau** 9905, 1658. (Van Horn, NC)

2124 UTC on 13610

SYRIA: Radio Damascus. Commentary on Israel and Palestine to ID at 2137. Review of the Syrian Press segment with good audio level, slight splatter via 13615 WEWN. (Scott R. Barbour, Jr, NH/Cumbre DX)

2223 UTC on 15220

ASCENSION ISLANDS: Radio Japan relay. Japanese service with news segments to feature at 2230. Additional Ascension Islands relays logged; **Radio Canada Intl** (French) 11755, 2227; **BBC WS** (Portuguese) 15390 // 9870, 2230. **VOA** (English) 7105, 0300. (Van Horn, NC) **BBC WS** (English) 12095, 2236. (MacKenzie, CA)

2302 UTC on 11775

ROMANIA: Radio Romania Intl. News of Romanian foreign policy and visit of Greek Archbishop. Station ID at 2307 // 11740 good. (Wood, TN)

2310 UTC on 4783

MALI: RTV Malienne. French service including pops, rap and hip hop tunes. Parallel 995 fair for ID and public service announcements. (Van Horn, NC)

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

Enclosures from the Goodie Factory

One of the methods used by collectors to hopefully extract a verification, is to enclose a small gift inside the envelope with their reception report. The practice of sending "extras" to the station is so common now, that many DXers have become experts when it comes to such.

There is, perhaps, less of a need to entice the larger stations, unless you simply desire to do so; it is the small broadcaster, the "tougher-to-verify" station where the "extras" may make the difference.

Normally, special enclosures should be fairly light and fit into a business size envelope, since the more weight you add to the report, the more the postage will climb. Consider too, a heavy letter could attract the attention of less than honest postal workers. No one has published a definitive list of possible enclosures, but they can be as limitless as your imagination, such as:

- Picture postcards of your local area, or pick up extras while on vacation.
- Bumper stickers and promotional souvenirs from local AM radio stations.
- Travel brochures from the Chamber of Commerce.

- Your SWL card. Print up a supply from your computer graphics program.
- Personal business card. Don't you always have plenty in stock?
- A photo of yourself, your shack, or your faithful companion, *Elvis the DX Dog!*
- Newspaper or magazine articles...but keep it friendly and positive.
- Used US or foreign stamps. Keep a supply on hand from your incoming mail.
- A cassette of recorded music. Some stations return them with their own local music
- Plastic pennants from your favorite sports team or football/baseball trading cards
- If you're a ham, don't forget your QSL card!

The list is endless. When I lived in New Orleans, Mardi Gras souvenirs proved very successful. Nowadays, scenic mountain photos from here in Brasstown remain a hit. What has been your favorite from the Goodie Factory?

AMATEUR RADIO

Angola-D2GG, 20 meters. Full data color mask QSL card. Received in 17 days for self addressed Euro nested envelope and two US dollars. QSL address: Vitor Figueiredo Reis, Quinta Dos Telheiros-Chainca, Abrantes 2200, Portugal. (Larry Van Horn, NC) DXCC # 168.

Dodecanese Islands-SV5AZP, 15 meters. Full data card. Received in 18 days for an SASE and one US dollar. QSL address: Padelis Vasileiadis, Box 278, GR-85100 Rhodes, Dodecanese. (Van Horn, NC)

CAMEROON

Cameroon RTV Corp., 4580 kHz. Full data verification letter signed by James Achanty-Fontem. Received in 17 months for an audio taped report. Station address: Boite Postal 1634, Yaounde, Cameroon. (Cesar Perez Dioses, Chimbote, Peru/HCDX). Verification was postmarked from Douala, which would verify that any CRTV reports may be sent to Mr. Fontem, Cameroon Link, Shortwave Monitors, P.O. Box 1460, Douala, Cameroon.. Website: <http://www.crtv.cm>. - GVH

CZECH REPUBLIC

Radio Prague, 7345 kHz. Full data Jawa 500 motorcycle card with illegible signature, plus schedule, sticker and bookmark. Received in 74 days for an email report to; cr@radio.cz Website: <http://www.radio.cz>. Postal address: Czech Radio, Vinohradska 12, 12099 Prague 2, Czech Rep. (Kraig Krist KG4LAC, Annandale, VA)

MEDIUM WAVE

KKOW, 860 kHz AM. Verification form letter signed by Lisa A. Butler-Promotions Director, plus coverage map and station profile sheet. Received in 90 days for a taped report. Station address: 1162 E. Hwy 126, Pittsburg, KS 66762. (Patrick Martin, OR)

KXMR, 710 kHz AM. Verification letter signed by Holly Weber-Business Manager, plus ND highway map and station T-shirt. Received in 23 days for a taped report. Station address: 3500 E. Rosser, P.O. Box 2156, Bismark, ND 58502. (Martin, OR)

MYANMAR

Radio Myanmar, 5985 kHz. Verification letter signed by Ko Ko Htway-Director of Broadcasting, plus schedule and freq schedule. Received in 85 days for a taped report. Station address: Pyay Road, Yangon 11041, Myanmar. (Martin, OR) *Bravo on this QSL, can't recall the last time I saw them verified. - GVH*

PERU

Radio La Hora, 4855 kHz. Full data Radio La Hora card signed by Carlos Gamarra Moscoso-Director. Received in one month. Station address: Av. Gercilaso No 411, Wanchaq-Cusco, Peru. (Joe Talbot, Red Deer, Alberta, Canada/HCDX)

PIRATE

Big Thunder Radio, 6925 kHz. Full data personalized card signed by Papa Doc and Sapphire. Card artwork depicts a Great Plains sunset and windmill. Received in 17 days for a pirate report via email to: bighunderradio@hotmail.com. (Joe Wood, Gray, TN)

Partial India Radio, 6950 kHz. Full data sheet *Reception Reports Arriving at PIR HQ*, signed by Sanjay Smilkstein and Harald Krishna. Received in six months for pirate report and three mint stamps. QSL maildrop: P.O. Box 28413, Providence, RI 02908. (Ross Comeau, Andover, MA)

POLAND

Radio Maryja, 15455 kHz (via Russia). Full data card signed by Malgorzata Zaniewska, plus personal letter, stickers and religious booklets. Received for an email report to; radio@radiomaryja.pl. Website: <http://www.radiomaryja.pl>. Postal address: ul.

Zwirki i Wigury 80, 87-100 Torun, Poland. (Dioses, Peru/HCDX)

Radio Polonia, 11820 kHz. Full data card unsigned. Received in two weeks for an English report. Station address: P.O. Box 46, PL-00-950 Warsaw, Poland. (Wood, TN) Website: <http://www.radio.com.pl/polonial/>.

SLOVAKIA

Radio Slovakia Intl, 5930 kHz. Full data Slovak Museum card, unsigned. Received in 62 days for an email report to; englishsection@slovakradio.sk. Website: <http://www.rsi.sk>. Postal address: Mytna 1, P.O. Box 55, 81755 Bratislava 15, Slovakia. (Krist, VA)

USA

WBOH 5920 kHz. Full data color light-house card signed by A. Robinson, plus personal note, large station sticker and program guide. Received in 10 days for an English report and one mint stamp. Station address: 520 Roberts Road, Newport, NC 28570. (Gayle Van Horn, NC)

UTILITY

Singapore Volmet, 6676 kHz USB. Verification letter signed by Chua Guat Mui-Director, plus pamphlet. Received in 29 days for an English report and one US dollar. Station address: National Environment Agency, Meteorological Service Division, P.O. Box 8, Chani Airport Post Office, Singapore 91841, Singapore. (Kenji Hashimoto, Japan Premiur/DXLD)

YEMEN

Radio Sana'a, 9779 kHz. Full data letter signed by Mohammad H. Bather-Director Engineering Dept., plus QSL card. Received in 34 days for an English report and one IRC. Station address: Ministry of Information, P.O. Box 2182 (or Box 2371), Sana'a-al Hasbah, Yemen. (Comeau, MA) Website: <http://www.yradio.gov.ye>.

This is the Voice of America

Late summer is "prime time for reading" season for me and the book I am avidly absorbing is *Voice of America, A History*. Its author is Alan Heil, Jr., whose 36 year career at "The Voice" included stints as a foreign correspondent, Chief of News and Current Affairs and Deputy Director of Programs. Those four decades of service placed him in a unique position to observe the VOA, and he draws conclusions about its effects and the forces which influenced it from a perspective truly informed by history and experience. I can say with confidence that anyone with a genuine interest in shortwave radio and international broadcasting cannot fail to be captivated by this account.

Voice of America, A History

by Alan L. Heil, Jr.

Columbia University Press, New York

(c) 2003, 538 pages, hardcover.

◆ A Duty to Monitor?

The Smith-Mundt Act bars the VOA from having virtually any contact with U.S. listeners. Yet, as is clear from Mr. Heil's book, the VOA's history and mission are no less important – nor less interesting and colorful – than that of the higher profile BBC. With a weekly worldwide audience of at least 94 million learning much about themselves and us from the VOA, shouldn't citizens exercise *some* informed oversight over such a pivotal government program? Who better to perform this public service than stateside shortwave listeners? So, here's a comprehensive program directory to help you monitor the VOA and form your views. More about this idea next month.

◆ Monitoring "The Voice"

Today's VOA consists of several services tailored to different audiences. These are: *News Now* (Worldwide English), *English to Africa*, *Special English*, *English Teaching*, *Radio Sawa* (formerly the Arabic Service), *Radio Farda* (formerly the Persian Service) and more than fifty language sections.

Like other international services, it utilizes a multimedia approach embracing radio, television, the internet (including text, audio, video and e-mail), shortwave, satellites and local broadcast partnerships. Some VOA television programs (termed *Worldnet*) – as well as individual radio programs and the live *VOA News Now* audio stream – can be accessed on the Internet. Start from the main web site <http://www.voa.gov> and navigate to the directed pages.

Shortwave remains a vital part of this distribution mix and many VOA frequencies, although targeted outside the US, can be heard here. Refer to the web sites provided and *MT's Shortwave Guide* for frequencies. Try them all. Different frequencies will work best at different monitoring locations and signal quality may vary considerably even day-to-day. My observations from upstate NY are in **bold brackets**.

News Now (VOA Worldwide English) – 24 hrs.

<http://www.voanews.com>

min.	utc hrs.	days	program
:00	All	D	News & Reports
:05	08/17*	M-F	Talk to America (*live)
		A/S	Best of TTA
		M-F	Border Crossings
		M	American Gold
		T	Roots & Branches
		W	Classic Rock
		H	Top 20 Countdown
		F	Country Hits
		A/S	Jazz America
:15	Even but*	M-F	Focus [*not 08]
:20	All but*	D	Sports [*not 08/09/13/17/19/21]
		D	Headlines
:30	All	M	Press Conference USA
:32	00	T-A	Coast to Coast
		S	Encounter
	Odd*	M-F	Business [*not 09/13/17/19/21]
	01/05	A	News Review
	02/04/06/10	S	Best of TTA
	12/14/16/18	S-H	Main Street
	19	F	On the Line
	02/06/10/14/18	M-F	Coast to Coast
	03/07/11/15/19/23	F	News Review
	04/12/16/20	A	On the Line
	20	A	Our World
	22	S	Issues in the News
	Odd*	A	Press Conference
:45	00	M-F	Business
	01/05/16/20	D	Main Street
	02/06/10	M-F	Dateline [*not 09/13/17/19/21]
	03/11/23	T-F	Opinion Roundup
	07/15/17	S-F	Editorial
	08/14	F	Opinion Roundup
	12	A	Editorial
	18	M-F	Editorial
		M-F	Opinion Roundup
		D	Editorial
		S	Editorial
		A/S	Editorial

[JF's "Guide": 0000-0200 – 5995/6130/9455(T-A), 0100-0300 – 11705, 1000-1100 – 5745/7370/9590, 1100-1500 – 15160, 1500-1700 – 15205, 1700-1800 – 15255, 2200-0000 – 17820.]

English to Africa (0300-0700; 1600-2230)

<http://www.voanews.com/englishafrica/>

utc	days	program
0300	M-F	Daybreak Africa
	A/S	News Now
0330	M-F	News Now
0430	M-F	Daybreak Africa
0500	M-F	News Now
0600	M-F	Daybreak Africa
0630	M-F	News Now
1600	M-F	News Now

1630	A/S	Nightline Africa
1653	M-F	Africa World Tonight
1700	M-F	Sonny Side of Sports*
	S	Reporters' Roundtable (after news)
	A	News Now
1730	S	Music Time in Africa
	M-F	News Now (on most freq.)
	M-F	Studio 7 (on 11975, 17895)+
1800	S	News Now
	M-F	Africa World Tonight
1830	W	Straight Talk Africa*
1838	M-F	Sonny Side of Sports*
1900	M/W-F	News Now
	T	Housecall (after news)
	A	Hip Hop Connection (after news)
1930	S	Music Time in Africa
	M-F	World of Music
	A	News Now
2000	M-F	Africa World Tonight
	A/S	Nightline Africa
2038	M-F	Sonny Side of Sports*
		*part of Africa World Tonight
		+special for Zimbabwe

[JF's "Guide": 0300-0500 – 9575, 0500-0700 – 6035/9535(from 0400), 1600-2200 – 15410/15580, 1730-2230 – 17895, 2000-2200 – 15445, 2200-2230(M-F) – 15580.]

Special English

<http://www.voaspecialenglish.com>

0030, 1530, 2230	to Asia	
1630	to Africa	
1930	to Mideast	
0130 (T-A)	to the Americas	
min.	days	program
:30	D	News
:41	M	Development Report
	T	Agriculture Report
	W	Health Report
	H	Education Report
	F	Environment Report
	A	In the News
	S	Words & Their Stories
:45	M	This is America
	T	Science in the News
	W	Explorations
	H	The Making of a Nation
	F	American Mosaic
	A	American Stories
	S	People in America

[JF's "Guide": 1630 – 17895, 0130(T-A) – 7405/9775/13740.]

English Teaching

<http://www.dyned.com/dyned/eng/voaradio.html>

1500	to Asia	
2300	to China	
1600	to Africa	
1900	to Mideast & Europe	
min.	days	program
:00	D	New Dynamic English (basic)
:15	D	Functioning in Business (intermediate)

[JF's "Guide": 1600 – 17895.]

Radio Sawa

<http://www.radiosawa.com>

freq. info: www.voa.gov/index.cfm?sectionTitle=Shortwave%20Frequencies#A

Radio Farda

<http://www.radiofarda.com>

freq. info: www.voa.gov/index.cfm?sectionTitle=Shortwave%20Frequencies#P

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 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
occ:	occasional
DRM:	Digital Radio Mondiale

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

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

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

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions.

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

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

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
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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Mark Fine, VA
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Program Highlights

John Figliozzi

❖ R. AUSTRALIA CUTS

Cuts to the parent *Australian Broadcasting Corporation's* budget will result in some changes to RA's schedule. At print deadline (late August), their precise nature were not known. However, several music programs could disappear, as well as *Go Zone* and *Australian Express*. In turn, there likely will be an increase in repeat broadcasts for some programs and/or an increase in programs taken from the domestic services, especially *ABC Radio National*.

❖ OTHER VOA PROGRAMS

The Voice of America broadcasts over 50 language services, and within some are music programs that stateside listeners may find enjoyable. These are from the French service to Africa on 9815, 11720, 12080, 13695, 15730, 17785 (to 2000):

1900	A	Du Blues au Jazz
1935	S	Soul USA
	A	Varietes Musicales
2000	S	Du Blues au Jazz
	M-F	Detente Musicale

The VOA Spanish service also produces several music programs. While only one of them is broadcast on shortwave (*Top Ten USA*—S 0130—9560, 9735, 9885, 11815, 13760), others are available on-demand from the Internet. Go to <http://www.voa.gov/index.cfm?sectionTitle=Fast%20Facts> and click on "Spanish" (or any of the other languages there) for further info.

❖ VOR - WORLD RADIO DAY

From www.vor.ru: "The Voice of Russia, together with other Russian radio stations—*Mayak*, *Mayak-24*, *Yunost*, *Radio Rossii* and *Orfey*—[and] with support from the *European Broadcasting Union* will hold **World Radio Day on October 3rd**. On that day, the **Voice of Russia** will present its own programs, those of its EBU partners, and programs produced by the world's leading radio stations. The guests of these programs will be chosen by our listeners. We are ready to interview people you have voted for. Put your question to a famous politician, actor, musician, historian or the Pope himself. Do tune in on October 3rd to hear the most well-known Europeans and Russians on the waves of the Voice of Russia."



0000 UTC - 8PM E / 7PM C / 5PM P

0000	0007		Sierra Leone, SLBS	3316do			
0000	0015	vl	Cambodia, National Radio Of	11940as			
0000	0015		Japan, Radio	13650as	17810as		
0000	0027		Czech Rep, Radio Prague Intl	7345na	9440na		
0000	0028	mtwhfa	Serbia & Montenegro, RSCG	9580na			
0000	0030		Egypt, Radio Cairo	11725na			
0000	0030	DRM	Netherlands, Radio	15525na			
0000	0030		Thailand, Radio	9570af			
0000	0030		UK, BBC World Service	17615as			
0000	0030		USA, Voice of America	7215as	9770as	11760as	
			15185as 15290as 17740as	17820as			
0000	0045		India, All India Radio	9705as	9950as	11620as	
			13605as				
0000	0100		Anguilla, Caribbean Beacon	6090am			
0000	0100		Australia, ABC NT Alice Springs	2310irr	4835do		
0000	0100		Australia, ABC NT Katherine	5025do			
0000	0100		Australia, ABC NT Tennant Creek	4910do			
0000	0100		Australia, Radio	9660pa	15240pa		
			15415as 17580pa 17750as	17775as	17795va		
			21725as				
0000	0100	vl	Botswana, Radio	3356do	4820do	7255do	
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	15205as		
0000	0100		Costa Rica, Radio for Peace Intl	7445om	15038va		
0000	0100		Costa Rica, University Network	5030om	6150am		
			7375am 9725sa 11870am	13750na			
0000	0100		Germany, Deutsche Welle	7130as	9505as		
			9825as				
0000	0100		Guyana, Voice of	3291do	5950do		
0000	0100		Malaysia, Radio	7295do			
0000	0100		Namibia, Namibian BC Corp	6060af	3270af	3290af	
0000	0100		Netherlands, Radio	6165na	9845na		
0000	0100		New Zealand, Radio NZ Intl	17675pa			
0000	0100		Sierra Leone, Radio UNAMSIL	6139af			
0000	0100		Singapore, Mediacorp Radio	6150do			
0000	0100	vl	Solomon Islands, SIBC 5020do	9545do			
0000	0100		Spain, Radio Exterior Espana	15385am			
0000	0100		UK, BBC World Service	5970as	5975as		
			6195as 9410as 9740as	9825so	11835am		
			11955as 12095sa 15280as	15310as	15360as		
			17790as				
0000	0100		Ukraine, Radio Ukraine Intl	12040na			
0000	0100		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb		
			5765usb 6350usb 7507usb	10320usb	12335usb		
			12579usb	13362usb	13855usb		
			13815va				
0000	0100		USA, KAIJ Dallas TX	13815va			
0000	0100		USA, KTBN Salt Lake City UT	15590na			
0000	0100		USA, KWHR Naalehu HI	17510as			
0000	0100	twhfa	USA, Voice of America	6130am	7405am	9455am	
			9775am 11695am 13790am				
0000	0100		USA, WBCQ Kennebunk ME	9330na	5105na	7415na	
0000	0100		USA, WBOH Newport NC	5920am			
0000	0100		USA, WEWN Birmingham AL	5825na			
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	sm	USA, WRMI Miami FL 9955am				
0000	0100	twhfa	USA, WRMI Miami FL 7385na				
0000	0100	vl	USA, WSHB Cypress Creek SC	7535am	9430sa		
0000	0100		USA, WTJC Newport NC	9370na			
0000	0100		USA, WWBS Macon GA	11910na			
0000	0100	sm	USA, WWCR Nashville TN	3210na	5070na		
			7465na 13845na				
0000	0100		USA, WWRB Manchester TN	6890na	5050na	5085na	
0000	0100		USA, WYFR Okeechobee FL	15130sa	6065na	9505na	
0000	0100	vl	Vanuatu, Radio	3945al	7260do		
0015	0100		Japan, Radio	6145na			
0030	0100		Iran, Voice of the Islamic Rep	9590na	11920na		
0030	0100		Lithuania, Radio Vilnius	9855al	11690na		
0030	0100		Sri Lanka, SLBC	6005as	9770as	15745as	
0030	0100		Thailand, Radio	15395na			
0030	0100		UAE, AWR Africa	9720as	9810as		
0030	0100		UAE, Bible Voice	7180as			
0030	0100		UK, BBC World Service	9580as	17615as		
0030	0100		USA, Voice of America	7215as	9770as	11760as	
			15185as 15290as 17740as	17820as			
0038	0050		Croatia, Voice of	9925sa			
0045	0100		Pakistan, Radio	11650as	15625as		
0055	0100		Italy, RAI Intl	9675am	11800am		

0100 UTC - 9PM E / 8PM C / 6PM P

0100	0115		Italy, RAI Intl	9675na	11800am			
0100	0115		Pakistan, Radio	11650as	15625as			
0100	0120		Kyrgyz, Kyrgyz Radio		4010as	4795as		
0100	0125		Netherlands, Radio	6165na	9845na			
0100	0127		Czech Rep, Radio Prague Intl		6200na	7345na		
0100	0127		Slovakia, Radio Slovakia Intl		5930na	6190ca		
			9440sa					
0100	0127		Vietnam, Voice of	6175na				
0100	0128		Hungary, Radio Budapest		9590na			
0100	0130	s	Germany, Universal Life		9435as			
0100	0130		Uzbekistan, Radio Tashkent Intl		7190as	9715as		
0100	0156		China, China Radio Intl		9580na	9790na		
0100	0156		North Korea, Voice of	3560as	6195as	7140am		
			11735am 13760am 15180am					
0100	0200		Anguilla, Caribbean Beacon		6090am			
0100	0200		Australia, ABC NT Katherine		5025do			
0100	0200		Australia, ABC NT Tennant Creek		4910do			
0100	0200		Australia, Radio	9660pa	15240pa			
			15415as 17580pa 17750as	17775va	17795va			
			21725as					
0100	0200	vl	Botswana, Radio	3356do	4820do	7255do		
0100	0200		Canada, CBC Northern Service	9625dc				
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		Canada, Radio Canada Intl	9755am	15170am			
			15305am					
0100	0200		Costa Rica, Radio for Peace Intl	7445am	15038va			
0100	0200		Costa Rica, University Network	5030am	6150am			
			7375am 9725sa 11870am	13750na				
0100	0200		Cuba, Radio Havana	6000na	9820na	11705na		
0100	0200		Guyana, Voice of	3291do	5950do			
0100	0200		Indonesia, Voice of	9525va	11785as			
0100	0200		Iran, Voice of the Islamic Rep		9590na	11920na		
0100	0200		Japan, Radio	11860as	11880me	15325as		
			17560me 17685pa 17810as		17835sa	17845as		
0100	0200		Malaysia, Radio	7295do				
0100	0200		Namibia, Namibian BC Corp	6060af	3270af	3290af		
0100	0200		New Zealand, Radio NZ Intl		17675pa			
0100	0200		Russia, Voice of	9665na	9725na	11825na		
			12000na 17595na					
0100	0200		Sierra Leone, Radio UNAMSIL		6139af			
0100	0200		Singapore, Mediacorp Radio		6150do			
0100	0200	vl	Solomon Islands, SIBC 5020do		9545do			
0100	0200		Sri Lanka, SLBC	6005as	9770as	15745as		
0100	0200		Taiwan, Radio Taiwan Intl		15600eu			
0100	0200		UK, BBC World Service		5975am	6195as		
			9410as 9525sa 9825so		11835om	11955as		
			12095sa 15280as 15310as		15360as	17790as		
0100	0200		USA, AFRTS/ Armed Forces Radio		4319usb	5446usb		
			5765usb 6350usb 7507usb		10320usb	12335usb		
			12579usb		13362usb	13855usb		
0100	0200		USA, KAIJ Dallas TX		13815va			
0100	0200		USA, KJES Vado NM		7555na			
0100	0200		USA, KTBN Salt Lake City UT		7505na			
0100	0200		USA, KWHR Naalehu HI		17510as			
0100	0200		USA, Voice of America	7115as	9635as	11705as		
			11725as 11820as 13650as		17740as	17820as		
0100	0200	twhfa	USA, Voice of America	5995af	6130af	7405am		
			9455am 9775am 13790am					
0100	0200		USA, WBCQ Kennebunk ME		9330na	5105na	7415na	
0100	0200		USA, WBOH Newport NC		5920am			
0100	0200		USA, WEWN Birmingham AL		5825na			
0100	0200		USA, WHRA Greenbush ME		7580va			
0100	0200		USA, WHRI Noblesville IN		5745va	7315am		
0100	0200		USA, WINB Red Lion PA		12160am			
0100	0200		USA, WJIE Louisville KY		7490am	13595am		
0100	0200	sm	USA, WRMI Miami FL 9955am					
0100	0200	twhfa	USA, WRMI Miami FL 7385na					
0100	0200	vl	USA, WSHB Cypress Creek SC		7535am	9430sa		
0100	0200		USA, WTJC Newport NC		9370na			
0100	0200		USA, WWCR Nashville TN		3210na	5070na		
			5935na 7465na					
0100	0200		USA, WWRB Manchester TN		6890na	5050na	5085na	
0100	0200		USA, WYFR Okeechobee FL		15060as	6065na	9505na	
0100	0200	vl	Vanuatu, Radio		3945al	7260do		
0105	0112		Croatia, Voice of		9925na			
0130	0200		Australia, HCB		15420as			
0130	0200		Australia, Voice Intl		17775as			
0130	0200	mtwhf	Austria, Radio Austria Intl		9870na			
0130	0200		Iraq, Radio Iraq Intl		6175irr	9687irr	11787irr	
0130	0200		Sweden, Radio		9435va			
0130	0200		UK, RTE Radio		6155ca			

SELECTED PROGRAMMING BEGINS ON PAGE 55

Shortwave Guide



0130	0200		USA, Voice of America 7115as 11725as 11820as 13650as	9635as 17740as	11705as 17820as
0130	0200	twhfa	USA, Voice of America 7405am	9775am	13740am
0140	0200		Vatican City, Vatican Radio	9650as	12055as
0145	0200	twhfa	Albania, Radio Tirana Intl	6115na	7160eu
0145	0200	mtwhf	Austria, Radio Austria Intl	9870na	

0245	0300		UK, BBC World Service	9610af	
0250	0300		Vatican City, Vatican Radio	7305am	9605am
0250	0300		Zambia, Radio	4910do	

0300 UTC - 11PM E / 10PM C / 8PM P

0200 UTC - 10PM E / 9PM C / 7PM P

0200	0210		Bangladesh, Bangla Betar	4882as	
0200	0227		Iran, Voice of the Islamic Rep	9590na	11920na
0200	0230	sm w fa	Belarus, Radio Belarus Intl	5970eu	7210eu
0200	0230		UAE, Bible Voice	9610as	
0200	0230	a	UK, Wales Radio Intl	9795na	
0200	0230		USA, KJES Vado NM	7555na	
0200	0256		North Korea, Voice of 4405as	11845as	15230as
0200	0256		Romania, Radio Romania Intl 15105as 17720as	9510na	11940na
0200	0256		South Korea, Radio Korea Intl 15575na	9560am	11810as
0200	0257		Canada, Radio Canada Intl	15510as	17860as
0200	0300		Anguilla, Caribbean Beacon	6090am	
0200	0300	twhfa	Argentina, RAE	11710am	
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835do
0200	0300		Australia, ABC NT Katherine	5025do	
0200	0300		Australia, ABC NT Tennant Creek	4910do	
0200	0300		Australia, HCBJ	15420as	
0200	0300		Australia, Radio	9660pa	12080va
0200	0300		15415as 15515va 17580pa	17750as	21725as
0200	0300		Austria, AWR Europe	9820as	
0200	0300	vi	Botswana, Radio	3356do	4820do
0200	0300		Bulgaria, Radio	9400na	11900na
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, Radio for Peace Intl	7445am	15038va
0200	0300		Costa Rica, University Network	5030am	6150am
0200	0300		7375am 9725so 11870am	13750na	
0200	0300		Cuba, Radio Havana	6000na	9820na
0200	0300		Egypt, Radio Cairo	11780na	11705na
0200	0300	vi/as	Germany, Bible Voice BC Network	11805as	17540as
0200	0300		Guyana, Voice of	3291do	5950do
0200	0300		Malaysia, Radio	7295do	
0200	0300		Myanmar, Radio	7185do	
0200	0300		Namibia, Namibian BC Corp	6090af	3270af
0200	0300		6090af	3290af	
0200	0300		New Zealand, Radio NZ Intl	17675po	
0200	0300	as	Philippines, Radio Pilipinas	11885me	15120me
0200	0300		15270me		
0200	0300		Russia, Voice of	9665na	9725na
0200	0300		17595na	12000na	
0200	0300		Sierra Leone, Radio UNAMSIL	6139af	
0200	0300		Singapore, Mediacorp Radio	6150do	
0200	0300	vi	Solomon Islands, SIBC	5020do	9545do
0200	0300		Sri Lanka, SLBC	6005as	9770as
0200	0300		Taiwan, Radio Taiwan Intl	5950na	9680na
0200	0300		11875as 15320as		
0200	0300		UK, BBC World Service	5975am	6195eu
0200	0300		9410eu 9750af 9825am	11835am	11760me
0200	0300		11955as 12095sa 15280as	15310as	15360as
0200	0300		17790as		
0200	0300		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
0200	0300		5765usb 6350usb 7507usb	10320usb	12335usb
0200	0300		12579usb 13362usb	13855usb	
0200	0300		USA, KAIJ Dallas TX	5755va	
0200	0300		USA, KTBN Salt Lake City UT	7505na	
0200	0300		USA, KWHR Naalehu HI	17510as	
0200	0300		USA, Voice of America 7115as	9635as	11705as
0200	0300		11725as 11820as 13650as	17740as	17820as
0200	0300		USA, WBCQ Kennebunk ME	5105na	7415na
0200	0300		9330na		
0200	0300		USA, WBOH Newport NC	5920am	
0200	0300		USA, WEWN Birmingham AL	5825na	
0200	0300		USA, WHRA Greenbush ME	7580va	
0200	0300		USA, WHRI Noblesville IN	5745va	7315am
0200	0300		USA, WINB Red Lion PA	12160am	
0200	0300		USA, WJIE Louisville KY	7490am	13595am
0200	0300		USA, WRMI Miami FL	7385na	
0200	0300	vi	USA, WSHB Cypress Creek SC	7535na	9430am
0200	0300		USA, WTJC Newport NC	9370na	
0200	0300		USA, WWCR Nashville TN	3210na	5070na
0200	0300		5935na 7465na		
0200	0300		USA, WWRB Manchester TN	5050na	5085na
0200	0300		6890na		
0200	0300		USA, WYFR Okeechobee FL	5985so	6065na
0205	0220		9505na 11855so 15255so		
0215	0220		Croatia, Voice of	9925na	
0215	0220		Nepal, Radio	3230as	5005as
0230	0257		7164as	6100as	
0230	0258		Vietnam, Voice of	6175na	
0230	0300	twhfa	Hungary, Radio Budapest	9570na	
0230	0300		Albania, Radio Tirana Intl	6115na	7160eu
0230	0300		Sweden, Radio	9495na	

0300	0310		Vatican City, Vatican Radio	7305am	9605am
0300	0327		9660af		
0300	0329		Czech Rep, Radio Prague Intl	7345na	9870na
0300	0330		Belgium, Radio Vlaanderen Intl	15565am	
0300	0330		Australia, HCJB	15420as	
0300	0330		Egypt, Radio Cairo	11780na	
0300	0330	stwhfa/vl	Mexico, Radio Mexico Intl	9705am	11770am
0300	0330	as	Philippines, Radio Pilipinas	11885me	15120me
0300	0330		15270me		
0300	0330		South Africa, Channel Africa	6035af	
0300	0330		Thailand, Radio	15395na	
0300	0330		USA, Voice of America	6080af	7105af
0300	0330		7340af 9575af 9885af	11835af	12080af
0300	0330		17895af		
0300	0356		China, China Radio Intl	9690na	9790na
0300	0356		North Korea, Voice of	6195as	7140as
0300	0400		9345as		
0300	0400		Anguilla, Caribbean Beacon	6090am	
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do
0300	0400		Australia, ABC NT Katherine	5025do	
0300	0400		Australia, ABC NT Tennant Creek	4910do	
0300	0400		Australia, Radio	9660pa	12080va
0300	0400		15415as 15515va 17580pa	17750as	21725as
0300	0400	vi	Botswana, Radio	3356do	4820do
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, Radio for Peace Intl	7445am	15038va
0300	0400		Costa Rica, University Network	5030am	6150am
0300	0400		7375am 9725sa 11870am	13750na	17645as
0300	0400	vi	Cuba, Radio Havana	6000na	9820na
0300	0400		Guatemala, Radio Cultural	3300do	11705na
0300	0400		Guyana, Voice of	3291do	5950do
0300	0400		Japan, Radio	17825ca	21610po
0300	0400		Malaysia, Radio	7295do	
0300	0400		Malaysia, Voice of	6175as	9665as
0300	0400		15295su	9750as	
0300	0400		Namibia, Namibian BC Corp	6090af	3270af
0300	0400		6090af	3290af	
0300	0400		New Zealand, Radio NZ Intl	17675po	
0300	0400		Oman, Radio	1535af	
0300	0400		Russia, Voice of	9665na	11720na
0300	0400		12000na 17565na 17650na	17660na	17690na
0300	0400		Sierra Leone, Radio UNAMSIL	6139af	
0300	0400		Singapore, Mediacorp Radio	6150do	
0300	0400	vi	Solomon Islands, SIBC	5020do	9545do
0300	0400		Sri Lanka, SLBC	6005as	9770as
0300	0400		Taiwan, Radio Taiwan Intl	5950na	9680na
0300	0400		15215sa 15320as		
0300	0400		Turkey, Voice of	7270va	9650eu
0300	0400		Uganda, Radio	4976do	5026do
0300	0400		UK, BBC World Service	3255af	7196do
0300	0400		6005af 6190af 6195eu	7120af	5975am
0300	0400		9410eu 9750af 9825am	11760as	7160af
0300	0400		12035af 12095eu 15280as	15310as	15360as
0300	0400		15575me 17760as 17790as	21660as	15360as
0300	0400	DRM	UK, BBC World Service	11955na	21830as
0300	0400		Ukraine, Radio Ukraine Intl	12040na	
0300	0400		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
0300	0400		5765usb 6350usb 7507usb	10320usb	12335usb
0300	0400		12579usb 13362usb	13855usb	
0300	0400		USA, KAIJ Dallas TX	5755va	
0300	0400		USA, KTBN Salt Lake City UT	7505na	
0300	0400		USA, KWHR Naalehu HI	17510as	
0300	0400		USA, WBCQ Kennebunk ME	5105na	7415na
0300	0400		9330na		
0300	0400		USA, WBOH Newport NC	5920am	
0300	0400		USA, WEWN Birmingham AL	5825na	
0300	0400		USA, WHRA Greenbush ME	7580va	
0300	0400		USA, WHRI Noblesville IN	5745va	7315am
0300	0400		USA, WINB Red Lion PA	12160am	
0300	0400		USA, WJIE Louisville KY	7490am	13595am
0300	0400	smtwhf	USA, WRMI Miami FL	7385na	
0300	0400		USA, WSHB Cypress Creek SC	7535na	9450eu
0300	0400	vi	USA, WTJC Newport NC	9370na	
0300	0400		USA, WWCR Nashville TN	3210na	5070na
0300	0400		5935na 7465na		
0300	0400		USA, WWRB Manchester TN	5050na	5085na
0300	0400		6890na		
0300	0400		USA, WYFR Okeechobee FL	5985so	6065na
0300	0400		11740sa		
0300	0400		Zambia, Radio	4910do	
0300	0400	vi	Zimbabwe, ZBC Corp	5975do	
0305	0312		Croatia, Voice of	9925na	
0310	0330		Vatican City, Vatican Radio	9660af	

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0330	0350	UAE, Radio Dubai 17890na	12005na	13675na	15400na
0330	0357	Czech Rep, Radio Prague Intl		11600va	15620va
0330	0357	Vietnam, Voice of	6175na		
0330	0400	Malaysia, Radio Malaysia Kota Kinabalu		5979do	
0330	0400	UAE, AWR Africa	15160as		
0330	0400	UK, BBC World Service		15420af	
0330	0400	USA, Voice of America	6080af	7105af	7290af
		9575af 9885af 11835af		12080af	17895af
0345	0400	Tajikistan, Radio	7245as		

0400 UTC - 12AM E / 11PM C / 9PM P

0400	0415	Israel, Kol Israel	9435va	15640va	17600va
0400	0415	South Africa, TWR	11640af		
0400	0430	France, Radio France Intl		9550af	11700af
		11910af 13610af			
0400	0430	Guatemala, Radio Cultural		3300do	
0400	0430	Mexico, Radio Mexico Intl		9705am	11770am
0400	0430	South Africa, Channel Africa		5955af	
0400	0430	Sri Lanka, SLBC	6005as	9770as	15745as
0400	0430	UK, Project Airwaves	21510as		
0400	0456	China, China Radio Intl		9560na	9755na
0400	0456	Romania, Radio Romania Intl		9510na	11940na
		15335as 17735as			
0400	0458	New Zealand, Radio NZ Intl		17675pa	
0400	0500	Anguilla, Caribbean Beacon		6090am	
0400	0500	Australia, ABC NT Alice Springs		2310irr	4835do
0400	0500	Australia, ABC NT Katherine		5025do	
0400	0500	Australia, ABC NT Tennant Creek		4910do	
0400	0500	Australia, Radio	9660pa	12080va	15240pa
		15415as 15515va 17580pa		17750as	21275as
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	Costa Rica, Radio for Peace Intl		7445am	15038va
0400	0500	Costa Rica, University Network		5030am	6150am
		7375am 9725sa 11870am		13750na	17645as
0400	0500	Cuba, Radio Havana	6000na	9820na	11705na
0400	0500	Germany, Deutsche Welle		7225af	11945af
		15410af			
0400	0500	Germany, Overcomer Ministries		9770au	
0400	0500	Guyana, Voice of	3291do	5950do	
0400	0500	Malaysia, Radio	7295do		
0400	0500	Malaysia, Radio Malaysia Kota Kinabalu		5979do	
0400	0500	Malaysia, Voice of	6175as	9665as	9750as
		15295as			
0400	0500	Namibia, Namibian BC Corp		3270af	3290af
0400	0500	Russia, Voice of	9665na	11720na	11750na
		12000na 17565na 17650na		17660na	17690na
0400	0500	Sierra Leone, Radio UNAMSIL		6139af	
0400	0500	Singapore, Mediacorp Radio		6150do	
0400	0500	Solomon Islands, SIBC	5020do	9545do	
0400	0500	Uganda, Radio	4976do	5026do	7196do
0400	0500	UK, BBC World Service		3255af	5975va
		6005af 6190af 6195eu		7120af	7160af
		9410eu 11835am 11760as		12095eu	15280as
		15310as 15360as 15420af		15575me	17640af
		17760as 17790as 21660as		21830as	
0400	0500	USA, AFRTS/ Armed Forces Radio		4319usb	5446usb
		5765usb 6350usb 7507usb		10320usb	12335usb
		12579usb 13362usb		13855usb	
0400	0500	USA, KAIJ Dallas TX	5755va		
0400	0500	USA, KTBN Salt Lake City UT		7505na	
0400	0500	USA, KWHR Naalehu HI		17780as	
0400	0500	USA, Voice of America	4960af	6080af	7290af
		9530eu 9575af 9885af		11835af	11965eu
		12080af 15205eu 17895af			
0400	0500	USA, WBCQ Kennebunk ME		5105na	
0400	0500	USA, WBCQ Kennebunk ME		9330na	
0400	0500	USA, WBOH Newport NC		5920am	
0400	0500	USA, WEWN Birmingham AL		5825na	
0400	0500	USA, WHRA Greenbush ME		7580va	
0400	0500	USA, WHRI Noblesville IN		5745va	7315am
0400	0500	USA, WINB Red Lion PA		12160am	
0400	0500	USA, WJIE Louisville KY		7490am	13595cm
0400	0500	USA, WMLK Bethel PA	9465eu		
0400	0500	USA, WRMI Miami FL	7385na		
0400	0500	USA, WSHB Cypress Creek SC		9450eu	13720af
0400	0500	USA, WTJC Newport NC		9370na	
0400	0500	USA, WWCR Nashville TN		3210na	5070na
		5935na 7560na			
0400	0500	USA, WWRB Manchester TN		5050na	5085na
		6890na			
0400	0500	USA, WYFR Okeechobee FL		6065na	7355eu
		9355eu 9505na 9715na		11580eu	
0400	0500	Zambia, Radio	4910do		
0400	0500	Zambia, Radio Christian Voice		6065do	
0400	0500	Zimbabwe, ZBC Corp	5975da		
0427	0500	Madagascar, AWR	12060af	15320af	
0430	0445	UK, BBC World Service		6010eu	9815eu
0430	0458	Serbia & Montenegro, RSCG		9580na	

0430	0500	Netherlands, Radio	6165na	9590na	
0430	0500	DRM/ as Netherlands, Radio	15400pa		
0430	0500	Nigeria, Radio/Abuja	7275do		
0430	0500	Nigeria, Radio/Enugu	6025do		
0430	0500	Nigeria, Radio/Ibadan		6050do	
0430	0500	Nigeria, Radio/Kaduna		4770do	6090do
0430	0500	Nigeria, Radio/Lagos	3326do	4990do	
0430	0500	Swaziland, TWR	3200af	4775af	
0438	0450	Croatia, Voice of	9925na		
0445	0500	Italy, RAI Intl	6110af	7235af	9875af
0459	0500	New Zealand, Radio NZ Intl		15340pa	

0500 UTC - 1AM E / 12AM C / 10PM P

0500	0520	Vatican City, Vatican Radio		4005eu	5890eu
		7250eu 9560af		11625af	
0500	0530	France, Radio France Intl		11685a:	15155af
		17800af			
0500	0530	Netherlands, Radio	6165na	9590na	
0500	0530	DRM/ as Netherlands, Radio	15400pa		
0500	0530	South Africa, AWR Africa		3215af	3345af
0500	0530	South Africa, Channel Africa		11710a:	
0500	0530	UK, BBC World Service		15280as	
0500	0556	China, China Radio Intl		9560na	
0500	0600	Anguilla, Caribbean Beacon		6090am	
0500	0600	Australia, ABC NT Alice Springs		2310irr	4835do
0500	0600	Australia, ABC NT Katherine		5025do	
0500	0600	Australia, ABC NT Tennant Creek		4910do	
0500	0600	Australia, Radio	9660pa	12080va	15240pa
		15415as 15515va 17580pa		17750as	21725as
0500	0600	Bhutan, Bhutan BC Service		5030af	6035do
0500	0600	vi Botswana, Radio	3356do	4820do	7255do
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	Costa Rica, Radio for Peace Intl		7445am	15038va
0500	0600	Costa Rica, University Network		5030am	6150am
		7375am 9725sa 11870am		13750na	17645as
0500	0600	a Cuba, Radio Havana	9665usb	9820na	11760am
0500	0600	Finland, Scandinavian Weekend Radio		11690va	6170va
0500	0600	Germany, Deutsche Welle		9700af	11925af
		12045af 13755af 15410af			
0500	0600	Germany, Overcomer Ministries		9770au	
0500	0600	Guyana, Voice of	3291do	5950do	
0500	0600	Japan, Radio	5975eu	6110na	7230eu
		11715as 11760as		15195as	21755pa
0500	0600	Kuwait, Radio	15110as		
0500	0600	Malaysia, Radio	7295do		
0500	0600	Malaysia, Radio Malaysia Kota Kinabalu		5979do	
0500	0600	Malaysia, Voice of	6175as	9665as	9750as
		15295as			
0500	0600	Namibia, Namibian BC Corp		6060af	6175af
0500	0600	New Zealand, Radio NZ Intl		15340pa	
0500	0600	Nigeria, Radio/Abuja	7275do		
0500	0600	Nigeria, Radio/Enugu	6025do		
0500	0600	Nigeria, Radio/Ibadan		6050do	
0500	0600	Nigeria, Radio/Kaduna		4770do	6090do
0500	0600	Nigeria, Radio/Lagos	3326do	4990do	
0500	0600	Nigeria, Voice of	7255af	9690af	
0500	0600	Russia, Voice of	17635au	21790au	
0500	0600	Sierra Leone, Radio UNAMSIL		6139af	
0500	0600	Singapore, Mediacorp Radio		6150do	
0500	0600	vi Solomon Islands, SIBC	5020do	9545do	
0500	0600	Swaziland, TWR	4775af	6120af	9500af
0500	0600	Uganda, Radio	4976do	5026do	7196do
0500	0600	UK, BBC World Service		6190af	6005af
		6195eu 7120af 7160af		9410eu	11760me
		11765af 11940af 11955as		15310as	15360as
		15420af 15565eu 15575as		17640af	17760as
		17790as 17885af 21660as			
0500	0600	USA, AFRTS/ Armed Forces Radio		4319usb	5446usb
		5765usb 6350usb 7507usb		10320usb	12335usb
		12579usb 13362usb		13855usb	
0500	0600	USA, KAIJ Dal as TX	5755va		
0500	0600	USA, KTBN Salt Lake City UT		7505na	
0500	0600	USA, KWHR Naalehu HI		17780as	
0500	0600	USA, Voice of America	6035af	6080af	7290af
		9530eu 11835af 11965eu		12080af	15205eu
0500	0600	mtwhf USA, Voice of America	7195af		
0500	0600	USA, WBCQ Kennebunk ME		5105na	7415na
0500	0600	USA, WBOH Newport NC		5920am	
0500	0600	USA, WEWN Birmingham AL		5825na	
0500	0600	USA, WHRA Greenbush ME		11730af	
0500	0600	USA, WHRI Noblesville IN		5745va	7315am
0500	0600	USA, WINB Red Lion PA		12160am	
0500	0600	USA, WJIE Louisville KY		7490am	13595am
0500	0600	smtwhf USA, WMLK Bethel PA	9465eu		
0500	0600	USA, WRMI Miami FL	7385na		
0500	0600	USA, WSHB Cypress Creek SC		9450eu	9840af
0500	0600	USA, WTJC Newport NC		9370na	
0500	0600	USA, WWCR Nashville TN		3210na	5070na
		5935na 7560na			
0500	0600	USA, WWRB Manchester TN		5050na	5085na
		6890na			

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0500	0600		USA, WYFR Okeechobee FL	9355eu	
0500	0600		Zambia, Radio Christian Voice	6065do	
0500	0600	vl	Zimbabwe, ZBC Corp 5975do		
0505	0512		Croatia, Voice of 9470pa		
0515	0525		Rwanda, Radio 6005do		
0520	0530		Vatican City, Vatican Radio 15570af	9660af	11625af
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do
0530	0545	as	UK, BBC World Service	9875eu	
0530	0550		UAE, Radio Dubai 13675au	15435au	17830au
			21700au		
0530	0600		Georgia, Radio Georgia	11805eu	
0530	0600	mtwhf/vl	Italy, IRRS 13840va		
0530	0600		South Africa, AWR Africa	15105af	
0530	0600		Thailand, Radio 21795eu		

0600 UTC - 2AM E / 1AM C / 11PM P

0600	0630		France, Radio France Intl 21620af	11665af	17800af
0600	0630		South Africa, Channel Africa	15215af	
0600	0630		Swaziland, TWR 4775af	6120af	9500af
0600	0630	mtwhf	USA, Voice of America 7195af	7290af	
0600	0630		USA, Voice of America 6035af	6080af	9530eu
			9760eu 11805eu 11835af	11965eu	11995af
			12080af 15205eu		
0600	0637		Romania, Radio Romania Intl	9530na	11830na
0600	0658		New Zealand, Radio NZ Intl	15340pa	
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835do
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek	4910do	
0600	0700		Australia, Radio 9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as
0600	0700	vl	Botswana, Radio 3356do	4820do	7255do
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, Radio for Peace Intl	7445am	15038va
0600	0700		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0600	0700		Cuba, Radio Havana 9665usb	9820na	11760am
0600	0700		Germany, Deutsche Welle 15275af 17860af	6140eu	9780af
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of 3291do	5950do	
0600	0700		Japan, Radio 7230eu	11740as	13630na
			13630na 15195as 17870pa	21755pa	
0600	0700		Kuwait, Radio 15110as		
0600	0700	DRM	Kuwait, Radio 15110as		
0600	0700		Liberia, ELWA 4760do		
0600	0700		Malaysia, Radio 7295do		
0600	0700		Malaysia, Voice of 6175as	9665as	9750as
			15295au		
0600	0700		Namibia, Namibian BC Corp	6060af	6175af
0600	0700		Nigeria, Radio/Abuja 7275do		
0600	0700		Nigeria, Radio/Enugu 6025do		
0600	0700		Nigeria, Radio/Ibadan	6050do	
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do
0600	0700		Nigeria, Radio/Lagos 3326do	4990do	
0600	0700		Nigeria, Voice of 7255af	9690af	
0600	0700		Russia, Voice of 15490au	17635au	17670au
			21790au		
0600	0700		Sierra Leone, Radio UNAMSIL	6139af	
0600	0700		Singapore, MediCorp Radio	6150do	
0600	0700	vl	Solomon Islands, SIBC 5020do	9545do	
0600	0700	mtwhf	UK, BBC World Service	6055af	6190af
			7120af 7160af 9410eu	11765af	11940af
			11955as 12095eu 15310as	15360as	15485eu
			15565eu 15575as 17640af	17760as	17790as
			21660as		
0600	0700	os	UK, BBC World Service	17885af	
0600	0700		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb 7507usb	10320usb	12335usb
			12579usb 13362usb	13855usb	
0600	0700		USA, KAIJ Dallas TX 5755va		
0600	0700		USA, KTBN Salt Lake City UT	7505na	
0600	0700		USA, KWHR Naalehu HI	17780as	
0600	0700	mtwhf	USA, WBCQ Kennebunk ME	5105na	
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5825na	9385eu
0600	0700		USA, WHRA Greenbush ME	11730af	
0600	0700		USA, WHRI Noblesville IN	5745va	7315am
0600	0700		USA, WINB Red Lion PA	12160am	
0600	0700		USA, WJIE Louisville KY	7490am	13595am
0600	0700		USA, WRMI Miami FL 7385na		
0600	0700		USA, WSHB Cypress Creek SC	9450af	
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na
			5935na 7560na		
0600	0700		USA, WYFR Okeechobee FL	7355eu	11580eu
0600	0700	vl	Vanuatu, Radio 3945af	4960do	
0600	0700		Yemen, Rep of Yemen Radio	9780me	
0600	0700		Zambia, Radio Christian Voice	9865do	

0600	0700	vl	Zimbabwe, ZBC Corp 5975do		
0630	0645	mtwhf	Vatican City, Vatican Radio	4005eu	5890eu
			6185eu 7250eu 9645eu	11740eu	15595eu
0630	0700		Bulgaria, Radio 11600eu	13600eu	
0630	0700		Swaziland, TWR 6120af	9500af	
0630	0700		UK, BBC World Service	15400af	
0630	0700	mtwhf	USA, Voice of America 9530eu	9760eu	11805eu
			11965eu 15205eu		
0630	0700	as	USA, Voice of America 6035af	6080af	7195af
			11835af 11995af 12080af		
0630	0700	as	Vatican City, Vatican Radio	11625af	15570af
0637	0700		Romania, Radio Romania Intl	9530na	9690eu
			11830na 11840eu 11940eu	15270eu	
0638	0650		Croatia, Voice of 9470pa		
0645	0700	as	Germany, TWR 6045eu		
0645	0700	as	Monaco, TWR 9870eu		
0655	0700	mtwhf	Germany, TWR 6045eu		
0655	0700	mtwhf	Monaco, TWR 9870eu		
0659	0700		New Zealand, Radio NZ Intl	11675pa	

0700 UTC - 3AM E / 2AM C / 12AM P

0700	0725		Belgium, Radio Vlaanderen Intl	5985eu	
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0727		Slovakia, Radio Slovakia Intl	9440au	15460au
			17550au		
0700	0730	a	Tibet, Xizang PBS 9490as	9580as	
0700	0750		Germany, TWR 6045eu		
0700	0750		Monaco, TWR 9870eu		
0700	0756		Romania, Radio Romania Intl	17720af	21480af
0700	0800		Anguilla, Caribbean Beacon	6090am	
0700	0800		Australia, ABC NT Alice Springs	2310irr	4835do
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek	4910do	
0700	0800		Australia, Radio 9660pa	12080va	15240va
			15415as 17580pa 17750as	21725as	
0700	0800	vl	Botswana, Radio 3356do	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, Radio for Peace Intl	7445am	15038va
0700	0800		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0700	0800		Eqt Guinea, Radio Africa	15184af	
0700	0800		France, Radio France Intl	15605af	
0700	0800		Germany, Deutsche Welle	6140eu	
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do
0700	0800		Guyana, Voice of 3291do	5950do	
0700	0800	DRM	Kuwait, Radio 15110as		
0700	0800		Kuwait, Radio 15110as		
0700	0800		Liberia, ELWA 4760do		
0700	0800		Malaysia, Radio 7295do		
0700	0800		Malaysia, Radio Malaysia Kota Kinabalu	5979do	
0700	0800		Malaysia, Voice of 6175as	9665as	9750as
			15295au		
0700	0800		Myanmar, Radio 9730do		
0700	0800		New Zealand, Radio NZ Intl	11675pa	
0700	0800		Papua New Guinea, NBC	4890do	9675irr
0700	0800		Russia, Voice of 15490au	17495au	17525au
			17635au 17670au		
0700	0800		Sierra Leone, Radio UNAMSIL	6139af	
0700	0800		Singapore, MediCorp Radio	6150do	
0700	0800	vl	Solomon Islands, SIBC 5020do	9545do	
0700	0800	as	Taiwan, Radio Taiwan Intl	5950na	
0700	0800		UK, BBC World Service	17885af	
0700	0800		UK, BBC World Service	6190af	7120af
			11760me 11765af 11940af	11955as	12095eu
			15310as 15360as 15400af	15485eu	15565eu
			15575eu 17640eu 17760as	17790as	21660as
0700	0800		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb 7507usb	10320usb	12335usb
			12579usb 13362usb	13855usb	
0700	0800		USA, KAIJ Dallas TX 5755va		
0700	0800		USA, KTBN Salt Lake City UT	7505na	
0700	0800		USA, KWHR Naalehu HI	11565pa	17780as
0700	0800		USA, Voice of America 13760as		
0700	0800		USA, WBCQ Kennebunk ME	7415na	
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Birmingham AL	5825na	9385eu
0700	0800		USA, WHRA Greenbush ME	11730af	
0700	0800		USA, WHRI Noblesville IN	5745va	7315am
0700	0800		USA, WINB Red Lion PA	12160am	
0700	0800		USA, WJIE Louisville KY	7490am	13595am
0700	0800	smtwhf	USA, WMLK Bethel PA 9465eu		
0700	0800		USA, WRMI Miami FL 7385na		
0700	0800		USA, WSHB Cypress Creek SC	9450af	
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3210na	5070na
			5935na 7560na		
0700	0800		USA, WYFR Okeechobee FL	7355eu	11530af
			13695af		
0700	0800	vl	Vanuatu, Radio 3945af	4960do	
0700	0800		Zambia, Radio Christian Voice	9865do	

Shortwave Guide



0705	0712		Croatia, Voice of	13820au	
0725	0800		Guam, AWR	15205as	
0730	0800		Austria, AWR Europe	9775eu	
0730	0800		Georgia, Radio Georgia	11910eu	
0730	0800		Switzerland, Swiss Radio Intl	13650va	15445va
			21750va		
0745	0800	mtwhf	Guam, TWR/KTWR	15330as	
0750	0800	smtwhf	Germany, TWR	6045eu	
0750	0800	smtwhf	Monaco, TWR	9870eu	

0800 UTC - 4AM E / 3AM C / 1AM P

0800	0804		Pakistan, Radio	17825eu	21465eu
0800	0815	as	Guam, TWR/KTWR	15205as	
0800	0815	mtwhf	Guam, TWR/KTWR	15330as	
0800	0820	smtwhf	Germany, TWR	6045eu	
0800	0820	smtwhf	Monaco, TWR	9870eu	
0800	0825		Malaysia, Voice of	6175as	9665as 9750as
			15295au		
0800	0830		Australia, ABC NT Katherine	5025do	
0800	0830		Australia, ABC NT Tennant Creek	4910do	
0800	0830		Malaysia, Radio Malaysia Kota Kinabalu		5979do
0800	0830		Myanmar, Radio	9730do	
0800	0900		Anguilla, Caribbean Beacon	6090am	
0800	0900		Australia, ABC NT Alice Springs	2310irr	4835do
0800	0900		Australia, HCJB	11750pa	
0800	0900		Australia, Radio	5995pa	9580va 9710pa
			11880as 12080va	15240va	15415as 15240va
			15415as 17750as	15272as	
0800	0900	as	Australia, Radio	17750as	
0800	0900	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do
0800	0900	vi	Botswana, Radio	3356do	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, Radio for Peace Intl	7445am	15038va
0800	0900		Costa Rica, University Network	5030am	6150am
			7375am 9725sa	11870am	13750na 17645as
0800	0900		Eqt Guinea, Radio Africa	15184af	
0800	0900		Germany, Deutsche Welle	6140eu	
0800	0900	vi	Ghana Ghana BC Corp	3366do	4915do
0800	0900		Guyana, Voice of	3950do	
0800	0900		Indonesia, Voice of	9525va	11785as
0800	0900	as/vl	Italy, IRRS 13840va		
0800	0900		Liberia, ELWA	4760do	
0800	0900	m-/f/ DRM	Luxembourg, RTL Radio Lutzeburg	6095eu	
0800	0900		Malaysia, Radio	7295do	
0800	0900		Malta, Voice of Mediterranean	9605eu	
0800	0900		New Zealand, Radio NZ Intl	11675pa	
0800	0900		Papua New Guinea, NBC	4890do	9675irr
0800	0900		Sierra Leone, Radio UNAMSIL	6139of	
0800	0900		Singapore, Mediacorp Radio	6150do	
0800	0900	vi	Solomon Islands, SIBC 5020do	9545do	
0800	0900	a	South Africa, Radio League	9750af	2156of
0800	0900		South Korea, Radio Korea Intl	9570om	13670eu
0800	0900		Swaziland, TWR	6120af	9500af
0800	0900		UK, BBC World Service	6190af	7120af
			11760me 11940af	11955as	12095eu 15310as
			15360as 15400af	15485eu	15665eu 17640eu
			17830af 17885as	21470af	21660as 21830as
0800	0900		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb	7507usb	10320usb 12335usb
			12579usb	13362usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755va	
0800	0900		USA, KNLS Anchor Point AK	11765as	
0800	0900		USA, KTBN Salt Lake City UT	7505na	
0800	0900		USA, KWHR Naalehu HI	11565pa	17780as
0800	0900		USA, Voice of America 11930as	13620as	13760as
			15150as		
0800	0900		USA, WBCQ Kennebunk ME	7415na	
0800	0900		USA, WBOH Newport NC	5920am	
0800	0900		USA, WEWN Birmingham AL	5825na	9385eu
0800	0900		USA, WHRI Noblesville IN	5745va	7315am
0800	0900		USA, WINB Red Lion PA	12160am	
0800	0900		USA, WJIE Louisville KY	7490am	13595am
0800	0900	smtwhf	USA, WMLK Bethel PA	9465eu	
0800	0900		USA, WRMI Miami FL	7385na	
0800	0900		USA, WSHB Cypress Creek SC	9860eu	9845pa
0800	0900		USA, WTJC Newport NC	9370na	
0800	0900		USA, WWCR Nashville TN	3210na	5070na
			5935na 7560na		
0800	0900		USA, WYFR Okeechobee FL	13570af	
0800	0900	vi	Vanuatu, Radio	3945al	4960do
0800	0900		Zambia, Radio Christian Voice	9865do	
0810	0830	s	Armenia, Voice of	4810eu	15270as
0815	0900		Guam, TWR/KTWR	15205as	15330as
0830	0900		Australia, ABC NT Katherine	2485do	
0830	0900		Australia, ABC NT Tennant Creek	2325do	
0830	0900		Austria, AWR Europe	17780af	
0830	0900		Georgia, Radio Georgia	11910me	
0830	0900		Lithuania, Radio Vilnius	9710eu	
0830	0900		Switzerland, Swiss Radio Intl	21770af	
0838	0850		Croatia, Voice of	13820au	
0840	0850		Turkmenistan, Turkmen Radio	4930as	

0900 UTC - 5AM E / 4AM C / 2AM P

0900	0927		Czech Rep, Radio Prague Intl		21745va
0900	0930	as	Australia, Radio	17750as	
0900	0930		Austria, AWR Europe	17780af	
0900	0930		Guam, TWR/KTWR	15330as	
0900	0956		China, China Radio Intl		17690pa 15210pa
0900	1000		Anguilla, Caribbean Beacon	6090am	
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr
0900	1000		Australia, ABC NT Katherine	2485do	
0900	1000		Australia, ABC NT Tennant Creek	2325do	
0900	1000		Australia, HCJB	11750pa	
0900	1000		Australia, Radio	9580va	11880as 15240as
			17750as 21820as		
0900	1000		Australia, Voice Intl	13685as	
0900	1000	vi	Botswana, Radio	3356do	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		Costa Rica, Radio for Peace Intl	7445am	15038va
0900	1000		Costa Rica University Network	5030am	6150am
			7375am 9725sa	11870am	13750na 17645as
0900	1000		Eqt Guinea, Radio Africa	15184af	
0900	1000		Germany, Deutsche Welle	6140eu	15440eu
0900	1000	DRM	Germany, Deutsche Welle	15440eu	
0900	1000		Guyana, Voice of	3291do	5950do
0900	1000	as/vl	Italy, IRRS 13840va		
0900	1000	m-/f/ DRM	Luxembourg, RTL Radio Lutzeburg	6095eu	
0900	1000		Malaysia, Radio	7295do	
0900	1000		New Zealand, Radio NZ Intl	11675pa	
0900	1000		Palau, Voice of Hope	15725as	
0900	1000		Papua New Guinea, NBC	4890do	9675irr
0900	1000		Singapore, Mediacorp Radio	6150do	
0900	1000	vi	Solomon Islands, SIBC 5020do	9545do	
0900	1000	s	UAE, Radio UNMEE	21790af	
0900	1000		UK, BBC World Service	6190af	6195as
			7120af 9605as	9740as	11760me 11940af
			12095eu 15190sa	15310as	15360as 15400af
			15485eu 15565eu	15575as	17640eu 17760as
			17790as 17830af	17885af	21470af 21660as
0900	1000	DRM	UK, BBC World Service	7370eu	
0900	1000		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb	7507usb	10320usb 12335usb
			12579usb	13362usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755va	
0900	1000		USA, KTBN Salt Lake City UT	7505na	
0900	1000		USA, KWHR Naalehu HI	11565pa	17780as
0900	1000		USA, Voice of America 11930as	13620as	13760as
			15150as		
0900	1000		USA, WBCQ Kennebunk ME	7415na	
0900	1000		USA, WBOH Newport NC	5920am	
0900	1000		USA, WEWN Birmingham AL	5825na	
0900	1000		USA, WHRA Greenbush ME	11730af	
0900	1000		USA, WJIE Louisville KY	7490am	13595am
0900	1000		USA, WRMI Miami FL	9955am	
0900	1000		USA, WSHB Cypress Creek SC	9860eu	9455sa
0900	1000		USA, WTJC Newport NC	9370na	
0900	1000		USA, WWCR Nashville TN	5070na	5935na
			7560na 9475na		
0900	1000	vi	Vanuatu, Radio	3945al	4960do
0900	1000	mt hfa	Vatican City, Vatican Radio	5890eu	
0900	1000		Zambia, Radio Christian Voice	9865do	
0930	1000	asmwhf	Greece, Voice of	12105eu	15630eu
0930	1000		Netherlands, Radio	9785pa	12065as 13710as
0930	1000	DRM	Netherlands, Radio	9590eu	

1000 UTC - 6AM E / 5AM C / 3AM P

1000	1027		Vietnam, Voice of	9840au	12020au
1000	1030		Germany, Deutsche Welle		17615as 17715as
1000	1030		Guam, AWR	11560as	11930as
1000	1030		Mongolia, Voice of	12085as	
1000	1030		Netherlands, Radio	9785pa	12065pa 13710as
1000	1030		UK, BBC World Service		9605as 21660as
1000	1030		UK, RTE Radio	15280au	
1000	1045		USA, KWHR Naalehu HI	9930as	11565pa
1000	1056		China, China Radio Intl	17690pa	15210pa
1000	1056		North Korea, Voice of	3560as	9335am 11710am
			11735as 13650as		
1000	1100		Anguilla, Caribbean Beacon	6090am	11775am
1000	1100		Australia, ABC NT Alice Springs	2310do	4835irr
1000	1100		Australia, ABC NT Katherine	2485do	
1000	1100		Australia, ABC NT Tennant Creek	2325do	
1000	1100		Australia, HCJB	11750pa	
1000	1100		Australia, Radio	9580va	11880as 15240as
			17750as 21820as		
1000	1100		Australia, Voice Intl	13685as	
1000	1100	as	Bhutan, Bhutan BC Service	5030al	6035do
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	

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1000	1100	Costa Rica, Radio for Peace Intl	7445am	15038va	
1000	1100	Costa Rica, University Network	5030am	6150am	
		7375am 9725sa	11870am	13750na	17645as
1000	1100	Eqt Guinea, Radio Africa	15184af		
1000	1100	Finland, Scandinavian Weekend Radio		11720va	
1000	1100	Germany, Deutsche Welle	6140eu	15440eu	
1000	1100	Germany, Deutsche Welle	6140eu	15440eu	
1000	1100	Guyana, Voice of	3291do	5949do	
1000	1100	India, All India Radio	13695as	15020as	15260as
		15410as 17510au	17800as	17895au	
1000	1100	Italy, IRRS	13840va		
1000	1100	Japan, Radio	9695as	15590as	17585eu
		21755pa			
1000	1100	Luxembourg, RTL Radio Lutzeburg		6095eu	
1000	1100	Malaysia, Radio	7295do		
1000	1100	Malta, Voice of Mediterranean		9605eu	
1000	1100	Netherlands, Radio	9590eu		
1000	1100	New Zealand, Radio NZ Intl		11675pa	
1000	1100	Polau, Voice of Hope	15725as		
1000	1100	Papua New Guinea, NBC	4890do	9675irr	
1000	1100	Singapore, MediCorp Radio	6150do		
1000	1100	Solomon Islands, SIBC	5020do	9545do	
1000	1100	South Africa, Radio Veritas	7240af		
1000	1100	UK, BBC World Service	7320eu		
1000	1100	UK, BBC World Service	6190af	6195va	
		7120af 9740as	9885va	11940af	
		12095eu 15310as	15360as	15485eu	15565eu
		15575as 17640eu	17760as	17790as	17885af
		21470af			
1000	1100	UK, BBC World Service	15400af	17830af	
1000	1100	UK, Christian Voice	9760eu		
1000	1100	USA, AFRTS/ Armed Forces Radio	4319usb	5446usb	
		5765usb 6350usb	7507usb	10320usb	12335usb
		12579usb	13362usb	13855usb	
1000	1100	USA, KAIJ Dallas TX	5755va		
1000	1100	USA, KTVN Salt Lake City UT	7505na		
1000	1100	USA, Voice of America	5745am	9590am	
		9770as 13620as	15240as		
1000	1100	USA, WBOH Newport NC	5920am		
1000	1100	USA, WEWN Birmingham AL	7520na		
1000	1100	USA, WHRI Noblesville IN	9495am	9850na	
1000	1100	USA, WINB Red Lion PA	13570am		
1000	1100	USA, WJIE Louisville KY	7490am	13595am	
1000	1100	USA, WRMI Miami FL	9955am		
1000	1100	USA, WSHB Cypress Creek SC	6095am	9455sa	
1000	1100	USA, WTJC Newport NC	9370na		
1000	1100	USA, WWCR Nashville TN	5070na	5935na	
		7560na 15825na			
1000	1100	USA, WYFR Okeechobee FL	5950na		
1000	1100	Zambia, Radio Christian Voice	9865do		
1010	1020	Israel, Kol Israel	17525va	17545va	
1015	1030	UK, BBC World Service	11680eu	15325eu	
		17695eu			
1030	1045	Ethiopia, Radio	5990do	7110do	9704do
1030	1057	Czech Rep, Radio Prague Intl		9880eu	11615eu
1030	1100	Guam, AWR	11560as		
1030	1100	Iran, Voice of the Islamic Rep	15600as 21470as	21730as	
		Netherlands, Radio	5965na	6045eu	9785au
		9860eu 12065as	13710as		
		UAE, Radio Dubai	13675eu	15395eu	17865eu
		21605eu			
1030	1100	UAE, Radio UNMEE	21550af		
1030	1100	UK, BBC World Service	15285as 21660as	9605as	11945as
		15285as 21660as			
1045	1100	USA, KWHR Naalehu HI	9930as		
1045	1100	USA, KWHR Naalehu HI	11565pa		

1100 UTC - 7AM E / 6AM C / 4AM P

1100	1104	Pakistan, Radio	17825eu	21465eu	
1100	1105	New Zealand, Radio NZ Intl		11675pa	
1100	1125	Netherlands, Radio	5965na	6045eu	9785au
		9860eu 12065as	13710as		
1100	1127	Iran, Voice of the Islamic Rep	15600as 21470as	21730as	
1100	1130	Vietnam, Voice of	11630as		
1100	1130	Bhutan, Bhutan BC Service	5030al	6035do	
1100	1130	Tibet, Xizang PBS	4905as	4920as	6200as
		7385as 9490as			
1100	1130	UAE, Radio UNMEE	21550af		
1100	1130	UK, BBC World Service	15400af	17790sa	
1100	1130	UK, BBC World Service	6195ca	15190ca	
1100	1200	Anguilla, Caribbean Beacon	11775om		
1100	1200	Australia, ABC NT Alice Springs	2310do	4835irr	
1100	1200	Australia, ABC NT Katherine	2485do		
1100	1200	Australia, ABC NT Tennant Creek	2325do		
1100	1200	Australia, HCJB	11750pa		
1100	1200	Australia, Radio	5995po	6020pa	9475as
		9580va 11650va	11880as	12080va	15240va
		21820as			
1100	1200	Australia, Voice Intl	13685as		
1100	1200	Canada, CBC Northern Service	9625do		
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, Radio for Peace Intl	7445am	15038va	
1100	1200	Costa Rica, University Network	5030am	6150am	
		7375am 9725sa	11870am	13750na	17645as
1100	1200	Ecuador, HCJB	15115am	21455pa	
1100	1200	Germany, Deutsche Welle		15440eu	
1100	1200	Germany, Deutsche Welle		6140eu	15110as
		17820eu			
1100	1200	Italy, IRRS	13840va		
1100	1200	Japan, Radio	6120na	9695as	15590as
1100	1200	Luxembourg, RTL Radio Lutzeburg		6095eu	
1100	1200	Malaysia, Radio	7295do		
1100	1200	Netherlands, Radio	9590eu		
1100	1200	Papua New Guinea, NBC		4890do	9675irr
1100	1200	Singapore, Radio Singapore Intl		6150as	9600as
1100	1200	UK, BBC World Service	6190af	6195va	
		7120af 9740as	11760me	11940af	12095eu
		15190va 15310as	15485eu	15565eu	15575eu
		17640eu 17760as	17790as	17830af	17885af
		21470af			
1100	1200	UK, BBC World Service	7320eu	9410eu	
1100	1200	Ukraine, Radio Ukraine Intl	15415eu		
1100	1200	USA, AFRTS/ Armed Forces Radio	4319usb	5446usb	
		5765usb 6350usb	7507usb	10320usb	12335usb
		12579usb	13362usb	13855usb	
1100	1200	USA, KAIJ Dallas TX	5755va		
1100	1200	USA, KTVN Salt Lake City UT	7505na		
1100	1200	USA, KWHR Naalehu HI	11565pa		
1100	1200	USA, Voice of America	6160as	9645as	9760as
		9770as 13610as	15240as	15425as	
1100	1200	USA, WBOH Newport NC	5920am		
1100	1200	USA, WEWN Birmingham AL	7520na		
1100	1200	USA, WHRI Noblesville IN	9495am	9850na	
1100	1200	USA, WINB Red Lion PA	13570am		
1100	1200	USA, WJIE Louisville KY	7490am	13595am	
1100	1200	USA, WRMI Miami FL	9955am		
1100	1200	USA, WSHB Cypress Creek SC	6095am	9455am	
1100	1200	USA, WTJC Newport NC	9370na		
1100	1200	USA, WWCR Nashville TN	5070na	5935na	
		7560na 15825na			
1100	1200	USA, WYFR Okeechobee FL	5850na	5950na	
		7335sa 11855sa			
1100	1200	Zambia, Radio Christian Voice	9865do		
1106	1200	New Zealand, Radio NZ Intl	11575pa		
1115	1145	Nepal, Radio	3230as	5005as	6100as
		7164as			
1125	1200	Netherlands, Radio	5965na	6045eu	9860eu
1130	1145	UK, BBC World Service	7135as	11920as	
1130	1159	Belgium, Radio Vlaanderen Intl	9865as		
1130	1200	Bulgaria, Radio	11700eu	15700eu	
1130	1200	South Korea, Radio Korea Intl	9650na		
1130	1200	Sweden, Radio	17505va	17840na	
1130	1200	Vatican City, Vatican Radio	15595va	17515va	

1200 UTC - 8AM E / 7AM C / 5AM P

1200	1215	vi	Cambodia, National Radio Of	11940as	
1200	1225		Netherlands, Radio	5965na	9860eu
1200	1230		Ecuador, HCJB	15115am	21455pa
1200	1230		France, Radio France Intl	17815af	21620af
			25820af		
1200	1230	DRM	Netherlands, Radio	9590eu	
1200	1230		South Korea, Radio Korea Intl	9650na	
1200	1230		Uzbekistan, Radio Toshkent Intl	7285as	9715as
			15295as 17775as		
1200	1256		China, China Radio Intl	9730as	9760pa
			11760pa 11980as	15415pa	
1200	1259		Poland, Radio Polonia	9525eu	11820eu
1200	1300		Anguilla, Caribbean Beacon	11775am	
1200	1300		Australia, ABC NT Alice Springs	2310do	4835irr
1200	1300		Australia, ABC NT Katherine	2485do	
1200	1300		Australia, ABC NT Tennant Creek	2325do	
1200	1300		Australia, Radio	5995pa	6020pa
			9580va 11650va	11880as	12080as
1200	1300		Australia, Voice Intl	13685as	21820as
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	miwhf	Canada, Radio Canada Intl	9515na	13655na
			17800na		
1200	1300		China, Voice of Hope	13590as	
1200	1300		Costa Rica, Radio for Peace Intl	7445am	15038va
1200	1300		Costa Rica, University Network	5030am	6150am
			7375am 9725sa	11870am	13750na
1200	1300	DRM	Germany, Deutsche Welle	9655eu	
1200	1300		Germany, Deutsche Welle	6140eu	15440eu
1200	1300		Germany, Overcomer Ministries	6110eu	
1200	1300		Jordan, Radio	11690eu	
1200	1300	m-/f/ DRM	Luxembourg, RTL Radio Lutzeburg	6095eu	
1200	1300		Malaysia, Radio	7295do	
1200	1300		New Zealand, Radio NZ Intl	15175pa	

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1200	1300		Papua New Guinea, NBC	4890da	9675irr		
1200	1300		Singapore, Radio Singapore Intl	6150as	9600as		
1200	1300		Taiwan, Radio Taiwan Intl	7130as	9610ou		
1200	1300		UK, BBC World Service	6190af	6195va		
			7120af 9740as 11760me	11940af	12095eu		
			15190as 15310as 15485eu	15565eu	15575me		
			17640eu 17760as 17790as	17830af	17885af		
			21470af				
1200	1300	DRM	UK, BBC World Service	7320eu	941ce		
1200	1300		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb		
			5765usb 6350usb 7507usb	10320usb	12335usb		
			12579usb 13362usb	13855usb			
1200	1300		USA, KAIJ Dallas TX	5755va			
1200	1300		USA, KTBN Salt Lake City UT	7505na			
1200	1300		USA, KWHR Naalehu HI	9930as			
1200	1300	as	USA, KWHR Naalehu HI	11565pa			
1200	1300		USA, Voice of America	6160as	9645as	9760as	
			13610as 15160as 15240as	15425as			
1200	1300	mtwhf	USA, WBCQ Kennebunk ME	17495na			
1200	1300		USA, WBOH Newport NC	5920am			
1200	1300		USA, WEWN Birmingham AL	7520na			
1200	1300		USA, WHRI Noblesville IN	9495am	9850na		
1200	1300		USA, WINB Red Lion PA	13570am			
1200	1300		USA, WJIE Louisville KY	7490am	13595am		
1200	1300		USA, WRMI Miami FL	15725na			
1200	1300		USA, WSHB Cypress Creek SC	9430am	11670am		
1200	1300		USA, WTJC Newport NC	9370na			
1200	1300		USA, WWCR Nashville TN	7560na	12160na		
			13845na 155825na				
1200	1300		USA, WYFR Okeechobee FL	5850na	5950na		
			13695na 17750na				
1200	1300		Zambia, Radio Christian Voice	9865do			
1215	1230	mtwhf	Austria, Radio Austria Intl	21780pa			
1215	1300		Egypt, Radio Cairo	17775as			
1230	1245		UK, BBC World Service	15105af	17780af		
			21640af				
1230	1257		Vietnam, Voice of	9840as	12019as		
1230	1300		Australia, HCJB	15390as			
1230	1300		Bangladesh, Bangla Betar	7185as	9550as		
1230	1300		Ecuador, HCJB	15115am	21455pa		
1230	1300		Sri Lanka, SLBC	6005as	9770as	15745as	
1230	1300		Sweden, Radio	13580as	15750as	17840na	
1230	1300		Thailand, Radio	9860as			
1230	1300		Turkey, Voice of	17595va	17830eu		
1230	1300		UAE, Gospel For Asia	15590as			
1230	1300	a	UK, Wales Radio Intl	17845ou			
1240	1255	f	Greece, Voice of	11730na	12110eu	15630eu	
			15650au				
1245	1300	mtwhf	Austria, Radio Austria Intl	6155eu	13730pa		
			21780pa				

1300 UTC - 9AM E / 8AM C / 6AM P

1300	1305		New Zealand, Radio NZ Intl	15175pa			
1300	1310	mtwhfa	Turkmenistan, Turkmen Radio	5015as			
1300	1327		Czech Rep, Radio Prague Intl	13580eu	21745as		
1300	1330		Egypt, Radio Cairo	17775as			
1300	1330		Turkey, Voice of	17595as	17830eu		
1300	1330		UAE, AWR Africa	17740as			
1300	1330		UAE, Gospel For Asia	15590as			
1300	1356		China, China Radio Intl	7405na	9570na		
			11760pa 11900pa 11980as	15180as	17720na		
			North Korea, Voice of	4405as	9335na	11335eu	
			11710am 13760eu 15245eu				
1300	1400		Anguilla, Caribbean Beacon	11775am			
1300	1400		Australia, HCJB	15390as			
1300	1400		Australia, Radio	5995pa	6020pa	9580va	
			11650va 11660as 21820as				
1300	1400		Australia, Voice Intl	9880as	13665as		
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		Canada, Radio Canada Intl	9515na	13655na		
			17800na				
1300	1400		China, Voice of Hope	13590as			
1300	1400		Costa Rica, Radio for Peace Intl	7445am	15038va		
1300	1400		Costa Rica, University Network	5030am	6150cm		
			7375am 9725sa 11870am	13750na	17645as		
1300	1400		Ecuador, HCJB	12005am	15115am	21455pa	
1300	1400	DRM	Germany, Deutsche Welle	6140eu			
1300	1400		Germany, Deutsche Welle	9655eu			
1300	1400		Germany, Overcomer Ministries	6110eu	13810me		
1300	1400		Jordan, Radio	11690eu			
1300	1400	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu			
1300	1400		Malaysia, Radio	7295do			
1300	1400		Papua New Guinea, NBC	4890do	9675irr		
1300	1400	DRM	Russia, Voice of	15780eu			
1300	1400		Singapore, Radio Singapore Intl	6150as	9600as		
1300	1400	as	South Africa, Channel Africa	11780af	21620af		
			21760af				
1300	1400		South Korea, Radio Korea Intl	9570am	13670am		
1300	1400		Sri Lanka, SLBC	6005as	9770as	15745as	

1300	1400		UK, BBC World Service	6190af	6195va		
			7120af 9740as 11760me	11940af	12095eu		
			15190va 15310as 15420af	15485eu	15575me		
			17640eu 17760as 17790as	17830af	17885as		
			21470af				
1300	1400	DRM	UK, BBC World Service	7320eu			
1300	1400		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb		
			5765usb 6350usb 7507usb	10320usb	12335usb		
			12579usb 13362usb	13855usb			
1300	1400		USA, KAIJ Dallas TX	5755va			
1300	1400		USA, KJES Vado NM	11715na			
1300	1400		USA, KNLS Anchor Point AK		11870as		
1300	1400		USA, KTBN Salt Lake City UT		7505na		
1300	1400		USA, KWHR Naalehu HI		9930as		
1300	1400		USA, Voice of America	5955as	9645as	9760as	
			15160as 15425as				
1300	1400		USA, WBCQ Kennebunk ME		17495na		
1300	1400		USA, WBOH Newport NC		5920am		
1300	1400		USA, WEWN Birmingham AL		7520na		
1300	1400		USA, WHRA Greenbush ME		17560af		
1300	1400		USA, WHRI Noblesville IN		9850na	15105am	
1300	1400		USA, WINB Red Lion PA		13570am		
1300	1400		USA, WJIE Louisville KY		7490am	13595am	
1300	1400		USA, WRMI Miami FL		15725na		
1300	1400		USA, WSHB Cypress Creek SC		9430na	11670am	
1300	1400		USA, WTJC Newport NC		9370na		
1300	1400		USA, WWCR Nashville TN		9475na	12160na	
			13845na 15825na				
1300	1400		USA, WYFR Okeechobee FL		11560as	11830na	
			11970na 17750na				
1300	1400		Zambia, Radio Christian Voice		9865do		
1306	1400	occasional	New Zealand, Radio NZ Intl		6095pa		
1330	1350		UAE, Radio Dubai	13630eu	13675eu	15395eu	
			17865eu 21605eu				
1330	1357		Vietnam, Voice of	11630eu	13740eu		
1330	1400		Guam, AWR	11980as	15275as		
1330	1400		India, All India Radio	9690as	13710as		
1330	1400		Laos, Lao National Radio		17145do		
1330	1400		Sweden, Radio	17505va	17840na		
1330	1400		UAE, AWR Africa	15320as			
1330	1400		UK, BBC World Service		15105af	21640af	
1330	1400		Uzbekistan, Radio Tashkent Intl		7285as	9715as	
			15295as 17775as				

1400 UTC - 10AM E / 9AM C / 7AM P

1400	1415	mtw	UK, BBC World Service	11860af	15420af		
			21490af				
1400	1430		Ecuador, HCJB	12005am	15115am	21455pa	
1400	1430		Egypt, Radio Cairo	17775as			
1400	1430		Germany, IBRA Radio	15715me			
1400	1430	vi	Mexico, Radio Mexico Intl		9705am	11770am	
1400	1430		Thailand, Radio	9830as			
1400	1455	as	South Africa, Channel Africa		11780af	21620af	
			21760af				
1400	1456		China, China Radio Intl		7405na	9700as	
			11675as 1765as 13685af	15125af	17720na		
1400	1456		Romania, Radio Romania Intl		15270eu	15365eu	
			17790eu 17805eu				
1400	1500		Anguilla, Caribbean Beacon		11775om		
1400	1500		Australia, HCJB	15390as			
1400	1500		Australia, Radio	5995va	6080pa	9580va	
			11650va 11660as				
1400	1500		Australia, Voice Intl	9880as	13655as		
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	
			17800na				
1400	1500		China, Voice of Hope	13590as			
1400	1500		Costa Rica, Radio for Peace Intl	7445am	15038va		
1400	1500		Costa Rica, University Network	5030am	6150am		
			7375am 9725sa 11870am	13750na	17645as		
1400	1500	a	Finland, Scandinavian Weekend Radio		5980va		
1400	1500		France, Radio France Intl		11610as	17515as	
1400	1500		Germany, Deutsche Welle		6140eu		
1400	1500	a	Germany, Overcomer Ministries		6110eu	13810me	
1400	1500		India, All India Radio	9690as	13710as		
1400	1500		Japan, Radio	7200as	9505na	11730as	
			11840pa 17870me				
1400	1500		Jordan, Radio	11690eu			
1400	1500	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu			
1400	1500	occasional	New Zealand, Radio NZ Intl	6095pa			
1400	1500		Oman, Radio	15140eu			
1400	1500		Russia, Voice of	7340as	9745as	12055as	
			17645as				
1400	1500	DRM	Russia, Voice of	15780eu			
1400	1500		Singapore, Mediacorp Radio		6150do		
1400	1500		Sri Lanka, SLBC	6005as	9770as	15745as	
1400	1500		Taiwan, Radio Taiwan Intl		15265as		
1400	1500	DRM	UK, BBC World Service		7320eu		

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1400	1500	UK, BBC World Service 6195as 7120af 9740as 15190va 15310as 15485eu 17640eu 17790as 17830af	6135as 6190af 11940af 12095eu 15565eu 15575me 21470af 21660af 4319usb 5446usb 10320usb 12335usb 13855usb	
1400	1500	USA, AFRTS/ Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb		
1400	1500	USA, KAIJ Dallas TX 13815va		
1400	1500	USA, KJES Vada NM 11715na		
1400	1500	USA, KTBN Salt Lake City UT	7505na	
1400	1500	USA, Voice of America 5955as 15160as 15255eu 15425as	7125as 9760as	
1400	1500	USA, WBCQ Kennebunk ME 17495na		
1400	1500	USA, WBOH Newport NC 5920am		
1400	1500	USA, WEWN Birmingham AL 9955na		
1400	1500	USA, WHRA Greenbush ME 17560af		
1400	1500	USA, WHRI Noblesville IN 9850am	15105am	
1400	1500	USA, WINB Red Lion PA 13570am		
1400	1500	USA, WJIE Louisville KY 7490am	13595am	
1400	1500	USA, WRMI Miami FL 15725na		
1400	1500	USA, WTJC Newport NC 9370na		
1400	1500	USA, WWCR Nashville TN 9475na 13845na 15825na	12160na	
1400	1500	USA, WYFR Okeechobee FL 11970na 17750na	11560as 11830na	
1400	1500	Zambia, Radio Christian Voice	9865do	
1415	1420	Nepal, Radio 3230as 7164as	5005as 6100as	
1430	1500	s Germany, Pan American BC 15650me		
1430	1500	Myanmar, Radio 5040do	5985do	
1430	1500	Netherlands, Radio 9860as 15220na	11835as 12075as	
1445	1500	Guam, TWR/KTWR 15330as		
1445	1500	UK, BBC World Service	6140as 7205as	

1500 UTC - 11AM E / 10AM C / 8AM P

1500	1500	as Canada, Radio Canada Intl 17800na	9515na 13655na	
1500	1528	s Hungary, Radio Budapest	6025eu 9715eu	
1500	1530	vi Mexico, Radio Mexico Intl	9705am 11770am	
1500	1530	Mongolia, Voice of 12015eu		
1500	1530	South Africa, Channel Africa	17770af	
1500	1530	Sri Lanka, SLBC 6005as	9770as 15745as	
1500	1545	Guam, TWR/KTWR 15330as		
1500	1556	China, China Radio Intl 13685af 15125af 17720af	7160as 9785as	
1500	1556	North Korea, Voice of 4405as 11710am 13760eu 15245eu	9335am 11335eu	
1500	1600	Anguilla, Caribbean Beacon	11775am	
1500	1600	Australia, HCJB 15390as		
1500	1600	Australia, Radio 5995va 9580va 11650va 11660as	6080pa 9475as	
1500	1600	Australia, Voice Intl 9880as	13655as	
1500	1600	Canada, CBC Northern Service	9625do	
1500	1600	Canada, CFRX Toronto ON	6070do	
1500	1600	Canada, CFPV Calgary AB	6030do	
1500	1600	Canada, CKZN St John's NF	6160do	
1500	1600	Canada, CKZU Vancouver BC	6160do	
1500	1600	Canada, Radio Canada Intl	15455as 17720as	
1500	1600	Costa Rica, Radio for Peace Intl	7445om 15038va	
1500	1600	Costa Rica, University Network	5030am 6150am	
1500	1600	7375am 9725sa 11870am	13750na 17645as	
1500	1600	Germany, Deutsche Welle	6140eu	
1500	1600	smtwhf Germany, Overcomer Ministries	6110eu 13810me	
1500	1600	s Germany, Pan American BC	15650me	
1500	1600	s Ireland, Reflections Europe 12255eu	3910eu 6295eu	
1500	1600	Japan, Radio 7200as 11730as	9750as 11705na	
1500	1600	Jordan, Radio 11690na		
1500	1600	s Latvia, Laser Radio 5935eu		
1500	1600	m-/f DRM Luxembourg, RTL Radio Lutzeburg	6095eu	
1500	1600	Myanmar, Radio 5040do	5985do	
1500	1600	Netherlands, Radio 9890as 15220na	11835as 12075as	
1500	1600	occasional New Zealand, Radio NZ Intl	6095pa	
1500	1600	Russia, Voice of 4940me 7315as 7325me 7340as	4965me 4975me 11500as 11985me	
1500	1600	DRM Russia, Voice of 15780eu		
1500	1600	Singapore, Mediacorp Radio	6150do	
1500	1600	UK, BBC World Service	5975as 6135as	
1500	1600	6190af 6195as 7120af 12095eu 15190va 15310as 15565eu 17790as 17830af	9740as 11940af 15400af 15485eu 21470af 21660af 4319usb 5446usb 10320usb 12335usb 13855usb	
1500	1600	USA, AFRTS/ Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb		
1500	1600	USA, KAIJ Dallas TX 13815va		
1500	1600	USA, KTBN Salt Lake City UT	15590na	
1500	1600	USA, KWHR Naalehu HI 9930as		
1500	1600	USA, Voice of America 6160as 9700eu 9760as 9845as	7125as 9590as 12040as 15205as	
1500	1600	15255eu 15550as		
1500	1600	USA, WBCQ Kennebunk ME	17495na	

1500	1600	USA, WBOH Newport NC	5920am	
1500	1600	USA, WEWN Birmingham AL	9955na	
1500	1600	USA, WHRA Greenbush ME	17650af	
1500	1600	USA, WHRI Noblesville IN	13760va	15105am
1500	1600	USA, WINB Red Lion PA	13570am	
1500	1600	USA, WJIE Louisville KY	7490am	13595am
1500	1600	smtwhf USA, WMLK Bethel PA 9465eu		
1500	1600	USA, WRMI Miami FL 15725na		
1500	1600	USA, WTJC Newport NC	9370na	
1500	1600	USA, WWCR Nashville TN 9475na 13845na 15825na	12160na	
1500	1600	USA, WYFR Okeechobee FL 15520as 17750na	6280as 11830na	
1500	1600	Zambia, Radio Christian Voice	4965do	
1510	1525	mtwhf Austria, Radio Austria Intl	15515na	
1515	1600	as Germany, Bible Voice BC Network	15680me	
1515	1600	a Vatican City, Vatican Radio	13765as	15235as
1530	1545	Bangladesh, Bangla Betar	4882as	
1530	1545	UK, BBC World Service	11685as	15540as
1530	1600	Georgia, Radio Georgia	6180me	
1530	1600	mtwhf Germany, Bible Voice BC Network	17655as	
1530	1600	Germany, IBRA Radio 15715me		
1530	1600	Iran, Voice of the Islamic Rep 11775as	7245eu 9635as	
1540	1550	Turkmenistan, Turkmen Radio	4930do	
1545	1600	s h Bangladesh, Bangla Betar	4882as	

1600 UTC - 12PM E / 11AM C / 9AM P

1600	1615	Pakistan, Radio 11570va 17720va	15065va 15725va	
1600	1625	Netherlands, Radio 9890as 15220na	11835as 12075as	
1600	1627	Czech Rep, Radio Prague Intl	5930eu 21745af	
1600	1627	Iran, Voice of the Islamic Rep 11775as	7245eu 9635as	
1600	1627	Vietnam, Voice of 11630eu	13740eu	
1600	1630	Guam, AWR 11560as	15215as	15235as
1600	1630	Jordan, Radio 11690na		
1600	1630	w Moldova, Radio Pridnestrovye	5960eu	
1600	1630	South Africa, Channel Africa	9525af	
1600	1630	UAE, Gospel For Asia 11695as		
1600	1635	UAE, Radio Dubai 13630eu 17865eu 21605eu	13675eu 15395eu	
1600	1650	occasional New Zealand, Radio NZ Intl	6095pa	
1600	1656	vi North Korea, Voice of 3560as	9975af 11710af	
1600	1700	UK, Sudan Radio Service	17630va	
1600	1700	Algeria, Radio Algiers Intl	11715eu	15160eu
1600	1700	Anguilla, Caribbean Beacon	11775am	
1600	1700	Australia, HCJB 15390as		
1600	1700	Australia, Radio 5995va 9580va 11650va 11660as	6080pa 9475as	
1600	1700	Australia, Voice Intl 9880as	13655as	
1600	1700	Canada, CBC Northern Service	9625do	
1600	1700	Canada, CFRX Toronto ON	6070do	
1600	1700	Canada, CFPV Calgary AB	6030do	
1600	1700	Canada, CKZN St John's NF	6160do	
1600	1700	Canada, CKZU Vancouver BC	6160do	
1600	1700	Costa Rica, Radio for Peace Intl	7445am	15038va
1600	1700	Costa Rica, University Network	5030am 6150am	
1600	1700	7375am 9725sa 11870am	13750na 17645as	
1600	1700	Ethiopia, Radio 5990af 9560af 9704af 11800af	7110af 7165af	
1600	1700	a Finland, Scandinavian Weekend Radio	6170va	
1600	1700	France, Radio France Intl 11995af 12015af 15160af	9730af 11615af 15605af 17605af	
1600	1700	Germany, Bible Voice BC Network	15680me	
1600	1700	DRM Germany, Deutsche Welle	6140eu 7125eu	
1600	1700	Germany, Deutsche Welle	6140eu 6170as	
1600	1700	a Germany, Overcomer Ministries	6110eu	
1600	1700	s Greece, Voice of 9420eu	15630eu 17705na	
1600	1700	s Ireland, Reflections Europe 12255eu	3910eu 6295eu	
1600	1700	s Latvia, Laser Radio 5935eu		
1600	1700	Russia, Voice of 7315as 11985me 12055as 15540me	7350as 11720as	
1600	1700	DRM Russia, Voice of 15780eu		
1600	1700	South Africa, Radio Veritas	3230af	
1600	1700	South Korea, Radio Korea Intl 9870af	5975om 9515af	
1600	1700	Taiwan, Radio Taiwan Intl	11550as	
1600	1700	UK, BBC World Service	3915as 5975as	
1600	1700	6190eu 6195as 7120af 9510as 11940af 12095eu	7160as 9410eu 15190va 15310as 17790as 17830af	
1600	1700	15400af 15475eu 15565eu		
1600	1700	UK, SWR Africa 4880va		
1600	1700	USA, AFRTS/ Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb	4319usb 5446usb 10320usb 12335usb 13855usb	
1600	1700	USA, KAIJ Dallas TX 13815va		
1600	1700	USA, KTBN Salt Lake City UT	15590na	
1600	1700	USA, KWHR Naalehu HI	9930as	

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1600	1700		USA, Voice of America	12080af	13600as	17895af		
1600	1700		USA, WBCQ Kennebunk ME		17495na			
1600	1700		USA, WBOH Newport NC		5920am			
1600	1700		USA, WEWN Birmingham AL		13615na			
1600	1700		USA, WHRA Greenbush ME		17650af			
1600	1700		USA, WHRI Noblesville IN		13760va	15105am		
1600	1700		USA, WINB Red Lion PA		13570am			
1600	1700		USA, WJIE Louisville KY		7490am	13595am		
1600	1700	smtwhf	USA, WMLK Bethel PA	9465eu				
1600	1700		USA, WRMI Miami FL	15725na				
1600	1700		USA, WSHB Cypress Creek SC		18910af			
1600	1700		USA, WTJC Newport NC		9370na			
1600	1700		USA, WWCR Nashville TN		9475na	12160na		
1600	1700			13845na	15825na			
1600	1700		USA, WWRB Manchester TN		9320na	12172na		
1600	1700		USA, WYFR Okeechobee FL		11830na	15520as		
1600	1700			17750na	18980eu	21455eu		
1600	1700		Zambia, Radio Christian Voice		4965do			
1615	1630		UK, BBC World Service		15420af			
1615	1630		Vatican City, Vatican Radio		4005eu	5890eu		
1615	1700	as		7250eu	9645eu	15595eu		
1630	1657		UK, BBC World Service		21490af			
1630	1700		Slovakia, Radio Slovakia Intl		5920eu	6055eu		
1630	1700			7345eu				
1630	1700		Egypt, Radio Cairo	15255af				
1630	1700		Guam, AWR	11560as	11975as	15215as		
1630	1700			15235as				
1630	1700		UAE, AWR Africa	1763Cme				
1630	1700		UK, BBC World Service		9530eu	11735eu		
1630	1700			13645eu	15420af			
1645	1700		Tajikistan, Radio	7245as				
1650	1700	mtwhf	New Zealand, Radio NZ Intl		11725pa			

1700 UTC - 1PM E / 12PM C / 10AM P

1700	1715	vi	Somalia, Radio Galkayo		6985va			
1700	1727		Czech Rep, Radio Prague Intl		5930eu	17485af		
1700	1727		Vietnam, Voice of	9725eu				
1700	1730		Azerbaijan, Voice of	6110eu	9155eu			
1700	1730		France, Radio France Intl		15605af	17605af		
1700	1730	mtwhf	Germany, Bible Voice BC Network		15680me			
1700	1730		South Africa, Channel Africa		15265af			
1700	1746		UK, BBC World Service		6005af	9630af		
1700	1750	mtwhf	New Zealand, Radio NZ Intl		11725pa			
1700	1756		China, China Radio Intl		9570af	9695af		
1700	1756			11910af	11920af			
1700	1759		Romania, Radio Romania Intl		9510eu	11820eu		
1700	1800			11940eu	15380eu			
1700	1800		Poland, Radio Polonia		5995eu	7285eu		
1700	1800		Anguilla, Caribbean Beacon		11775am			
1700	1800		Australia, Radio	5995va	6080pa	9475as		
1700	1800			9580va	9815pa	11880va		
1700	1800		Australia, Voice Intl		11680as			
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		Costa Rica, Radio for Peace Intl		7445am	15038va		
1700	1800		Costa Rica, University Network		5030am	6150am		
1700	1800			7375am	9725sa	11870am	13750na	17645as
1700	1800		Egypt, Radio Cairo		15255af			
1700	1800		Eq Guinea, Radio Africa		7189af	15184af		
1700	1800	as	Germany, Bible Voice BC Network		15750me			
1700	1800	DRM	Germany, Deutsche Welle		7125eu			
1700	1800		Germany, Deutsche Welle		6140eu			
1700	1800		Germany, Radio Africa Intl		13820af	15715af		
1700	1800		Japan, Radio	9505na	11970eu	15355af		
1700	1800		Nigeria, Voice of	7255af	9690af	15120af		
1700	1800		Russia, Voice of	7315as	9775eu	9890eu		
1700	1800			11510af	11985af			
1700	1800	as	Russia, Voice of	9480eu				
1700	1800		South Africa, Radio Veritas		3230af			
1700	1800		UK, BBC World Service		3255af	3915as		
1700	1800			5975as	6190af	6195eu	7120af	7160as
1700	1800			9410eu	9510as	12095eu	15310as	15400af
1700	1800			15420af	15485eu	15565eu	17830af	21470af
1700	1800	vi	UK, Sudan Radio Service		17660va			
1700	1800		UK, SWR Africa		4880va			
1700	1800		USA, AFRTS/ Armed Forces Radio		4319usb	5446usb		
1700	1800			5765usb	6350usb	7507usb	10320usb	12335usb
1700	1800			12579usb	13362usb	13855usb		
1700	1800		USA, KAIJ Dallas TX		13815va			
1700	1800		USA, KTNB Salt Lake City UT		15590na			
1700	1800		USA, WBCQ Kennebunk ME		17495na			
1700	1800		USA, WBOH Newport NC		5920am			
1700	1800		USA, WEWN Birmingham AL		13615na	17595eu		
1700	1800		USA, WHRA Greenbush ME		17650af			
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	smtwhf	USA, WMLK Bethel PA	9465eu				
1700	1800		USA, WRMI Miami FL	15725na				
1700	1800		USA, WSHB Cypress Creek SC		18910af			
1700	1800		USA, WTJC Newport NC		9370na			

1700	1800		USA, WWCR Nashville TN		9475na	12160na		
1700	1800			13845na	15825na			
1700	1800		USA, WWRB Manchester TN		9320na	12172na		
1700	1800		USA, WYFR Okeechobee FL		18980eu	21455eu		
1700	1800			21680af				
1700	1800		Zambia, Radio Christian Voice		4965do			
1715	1730		Swaziland, TWR	3200af				
1730	1745		UK, BBC World Service		3390va	7230va		
1730	1745	mw		9525va				
1730	1745		UK, BBC World Service		6050eu	11955eu		
1730	1745	mtwhf		15585eu				
1730	1745		UK, United Nations Radio		7150af	15495me		
1730	1755			17810af				
1730	1755		Belgium, Radio Vlaanderen Intl		9925eu	13690eu		
1730	1800			13710me				
1730	1800		Bulgaria, Radio	9400eu	11900eu			
1730	1800		Georgia, Radio Georgia		11910eu			
1730	1800		Guam, AWR	9385me	12015me			
1730	1800		Liberia, ELWA	4760do				
1730	1800	mtwhfa	Malta, Voice of Mediterranean		6185eu			
1730	1800		Netherlands, Radio	6020af	7120af	11655af		
1730	1800		Philippines, Radio Pilipinas		11720me	15190me		
1730	1800			17720me				
1730	1800		Swaziland, TWR	3200af	9500af			
1730	1800	mtwhfa	Sweden, Radio	6065va				
1730	1800	s	Sweden, Radio	13580va				
1730	1800		Switzerland, Swiss Radio Intl		13750va	15515va		
1730	1800			17870va				
1730	1800		Vatican City Vatican Radio		13765af	15570af		
1730	1800			17515af				
1735	1745	vi/th	Paraguay, Radio Nacional		9739sa			
1745	1800		Bangladesh, Bangla Betar		7185eu	9550eu		
1745	1800			15520eu				
1745	1800		India, All India Radio	7410eu	9445af	9950eu		
1745	1800			11620eu	11935af	13605af	15075af	15155af
1745	1800			17670af				
1751	1800		New Zealand, Radio NZ Intl		15160pa			

1800 UTC - 2PM E / 1PM C / 11AM P

1800	1810		Zanzibar, Voice of Tanzania		11734do			
1800	1815		Germany, Bible Voice BC Network		13845me			
1800	1827		Slovakia, Radio Slovakia Intl		5920eu	6055eu		
1800	1827			7345eu				
1800	1830		Vietnam, Voice of	11630eu	13740eu			
1800	1830	s	Egypt, Radio Cairo	15255af				
1800	1830		Germany, Universal Life		15750af			
1800	1830		Netherlands, Radio	6020af	7120af	11655af		
1800	1830		South Africa, AWR Africa		3215af	3345af		
1800	1830			9520af				
1800	1830		South Africa, Channel Africa		15265af			
1800	1830		UK, BBC World Service		5975as	9510as		
1800	1830		UK, RTE Radio	15585me				
1800	1900		Anguilla, Caribbean Beacon		11775am			
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu			
1800	1900		Australia, HCJB	11765pa				
1800	1900		Australia, Radio	6080pa	7240va	9475as		
1800	1900			9580va	9815pa	11880va		
1800	1900		Australia, Voice Intl	11680as				
1800	1900		Bangladesh, Bangla Betar		7185eu	9550eu		
1800	1900			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, Radio for Peace Intl		7445am	15038va		
1800	1900		Costa Rica, University Network		5030am	6150am		
1800	1900			7375am	9725sa	11870am	13750na	17645as
1800	1900		Eq Guinea, Radio Africa		7189af	15184af		
1800	1900		Germany, Bible Voice BC Network		5970eu			
1800	1900	DRM	Germany, Deutsche Welle		6140eu			
1800	1900		Germany, Deutsche Welle		6140eu			
1800	1900		Germany, Radio Africa Intl		13820af	15715af		
1800	1900	s	Greece, Voice of	9420eu	15630eu	17705na		
1800	1900		India, All India Radio	7410eu	9445af	9950eu		
1800	1900			11620eu	11935af	13605af	15075af	15155af
1800	1900			17670af				
1800	1900	s	Ireland, Reflections Europe		3910eu	6295eu		
1800	1900			12255eu				
1800	1900		Kuwait, Radio	11990va				
1800	1900	s	Latvia, Laser Radio	5935eu				
1800	1900		Liberia, ELWA	4760do				
1800	1900		New Zealand, Radio NZ Intl		15160pa			
1800	1900		Nigeria, Voice of	7255af	9690af	15120af		
1800	1900		Philippines, Radio Pilipinas		11720me	15190me		
1800	1900			17720me				
1800	1900		Russia, Voice of	9480eu	9775eu	9890eu		
1800	1900							

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1800	1900	UK, BBC World Service	3255af	6190af			
		6195eu 7120af 9410eu	12095eu	15310me			
		15400af 15420af 17830af	21470af				
1800	1900	UK, SWR Africa	4880va				
1800	1900	USA, AFRTS/ Armed Forces Radio	4319usb	5446usb			
		5765usb 6350usb 7507usb	10320usb	12335usb			
		12579usb	13362usb	13855usb			
1800	1900	USA, KAIJ Dallas TX	13815va				
1800	1900	USA, KJES Vado NM	15385na				
1800	1900	USA, KTBN Salt Lake City UT	15590na				
1800	1900	USA, WBCQ Kennebunk ME	17495na				
1800	1900	USA, WBCQ Kennebunk ME	7415na				
1800	1900	USA, WBOH Newport NC	5920am				
1800	1900	USA, WEWN Birmingham AL	13615na	17595eu			
1800	1900	USA, WHRA Greenbush ME	17650af				
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 9465eu					
1800	1900	USA, WRMI Miami FL 15725na					
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 15825na					
1800	1900	USA, WWRB Manchester TN	9320na	12172na			
1800	1900	USA, WYFR Okeechobee FL	18980me				
1800	1900	Yemen, Rep of Yemen Radio	9780me				
1800	1900	Zambia, Radio Christian Voice	4965do				
1830	1845	Germany, IBRA Radio 15695af					
1830	1855	Greece, Voice of	12110eu				
1830	1858	Serbia & Montenegro, RSCG	6100eu				
1830	1900	Georgia, Radio Georgia	11760eu				
1830	1900	Netherlands, Radio	6020af	7120af	9895af		
		11655af 13700af 17605af	21590af	9520af			
1830	1900	South Africa, AWR Africa					
1830	1900	Turkey, Voice of	9785eu				
1830	1900	UK, BBC World Service	6005af	9630af			
1830	1900	UK, RTE Radio	13640na	21630af			
1845	1900	Albania, Radio Tirana Intl	7210eu	9520eu			
1845	1900	Congo, RTV Congolaise	4765af	5985af			

1900 UTC - 3PM E / 2PM C / 12PM P

1900	1925	Israel, Kol Israel	11605va	15615va	15640af		
		17545va					
1900	1927	Vietnam, Voice of	9725eu	11630eu	13740eu		
1900	1928	Hungary, Radio Budapest	11720eu	3975eu	6025eu		
1900	1930	Germany, Bible Voice BC Network	5970eu				
1900	1930	Germany, Universal Life	15565me				
1900	1930	Nigeria, Radio Jakada Intl	15170af				
1900	1930	Philippines, Radio Pilipinas	11720me	15190me			
		17720me					
1900	1930	Turkey, Voice of	9785eu				
1900	1945	India, All India Radio	7410eu	9445af	9950eu		
		11620eu 11935af 13605af	15075af	15155af			
		17670af					
1900	1945	Iraq, Radio Iraq Intl	6175irr	9687irr	11787irr		
1900	1956	China, China Radio Intl	9440af	13790af			
1900	1956	North Korea, Voice of 4405as	13760eu 15245eu	7505eu	11335eu		
1900	2000	Anguilla, Caribbean Beacon	11775am				
1900	2000	Australia, HCJB	11765pa				
1900	2000	Australia, Radio	6080pa	7240va	9500as		
		9580va 9815pa 11880va					
1900	2000	Australia, Voice Intl	11680as				
1900	2000	Botswana, Radio	3356do	4820do	7255do		
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	Costa Rica, Radio for Peace Intl	7445am	15038va			
1900	2000	Costa Rica, University Network	5030am	6150am			
		7375am 9725sa 11870am	13750na	17645as			
1900	2000	Eq Guinea, Radio Africa	7189af	15184al			
1900	2000	Finland, Scandinavian Weekend Radio	5990va				
		11690va					
1900	2000	Germany, Bible Voice BC Network	13710me	13725af			
1900	2000	Germany, Deutsche Welle	6180af	7225af			
		11965af 13590af					
1900	2000	Ghana, Ghana BC Corp	3366do	4915do			
1900	2000	Italy, IRRS 5775va					
1900	2000	Kuwait, Radio	11990va				
1900	2000	Latvia, Laser Radio	5935eu				
1900	2000	Liberia, ELWA	4760do				
1900	2000	Malaysia, Radio	7295do				
1900	2000	Malta, Voice of Mediterranean	12060eu				
1900	2000	Namibia, Namibian BC Corp	3270af	3290af			
		6060af					
1900	2000	Netherlands, Radio	6020af	7120af	9895af		
		11655af 13700af 17605af	21590af	15160pa			
1900	2000	New Zealand, Radio NZ Intl					
1900	2000	Nigeria, Radio/Abuja	7275do				
1900	2000	Nigeria, Radio/Enugu	6025do				

1900	2000	Nigeria, Radio/Ibadan	6050do				
1900	2000	Nigeria, Radio/Kaduna	4770do	6090do			
1900	2000	Nigeria, Radio/Lagos	3326do	4990do			
1900	2000	Nigeria, Voice of	7255af	9690af	15120af		
1900	2000	Russia, Voice of	7440eu	9775eu	9890eu		
		11675eu 12070eu 15735am					
1900	2000	Sierra Leone, Radio UNAMSIL	6139af				
1900	2000	Sierra Leone, SLBS	3316do				
1900	2000	Salomon Islands, SIBC	5020do	9545do			
1900	2000	South Korea, Radio Korea Intl	5975om	7275eu			
1900	2000	Sri Lanka, SLBC	6010am				
1900	2000	Swaziland, TWR	3200af				
1900	2000	Thailand, Radio	7155eu				
1900	2000	Uganda, Radio	4976do	5026do	7196do		
1900	2000	UK, BBC World Service	3255af	6005af			
		6190af 6195eu 7120af	9410eu	9630af			
		12095af 15310me 15400af	17830af				
1900	2000	UK, Gospel For Asia	15590af				
1900	2000	USA, AFRTS/ Armed Forces Radio	4319usb	5446usb			
		5765usb 6350usb 7507usb	10320usb	12335usb			
		12579usb	13362usb	13855usb			
1900	2000	USA, KAIJ Dallas TX	13815va				
1900	2000	USA, KTBN Salt Lake City UT	15590na				
1900	2000	USA, Voice of America	7260me	9680me	11925as		
		13635me					
1900	2000	USA, WBCQ Kennebunk ME	7415na				
1900	2000	USA, WBOH Newport NC	5920am				
1900	2000	USA, WEWN Birmingham AL	13615na	17595eu			
1900	2000	USA, WHRA Greenbush ME	17650af				
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 9465eu					
1900	2000	USA, WRMI Miami FL 15725na					
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 15825na					
1900	2000	USA, WWRB Manchester TN	9320na	12172na			
1900	2000	USA, WYFR Okeechobee FL	18980eu				
1900	2000	Vanuatu, Radio	3945al	7260do			
1900	2000	Zimbabwe, ZBC Corp	5975do				
1915	1925	Rwanda, Radio	6005do				
1915	1930	UK, BBC World Service	17885af				
1923	1930	Libya, Voice of Africa	11635af	15105af	15315af		
1930	1959	Belgium, Radio Vlaanderen Intl	9925eu	13690eu			
1930	2000	Belarus, Radio Belarus Intl	7105eu	7210eu			
1930	2000	Iran, Voice of the Islamic Rep	9800eu	11670eu			
		11750eu 11860eu					
1930	2000	Papua New Guinea, NBC	4890do	9675irr			
1930	2000	Slovakia, AWR Europe	7130eu				
1930	2000	Sweden, Radio	6065va				
1930	2000	Switzerland, Swiss Radio Intl	11815va	13645va			
		13795va 15220af					
1935	1955	Italy, RAI Intl	5970eu	9745eu			
1940	1945	Turkmenistan, Turkmen Radio	4930as				
1940	2000	Armenia, Voice of	4810eu	9960eu			
1950	2000	Vatican City, Vatican Radio	4005eu	5890eu			
		7350eu					

2000 UTC - 4PM E / 3PM C / 1PM P

2000	2010	Vatican City, Vatican Radio	4005eu	5890eu			
		7250eu 9660af 11625af	13765af				
2000	2025	Netherlands, Radio	6020af	7120af	9895af		
		11655af 13700af 17605af	21590af				
2000	2027	Czech Rep, Radio Prague Intl	5930eu	11600as			
2000	2027	Iran, Voice of the Islamic Rep	9800eu	11670eu			
		11750eu 11860eu					
2000	2030	Australia, HCJB	11765pa				
2000	2030	Mongolia, Voice of	12015eu				
2000	2030	Swaziland, TWR	3200af				
2000	2030	Switzerland, Swiss Radio Intl	11815va	13645va			
		13795va 15220af					
2000	2030	Vatican City, Vatican Radio	9800eu				
2000	2056	China, China Radio Intl	9440af	11640af			
		13630af 15110eu 17790eu					
2000	2059	Spain, Radio Exterior Espana	9570af	15290eu			

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2000	2100	Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na 17645as	6150am 1789af 15184af		2100	2156	Romania, Radio Romania Intl 9725eu 11775eu	7185eu	9510eu
2000	2100	Eat Guinea, Radio Africa	1789af	15184af		2100	2159	Spain, Radio Exterior Espana	9570af	9840eu
2000	2100	Germany, Deutsche Welle 17810af	9780af	15205af		2100	2200	Anguilla, Caribbean Beacon	11775am	
2000	2100	vi Ghana, Ghana BC Corp	3366do	4915do		2100	2200	Australia, Radio 7240va 9660pa 11880va 12080va	9500as	9580va 21740va
2000	2100	Guam, AWR	11980as			2100	2200	Austria, AWR Europe	15130af	
2000	2100	Indonesia, Voice of	11785eu	15150eu		2100	2200	vi Botswana, Radio	3356do	4820do 7255do
2000	2100	s Ireland, Reflections Europe	3910eu	6295eu		2100	2200	Bulgaria, Radio	5800eu	7500eu
2000	2100	Italy, IRRS 5775va				2100	2200	Canada, CBC Northern Service	9625do	
2000	2100	s Kuwait, Radio	11990va			2100	2200	Canada, CFRX Toronto ON	6070do	
2000	2100	Latvia, Laser Radio	5935eu			2100	2200	Canada, CFVP Calgary AB	6030do	
2000	2100	Liberia, ELWA	4760do			2100	2200	Canada, CKZN St John's NF	6160do	
2000	2100	Malaysia, Radio	7295do			2100	2200	Canada, CKZU Vancouver BC	6160do	
2000	2100	Namibia, Namibian BC Corp	3270af	3290af		2100	2200	Canada, Radio Canada Intl	9800eu	
2000	2100	Nigeria, Radio/Abuja	7275do			2100	2200	Costa Rica, Radio for Peace Intl	7445am	15038va
2000	2100	Nigeria, Radio/Enugu	6025do			2100	2200	Costa Rica, University Network	5030am	6150am
2000	2100	Nigeria, Radio/Ibadan	6050do			2100	2200	7375am 9725sa 11870am	13750na	17645as
2000	2100	Nigeria, Radio/Kaduna	4770do	6090do		2100	2200	Egypt, Radio Cairo	15375af	
2000	2100	Nigeria, Radio/Lagos	3326do			2100	2200	f Eat Guinea, Radio Africa	7189af	15184af
2000	2100	Nigeria, Voice of	7255af	9690af	15120af	2100	2200	Finland, Scandinavian Weekend Radio	11720va	5990va
2000	2100	Papua New Guinea, NBC	4890do	9675irr		2100	2200	Germany, Deutsche Welle	9440af	11865af
2000	2100	Russia, Voice of	9775eu	11675eu	12070eu	2100	2200	vi 15205af	3366do	4915do
2000	2100	Sierra Leone, Radio UNAMSIL	6139af			2100	2200	Guyana, Voice of	5949do	
2000	2100	vi Sierra Leone, SLBS	3316do			2100	2200	India, All India Radio 7410eu 9910au 9950eu 11620va	9445eu	9575au 11715au
2000	2100	Soloman Islands, SIBC	5020do	9545do		2100	2200	s Ireland, Reflections Europe	3910eu	6295eu
2000	2100	Syria, Radio Damascus	12085eu	13610eu		2100	2200	Japan, Radio	6035pa	6055eu
2000	2100	Uganda, Radio	4976do	5026do	7196co	2100	2200	11855af 17825na 21670pa		6180eu
2000	2100	UK, AWR Europe	15385af			2100	2200	Liberia, ELWA	4760do	
2000	2100	UK, BBC World Service	3255af	6005af		2100	2200	Malaysia, Radio	7295do	
2000	2100	6190af 6195eu 7120af 12095af 15400af 17830af	4319usb	5446usb		2100	2200	Malta, Voice of Mediterranean	12060eu	
2000	2100	USA, AFRTS/ Armed Forces Radio	5765usb	6350usb	7507usb	2100	2200	vi Mexico, Radio Mexico Intl	9705am	11770am
2000	2100	USA, KAJI Dallas TX	13815va			2100	2200	Namibia, Namibian BC Corp	3270af	3290af
2000	2100	USA, KTVN Salt Lake City UT	15590na			2100	2200	New Zealand, Radio NZ Intl	17675pa	
2000	2100	USA, Voice of America 4950af 9770eu 9850af 11855af 15410af 15445af 15580af	6095eu	9760eu		2100	2200	Nigeria, Radio/Abuja	7275do	
2000	2100	USA, WBCQ Kennebunk ME	17495na	9330ra		2100	2200	Nigeria, Radio/Enugu	6025do	
2000	2100	USA, WBOH Newport NC	5920am			2100	2200	Nigeria, Radio/Ibadan	6050do	
2000	2100	USA, WEWN Birmingham AL	13615na	17595eu		2100	2200	Nigeria, Radio/Kaduna	4770do	6090do
2000	2100	USA, WHRA Greenbush ME	17650as			2100	2200	Nigeria, Radio/Lagos	3326do	
2000	2100	USA, WHRI Noblesville IN	5745va	9495am		2100	2200	Nigeria, Voice of	15120af	
2000	2100	USA, WINB Red Lion PA	13570am			2100	2200	Papua New Guinea, NBC	4890do	9675irr
2000	2100	USA, WJIE Louisville KY	7490am	13595am		2100	2200	Sierra Leone, Radio UNAMSIL	6139af	
2000	2100	USA, WRMI Miami FL	15725na			2100	2200	Sierra Leone, SLBS	3316do	
2000	2100	USA, WTJC Newport NC	9370na			2100	2200	Syria, Radio Damascus	12085eu	13610eu
2000	2100	USA, WWCR Nashville TN	9475na	12160na		2100	2200	UK, BBC World Service	3255af	3915as
2000	2100	USA, WWRB Manchester TN	9320na	12172na		2100	2200	5965as 5975am 6005af 7120af 9410eu 11945as 17830af	6190af	6195va 15400af
2000	2100	USA, WYFR Okeechobee FL	3230af	15195af		2100	2200	Ukraine, Radio Ukraine Intl	5905eu	
2000	2100	17725sa 17845af 18930eu	18980eu			2100	2200	USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
2000	2100	Vanuatu, Radio	3945af	7260do		2100	2200	5765usb 6350usb 7507usb 12579usb 13362usb	10320usb	12335usb
2000	2100	vi Zimbabwe, ZBC Corp	5975do			2100	2200	USA, KAJI Dallas TX	13815va	
2000	2100	vi USA, WSHB Cypress Creek SC	15665af	18910af		2100	2200	USA, KTVN Salt Lake City UT	15590na	
2010	2030	Vatican City, Vatican Radio	13765af	9660af	11625af	2100	2200	USA, Voice of America 6040eu 9705as 9760eu 9850af 13670af 15185as 15410af 17740as 17820as 17895af	6095eu	9530eu 11975af 15445af
2025	2045	Italy, RAI Intl	6185va	9670va	11880af	2100	2200	USA, WBCQ Kennebunk ME	7415na	9330na
2030	2045	Swaziland, TWR	3200af			2100	2200	17495na		
2030	2045	Thailand, Radio	9680eu			2100	2200	USA, WBOH Newport NC	5920am	
2030	2056	vi Burundi, Radio	6140af			2100	2200	USA, WEWN Birmingham AL	13615na	17595eu
2030	2057	Vietnam, Voice of	11630eu	13740eu		2100	2200	USA, WHRA Greenbush ME	17650af	
2030	2100	th Belarus, Radio Belarus Intl	7105eu	7210eu		2100	2200	USA, WHRI Noblesville IN	5745va	9495am
2030	2100	Cuba, Radio Havana	11760eu			2100	2200	USA, WINB Red Lion PA	13570am	
2030	2100	DRM Egypt, Radio Cairo	15375af			2100	2200	USA, WJIE Louisville KY	7490am	13595am
2030	2100	Netherlands, Radio	9800eu			2100	2200	USA, WRMI Miami FL	15725na	
2030	2100	Turkey, Voice of	9525as			2100	2200	USA, WSHB Cypress Creek SC	15665af	18910af
2030	2100	f UK, Wales Radio Intl	7325eu			2100	2200	USA, WTJC Newport NC	9370na	
2030	2100	as USA, Voice of America 4950af				2100	2200	USA, WWCR Nashville TN	9475na	12160na
2030	2100	Uzbekistan, Radio Tashkent Intl	11905eu	5025eu	9545eu	2100	2200	13845na 15825na		
2045	2100	India, All India Radio	7410eu	9445eu	9575au	2100	2200	USA, WWRB Manchester TN	9320na	12172na
2051	2100	9910au 9950eu 11620va	11715au			2100	2200	USA, WYFR Okeechobee FL	17725sa	17845af
		New Zealand, Radio NZ Intl	17675pa			2100	2200	18930eu 18980eu		

2100 UTC - 5PM E / 4PM C / 2PM P

2100	2128	Hungary, Radio Budapest	6025eu	11890af
2100	2128	Serbia & Montenegro, RSCG	6100eu	
2100	2130	Canada, Radio Canada Intl	5850va	7235va
2100	2130	China, China Radio Intl	11640af	13630af
2100	2130	vi Cuba, Radio Havana	11760eu	13660na
2100	2130	Italy, IRRS 5775va		
2100	2130	South Korea, Radio Korea Intl	3955eu	
2100	2130	Turkey, Voice of	9525as	
2100	2156	North Korea, Voice of	7505eu	11335eu
		13760eu 15245eu		

2100	2156	Romania, Radio Romania Intl	7185eu	9510eu
2100	2159	as Spain, Radio Exterior Espana	9570af	9840eu
2100	2200	Anguilla, Caribbean Beacon	11775am	
2100	2200	Australia, Radio 7240va 9660pa 11880va 12080va	9500as	9580va 21740va
2100	2200	vi Austria, AWR Europe	15130af	
2100	2200	Botswana, Radio	3356do	4820do 7255do
2100	2200	Bulgaria, Radio	5800eu	7500eu
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, CKZU Vancouver BC	6160do	
2100	2200	vi/ DRM Canada, Radio Canada Intl	9800eu	
2100	2200	Costa Rica, Radio for Peace Intl	7445am	15038va
2100	2200	Costa Rica, University Network	5030am	6150am
2100	2200	7375am 9725sa 11870am	13750na	17645as
2100	2200	Egypt, Radio Cairo	15375af	
2100	2200	f Eat Guinea, Radio Africa	7189af	15184af
2100	2200	Finland, Scandinavian Weekend Radio	11720va	5990va
2100	2200	Germany, Deutsche Welle	9440af	11865af
2100	2200	vi 15205af	3366do	4915do
2100	2200	Guyana, Voice of	5949do	
2100	2200	India, All India Radio 7410eu 9910au 9950eu 11620va	9445eu	9575au 11715au
2100	2200	s Ireland, Reflections Europe	3910eu	6295eu
2100	2200	Japan, Radio	6035pa	6055eu
2100	2200	11855af 17825na 21670pa		6180eu
2100	2200	Liberia, ELWA	4760do	
2100	2200	Malaysia, Radio	7295do	
2100	2200	Malta, Voice of Mediterranean	12060eu	
2100	2200	vi Mexico, Radio Mexico Intl	9705am	11770am
2100	2200	Namibia, Namibian BC Corp	3270af	3290af
2100	2200	New Zealand, Radio NZ Intl	17675pa	
2100	2200	Nigeria, Radio/Abuja	7275do	
2100	2200	Nigeria, Radio/Enugu	6025do	
2100	2200	Nigeria, Radio/Ibadan	6050do	
2100	2200	Nigeria, Radio/Kaduna	4770do	6090do
2100	2200	Nigeria, Radio/Lagos	3326do	
2100	2200	Nigeria, Voice of	15120af	
2100	2200	Papua New Guinea, NBC	4890do	9675irr
2100	2200	Sierra Leone, Radio UNAMSIL	6139af	
2100	2200	Sierra Leone, SLBS	3316do	
2100	2200	Syria, Radio Damascus	12085eu	13610eu
2100	2200	UK, BBC World Service	3255af	3915as
2100	2200	5965as 5975am 6005af 7120af 9410eu 11945as 17830af	6190af	6195va 15400af
2100	2200	Ukraine, Radio Ukraine Intl	5905eu	
2100	2200	USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
2100	2200	5765usb 6350usb 7507usb 12579usb 13362usb	10320usb	12335usb
2100	2200	USA, KAJI Dallas TX	13815va	
2100	2200	USA, KTVN Salt Lake City UT	15590na	
2100	2200	USA, Voice of America 6040eu 9705as 9760eu 9850af 13670af 15185as 15410af 17740as 17820as 17895af	6095eu	9530eu 11975af 15445af
2100	2200	USA, WBCQ Kennebunk ME	7415na	9330na
2100	2200	17495na		
2100	2200	USA, WBOH Newport NC	5920am	
2100	2200	USA, WEWN Birmingham AL	13615na	17595eu
2100	2200	USA, WHRA Greenbush ME	17650af	
21				

Shortwave Guide



2200 UTC - 6PM E / 5PM C / 3PM P

2200	2227		Iran, Voice of the Islamic Rep	9870au	13665au
2200	2228	smtwhf	Serbia & Montenegro, RSCG	7230au	
2200	2230		Canada, Radio Canada Intl	6140am	9590am
			11920am 15170am 15455am	17880am	
2200	2230	DRM	Germany, Deutsche Welle	9800eu	
2200	2230		India, All India Radio 7410eu	9445eu	9575au
			9910au 9950eu 11620va	11715au	
2200	2230	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
2200	2230	mtwhf/vl	Mexico, Radio Mexico Intl	9705am	11770am
2200	2230		Papua New Guinea, NBC	4890da	9675irr
2200	2230	mtwhf	USA, Voice of America 9850af	11975af	13670af
			15580af		
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2255		Turkey, Voice of 9830va	12000va	
2200	2256		China, China Radio Intl	9880eu	
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek	4910do	
2200	2300		Australia, Radio 9660va	12080va	13620va
			15230as 17715va 17795va	21740va	
2200	2300	vl	Botswana, Radio 3356do	4820do	7255do
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		Costa Rica, Radio for Peace Intl	7445am	15038va
2200	2300		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
2200	2300		Eqt Guinea, Radio Africa	7189af	15184af
2200	2300		Germany, Deutsche Welle	9720as	15605as
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3291do	5949do	
2200	2300		Malaysia, Radio 7295do		
2200	2300		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
2200	2300		New Zealand, Radio NZ Intl	17675pa	
2200	2300		Nigeria, Radio/Abuja 7275do		
2200	2300		Nigeria, Radio/Enugu 6025do		
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos 3326do	4990do	
2200	2300		Nigeria, Voice of 15120af		
2200	2300		Sierra Leone, Radio UNAMSIL	6139af	
2200	2300		Sierra Leone, SLBS 3316do		
2200	2300	vl	Solomon Islands, SIBC 5020do	9545do	
2200	2300		Taiwan, Radio Taiwan Intl	15600eu	
2200	2300		UK, BBC World Service	5965as	5975am
			6195as 7105as 7120af	9740as	11955as
			12095sa 15400af 17830af		
2200	2300		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb 7507usb	10320usb	12335usb
			12579usb 13362usb	13855usb	
2200	2300		USA, KAIJ Dallas TX 13815va		
2200	2300		USA, KTBN Salt Lake City UT	15590na	
2200	2300		USA, KWHR Naalehu HI	17510as	
2200	2300		USA, Voice of America 7215as	9705as	9770as
			11760as 15185as 15290as	15305as	17740as
			17820as		
2200	2300		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na		
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	9975na	17595eu
2200	2300		USA, WHRA Greenbush ME	17650af	
2200	2300		USA, WHRI Noblesville IN	5745va	9495am
2200	2300		USA, WINB Red Lion PA	13570am	
2200	2300		USA, WJIE Louisville KY	7490am	13595am
2200	2300		USA, WRMI Miami FL 15725na		
2200	2300	vl	USA, WSHB Cypress Creek SC	13770do	15285sa
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN	7465na	9475na
			12160na 13845na		
2200	2300		USA, WWRB Manchester TN	5050na	5085na
			6890na		
2200	2300		USA, WYFR Okeechobee FL	11740na	15695eu
			15770af 17845af		
2200	2300	vl	Vanuatu, Radio 3945af	7260do	
2205	2230		Italy, RAI Intl 11895va		
2230	2257		Czech Rep, Radio Prague Intl	11600na	13580na
2230	2259		Belgium, Radio Vlaanderen Intl	15565am	
2230	2300		Canada, Radio Canada Intl	9590na	13670na
			15455na		
2230	2300		Cuba, Radio Havana 6195am	9550na	
2230	2300		Papua New Guinea, NBC	4890do	9675irr
2230	2300	DRM	Sweden, Radio 9800eu		
2245	2300		India, All India Radio 9705as	9950as	11620as
			13605as		

2300 UTC - 7PM E / 6PM C / 4PM P

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek	4910do	
2300	0000		Australia, Radio 9660pa	11695as	12080va
			13620as 15230as 15415as	17715va	17795va
			21740va		
2300	0000	vl	Botswana, Radio 3356do	4820do	7255do
2300	0000		Bulgaria, Radio 9400na	11900na	
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		Canada, Radio Canada Intl	6140na	9590na
			13670na 15455na		
2300	0000		Costa Rica, Radio for Peace Intl	7445am	15038am
2300	0000		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
2300	0000		Egypt, Radio Cairo 11725na		
2300	0000		Germany, Deutsche Welle	9890as	17860as
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3291do	5949do	
2300	0000		India, All India Radio 9705as	9950as	11620as
			13605as		
2300	0000		Malaysia, Radio 7295do		
2300	0000		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
2300	0000	DRM	Netherlands, Radio 15525na		
2300	0000		New Zealand, Radio NZ Intl	17675pa	
2300	0000		Papua New Guinea, NBC	4890do	9675irr
2300	0000		Sierra Leone, Radio UNAMSIL	6139af	
2300	0000		Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vl	Solomon Islands, SIBC 5020do	9545do	
2300	0000		UK, BBC World Service	3915as	5965as
			5975am 6195as 7120af	9580as	9740as
			11955as 12095sa 15280as		
2300	0000	DRM	UK, BBC World Service	9800eu	
2300	0000		USA, AFRTS/ Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb 7507usb	10320usb	12335usb
			12579usb 13362usb	13855usb	
2300	0000		USA, KAIJ Dallas TX 13815va		
2300	0000		USA, KTBN Salt Lake City UT	15590na	
2300	0000		USA, KWHR Naalehu HI	17510as	
2300	0000		USA, Voice of America 7215as	7200as	7225as
			7260as 9545as 11760as	11805as	11925as
			13725as 13775as 15185as	15205as	15290as
			15305as 17740as 17820as		
2300	0000		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na		
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	9975na	17595eu
2300	0000		USA, WHRA Greenbush ME	7580va	
2300	0000		USA, WHRI Noblesville IN	5745va	9495am
2300	0000		USA, WINB Red Lion PA	12160am	
2300	0000		USA, WJIE Louisville KY	7490am	13595am
2300	0000	as	USA, WRMI Miami FL 9955am		
2300	0000	mtwhf	USA, WRMI Miami FL 7385na		
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000	as	USA, WWBS Macon GA	11910na	
2300	0000		USA, WWCR Nashville TN	5070na	7465na
			9475na 13845na		
2300	0000		USA, WWRB Manchester TN	5050na	5085na
			6890na		
2300	0000		USA, WYFR Okeechobee FL	5985sa	11740na
			11855sa 15255sa 17750sa		
2300	0000	vl	Vanuatu, Radio 3945af	7260do	
2300	2305		Nigeria, Radio/Abuja 7275do		
2300	2305		Nigeria, Radio/Enugu 6025do		
2300	2305		Nigeria, Radio/Ibadan	6050do	
2300	2305		Nigeria, Radio/Kaduna	4770do	6090do
2300	2305		Nigeria, Radio/Lagos 3326do	4990do	
2300	2330		Cuba, Radio Havana 6195am	9550na	
2300	2356		China, China Radio Intl	5990na	13680na
2300	2356		Romania, Radio Romania Intl	9570eu	11740na
			11775eu 15105na		
2305	2312		Croatia, Voice of 9925sa		
2315	2330	mtwhf	Austria, Radio Austria Intl	9870sa	13730sa
2320	2330		Kyrgyz, Kyrgyz Radio	4010as	4795as
2330	0000		Lithuania, Radio Vilnius	9875na	
2330	0000		Netherlands, Radio 6165na	9845na	
2330	0000	DRM	Netherlands, Radio 15525eu		
2330	0000		Switzerland, Swiss Radio Intl	9885sa	11905sa
2330	2345		Iraq, Radio Iraq Intl 11787irr		
2330	2357		Vietnam, Voice of 9840as	12019as	
2345	0000	mtwhf	Austria, Radio Austria Intl	9870sa	13730sa

Headnotes:

1. **Deutsche Welle** program listings for transmissions to other regions that have provided credible reception in at least parts of North America are included herein. These are, in order of reliability, 2100, 0400, 1900 and 2000. Consult the frequency section of the SWG for where to tune.
2. **Radio Austria International** has a revised English language service and listings for it are included in this month's SWG.
3. **HCJB Ecuador** retains a morning English service, reception of which has proven viable for at least some North American regions. Listings for this service are included.
4. **RNZI** has gone to a 24 hour schedule with a significant increase in current affairs coverage of Pacific news and issues. Reception in western parts of North America likely will extend later into local morning hours, as a result. Those changes are reflected herein.
5. Although some changes are likely to **R. Australia's** schedule, these were unspecified at print deadline (late August). The schedule herein is that which was in effect at that time.
6. **BBCWS** stream abbreviations: (am)=Americas; (eas)=East Asia. These are the streams recommended by Bush House for North American listeners.
7. Listings for the US-based independent shortwave broadcasters are limited to general interest programming that departs from their primary formats of religious and political fare.
8. **North America** reverts to standard time on October 26. Several stations adjust their schedules accordingly. **RNZI** usually makes this seasonal change a few weeks earlier. Details in November's SWG.

0000 UTC/ 8pm E/5pm P - Page 43 Freqs

BBC WORLD SERVICE (am)

0000 D News; 0006 S The Ticket (arts performances), M Everywoman, T/H Documentaries, W Masterpiece (artistic ideas), F Assignment, A Sports International; 0032 M Westway Omnibus, T Music Feature, W Top of the Pops, H Charlie Gillett (world music), F Music Biz, A John Peel (eclectic).

RADIO AUSTRALIA

0000 D News; 0005 S Go Zone (pop music), A Australian Express (magazine); 0010 M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history).

RADIO EXTERIOR ESPANA

0000 S Visitors Book (travelers to Spain), M Window on Spain (culture), T-A News (international, Spain, Latin America); 0015 S/M Spanish history or culture series; 0025 S/M Rebroadcast of 0035 weekday programs, T-A Spanish pop music; 0030 T-A Press Review; 0035 S/T Radio Waves, W Chronicles (Spain & the US), H Entremeses (food & travel), F Africa Today, A Radio Club (letters); 0045 T-A A Language Without Bounds (Spanish lesson).

RADIO JAPAN - NHK WORLD

0000 D News; 0010 S Hello from Tokyo (listener contact), M Weekend Japonology, T-A Songs for Everyone; 0015 T-A 44 Minutes (magazine); 0054 M Sights & Sounds of Japan.

RADIO NETHERLANDS

0000 S/W Music 52-15 (international music), M Dutch Horizons, T Research File (science), H Documentary, F Aural Tapestry (culture), A A Good Life (development issues); 0030 S Amsterdam Forum (conversations), M Aural Tapestry, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

RADIO NEW ZEALAND INT.

0000 S/A News; M-F Midday Report; 0012 S This Week in Parliament, A Focus on Politics; 0033 S Spectrum (life in NZ), A The Sampler (latest CDs).

RADIO FOR PEACE INTERNATIONAL, Costa Rica
0000 S Mailbag, M Spiritual Awakening, T Middle East

Project, W CounterSpin (media analysis), H Making Contact, F Peace Watch (cont'd.), A WINGS; 0030 S Making Contact, M World of Radio, T-A Hightower Radio (commentary); 0035 T-A Earthwatch (ecology); 0040 T-A Earth & Sky (astronomy); 0045 T Neumaier Report, W-A UN programs.

RADIO PRAGUE

0000 D News; 0005 S Insight Central Europe, M Mailbox, T-A Current Affairs; 0010 M ABC of Czech; 0015 M Czech Books (fortnightly) or Encore (classical music monthly) or Magic Carpet (world music monthly), T Talking Point (Czech issues), W Witness (oral history), H ABC of Czech (language), F Economics Report, A The Arts; 0020 W One on One (interview), H Czechs in History or Spotlight (travelogue).

RADIO UKRAINE INTERNATIONAL

0000 D News; 0010 S Ukrainian Diary (weekly review), M Music from Ukraine, T-A Ukraine Today (magazine); 0015 S The Whole World on the Radio Diol (DX program); 0030 S Hello From Kiev (listener letters/music), M Roots (culture & education); 0045 T-A Closeup (current issues).

VOICE OF AMERICA (News Now)

0000 T-A News and Reports; 0015 T-A Focus (topic in-depth); 0023 T-A Sports; 0030 T-A News Headlines; 0033 T-A Coast to Coast (American life); 0055 Government Editorial.

WBCQ, Maine

7415 kHz.: 0000 S A Different Kind of Oldies Show, M Radio New York International, W/A Allon Weiner Worldwide.

WINB, Pennsylvania

0000 S DX Partyline; 0030 S World of Radio.

0100 UTC/ 9pm E/6pm P - Page 43 Freqs

BBC WORLD SERVICE (am)

0100 D News; 0106 S Play of the Week, M Wright Around the World (musical variety), T Health Matters, W Go Digital, H Discovery (science), F One Planet (ecology), A Science in Action; 0132 T I'm Sorry I Haven't a Clue (panel game), W Music Review, H/A Westway, F The Word (writing & writers) [exc. last F, World Book Club (discussion)]; 0145 H Heart & Soul (beliefs & values), A What's the Problem (advice).

CHINA RADIO INTERNATIONAL

0100 D News & Reports; 0110 S Report on Developing Countries; 0115 A Cutting Edge (sci/tech); 0120 S In the Spotlight (cultural magazine); 0130 M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

0100 D News; 0105 S Correspondents' Report, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific; 0130 S Oz Sounds (new music releases), M Health Report, T Low Report, W Religion Report, H Media Report, F The Sports Factor, A Music Deli (international).

[Special service: 0105 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO AUSTRIA INTERNATIONAL

0105 S/M Insight Central Europe; 0115 T-A Report from Austria; 0125 S/M Listener Letters; 0135 S/M Insight Central Europe; 0145 T-A Report from Austria; 0155 S/M Listener Letters.

RADIO BUDAPEST

0100 D News; 0105 S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine); 0120 ADX Corner.

RADIO CANADA INTERNATIONAL

0100 D News; 0105 S Business Sense, M Mople Leaf

Mailbag (w/CIDX report bimonthly); 0110 T-A Canada Today (current events magazine); 0135 S/A Sci-Tech File, M/H Spotlight (arts & culture), T Media Zone (journalists discuss), W Mople Leaf Mailbag (w/CIDX report bimonthly), F Business Sense.

RADIO HABANA CUBA

0100 D International News; 0110 M Weekly Review, T-S National News; 0115 T-S Viewpoint; 0130 M Reports & Music, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0150 M Breakthrough (science report).

RADIO NETHERLANDS

0100 S/M News, T-A Newline; 0105 S Europe Unzipped, M Wide Angle (one issue focus).

RADIO NEW ZEALAND INTERNATIONAL

0100 S/A RNZ News, M-F Pacific Regional News; 0106 S At the Movies, M-F Cadenza (light classics), A Digital Life; 0130 S Bookmarks, A Saturday Comedy Zone.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0100 S Between the Lines, M Radio Nation ("The Nation" magazine), T This Way Out, W World of Radio, H A Public Affair, F Living Enrichment Center, A Middle East Project; 0130 S Peace Watch, T University Forum, W Mailbag, F Progressive Radio, A World of Radio.

RADIO PRAGUE

0100 D News; 0105 S Magozine, M Mailbox, T-A Current Affairs; 0110 M ABC of Czech; 0115 S Letter from Prague (local life), M Czech Books (fortnightly) or Encore (classical music monthly) or Magic Carpet (world music monthly), T Talking Point (Czech issues), W Witness (oral history), H ABC of Czech (language), F Economics Report, A The Arts; 0120 S/W One on One (interview), H Czechs in History or Spotlight (travelogue).

RADIO SLOVAKIA INTERNATIONAL

0100 D News; 0105 S Front Page Review (Slovak press), M Weekly Newsreel T-A Topical Issue; 0110 S Various features, M Listeners' Tribune (letters, magazine, Slovak music), T Insight Central Europe, W Tourism News or Environmental Update, H Business News, F Culture News or Back Page News (the offbeat), A Education, Science and Regional News.

VOICE OF AMERICA (News Now)

0100 T-A News and Reports; 0123 T-A Sports; 0130 T-A News Headlines; 0133 T-F Business Report, A VOA News Review; 0145 T-F Dateline (news magazine); 0155 T-F Government Editorial.

VOICE OF RUSSIA

0100 D News; 0111 S Moscow Mailbag/M, T-A Commonwealth Update; 0130 D News in Brief; 0132 S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits, F Music Around Us, A Christian Message from Moscow; 0146 F Music At Your Request; 0154 H Russia: People & Events.

VOICE OF VIETNAM

0100 D News; 0105 D Current Affairs; 0110 S Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: 0100 S Marion's Attic (vintage recordings), M Radio New York International (cont'd.), A Toshio Takes Control.

WINB, Pennsylvania

0100 S Wavescan.

RADIO SWEDEN

0130 S Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0145 T Sports Scan, W Close Up (profiles of

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Swedes-1st/3rd), F Nordic Lights (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

RTE, Ireland

0130 S Saturday View, M This Week with Gerald Barry, T-A 5-7 Live (top news of the day).

VOICE OF AMERICA (Special English)

0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

0200 UTC/ 10pm E/7pm P - Page 44 Freqs

BBC WORLD SERVICE (am)

0200 D The World Today; 0232 S Global Business, M World Business Review, T-A World Business Report; 0245 M Instant Guide (background), T/W/F/A Analysis, H From Our Own Correspondent.

RADIO AUSTRALIA

0200 D News; 0205 S Margaret Throsby (interviews and music), A Background Briefing (documentary); 0210 M-F The World Today (ABC Radio flagship news program); 0255 A Perspective (comment).

[Special service: 0205 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO BULGARIA

0200 D News; 0210 S Views Behind the News, M Folk Studio (Bulgarian folk music), T-A Events and Developments; 0220 T Sports; 0225 W-S Timeout for Music; 0230 T Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); 0235 T Answering Your Letters, W-M Keyword Bulgaria (Bulgaria and things Bulgarian); 0245 S Radio Bulgaria Calling (for radio hobbyists), W Magazine Economy, H Arts and Artists, F History Club, A The Way We Live.

RADIO HABANA CUBA

0200 D International News; 0210 M From Habana (Cuban musicians), T-S National News; 0215 T-S Reports and music; 0230 M The Jazz Place or Top Tens, T-S News Bulletin; 0235 S World of Stamps, T-A Reports and music; 0250 S Cuban music.

RADIO KOREA INTERNATIONAL

0200 D News; 0210 S Worldwide Friendship (letters, DX news), M Korean Pop Interactive (requests), T-A News Commentary; 0215 T-A Seoul Calling (magazine); 0230 T Korea Today & Tomorrow (peninsular relations), W Korean Kaleidoscope (society), H Wonderful Korea (travelogue), F Seoul Report.

RADIO NEW ZEALAND INTERNATIONAL

0200 D RNZ News; 0205 S Feature, M-F In Touch with New Zealand (music, interviews, variety), A Eureka! (science)*; 0230 A Health Matters [or] Environment Matters.

[* may be preempted by live sport]

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0200 S Peace Watch (cont'd.), M New Dimensions ("progressive" ideas), T Honoring Mother Earth: Indigenous Voices, W WINGS (women's news), H Global Community Forum, F Continent of Media, A Mailbag; 0230 S Daily Reading, W A World of Possibilities, F Steppin' Out of Babylon, A Disability Radio Worldwide.

RADIO ROMANIA INTERNATIONAL

0200 D Radio Newsreel; 0210 S The Week, M Focus, T-A Commentary; 0215 S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; 0220 S RRI Encyclopedia, T Political Flash, W European Horizons; 0225 S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; 0230 S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W W Mother Nature (ecology), H Visit Romania, A Practical Guide; 0235 S

Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; 0240 S, Bucharest Along the Centuries, T Pages of Roman Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); 0245 S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; 0250 M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RADIO TAIWAN INTERNATIONAL

0200 D News; 0215 S Hakka World (Hakka culture), M Jade Bells & Bamboo Pipes (traditional music), T Culture Express, W Taiwan Today, H Discover Taiwan, F Taipei Magazine, A Groove Zone; 0230 S Mailbag Time, T Trends, W Instant Noodles (the wacky), H New Music Lounge, F People; 0245 M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate), A Kaleidoscope (life in Taiwan).

[This schedule also airs at 0700 for western North America.]

VOICE OF RUSSIA

0200 D News; 0211 M Sunday Panorama, T-S News & Views; 0230 D News in Brief; 0232 S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); 0246 S You Write to Moscow; 0254 W Russia: People & Events.

WBCQ, Maine

7415 kHz.: 0200 S Alan Sane ("pirate" radio), M Radio New York International (cont'd).

WHRA, Maine

7580 kHz.: 0230 S DXing with Cumbre.

WHRI, Indiana

5745 kHz.: 0230 M DXing with Cumbre.

WRMI, Florida

7385 kHz.: 0200 S Wavescan; 0230 S Viva Miami, M Wavescan.

WWCR, Tennessee

5070 kHz.: 0200 S DX Partyline; 0230 S World of Radio.

RADIO BUDAPEST

0230 D News; 0235 S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine); 0250 A DX Corner.

RADIO SWEDEN

0230 S Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0245 T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), F Nordic Lights (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

VOICE OF VIETNAM

0230 D News; 0235 D Current Affairs; 0240 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0245 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0250 S Music, A Literature and Arts.

0300 UTC/ 11pm E/8pm P - Page 44 Freqs

BBC WORLD SERVICE (am)

0300 D News; 0306 S From Our Own Correspondent, M Talking Point (phone-in), T-F Outlook (magazine), A Pick of the World (BBC's best); 0332 S People & Politics; 0345 M-F Off the Shelf (book readings), A Write On (letters).

CHINA RADIO INTERNATIONAL

0300 D News & Reports; 0310 S Report on Developing Countries; 0315 A Cutting Edge (sci/tech); 0320 S In the Spotlight (cultural magazine); 0330 M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

0300 D News; 0305 S Feedback (letters, station news, on communications), A Rural Reporter; 0310 M-F Regional Sports Report; 0320 M-F Life Matters (social issues); 0330 S Jazz Notes, A Australian Country Style; 0354 Heywire (young rural Australians).

[Special service: 0305 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0300 D International News; 0310 M Weekly Review, T-S National News; 0315 T-S Viewpoint; 0330 M Reports & Music, T-S News Bulletin; 0335 T-A Time Out (sports); 0340 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0350 M Breakthrough (science report).

RADIO NEW ZEALAND INTERNATIONAL

0300 S/A* RNZ News, M-F Pacific Regional News; 0305 S Feature*, A Home Grown (NZ music)*; 0308 M-F Dateline Pacific; 0330 M New Music Releases, T Mailbox (letters & DX news) or RNZI Talk (station info), W Tradewinds (Pacific commerce), H The World in Sport, F Pacific Correspondent, A Musical Chairs (artist spotlight)*.

[* may be preempted by live sport]

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0300 S Daily Reading (cont'd), M Voices of Our World (Moryknoll program), T-A Daily Reading; 0315 T Disability Radio Worldwide, W-A Freespeech Radio News; 0330 S Continent of Media, M UN program; 0345 M Sneak Peaks, T-A UN Daily News.

RADIO PRAGUE

0300 D News; 0305 S Magazine, M Mailbox, T-A Current Affairs; 0310 M ABC of Czech; 0315 S Letter from Prague (local life), M Czech Books (fortnightly) or Encore (classical music monthly) or Magic Carpet (world music monthly), T Talking Point (Czech issues), W Witness (oral history), H ABC of Czech (language), F Economics Report, A The Arts; 0320 S/W One on One (interview), H Czechs in History or Spotlight (travelogue).

RADIO TAIWAN INTERNATIONAL

0300 D News; 0315 S Hakka World (Hakka culture), M Taiwan Economic Journal, T Jade Bells & Bamboo Pipes (traditional music), W New Music Lounge, H News Talk, F Formosa Outlook, A Kaleidoscope (life in Taiwan); 0330 S Asia Pacific (from Radio Australia), M Stage, Screen & Studio, W Confucius & Inspiration Beyond, H Life Unusual, F Taiwan Gourmet, A Mailbag Time; 0345 M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate).

RADIO UKRAINE INTERNATIONAL

0300 D News; 0310 S Ukrainian Diary (weekly review), M Music from Ukraine, T-A Ukraine Today (magazine); 0315 S The Whole World on the Radio Dial (DX program); 0330 S Hello From Kiev (listener letters/music), M Roots (culture & education); 0345 T-A Closeup (current issues).

Rvi, Belgium

0300 S Music from Flanders, M Radio World, T-A News; 0304 T-A Flanders Today (incl. press review, reports & CD of the Week); 0308 M Tourism in Flanders; 0314 M Brussels 1043 (letters).

VOICE OF AMERICA, Africa Service

0300 S/A News & Reports, M-F Daybreak Africa (mornng newsmagazine); 0323 S/A Sports; 0330 D News Headlines; 0333 S Issues in the News, M-F Business Report, A Our World (ecology, science & technology); 0345 M-F Dateline (documentary); 0355 M-F Government Editorial.

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VOICE OF RUSSIA

0300 D News; 0311 S Music & Musicians, M/H Science & Engineering, T Musical Portraits, W/A Moscow Mailbag, F Newmarket; 0330 D News in Brief; 0332 M Audio Book Club (Russian lit.), T/H/A 20th Century, W/F Russian history/culture.

VOICE OF TURKEY

0300 D News; 0310 D Press Review; 0315 S Outlook, M Tunes Spanning Centuries, T Last Week, W Live From Turkey, H Review of the Foreign Media, F Big Powers & the Armenian Problem, A Archaeological Settlements in Turkey; 0320 S The Stream of Love or DX Corner, T Hues & Colors of Anatolia, H Letterbox; 2225 M/A Music, F In the Wake of a Contest; 0330 S/T Music; 0335 S Turkish Arts, M Turks in the Mirror of Centuries, T From Past to Present, H Turkey's Off the Beaten Track Sites, F The Culture Parade, A The Travel Itinerary of Anatolia.

KWHR, Hawaii

17510 kHz.: 0300 M DXing with Cumbre.

WBCQ, Moine

7415 kHz.: 0300 S You Are What You Think (satire), M Radio New York International (cont'd).

WHRI, Indiono

7315 kHz.: 0330 M DXing with Cumbre.

WRMI, Florida

7385 kHz.: 0300 S IBC Radio Network, M Old Time Radio.

WWCR Tennessee

5070 kHz.: 0300 S Spectrum (communications discussion).

VOICE OF VIETNAM

0330 D News; 0335 D Current Affairs; 0340 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0345 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0350 S Music, A Literature & Arts.

0400 UTC/ 12am E/9pm P - Page 45 Freqs

BBC WORLD SERVICE (om)

0400 D World Briefing; 0432 S Letter from America, M-F The World Today, A Reporting Religion; 0445 S The Instant Guide.

CHINA RADIO INTERNATIONAL

0400 D News & Reports; 0410 S Report on Developing Countries; 0415 A Cutting Edge (sci/tech); 0420 S In the Spotlight (cultural magazine); 0430 M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

DEUTSCHE WELLE

0400 D News; 0405 S Inside Europe, M Mailbag, T-A Newlink Africa; 0430 T Insight (international affairs), W World in Progress (development), H Money Talks, F Mon & Environment, A Spectrum (sci-tech); 0445 T Business German.

RADIO AUSTRALIA

0400 D News; 0405 S All in the Mind (the brain), A Business Report; 0410 M-F Margaret Throsby (interviews and music); 0430 S In Conversation, A Aussie Music Show (hits); 0455 Perspective (commentary).

[Special service: 0405 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0400 D International News; 0410 M From Habana (Cuban musicians), T-S Notional News; 0415 T-S Reports and music; 0430 M The Jazz Place or Top Tens, T-S News Bulletin; 0435 S World of Stamps, T-A Reports and music; 0450 S Cuban music.

RADIO NETHERLANDS

0430 S/M News; T-A Newline; 0435 S Europe Unzipped,

M Sincerely Yours (letters); 0455 S Insight (commentary), M The Week Ahead (program previews).

RADIO NEW ZEALAND INTERNATIONAL

0400 D RNZ News*; 0405 S Sunday Drama* (radio plays), M-F In Touch with New Zealand (cont'd), A Home Grown (cont'd from 0305).

[*may be preempted by live sport].

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0400 S CounterSpin (media analysis), M Honoring Mother Earth: Indigenous Voices, T-A Democracy Now!; 0430 S Freespeech Radio News (repeat of Fri. newscast).

RADIO ROMANIA INTERNATIONAL

0400 D Radio Newsreel; 0410 S The Week, M Focus, T-A Commentary; 0415 S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; 0420 S RRI Encyclopedia, T Political Flash, W European Horizons; 0425 S Roots (culture/traditions), M Romonion by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; 0430 S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W Mother Nature (ecology), H Visit Romonia, A Practical Guide; 0435 S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; 0440 S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); 0445 S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; 0450 M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

VOICE OF AMERICA, Africo Service

0400 D News & Reports; 0415 M-F Focus (a topic in-depth); 0423 D Sports; 0430 S/A News Headlines, M-F Daybreak Africa (morning newsmagazine); 0433 S Main Street (about America, incl. Kim Elliott medio report), A Press Conference USA.

VOICE OF RUSSIA

0400 D News; 0411 S/M Musical Portraits, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); 0430 D News in Brief; 0432 S Kaleidoscope, M Jazz Show, T Music Around Us, W Moscow Yesterday & Today, H Folk Box, F Audio Book Club (Russian lit.) A Timelines; 0447 T Music At Your Request.

KWHR, Hawaii

17780 kHz.: 0430 S DXing with Cumbre.

WBCQ, Moine

7415 kHz.: 0400 S Tom & Darryl (electronic medio), M-A Amos 'n Andy; 0415 T-F Planet World News Tonight; 0445 M World of Radio.

WHRA, Moine

7580 kHz.: 0430 A DXing with Cumbre.

WRMI, Florida

7385 kHz.: 0400 S Twilight Zone (science fiction), M Old Time Radio (cont'd.)

WWCR, Tennessee

5070 kHz.: 0400 S Cyber Line (digital communications).

0500 UTC/ 1am E/10pm P - Page 45 Freqs

CHANNEL AFRICA, South Africa

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

CHINA RADIO INTERNATIONAL

0500 D News & Reports; 0510 S Report on Developing Countries; 0515 A Cutting Edge (sci/tech); 0520 S In the Spotlight (cultural magazine); 0530 M People in the Know (China's leading personalities), T Biz China, W China Horizons (China outside Beijing), H Voices

from Other Lands, F Life in Chino, A Listeners' Garden; 0545 S Health Bites.

RADIO AUSTRALIA

0500 D News; 0505 S The Europeans, A Ockham's Razor (science opinion); 0510 M-F Pacific Beat (Pacific islands magazine with regional sports report @ 0530); 0520 A Lingua Franca (about language) 0530 S The Ark (religious history), A Fine Music Australia (classical). [Special service: 0505 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0500 D International News; 0510 M Weekly Review, T-S National News; 0515 T-S Viewpoint; 0530 M Reports & Music, T-S News Bulletin; 0535 T-A Time Out (sports); 0540 S/W DXers Unlimited, M Mailbag Show, T/-/F Caribbean Outlook, A Weekly Review; 0550 M Breakthrough (science report).

RADIO JAPAN - NHK WORLD

0500 D News; 0510 S Pop Joins the Wor'd, A Hello from Tokyo (listener contact); 0515 M-F 44 Minutes (magazine).

RADIO NETHERLANDS

0500 S Amsterdam Forum (conversations), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Aural Tapestry (culture), A A Good Life (development issues).

RADIO NEW ZEALAND INTERNATIONAL

0500 S/A RNZ News, M-F Checkpoint (major domestic evening news magazine); 0510 S Religion feature or series, A Tagata O Te Moana (Pacific magazine); 0540 S Jazz Spotlight.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0500 S/F TUC Radio, M Living Enrichment Center, T Making Contact, W/H/A Peace Watch; 0530 S World of Radio, T Steppin' Out of Babylon, F Peace Watch.

VOICE OF AMERICA, Africo Service

0500 S News, M-A News & Reports; 0506 S Best of Talk to America; 0523 M-A Sports; 0530 D News Headlines; 0533 S Best of Talk to America, M-F Business Report, A VOA News Review; 0545 M-F Dateline (documentary); 0555 M-F Government Editorial.

VOICE OF NIGERIA

0500 S/A News Summary, M-F VON Scope (news magazine); 0505 S This Week on VON, A VON Link-up (music requests); 0530 D Moving On (variety magazine).

WBCQ, Moine

7415 kHz.: 0500 S Juliet's Wild Kingdom.

WRMI, Florida

7385 kHz.: 0500 S Lou Gentile (the paronormal), M IBC Radio Network.

0600 UTC/ 2am E/11pm P - Page 46 Freqs

CHANNEL AFRICA, South Africa

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

RADIO AUSTRALIA

0600 D News; 0605 S The Arts on RA, A Feedback (letters/station news/on communications); 0610 M-F Regional Sports Report; 0620 M Ockham's Razor (science opinion), T In Conversation, W Lingua Franca (about language), H The Ark (religious history), F The Makers (artists); 0630 S Blocktracker (contemporary Aboriginal music); A Oz Sounds (new releases); 0640 M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blocktracker, H Australian Country Style, F Jazz Notes. [Special service: 0605 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0600 D International News; 0610 M From Habana (Cuban musicians), T-S Notional News; 0615 T-S

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Reports and music; 0630 M The Jazz Place or Top Tens, T-S News Bulletin; 0635 S World of Stamps, T-A Reports and music; 0650 S Cuban music.

RADIO JAPAN - NHK WORLD

0600 D News; 0610 S Weekend Square (Japanese life), M-F Songs for Everyone, A Pop Joins the World; 0615 M-F Asian Top News (headlines from region's radio); 0625 M Japan Music Treasure Box, T Basic Japanese for You, W Japan Musicscape, H Brush Up Your Japanese, F Music Beat; 0654 S Sights & Sounds of Japan.

RADIO NEW ZEALAND INTERNATIONAL

0600 D RNZ News; 0607 S Whenua (Maori magazine), M-F What's Going On? (arts & entertainment), A The Mix ('live' music acts); 0630 M-F Worldwatch (international news) 0645 M-F Pacific News.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

0600 S Mailbag, M Spiritual Awakening, T Middle East Project, W CounterSpin (media analysis), H Making Contact, F Peace Watch (cont'd.), A WINGS; 0630 S Making Contact, M World of Radio, T-A Hightower Radio (commentary); 0635 T-A Earthwatch (ecology); 0640 T-A Earth & Sky (astronomy); 0645 T Neumaier Report, W-A UN programs.

RADIO ROMANIA INTERNATIONAL

0600 D Radio Newsreel; 0610 S The Week, M Focus, T-A Commentary; 0615 S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; 0620 S RRI Encyclopedia, T Political Flash, W European Horizons; 0625 S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; 0630 S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W W Mother Nature (ecology), H Visit Romania, A Practical Guide; 0635 S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; 0640 S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectorator (voice of the people); 0645 S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; 0650 M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

VOICE OF AMERICA, Africa Service

0600 S/A News & Reports, M-F Daybreak Africa (morning newsmagazine); 0623 S/A Sports; 0630 S/A News Headlines; 0633 S Main Street (about America, incl. Kim Eliott media report), A On the Line (US foreign policy).

VOICE OF NIGERIA

0600 D Nigeria/Africa/World News (magazine); 0630 S In the News, A News Maker; 0645 A Window on Abuja.

KWHR, Hawaii

17780 kHz.: 0600 A DXing with Cumbre.

WHRI, Indiana

5745 kHz.: 0630 S/A DXing with Cumbre.

WRMI, Florida

7385 kHz.: 0600 S Lou Gentile (cont'd.), M IBC Radio Network (cont'd.).

1000 UTC/6am E/3am P - Page 47 Freqs

BBC WORLD SERVICE (am)(eos)

1000 S/A News, M-F World Briefing; 1006 S From Our Own Correspondent, A Assignment; 1032 S Reporting Religion, M-F World Business Report, A The Interview; 1045 M-H Sports Roundup, F Football Extra.

RADIO AUSTRALIA

1000 D News; 1005 S Go Zone (pop music), M-F Asia Pacific (regional current affairs), A Australian Express

(magazine); 1030 M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1000 S CounterSpin (media analysis), M Honoring Mother Earth: Indigenous Voices, T-A Democracy Now!; 1030 S Freespeech Radio News (repeat of Fri. newscast).

RADIO NETHERLANDS

1030 S/A News, M-F Newline; 1035 S Wide Angle (week in review), A Europe Unzipped; 1055 S The Week Ahead (program previews), A Insight (commentary).

RADIO NEW ZEALAND INTERNATIONAL

1000 D News; 1005 S Mediawatch, M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia); 1035 S Sunday Supplement.

VOICE OF AMERICA (News Now)

1000 D News and Reports; 1023 D Sports; 1030 D News Headlines; 1033 S-H Main Street (life in the US), F/A On the Line (US foreign policy); 1055 A Government Editorial.

KWHR, Hawaii

11565 kHz.: 1000 A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: 1030 A World of Radio.

1100 UTC/7am E/4am P - Page 48 Freqs

BBC WORLD SERVICE (am)

1100 D World Briefing; 1105 M-F Caribbean Morning Report; 1110 M-F Sports Caribbean; 1115 M-F Caribbean Magazine; 1120 D British News; 1132 S Instant Guide (background), M Letter from America, T/W/F Analysis, H From Our Own Correspondent A World Football; 1145 S-F Sports Roundup.

BBC WORLD SERVICE (eos)

1100 S World Briefing, M-A News; 1106 M-F Outlook (magazine), A The Ticket (arts performances); 1120 S British News; 1132 S Play of the Week; 1145 M-F Off the Shelf (book readings).

HCJB ECUADOR

1100 S Let My People Think, M-F Insight for Living, A Down Gilead Lane; 1130 S Renewing Your Mind, M-F Family Life Today, A Adventures in Odyssey.

RADIO AUSTRALIA

1100 D News; 1105 S Correspondents' Report, M-A Asia Pacific (regional current affairs); 1130 S The Arts on RA, M-F Bush Telegraph (rural life), A The Europeans.

RADIO JAPAN - NHK WORLD

1100 D News; 1110 S Hello from Tokyo (listener contact), M-F Songs for Everyone, A Pop Joins the World; 1115 M-F Asian Top News (headlines from region's radio); 1125 M Japan Music Treasure Box, T Basic Japanese for You, W Japan Musicscape, H Brush Up Your Japanese, F Music Beat.

RADIO KOREA INTERNATIONAL

1130 D News; 1140 S Korean Pop Interactive (requests), M-F News Commentary, A Worldwide Friendship (letters, DX news); 1145 M-F Seoul Calling (magazine).

RADIO NETHERLANDS

1100 S Aural Tapestry (culture), M EuroQuest (Europe in context), T A Good Life (development issues), W Dutch Horizons, H Research File (science), F Documentary, A Amsterdam Forum (conversations); 1130 S Dutch Horizons, M Research File, T/A Music 52-15 (international music), W Documentary, H Aural Tapestry, F A Good Life.

RADIO NEW ZEALAND INTERNATIONAL

1100 S/A RNZ News, M-F Pacific Regional News; 1105 S/A Forces Programme (for NZ personnel serving in PNG & E. Timor); 1108 M-F Dateline Pacific; 1130 M New Music Releases, T Mailbox (letters & DX news) or RNZI Talk (station info), W Tradewinds (Pacific commerce), H The World in Sport, F Pacific

Correspondent.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1100 S/F TUC Radio, M Living Enrichment Center, T Making Contact, W/H/A Peace Watch; 1130 S World of Radio, T Steppin' Out of Babylon, F Peace Watch.

RADIO SWEDEN

1130 S In Touch with Stockholm (listener contact-1st)/ Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1145 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), H Nordic Lights (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

1200 UTC/8am E/5am P - Page 48 Freqs

BBC WORLD SERVICE (am)

1200 D Newshour; 1205 M-F Caribbean Business; 1210 M-F Caribbean Morning Report 2nd Edition; 1215 M-F Newshour (cont'd.).

BBC WORLD SERVICE (eos)

1200 S Play of the Week (cont'd. from 1130), M-A News; 1206 M/W Documentaries, T Masterpiece (arts ideas), H Assignment, F Sports International, A In Concert; 1232 S Reporting Religion, M The Music Feature, T Top of the Pops, W Charlie Gillett (world music), H The Music Biz, F John Peel (eclectic music).

HCJB ECUADOR

1200 S Moody Presents, M-F Precept, A Hour of Decision; 1215 M-F Proclaim; 1230 S The Living Word, M-F Renewing Your Mind, A DX Partyline.

RADIO AUSTRALIA

1200 D News; 1205 S The Spirit of Things (spiritual matters), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Music Show; 1255 S The Pulse (Aussie music now).

RADIO CANADA INTERNATIONAL

1200 M-F News; 1205 M-F The Current (current affairs-joined in progress).

RADIO KOREA INTERNATIONAL

1200 S Korean Pop Interactive (cont'd.), M-F Seoul Calling (cont'd.), A Worldwide Friendship (cont'd.); 1215 M Korea Today & Tomorrow (peninsula issues), T Korean Kaleidoscope (Korean society), W Wonderful Korea (tourism), H Seoul Report (interviews).

RADIO NETHERLANDS

1200 S/A News, M-F Newline; 1205 S Sincerely Yours (letters), A Europe Unzipped.

RADIO NEW ZEALAND INTERNATIONAL

1200 S-F RNZ News, A Forces Programme (cont'd.); 1205 S Sportsworld (recop magazine), M-F Late Edition.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1200 S Mailbag, M Spiritual Awakening, T Middle East Project, W CounterSpin (media analysis), H Making Contact, F Peace Watch (cont'd.), A WINGS; 1230 S Making Contact, M World of Radio, T-A Hightower Radio (commentary); 1235 T-A Earthwatch (ecology); 1240 T-A Earth & Sky (astronomy); 1245 T Neumaier Report, W-A UN programs.

RADIO SWEDEN

1230 S In Touch with Stockholm (listener contact-1st)/ Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1245 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), H Nordic Lights (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

15105 kHz.: 1230 A DXing with Cumbre.

Shortwave Guide



WRMI, Florida
15725 kHz.: 1200 A Shortwave Radio Network; 1230 S Viva Miami

1300 UTC/ 9am E/6am P - Page 49 Freqs

BBC WORLD SERVICE (am)

1300 D News; 1306 S The Ticket (arts performances), M-F Outlook (magazine), A Pick of the World (BBC's best); 1345 M-F Off the Shelf (book readings), A Write On (letters).

BBC WORLD SERVICE (eas)

1300 D Newshour.

CHANNEL AFRICA, South Africa

1300 S/A Channel Africa Extra (weekend variety magazine).

CHINA RADIO INTERNATIONAL

1300 D News & Reports; 1310 S Report on Developing Countries; 1315 A Cutting Edge (sci/tech); 1320 S In the Spotlight (cultural magazine); 1330 M People in the Know (China's leading personalities), T Biz China, W Chino Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

1300 D News; 1305 S The Science Show, M-F The Planet (diverse music from around the world), A The Music Show (cont'd); 1355 S Perspective (commentary).

RADIO CANADA INTERNATIONAL

1300 D News; 1305 S The Sunday Edition, M-F Sounds Like Canada (Canadian magazine); A The House (Canadian politics).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1300 S Between the Lines, M Radio Nation ("The Nation" magazine), T This Way Out, W World of Radio, H A Public Affair, F Living Enrichment Center, A Middle East Project; 1330 S Peace Watch, T University Forum, W Mailbag, F Progressive Radio, A World of Radio.

RADIO NEW ZEALAND INTERNATIONAL

1300 S/A RNZ News, M-F Pacific Regional News; 1305 S Tagata o te Moana, A New Music Releases; 1308 M-F DoteLine Pacific; 1330 M New Music Releases, T Mailbox (letters & DX news) or RNZI Talk (station info), W Tradewinds (Pacific commerce), H The World in Sport, F Pacific Correspondent, A tba.

RADIO SWEDEN

1330 S In Touch with Stockholm (listener contact-1st)/ Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1345 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), H Nordic Lights (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WRMI, Florida

15725 kHz.: 1300 S Wovescan, A Shortwave Radio Network (cont'd.).

WWCR, Tennessee

15825 kHz.: 1300 S Golden Age of Radio.

1400 UTC/ 10am E/7am P - Page 49 Freqs

BBC WORLD SERVICE (am)

1400 D News; 1406 S Talking Point (live phone-in), M/W Documentaries, T Masterpiece (arts ideas), H Assignment, F Sports International, A Sportsworld (live action); 1432 M Music Feature, T Top of the Pops, W Charlie Gillett (world music), H Music Biz, F John Peel (electic).

BBC WORLD SERVICE (eas)

1400 S/A News, M-F East Asia Today; 1406 S Talking Point (live phone-in), A Sportsworld (live action); 1432 M-F

British News; 1445 M-H Sports Roundup, F Football Extra.

CHANNEL AFRICA, South Africa

1400 S/A Channel Africa Extra (cont'd from 1300).

CHINA RADIO INTERNATIONAL

1400 D News & Reports; 1410 S Report on Developing Countries; 1415 A Cutting Edge (sci/tech); 1420 S In the Spotlight (cultural magazine); 1430 M People in the Know (China's leading personalities), T Biz China, W Chino Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

1400 D News; 1405 S Books & Writing, M-F Margaret Throsby (interview/music), A The Comfort Zone (design issues).

RADIO CANADA INTERNATIONAL

1400 D News; 1405 S The Sunday Edition (cont'd.), M-F Sounds Like Canada (cont'd.), including 1430 F C'est La Vie (life in French Canada), 1445 T-F Out Front (first person views of life), A Vinyl Cafe.

RADIO JAPAN - NHK WORLD

1400 D News; 1410 S Pop Joins the World, A Weekend Japanology; 1415 M-F 44 Minutes (feature magazine); 1454 A Sights & Sounds of Japan.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1400 S Peace Watch (cont'd.), M New Dimensions ("progressive" ideas), T Honoring Mother Earth: Indigenous Voices, W WINGS (women's news), H Global Community Forum, F Continent of Media, A Mailbag; 1430 S Daily Reading, W A World of Possibilities, F Steppin' Out of Babylon, A Disability Radio Worldwide.

RADIO NETHERLANDS

1430 S/A News, M-F Newslines; 1435 S Sincerely Yours (letters), A Europe Unzipped; 1455 S The Week Ahead (program previews), A Insight (commentary).

RADIO NEW ZEALAND INTERNATIONAL

1400 D RNZ News; 1405 S Touchstone (religion), M-F Cadenza (light classics), A In a Mellow Tone.

WRMI, Florida

15725 kHz.: 1400 S Shortwave Radio Network, A Shortwave Radio Network (cont'd).

1500 UTC/ 11am E/8am P - Page 50 Freqs

BBC WORLD SERVICE (am)

1500 D News; 1506 S Assignment, M Health Matters, T Go Digital, W Discovery (science), H One Planet (ecology), F Science in Action, A Sportsworld (live action from 1406); 1532 S People & Politics, M I'm Sorry I Haven't a Clue (panel game), T Music Review, W/F Westway (drama serial), H The Word (writers & writing) [exc. last H, World Book Club (discussion)]; 1545 W Heart & Soul (beliefs & values), F What's the Problem? (advice).

BBC WORLD SERVICE (eas)

1500 D News; 1501 S In Concert; 1506 M Health Matters, T Go Digital, W Discovery (research), H One Planet (ecology), F Science in Action, A Sportsworld (live action); 1532 M I'm Sorry I Haven't a Clue (panel game), T Music Review, W/F Westway, H The Word (writers & writings) [exc. last H, World Book Club (discussion)]; 1545 W Heart & Soul (beliefs & values), F What's the Problem? (advice).

CHINA RADIO INTERNATIONAL

1500 D News & Reports; 1510 S Report on Developing Countries; 1515 A Cutting Edge (sci/tech); 1520 S In the Spotlight (cultural magazine); 1530 M People in the Know (China's leading personalities), T Biz China, W Chino Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

1500 D News; 1505 S Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Nocturne (night music); 1530 M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor; 1555 S The Pulse (Aussie new music), A Business Weekend.

RADIO AUSTRIA INTERNATIONAL

1505 S/A Insight Central Europe; 1515 M-F Report from Austria; 1525 S/A Listener Letters; 1535 S/A Insight Central Europe; 1545 M-F Report from Austria; 1555 S/A Listener Letters.

RADIO CANADA INTERNATIONAL

1500 S/A News; 1505 S The Sunday Edition (cont'd.), A Quirks and Quarks (science).

RADIO JAPAN

1500 D News; 1505 S Hello from Tokyo (letters), M-F Songs for Everyone, A Pop Joins the World; 1515 M-F Asian Top News (reports from region's radio); 1525 M Japan Music Treasure Box, T Basic Japanese for You, W Japan Musicscape, H Brush Up Your Japanese, F Music Beat.

RADIO NETHERLANDS

1500 S Dutch Horizons, M Research File (science), T/A Music 52-15 (international music), W Documentary, H Aural Tapestry (culture), F A Good Life (development issues); 1530 S Aural Tapestry, M EuroQuest (Europe in context), T A Good Life, W Dutch Horizons, H Research File, F Documentary, A Amsterdam Forum (conversations).

RADIO NEW ZEALAND INTERNATIONAL

1500 S/A RNZ News, M-F Pacific Regional News; 1505 S/A Forces Radio; 1508 M-F DoteLine Pacific; 1530 M New Music Releases, T Mailbox (letters & DX news) or RNZI Talk (station info), W Tradewinds (Pacific commerce), H The World in Sport, F Pacific Correspondent, A tba.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1500 S Daily Reading (cont'd.), M Voices of Our World (Monyknoll program), T-A Daily Reading; 1515 T Disability Radio Worldwide, W-A Freespeech Radio News; 1530 S Continent of Media, M UN program; 1545 M Sneak Peaks, T-A UN Daily News.

WHRI, Indiana

13760 kHz.: 1500 A DXing with Cumbre.

WRMI, Florida

15725 kHz.: 1500 S/A Shortwave Radio Network (cont'd).

1600 UTC 12pm E/9am P - Page 50 Freqs

BBC WORLD SERVICE (am)

1600 S/A News, M-F Europe Today; 1606 S/A Sportsworld (live action).

RADIO AUSTRALIA

1600 D News; 1605 S The National Interest (Australian politics), M-F Bush Telegraph (rural/outback Australia), A Nocturne (cont'd.).

RADIO NETHERLANDS

1600 S/A News, M-F Newslines; 1605 S Sincerely Yours, A Europe Unzipped.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

1600 S Honoring Mother Earth: Indigenous Voices, M-F Democracy Now!, A CounterSpin (media analysis); 1630 A Freespeech Radio News (repeat of Fri. newscast).

VOICE OF AMERICA, Africa Service

1600 S/A Nightline Africa (weekend newsmagazine), M-F News & Reports; 1615 M-F Focus (a topic in-depth); 1623 M-F Sports; 1630 M-F Africa World Tonight.

KWHR, Hawaii

9930 kHz.: 1600 S DXing with Cumbre.

Shortwave Guide



WBCQ, Maine
17495 kHz.: 1600 A Allan Weiner Worldwide.

WRMI, Florida
15725 kHz.: 1600 S Shortwave Radio Network, A Shortwave Radio Network (cont'd).

1700 UTC 1pm E/10am P - Page 51 Freqs

1700 UTC/ 1pm E/10am P - Page 51 Freqs
CHANNEL AFRICA, South Africa
1700 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

RADIO AUSTRALIA
1700 D News; 1705 S Sound Quality (innovative music), M-F Australia Talks Back (phone-in), A The Spirit of Things (spiritual matters); 1755 M-F Perspective (commentary), A The Pulse (Aussie new music).

RADIO JAPAN - NHK WORLD
1700 D News; 1710 S Pop Joins the World, M-F Songs for Everyone, A Hello from Tokyo (listener contact); 1715 M-F 44 Minutes (feature magazine).

RADIO FOR PEACE INTERNATIONAL, Costa Rica
1700 S Living Enrichment Center, M Making Contact, T/W/F Peace Watch, H/A TUC Radio; 1730 M Steppin' Out of Babylon, H Peace Watch, A World of Radio.

VOICE OF AMERICA, Africa Service
1700 S Reporters' Roundtable, M-A News; 1706 M-F Talk to America (global phone-in), A Best of Talk to America; 1730 S Music Time in Africa; 1755 A Government Editorial.

VOICE OF GREECE
1700 A All Greek to Me (Greek popular & traditional music)

SWISS RADIO INT.
1730 S/A Swiss Scene, M-F Newsnet; 1735 A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 1745 F Business Spotlight.

ALL INDIA RADIO
1745 M Light Music, T Karnatak Instrumental Music, W Folk Songs, H-S Devotional Music.

WBCQ, Maine
17495 kHz.: 1700 A Zombo's Mondo Record Party.

WRMI, Florida
15725 kHz.: 1700 S/A Changesurfer Radio; 1730 S/A Shortwave Report.

1800 UTC/ 2pm E/11am P - Page 51 Freqs

ALL INDIA RADIO
1800 D News; 1810 D Commentary; 1815 W Instrumental Music—Old Masters, H-T Hindustani Classical Vocal Music; 1830 S Sports Roundup (1st wk)/Feature (2nd)/Film Story (3rd)/Discussion (4th), M Faithfully Yours (letters), T Cultural Talk, W Book Review (1st)/Window on Science (2nd/4th)/Times & Lives (biography-3rd), H General Talk, F Focus (magazine-1st)/Horizon (literature-2nd/4th)/Music (3rd), A For Youth (1st)/Indian Classics (books-2nd)/From the Archives (3rd)/Quiz Time (4th); 1840 M DXers Corner (2nd/4th), T Film Songs of Yesteryears, W Hits from Films, H Light Karnatak Music, F Light Instrumental Music; 1850 M Film Songs, F Light Music.

CHANNEL AFRICA, South Africa
1800 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

RADIO AUSTRALIA
1800 D News; 1805 S-H Pacific Beat (Pacific islands magazine), F Pacific Review, A Best of 'Late Night Live' (interviews); 1830 F Country Breakfast (rural life).

RADIO FOR PEACE INTERNATIONAL, Costa Rica
1800 S Spiritual Awakening, M Middle East Project, T CounterSpin (media analysis), W Making Contact, H Peace Watch (cont'd.), F WINGS, A Mailbag; 1830 S World of Radio, M-F Hightower Radio (commentary), A Making Contact; 1835 M-F Earthwatch (ecology); 1840 M-F Earth & Sky (astronomy); 1845 M Neumaier Report, T-F UN programs.

RTE, Ireland
1830 S Saturday View, M This Week with Gerald Barry, T-A 5-7 Live (top news of the day).

VOICE OF AMERICA, Africa Service
1800 S/A News & Reports, M-F Africa World Tonight; 1823 S/A Sports; 1830 S/A News Headlines, W Straight Talk Africa (continental phone-in); 1833 S/A On the Line (US foreign policy); 1855 S/A Government Editoria .

1900 UTC/ 3pm E/12pm P - Page 52 Freqs

ALL INDIA RADIO
1900 D News; 1905 D Press Review; 1910 S Women's World, M/W/F Radio Newsreel, T Of Persons, Places & Things (1st/3rd wk)/Our Guest (interviews-2nd/4th), H Panorama of Progress, A Mainly for Tourists (1st/3rd)/Indian Cinema (2nd)/On the Export Front (4th); 1920 S/M/W/F Film Songs, T Light Classical Music, H Light Instrumental Music, A Karnatak Classical Music; 1930 D Commentary; 1935 S/H/F Film Songs, M Karnatak Vocal Music, T Folk Songs, W/A Light Music.

DEUTSCHE WELLE
1900 D news; 1905 S Hard to Beat (sport), M-F Newslink Africa, A Religion & Society; 1915 S Inspired Minds, A German by Radio; 1930 S Hits in Germany or Melody Time, M World Music Live, T Arts on the Air, W Living in Germany, H Cool (youth culture), F Focus on Folk; 1945 W Europe on Stage.

RADIO AUSTRALIA
1900 D News; 1905 F Rural Reporter, A Earthbeat (ecology); 1910 S-H Pacific Beat (regional magazine w/Sport @ 1929); 1930 H Australian Country Style (music), A Business Report.

RADIO FOR PEACE INTERNATIONAL, Costa Rica
1900 S Radio Nation ("The Nation" magazine), M This Way Out, T World of Radio, W A Public Affair, H Living Enrichment Center, F Middle East Project, A Between the Lines; 1930 M University Forum, T Mailbag, H Progressive Radio, F World of Radio, A Peace Watch.

VOICE OF AMERICA, Africa Service
1900 S News & Reports, M-F News, A Hip Hop Connections (music); 1906 M-F Border Crossings (music—exc. W Straight Talk Africa cont'd.); 1923 S Sports; 1930 S Music Time in Africa (part 2), M-F World of Music, A News Headlines; 1933 A Our World (ecology, science & technology).

VOICE OF NIGERIA
1900 S Youth Forum, M Our Cities, T Our Environment, W Who Are the Nigerians?, H Listeners' Letters, F Nigerian Scene, A Folktales; 1915 H Wheel of Progress, F Business Weekly, A Nigerian Newsletter; 1930 S Window on Abuja, M Perspectives, T African Monarchy, W Theatre on the Air, H Women and Development, F Weekend Magazine, A Time for Highlife; 1945 S From the Bookshelf, T Listeners' Letters.

SWISS RADIO INT.
1930 S/A Swiss Scene, M-F Newsnet; 1935 A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 1945 F Business Spotlight.

WHRI, Indiana
9495 kHz.: 1930 A DXing with Cumbre.

WWCR, Tennessee
15825 kHz.: 1900 A Presidential Radio Address/Democratic Response.

2000 UTC/ 4pm E/1pm P - Page 52 Freqs

DEUTSCHE WELLE
2000 D News; 2005 S Mailbag, M-F Newslink Africa, A Inside Europe; 2030 M Insight (international affairs), T World in Progress (development), W Money Talks, H Man & Environment, F Spectrum (sci-tech); 2045 M Business German.

RADIO AUSTRALIA
2000 D News; 2005 F Pacific Review, A Australia All Over; 2010 S-H Pacific Beat (regional magazine w/Sport @ 2029), 2030 F The Buzz (technology).

RADIO FOR PEACE INTERNATIONAL, Costa Rica
2000 S New Dimensions ("progressive" ideas), M Honoring Mother Earth: Indigenous Voices, T WINGS (women's news), W Global Community Forum, H Continent of Media, F Mailbag, A Peace Watch (cont'd.); 2030 T A World of Possibilities, H Steppin' Out of Babylon, F Disability Radio Worldwide, A Daily Reading.

SWISS RADIO INT.
2000 S/A Swiss Scene, M-F Newsnet; 2005 A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 2015 F Business Spotlight.

VOICE OF NIGERIA
2000 S News Bulletin, M-F Sixty Minutes, A African Hour; 2015 S Sports Roundup; 2030 S In the News.

VOICE OF AMERICA, Africa Service
2000 S/A Nightline Africa (weekend magazine), M-F Africa World Tonight.

ALL INDIA RADIO
2045 D Press Review; 2050 S/T Instrumental Music, M/F Folk Songs, W Light Music, H Classical Indian Vocal Music, A Regional Indian Devotional Music.

WWCR, Tennessee
15825 kHz.: 2000 H DX Partyline, 2030 H World of Radio.

2100 UTC/ 5pm E/2pm P - Page 53 Freqs

ALL INDIA RADIO
2100 D News; 2105 D Commentary; 2111 S Regional Film Songs, M/A Classical Indian Vocal Music, T Karnatak Vocal Music, W/H Instrumental Music, F Orchestral Music; 2120 S Sports Roundup (1st wk)/Feature (2nd)/Film Story (3rd)/Discussion (4th), M Faithfully Yours (letters), T Cultural Talk, W Radio Newsreel, H Panorama of Progress, F Focus (magazine-1st wk)/Horizon (literature-2nd/4th)/Indian Music (3rd), For Youth (1st)/Indian Classics (books-2nd)/From the Archives (3rd)/Quiz Time (4th); 2130 M DXers Corner (2nd/4th), T/W Film Songs, H Classical Half-Hour, A Old Film Songs; 2140 F Film Songs; 2145 M Film Songs; 2150 S Karnatak Vocal Music.

BBC WORLD SERVICE (am)
2100 D News; 2101 A Play of the Week; 2106 S Documentaries, M Health Matters, T Go Digital, W Discovery, H One Planet, F Science in Action; *2115 M-F Caribbean Report; 2132 M I'm Sorry I Haven't a Clue (panel game), T Music Review, W/F Westway (drama serial), H The Word (writers & writings) [exc. last H, World Book Club (discussion)]; 2145 W Heart & Soul (beliefs & values), F What's the Problem? (advice).
[*Special service to the Caribbean on 5975, 11675, 15390 kHz.: 2105 M-F Caribbean Report. Special service to the Falklands on 11680 kHz.: 2130 T/F Calling the Falklands.]

DEUTSCHE WELLE
2100 News; 2105 S Hard to Beat (sport), M-F Newslink Africa, A Religion & Society; 2115 S Inspired Minds, A German by Radio; 2130 S Hits in Germany [or]

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Melody Time, M World Music Live, T Arts on the Air, W Living in Germany, H Cool (youth culture), F Focus on Folk, A Africa This Week; **2145** W Europe on Stage.

RADIO AUSTRALIA

2100 D News; **2105** F Feedback (letters, station news, on communications), A Australia All Over (cont'd); **2110** S-H AM (morning news magazine); **2130** S Country Breakfast (rural life), M Earthbeat (ecology), T Innovations (new products), W Australia Now, H All in the Mind (the brain), F Oz Sounds (new music releases); **2145** A Asia Sunday.

RADIO JAPAN - NHK WORLD

2100 D News; **2110** S Pop Joins the World, M-F Songs for Everyone, A Weekend Japanology; **2115** M-F Asian Top News (headlines from region's radio); **2125** M Japan Music Treasure Box, T Basic Japanese for You, W Japan Musicscope, H Brush Up Your Japanese, F Music Beat; **2154** A Sights & Sounds of Japan.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2100 S Voices of Our World (Maryknoll program), M-F Daily Reading, A Daily Reading (cont'd); **2115** M Disability Radio Worldwide, T-F Freespeech Radio News; **2130** S UN program, A Continent of Media; **2145** S Sneak Peaks, M-F UN Daily News.

VOICE OF AMERICA, Africa Service

2100 D News; **2106** S/A Jazz America, M American Gold, T Roots and Branches, W Classic Rock, H Top 20, F Country Hits.

WBCQ, Maine

7415 kHz.: **2100** S Radia Free Euphoria, M Jean Shepherd, F Pon Global Wireless; **2130** F Pab Sungenis Project.
9330 kHz.: **2100** A Allan Weiner Worldwide.

WHRI, Indiana

5745 kHz.: **2100** S DXing with Cumbre.

WHRA, Maine

17650 kHz.: **2100** F DXing with Cumbre; **2130** A DXing with Cumbre.

WRMI, Florida

51725 kHz.: **2100** A Shortwave Radio Network.

2200 UTC/ 6pm E/3pm P - Page 54 Freqs

ALL INDIA RADIO

2200 D News; **2210** D Commentary; **2215** S Women's World, M/F Radio Newsreel, T Of Persons, Places & Things (1st/3rd wk)/Our Guest (interview-2nd/4th), W Book Review (1st)/Window on Science (2nd/4th)/Times & Lives (biography-3rd), H General Talk, A Mainly for Tourists (1st/3rd)/Indian Cinema (2nd)/On the Export Front (4th); **2225** D Film Tune.

BBC WORLD SERVICE (am)

2200 D The World Today; **2232** A The Interview.

RADIO AUSTRALIA

2200 D News; **2205** F Asia Pacific (regional current affairs), A Correspondents' Report; **2210** S-H AM (morning news magazine); **2230** F AM Saturday (morning news magazine), A Fine Music Australia (classical); **2240** S-H Australia Wide (national report); **2254** A-H Perspective (commentary).

RADIO CANADA INTERNATIONAL

2200 S/A The World This Weekend, M-F The World at 6; **2230** S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Summer Comedy Special.

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2200 S Honoring Mother Earth: Indigenous Voices, M-F Democracy Now!, A CounterSpin (media analysis); **2230** A Freespeech Radio News (repeat of Fri. newscast).

RADIO PRAGUE

2230 D News; **2235** S Letter from Prague, M-F Newswire, A Insight Central Europe; **2240** S Mailbox, M One on One (interview), T Witness (oral history), W ABC of Czech (language), H Economic Report, F The Arts; **2250** S Readings from Czech Literature, T Talking Point (Czech issues), W Czechs in History or Spotlight (travelogue), F Away from Politics (poetry).

RvI, Belgium

2230 S Radio World, M-F News, A Music from Flanders; **2234** M-F Flanders Today (incl. press review, reports & 'CD of the Week'); **2238** S Tourism in Flanders; **2244** S Brussels 1043 (letters).

VOICE OF TURKEY

2200 D News; **2210** D Press Review; **2215** S Tunes Spanning Centuries, M Last Week, T Live From Turkey, W Review of the Foreign Media, H Big Powers & the Armenian Problem, F Archaeological Settlements in Turkey, A Outlook; **2220** M Hues & Colors of Anatolia, W Letterbox, A The Stream of Love or DX Corner; **2225** S/F Music, H In the Wake of a Contest; **2230** M/A Music; **2235** S Turks in the Mirror of Centuries, M From Past to Present, W Turkey's Off the Beaten Track Sites, H The Culture Parade, F The Travel Itinerary of Anatolia, A Turkish Arts.

WBCQ, Maine

5105 kHz.: **2200** M-F Radio Caroline (the original Europirate radio station).
7415 kHz.: **2200** W World of Radio, F Pab Sungenis Project (cont'd), A Radio Timtron Worldwide; **2230** W Think Tank North America (the bizarre), H Uncle Ed's Musical Memories, F Wanton Display of Control & Disruption.

WHRI, Indiana

9495 kHz.: **2230** A DXing with Cumbre.

WWCR, Tennessee

12160 kHz.: **2200** S Travel Channel Radio.

2300 UTC/ 7pm E/4pm P - Page 54 Freqs

BBC WORLD SERVICE (am)

2300 D News; **2306** S One Planet (ecology), M-F Outlook (magazine), A Pick of the World (BBC's best); **2332** S I'm Sorry I Haven't a Clue (panel game); **2345** M-F Off the Shelf (book readings), A Write On (letters).

CHINA RADIO INTERNATIONAL

2300 D News & Reports; **2310** A Report on Developing Countries; **2315** F Cutting Edge (sci/tech); **2320** A In the Spotlight (cultural magazine); **2330** S People in the Know (China's leading personalities), M Biz China, T Chino Horizons (China outside Beijing), W Voices from Other Lands, H Life in China, F Listeners' Garden.

RADIO AUSTRALIA

2300 D News; **2305** F Country Breakfast (rural life), A All in the Mind; **2310** S-H Asia Pacific (regional current affairs); **2330** S Business Report, M, T Rural Reporter, W The Arts on RA, H The Buzz (technology issues), F Lingua Franca (about language), A Innovations (new products).

RADIO AUSTRIA INTERNATIONAL

2305 S/A Insight Central Europe; **2315** M-F Report from Austria; **2325** S/A Listener Letters; **2335** S/A Insight Central Europe; **2345** M-F Report from Austria; **2355** S/A Listener Letters.

RADIO BULGARIA

2300 D News; **2310** A Views Behind the News, S Falk Studio (Bulgarian folk music), M-F Events and Developments (current affairs review); **2320** M Sports; **2325** M-F Timeout for Music; **2330** F Bulgarian Plozo (cultural magazine) or Walks and Talks (interesting places); **2335** M-F Keyword Bulgaria (Bulgaria and things Bulgarian), H Answering Your Letters; **2345** M Magazine Economy, T Arts and Artists; W History Club, H The Way We Live, F Radio Bulgaria Calling (for radio hobbyists).

RADIO CANADA INTERNATIONAL

2300 D CBC News; **2305** A Quirks & Quarks (science), S Global Village (world music), M-F As It Happens (interviews with newsmakers) [began at 2230]; **2330** W Dispatches (world events in Canadian perspective).

RADIO NETHERLANDS

2330 S/A News; M-F Newswire; **2335** S Sincerely Yours (letters), A Europe Unzipped; **2355** S The Week Ahead (program previews), A Insight (commentary).

RADIO NEW ZEALAND INTERNATIONAL

2300 S-H World and Pacific News, F/A RNZ News; **2310** S-H Sports News, F Saturday with Kim Hill, A Feature or series; **2315** S-H Pacific Weather; **2317** S-H Nine to Noon (topical magazine).

RADIO FOR PEACE INTERNATIONAL, Costa Rica

2300 S Living Enrichment Center, M Making Contact, T/W/F Peace Watch, H/A TUC Radio; **2330** M Steppin' Out of Babylon, H Peace Watch, A World of Radio.

RADIO ROMANIA INTERNATIONAL

2300 D Radio Newsreel; **2310** S Focus, M-F Commentary, A The Week; **2315** S Sunday Studio, M Pro Memoria (history), T Business Club, W Society Today, H Cards on the Table (debate) or The Romanian Next to You (interview), F Challenge for the Future or Terra 2001, A World of Culture; **2320** M Political Flash, T European Horizons, A RRI Encyclopedia; **2325** S Romanian by Radio, M/W/F Business Update, T Tourist News, H Listeners' Letterbox, A Roots (culture/traditions); **2330** S Romanian Itineraries, M Pulse of Transition, T Mother Nature (ecology), W Visit Romania, F Practical Guide, A Radio Pictures; **2335** S Listeners' Letterbox, M Performing Arts, T Youth Club, W Partners in a Changing World, F Cultural Survey, A Romanian Itineraries; **2340** M Pages of Romanian Literature, T/H Skylark (folk music), W Stage and Screen, F Spectator (voice of the people), A Bucharest Along the Centuries; **2345** M Romanian Hits, W Romanian Musicians, F Romanian Folk Music At Its Best, A DX Mailbag; **2350** S Romanian Folk Music At Its Best, M Sports Roundup, T Athlete of the Week, W Sports Club, H Football Flash, F Sports Weekend.

SWISS RADIO INTERNATIONAL

2330 S/A Swiss Scene, M-F Newsnet; **2335** A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); **2345** F Business Spotlight.

WBCQ, Maine

7415 kHz.: **2300** S Le Show (humor/entertainment), W Off the Hook (public telecommunications issues), H Uncle Ed's Musical Memories (cont'd from 2230), F The Lost Discs Radio Show, A The Real Amateur Radio Show; **2330** A Fred Flintstone Music Show.
9330 kHz.: **2300** A Split Secs (free form).

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; Glenn Hauser, Enid, OK, *DX Listening Digest*; World of Radio; Jose Jacob VU2JOS, India; Anker Petersen, *DX Window*; Harold Sellers, Canada, ODXA/DX Ontario; Larry Van Horn, MT Asst. Editor; *BBC On Air*; *BCL News*; *BCDXC*; *CIDX*; *Cumbre DX*; *DXA*; *DX News*; *Fineware*; *Hard Core DX*; *NASWA Journal*; *Observer*; *World-wide DX Club*.

Milcom Monitoring in the Southeast

Those of us who live in the Southeastern United States are extremely fortunate to live in an area that is a hotbed of military communications monitoring. Even here in the mountains of western North Carolina, we have a lot of activity around and over us, even though the nearest base is nearly 90 miles away.

The Southeast is also home to some of the most active posters to the Milcom email newsgroup than any other area, except maybe Southern California. In this month's column we are extremely fortunate to feature base profiles from two of the best here in the southeastern US: Roland "Mac" McCormack and Mike Riffle.

Our first stop will be at the Marine Corps Air Station Beaufort, South Carolina.

◆ MCAS Beaufort, South Carolina (KNBC)

MCAS Beaufort hosts all active duty U.S. Marine Corp F/A-18 air operations on the East Coast and these units are assigned to Marine Air Group 31 (MAG-31). There are also two U.S. Navy F/A-18 squadrons assigned to this installation.

The base is located four miles from downtown Beaufort, South Carolina. Managing more than 12,000 acres, the air station includes the Laurel Bay military family housing just outside the main gate and Townsend Bombing Range located about 130 miles away in McIntosh County, Georgia.

There are two runways at the air station in Beaufort. One is 12,000 feet long; the other is 8,000 feet. MCAS Beaufort is an alternative Space Shuttle landing site for NASA.

Most of the F/A-18 activities based at Beaufort use offshore airspace for training, although the air to surface weapons mission of the F/A-18 does require range access. The warning airspace adjacent to MCAS Beaufort is equipped with a Tactical Aircrew Combat Training System (TACTS). Beaufort aircraft use the Dare County Range in North Carolina, other ranges managed by North Carolina-based U.S. Marine Corps units, and the coastal Georgia ranges (Ft. Stewart and Townsend) near Savannah. Local Military Operating Areas (MOAs) have not been used extensively due to local access issues with the neighboring community.

The 1993 Defense Base Closure and Realignment Commission (BRAC) recommended closure of NAS Cecil Field, Florida, and realignment of all of its aircraft and associated personnel to MCAS Cherry Point, North Carolina; MCAS Beaufort, South Carolina; and NAS

Oceana, Virginia. In 1995, the BRAC Commission revised its recommendations regarding realignment of NAS Cecil Field assets by redirecting all aircraft and associated personnel to "...other naval air stations."

The Department of the Navy, after carefully weighing the operational, environmental, and cost implications of relocating F/A-18 aircraft from NAS Cecil Field to other Naval and Marine Corps installations, decided to realign two F/A-18 fleet squadrons to Marine Corps Air Station (MCAS) Beaufort, South Carolina, and nine F/A-18 fleet squadrons and the Fleet Replacement Squadron (FRS) to Naval Air Station (NAS) Oceana, Virginia.

From Roland McCormick, here is his frequency profile for the base.

MCAS Beaufort

Air Traffic Control

119.050	Tower
340.200	Tower
360.200	Tower
128.150	Ground Control
336.400	Ground Control
118.450	Approach/Departure above 3000 feet
301.200	Approach/Departure above 3000 feet
123.700	Approach/Departure 3000 feet and below
251.700	Approach/Departure 3000 feet and below
278.800	Automatic Terminal Information Service (ATIS)
281.800	Base Operations

Miscellaneous Frequencies

269.700	Tactical Control
264.000	Group Common, possibly Wing Common

Squadron Frequencies

VMFA-115 "Silver Eagles" F/A-18A
Tailcode: AC (VE) ## Callsign: BLADE

361.800	BLADE Base
320.200	TAC
339.500	TAC
321.900	TAC 3 (Tentative)

VMFA-122 "Crusaders" F/A-18A

Tailcode: DC Callsign: NICKEL	
253.100	NICKEL Base
283.400	TAC
354.325	TAC
251.400	Former TAC (not known if still in use)
251.900	Former TAC (not known if still in use)

VMFA(AW)-224 "Bengals" F/A-18D

Tailcode: WK 5## Callsign: BENGAL	
305.800	Base
250.300	TAC 1
258.900	TAC 2
336.225	TAC 3

VMFA-251 "Thunderbolts" F/A-18C

Tailcode: DW AB 2## Callsign: TBOLT	
313.800	Base
290.000	TAC
327.475	TAC
315.300	Former TAC (not known if still in use)
358.150	Occasional use

VMFA-312 "Checkerboards" F/A-18C
Tailcode: DR AC 2## Callsign: CHECK

300.200	Base
301.950	TAC 1
320.300	TAC 2

VMFA(AW)-332 "Moonlighters" F/A-18D
Tailcode: EA 4## Callsign: SKULL, ATTIC

344.200	Base
326.700	TAC 1
346.600	TAC 2
333.300	TAC 3 (Tentative)

VMFA(AW)-533 "HAWKS" F/A-18D

Tailcode: ED Callsign: HAWK	
289.275	TAC
299.300	TAC
354.700	Old TAC 2, not used recently

VFA-82 "Marauders" F/A-18C

Tailcode: AB 3## Callsign: SCAR, CARR	
358.900	Base
265.700	TAC
258.925	TAC
369.300	TAC
265.900	Tentative

VFA-86 "Sidewinders" F/A-18C

Tailcode: AB 4## Callsign: WINDER	
345.800	Base
256.250	TAC 1
257.450	TAC 2 (Tentative)

One final note from Mac: The Beaufort U.S. Marine Corps squadrons have used the BM in the past as a wing-wide tailcode. Recently, it has been observed that they have been using their squadron tailcodes again (possibly due to wing leadership changes).

Thanks for sending us that great update, Mac.

◆ Fort Benning/Lawson AAF, Georgia

Fort Benning is located south of Columbus, Georgia, on U.S. highway 27. It has an active duty population of 34,834 and this includes both reserve components.

The base covers 73,533 hectares (181,626 acres) of land with 93 percent in west central Georgia and the remaining 7 percent in east central Alabama. Major portions of land lie in three counties: Muscogee and Chattahoochee counties in Georgia and Russell county in Alabama. There are about 124 hectares of open water, including ponds, streams, and rivers. The Chattahoochee River divides Fort Benning between Georgia and Alabama.

The natural and manmade features of Fort Benning reflect the quality and diversity of its military missions. Most of the reservation is undeveloped and is used for military training, weapons ranges, drop zones, and landing zones. Rolling, pine-covered hills are predominant, and grasslands are intermingled with forested areas. There are 63 action firing and non-firing ranges. An average of 20,000 troops are in the field daily.

There are currently 17,454 hectares (43,128 acres) of mechanized training area out of 46,210 hectares (114,184 acres) of total available training area. In addition, 14,225 hectares (35,149 acres) are established impact areas and 6,866 hectares (16,967 acres) are restricted dud areas. Approximately 5,759 hectares (14,231 acres) of land comprise four cantonment areas.

Fort Benning is a US Army Training and Doctrine Command (TRADOC) installation. Benning's mission is to "provide the world's best infantry soldiers and trained units; to provide a power projection platform that can deploy soldiers and units anywhere in the world on short notice; and to provide the Army's premier installation and home for soldiers, families, civilian employees, and military retirees." Five types of infantry train at Fort Benning: mechanized, light, airborne, air assault, and ranger.

Known as the "Home of the Infantry," the installation is home to the U.S. Army Infantry Training Brigade, U.S. Infantry School, Ranger Training Brigade, Airborne School, and School of the Americas. The Fort Benning military community has several major units. The U. S. Army Infantry School produces infantry combat leaders by preparing officers and enlisted soldiers to perform infantry duties required in both peace and war. Functional courses comprise the second major area of training. These courses are designed to train military personnel in specialized, infantry-related skills.

Although Benning is a Training and Doctrine command installation, units of Forces Command make up 50 percent of permanent party personnel on post. They are the 3rd Brigade, 3d Infantry Division, and the 36th Engineer Group. The 3d Ranger Battalion, 75th Ranger Regiment, and its Regimental Headquarters are also located at Benning.

Mike Riffle recently moved from the Atlanta area to a new home in Cataula, Georgia, and has already cranked up his scanner up to do some military monitoring. Here is his report of some of the active frequencies from the base.

Fort Benning

Aeronautical Frequencies

119.050	Lawson Army Air Field (AAF) Tower
121.050	Lawson AAF Ground Control
121.700	Lawson AAF Clearance
134.100	Lawson AAF Base Operations
134.375	Lawson AAF ATIS
234.500	Fryar Drop Zone
245.700	Lawson AAF Base Operations
249.500	Skywatch (Range Control - simulcast on Ft. Benning trunk system)
254.250	Lawson AAF Ground Control
257.800	Columbus Tower (paired with 120.100)*
269.525	Lawson AAF Tower
285.525	Lawson AAF Approach/Departure Control (151-2401 paired with 126.025)**
288.275	Lawson AAF Tower (only heard during radio check, no control of aircraft yet)
323.100	Lawson AAF Approach/Departure Control (241-3601 paired with 125.500)**
343.200	Lawson AAF Metro
348.600	Columbus Ground (paired with 121.900)*
353.750	Lawson AAF Approach/Departure Control (001-1501 paired with 126.055)**

Notes:

* The Columbus Metropolitan Airport (KCSG) simulcasts continuously on these frequency pairs
 ** Despite these frequencies being listed as separate approach/departure control sectors, Mike has yet to hear them used as such. So far all approach/departure control activity is being simulcast on the listed frequencies.

Land Mobile Frequencies

Ft. Benning TRS (EDACS wide system)	
LCN01	406.55
LCN02	407.35
LCN03	408.15
LCN04	408.95
LCN05	409.75
LCN06	406.225
LCN07	406.75
LCN08	408.35
LCN09	409.05
LCN10	409.15

Some active talkgroups (in AFS format)

08-035	Interagency
08-055	Range Control (very active)
08-101	MP Dispatch (callsign DRAGNET)
08-102	MP TAC
08-106	MP Investigators
08-011	MP Checkpoints
09-153	Jump Recovery
09-154	Jump Ops
10-142	Fire Dispatch
11-002	EMS Dispatch
11-011	EMS-hospital
15-150	Airborne Ops
15-156	Skywatch (simulcast from 249.5)

Miscellaneous Notes:

Fryar is the main drop zone used at Ft. Benning. On the Atlanta VFR Sectional Chart it is indicated by the parachute symbol located approximately six miles southeast of Lawson AAF.

And to supplement Mike's information above, here are notes from my database on the Benning trunk system.

System: EDACS Regular with encryption

406.550/415.350	(LCN1)
407.350/416.150	(LCN2)
408.150/416.950	(LCN3)
408.950/417.750	(LCN4)
409.750/418.550	(LCN5)
406.225/414.750	(LCN6)
406.750/415.550	(LCN7)
408.350/416.350	(LCN8)
409.050/417.150	(LCN9)
409.150/417.950	(LCN10)

Talkgroups:

01-002	Unknown User/Usage
01-004	Unknown User/Usage
04-144	Cable Base
05-112	Troop Net Firefox Base
08-035	Public Safety E911 Contro
08-055	Troop Net Range Control
08-100	Net Call
08-101	Public Safety Patrol-1
08-102	Public Safety Patrol-2
08-103	Operations Net
08-104	Command Net
08-106	Public Safety Military Police Investigators
08-110	Public Safety Search and Rescue Teams
08-111	Public Safety Checkpoint Operations
08-112	Spare
08-113	Public Safety Traffic
08-114	Public Safety K-9s
08-122	Unknown User/Usage
08-124	Public Safety Spare-1
08-125	Troop Net Pioneer Base
08-131	Troop Net Payton Range
08-132	Troop Net Bradley Base
08-134	Troop Net Wagon Base
08-135	Troop Net Bradley CQ
09-042	Unknown User/Usage
09-043	Troop Net Rocksteady Base
09-045	Troop Net Bayonet Base
09-046	Troop Net Melfort Base
09-047	Troop Net Patriot Base
09-051	Strike Hard Base
09-054	Troop Net Rock Support Base
09-063	Troop Net Sand Hill (Base Maintenance)
09-064	Troop Net Kelly Hill (Base Utilities)
09-065	MR Base
09-066	Unknown User/Usage
09-067	Shop 7
09-070	Public Safety Forestry
09-081	Troop Net Romeo Base

09-092	Troop Net Bravo Talk
09-095	Troop Net Eagle Base
09-121	Unknown User/Usage
09-142	Troop Net Charlie Talk
09-143	Unknown User/Usage
09-144	Bravo Operations
09-145	Troop Net Ammo Point (Armory)
09-146	Unknown User/Usage
09-151	Unknown User/Usage
09-152	Troop Net Staff Duty
09-153	Troop Net Recovery
09-154	Troop Net Jump Control
09-157	Unknown User/Usage
10-041	Troop Net Hammer Base
10-046	Troop Net Dragon Base
10-047	Troop Net Battle Base
10-051	Troop Net Bull Base
10-052	Unknown User/Usage
10-053	Unknown User/Usage
10-054	Troop Net Blackjack Base
10-061	Troop Net Control
10-101	Unknown User/Usage
10-142	Public Safety Fire Control/Operations
11-002	Public Safety EMS Control/Operations
11-011	Public Safety Hospital TAC ADust Operations"
11-031	Unknown User/Usage
11-033	Unknown User/Usage
11-063	Troop Net Kingpin Base
11-072	Troop Net Malone Base
11-074	Unknown User/Usage
11-081	Troop Net Cold Steel Base
11-083	Troop Net Marne Base
11-084	Troop Net Raider Base
11-085	Troop Net Tiger Base
11-123	Unknown User/Usage
11-125	Unknown User/Usage
11-141	Unknown User/Usage
12-043	Red Base
12-046	Echo Base
12-063	Troop Net Ruth Range
12-084	Unknown User/Usage
12-092	Troop Net Bushmaster Base
13-141	Troop Net Stock Control (Base Supplies)
15-121	Public Safety Crash-1
14-021	Unknown User/Usage
14-042	Unknown User/Usage
15-064	Unknown User/Usage
15-066	Unknown User/Usage
15-121	Public Safety Crash-1
15-122	Public Safety Crash-2
15-143	Troop Net Darby Talk
15-145	Troop Net Alpha TAC
15-146	Troop Net Bravo TAC
15-147	Troop Net Charlie TAC
15-150	Troop Net Mike Base
15-153	Troop Net Operations 4
15-156	Troop Net Skywatch (simulcast from 249.500 MHz)
15-157	Public Safety Medevac Control

They also have a conventional net shown as "MP-CNV" at 408.950 MHz simplex with the encryption forced on (always used), and the following shown as "CNV-2" with the agency identified (simplex):

406.550	MP-CNV
417.750	FIRE-CNV
415.550	EMS-CNV
408.950	EOD-CNV
406.750	EOC-CNV
417.950	DOIM

And that does it for this month's Milcom column. Until next month, 73 and good hunting.

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Tracking the Logic of LTR

Public safety systems used by police and fire departments are not the only trunked radio traffic available to scanner listeners. Logic Trunked Radio (LTR) is commonly used by businesses and other commercial entities as a reliable, relatively inexpensive way to keep in touch while on the move.

◆ Quebec, Canada

Let me start out by saying I read your column in Monitoring Times each month and I appreciate your wealth of knowledge. This is why I write to you today.

There is an ambulance dispatch service just north of the border from me in Quebec called Alerte Sante. I live in northwestern Vermont, and I can hear Montreal, which is 75 miles north, crystal clear. Alerte Sante is on a LTR system.

Here is the info I have.

I know the id center numbers can tell you the channel number, but what happens if the ids on 6 of the 8 repeaters are 1-01-001? I don't know what to do next. The frequencies are as follows. I have programmed them in in this order.

866.9375, 867.5625, 867.9375, 867.9625, 867.9875, 868.0375, 868.0625, 868.1375

When I am in trunk manual mode I get the ID of 1-01-001 on 867.9375, 867.9625, 867.9875, 868.0625

Also I looked up the ambulances on this system, and they are assigned to the following only:

867.9375, 867.9625, 867.9875, 868.0625, 868.0375

Any help would be appreciated and thanks in advance.

Jeff

Logic Trunked Radio (LTR) is an older type of trunked radio, different in many ways from the more common Motorola and EDACS systems. The biggest technical difference is that LTR does not have a dedicated control channel. All of the radio frequencies may be used for voice traffic.

All mobiles in a LTR system are assigned to a "home repeater." When a mobile is not involved in an active conversation it is tuned to the home repeater frequency, listening to messages the repeater is transmitting. If a repeater is not engaged in a call (it's *idle*), every ten seconds it will transmit a brief information mes-

sage to let mobiles know that the system is up and running. If a repeater is engaged in a call (it's *busy*), a sub-audible message will be transmitted along with voice traffic, informing the listening mobiles of the active talkgroup and which other repeater is idle.

When a mobile wishes to initiate a call, it tunes to the idle channel and transmits a service request. Usually the idle channel will be the home repeater, unless that repeater is busy with another call. Whether idle or busy with a conversation, the repeater will transmit a message that allows a mobile to determine which channel in the system is free.

◆ LTR Talkgroups

LTR uses a talkgroup format composed of three fields: Area, Home Channel and User ID.

In most LTR systems the Area value is typically 0. If there is another LTR system nearby, one system will have Area set to 0 and the other will have Area set to 1. The mobiles will be programmed with the same Area value as the repeaters. This allows the mobile radio to distinguish between messages from its own system (which it will process) and messages from a foreign system (which it will ignore). The same is true of the repeaters – they will ignore transmissions from mobiles that have a different Area value.

The Home Channel number is the repeater number to which the mobile radio is assigned. Since an LTR system may have as many as 20 repeaters, this value can be anywhere from 01 to 20. In LTR systems with fewer than 20 frequencies there will usually be gaps between channel numbers, as we'll soon see.

The User ID can range from 000 to 254, and identifies the individual radio or talk group. As many as 250 ID codes are assigned to each repeater. An ID code may be assigned to a single radio or to a group of mobiles. User IDs above 250 may be used for special system messages.

So, Jeff, what you're seeing with a talkgroup of 1-01-001, means it is part of

LTR Talkgroup Format

Area Code	Home Repeater	User ID
-----------	---------------	---------

Area Code: 0 or 1
Home Repeater: 01 to 20
User ID: 000 to 254

Area 1, assigned to repeater 01 and has a user ID of 001. You mention that you've seen this talkgroup on at least six of the eight repeaters you've located.

Groupe Alerte Sante ("Health Alarm Group") is a popular dispatch agency for emergency medical services in southern Quebec. They are based out of Greenfield Park (now a borough of Longueuil), across the Saint Lawrence River from Montreal, with a primary repeater located in Covey Hill (867.9875 MHz). Other frequencies used by *Groupe Alerte Sante* appear to be from different repeater locations.

There are a couple of possibilities for the prevalence of 1-01-001. One is that the repeaters are operating independently as far as talkgroups are concerned. Are you sure the voice traffic on all of these frequencies is related? Do conversations carry across several of these frequencies? Perhaps some of these frequencies are dedicated to different customers. Another possibility is that talkgroup 1-01-001 is simply the busiest talkgroup during the times you've been monitoring. Do you see other talkgroups during busier times of the day?

As for what to do: first, be sure the frequencies are programmed in the proper order in your scanner. Due to the way the system determines which repeaters are free, LTR operators are encouraged to assign repeater numbers with equal gaps between them. For instance, an LTR system with five repeaters typically has repeater numbers of 1, 5, 9, 13 and 17. The gaps between the numbers are always 4, and the gap between 17 and 20 is 3. A system with eight repeaters, as the *Groupe Alerte Sante* appears to be, would most likely use repeater numbers like 1, 3, 6, 8, 11, 13, 16, 18 or 1, 4, 6, 9, 11, 14, 16, 19. I'd try those number sequences first and see if conversations trunk correctly. Keep in mind that the corresponding radio frequencies may not be in ascending order.

Another thing to try is programming the same frequency in your scanner in channels 1 through 20, then scan in trunked mode. When you hear activity, switch out of trunk mode. The scanner channel that you're on should be the repeater number for that frequency.

If you have a PRO-92 or PRO-2067, the scanner will display LTR talkgroups even if the frequency is programmed by itself in a conventional bank. This will allow you to gather talkgroup IDs and look for patterns

without having to program every channel correctly.

Jeff, let us know what you find out!

◆ Albuquerque, New Mexico

Last month William wrote in with a question about EDACS (Enhanced Digital Access Communication System) and the Radio Shack PRO-92 scanner. This month he gives us the details of the transit system he's monitoring in New Mexico.



This is all very interesting and a great hobby. I always read your column in Monitoring Times magazine - it is a good learning experience.

The city buses are on an EDACS system (call sign WNSS410) in Albuquerque. The frequencies in Logical Channel Order are:

856.2625, 857.2625, 858.2625, 859.2625, 860.2625, 856.4625, 857.4625, 858.4625, 859.4625, 860.4625, 856.4875, 856.7125, 857.7125, 858.7125 and 860.9875 MHz.

Some of the talk groups are:

Decimal	AFS	User
0273	02-021	garbage pickup
0276	02-024	garbage pickup
0278	02-026	litter removal
0279	02-027	garbage pickup
0280	02-030	garbage pickup
0281	02-031	garbage pickup
0289	02-041	dispatcher broadcasts to buses
0290	02-042	transit security
0291	02-043	transit operations and supervisors
0292	02-044	handicap van service
0294	02-046	bus maintenance
0295	02-047	dispatcher broadcasts to handicap vans
0305	02-061	water department
0306	02-062	water department
0307	02-063	water department well maintenance
0308	02-064	water department customer service; sewer
0309	02-065	water department
0314	02-072	storm pumps and sewer
0321	02-081	street maintenance
0322	02-082	traffic signals and signs
0324	02-084	street maintenance
0337	02-101	animal control

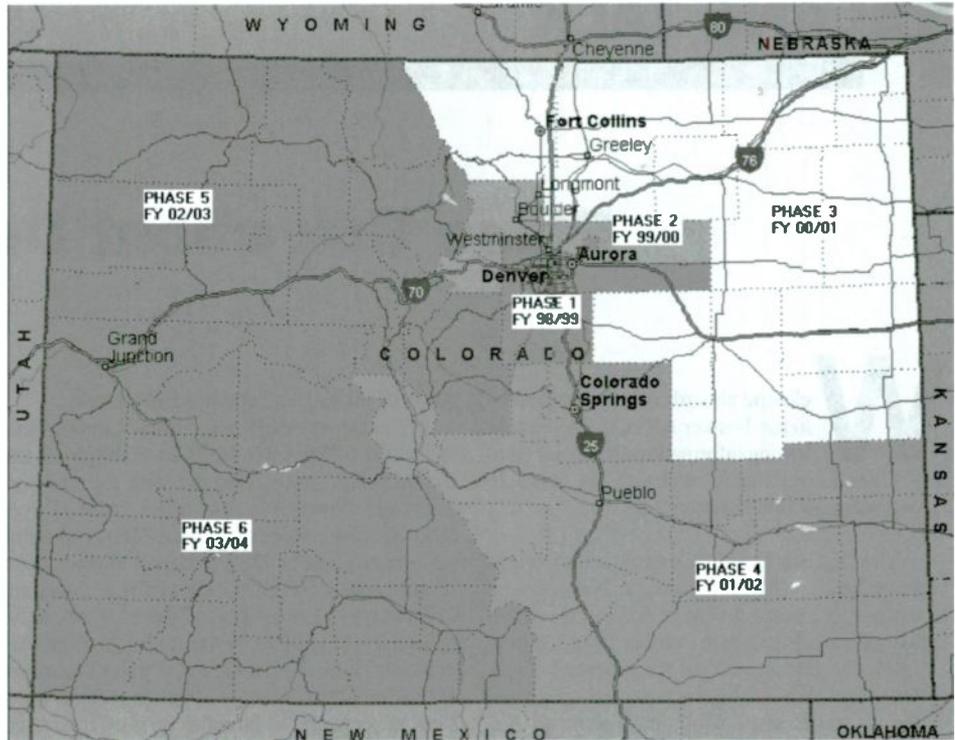
There are other talk groups, but I have not been able to determine what they are. Besides the buses, the 02-082 traffic signals and signs is one of my favorites. They discuss the details of traffic signal operation such as timing, traffic plans, traffic progression along routes, loop and camera detectors, signal and power failures, and so on.

William

◆ Colorado

Do you have any information in regard to being able to scan the City and County of Broomfield (Colorado)? I know they are part of the APCO Project 25 radio system, but I think they are at 9600 baud...

*Thank you in advance,
Tom*



Colorado currently operates one of the largest APCO Project 25 trunked radio systems in the United States. Their Digital Trunked Radio (DTR) is expected to provide better coverage and eliminate interoperability issues by replacing a patchwork of older wireless systems with a single, standardized state-wide system. Currently 35 of the 64 counties in the state have partial or complete coverage, from Wyoming down to New Mexico and from the Kansas border westward to the Front Range. More than 8,000 mobile and portable radios are in use.

When the remainder of the state is finally completed there will be 120 repeater sites, each with at least four radio channels. Five dispatch centers across the state will manage the day-to-day communications of an estimated 12,000 radios.

The system build-out in the metro Denver area was complete in 2001, covering part of all of Adams, Arapahoe, Boulder, Clear Creek, Denver, Douglas, Gilpin and Jefferson counties. The system got a workout last March during Denver's record-setting blizzard, supporting three times as many transmissions per day (240,000) as usual.

Broomfield, in north central Colorado, lies between the cities of Boulder and Denver. You may be able to hear the Denver repeater, which uses five frequencies: 866.4375, 867.5625, 867.8125, 868.1125 and 868.7000 MHz. If you're north of Broomfield you might be able to hear the Mead tower in Boulder County, which uses 866.6125, 867.4250, 867.8000, 868.3875 and 868.9875 MHz. Unfortunately, you'll have to monitor these frequencies in conventional mode.

The Colorado system is what's known as a "pure" trunked APCO-25 system, where all of the voice channels carry only digital traffic and the control channel operates at 9600 baud.

Other types of APCO-25 systems, if they're trunked, use an older control channel format that runs at 3600 baud. The currently available APCO-25 scanners from Uniden are only able to track 3600 baud systems.

As noted in a previous column, Radio Shack has received FCC authorization for a new scanner, the PRO-96, that promises the capability of tracking 9600 baud APCO-25 systems. Authorization is a necessary step before the scanner can be offered for sale, but as of August there was no announced date of availability. When it finally does come out it's expected to have a retail price of about \$500. The best bet at this point is to wait a couple of months for the PRO-96 and see if it lives up to expectations.

Until then, be sure to check my website at <http://www.signalharbor.com> for updates on APCO-25 scanners, frequencies, and links. I also welcome e-mail at dan@monitoringtimes.com. Until next month, happy monitoring!

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Plane Talk about Denver

Welcome aboard! A very big thanks to the Denver ARTCC for the following information about their center. Check out their website at <http://www.nw.faa.gov/ats/zdvarctc>.

The first Air Traffic Control Center originated at Newark Airport, Newark, New Jersey, as a privately operated venture formed by cooperative airline companies in October 1935. On July 8, 1936, the Department of Commerce's Civil Aeronautical Administration assumed operation of the air traffic responsibilities. Today, all Air Traffic Control Centers are governed by the Federal Aviation Administration.

The original Denver Air Route Traffic Control Center was commissioned on March 1, 1942, and was located at the Denver Municipal Airport. A small staff of 12 Air Traffic Control Specialists made up the work force at that time.

The Center remained at its airport location until May 1962. It was then relocated to Longmont, Colorado, on land donated by the citizens of Longmont. The building has been expanded or refurbished three times (the last being in 1987) for computer, power, and air conditioning upgrades.

The electrical power system in use is sufficient to support a community of approximately 3,000 people. There is also a continuous standby system available consisting of three 550 hp standby (diesel) generators which can be started and operated normally at peak power within a few seconds. A four-week supply of fuel for the standby system is kept on hand.

The building has a "personal shelter" in the basement containing emergency food, medical supplies, cots and blankets. These necessities would be used by employees needed to sustain the Center operations during a national emergency. The Center has a series of batteries which support equipment to provide direct communication to the Regional Office and other Centers in case of emergency loss of commercial facilities. The Center also has its own heliport which can be used during emergencies.

The microwave tower along the east side of the building brings radar data to the Center from twelve sites. These radar sites are located near Grand Junction, Trinidad, and Parker, Colorado; Gallup, New Mexico; Lusk, Rock Springs, and Lovell, Wyoming; North Platte and Rockville, Nebraska; Gettysburg, South Dakota; Garden City, Kansas; and Cedar City, Utah.

The radar information received from these sites is needed by the Center in order to accomplish its mission of controlling private, military,

business, air taxi, and commercial aircraft.

The Denver Air Route Traffic Control Center is one of 20 such facilities throughout the United States and is charged with the safe, orderly, and expeditious flow of air traffic in over 280,000 square miles of airspace. The geographical area covered by Denver Center extends from approximately 50 miles west of Grand Junction, Colorado, to 12 miles east of Vernal, Utah, to 50 miles north of Gillette, Wyoming, to 75 miles east of North Platte, Nebraska, to 25 miles northwest of Garden City, Kansas, to 10 miles north of Taos, New Mexico, and to 20 miles west of Tuba City, Arizona.

The Center has the responsibility for maintaining separation between aircraft, which operate on Instrument Flight Rules (IFR) within this geographical area. The Center works closely with approach control facilities at Denver, Aspen, Colorado Springs, Grand Junction, and Pueblo, Colorado; Ellsworth Military Approach Control at Rapid City, South Dakota; Cheyenne and Casper, Wyoming. Each approach control is responsible for maintaining separation between aircraft within its own delegated airspace. Except for aircraft in an approach control's airspace, every public transportation aircraft, general aviation aircraft, and military aircraft operating on an instrument flight plan over this area is controlled from this building.

The Center's area is divided into sectors. **Low altitude sectors** control from the ground to Flight Level 260 (26,000 feet); **high altitude sectors** control Flight Level 270 (27,000) feet and above. One to three controllers may work a sector, depending upon the traffic density. Controllers have direct communication with pilots, with surrounding sectors and Centers, plus the Towers and Flight Service Stations under their jurisdiction. Each control position is equipped with computer input and readout devices for aircraft flight plan data.

At the present time, the Center is controlling an average of more than 5121 flights per day. Instrument traffic in this area is increasing at slightly more than four percent annually. Percentage by category is as follows:

- Air Carrier 48 percent

- General Aviation 12 percent
- Military 14 percent
- Air Taxi 26 percent

In the last 12 months, there were more than 1,996,265 aircraft operations handled by the controllers.

The Airway Facilities Sector has maintenance/technical responsibilities for all equipment used in accomplishing the task of air traffic control. In addition, the Airway Facilities Sector is responsible for all buildings and grounds on the compound.

Some of the major areas of responsibility include:

- The Power Conditioning System (PCS) for uninterrupted power source which consists of battery packs and three 550 horsepower diesel-engine-driven generators.

- A small computer called the Central Control and Monitoring System (CCMS) which continuously monitors and controls critical temperatures and pressures throughout the building's environment.

- The Computer Display Channel (CDC), a Raytheon-built computer which receives digitized information from the IBM Host Computer and distributes it to the proper area of coverage. This data contains visual aircraft blocks with information as to aircraft speed, altitude and direction, and is displayed on the Plan View Display (PVD) which the controller observes in order to direct the aircraft being controlled.

- The IBM Host Computer which is the "main drive" for processing all radar information and flight plan data used by the air traffic controllers. The Host Computer operates with a redundant system at all times. Each system makes "health checks" every half second to ensure correct data processing.

- The radar system which consists of twelve Long Range Radar Systems. In

A Fond Farewell

Well, folks, with this column I am saying goodbye, God Speed, and thanks to each and every one of you who have read, contributed to, and supported *Plane Talk* for the past 18 years. I'm going to miss everyone, but it's time to move on. I'll always be an aero comms monitor and will continue to keep my scanners and HF rx on 24/7. And who knows, maybe I'll sit down at the computer and contribute a feature once in a while!

73 and out.
Jean

addition, radar information is brought into the Center via Remote Communication Links from five other sites in Wyoming, South Dakota, Kansas, and Nebraska.

- Providing radio coverage, which is vital to air safety. Denver Center's coverage is close to 280,000 square miles. Remote air/ground stations (see frequencies above) are strategically located across the Air Traffic Control Center's Control area. Utilizing a Backup Emergency Communications System (BUEC) in case of primary system failure gives an added measure of air safety.

- The DARC (Direct Access Radar Channel) system, a Raytheon computer, provides an additional measure of safety. If the primary computer system were to have a failure, the DARC system would be able to continue the entire operation with only minor differences in presentation.

- The TELCO communication system which supports over 90 percent of all ARTCC communication. The network is controlled by a 300 Switching System, custom designed by Bell Labs exclusively for the FAA, and so named because it will facilitate 300 controller positions. The system allows a controller access to any of more than 100 locations at the press of a button and the capability to talk to any other controller without losing communications with his/her aircraft. The Bell System also provides digital data and in-house communications for the FAA.

◆ Radar Data Processing

Radar data processing provides an automatic display of aircraft identification, altitude, speed, velocity vector (which indicates track direction of the aircraft), and special conditions having to do with the aircraft status; i.e., emergency or radio failure.

Also displayed on the radar scopes are NEXRAD weather returns, high terrain, and a feature called Conflict Alert. Conflict Alert consists of the detection of impending infractions of safe separation limits between aircraft and will alert the controller to a potential violation.

Another safety feature is the En Route Minimum Safe Altitude Warning (EMSAV). It is incorporated into the Center's computer system and alerts the controller to the potential intrusion of an aircraft into airspace that has terrain at or near its altitude.

All incoming data from the radar antennas to the computer system are recorded on magnetic tapes and can be saved indefinitely for future analysis. Having this recall feature has also greatly assisted in the search for aircraft that have become lost or overdue. Occasionally, controllers are called upon by the Air Force Rescue Coordination Center in Illinois to assist in its search. By "replaying" these tapes, the computer will print on a high speed printer a graphic plot of an aircraft's flight path as flown through the Center's area. This program has saved thousands of man-hours and dollars, plus many lives, as SAR forces are able to concentrate their efforts in the vicinity of the last known radar position.

Nearby Radio Navigation Aids (For Denver International):				
VOR radial/distance	VOR name	Freq	Var	
DENr33/2.8	Denver VOR/DME	117.900	11E	
DVVR22/2.9	Mile High VORTAC	114.700	11E	
FQF4337/10.3	Falcon VORTAC	116.300	11E	
BJCr088/22.0	Jeffco VOR/DME	115.400	11E	
BVYr269/34.5	Byers VOR/DME	113.500	10E	
GLLR175/39.1	Gill VORTAC	114.200	13E	
NDB name	Hdg./Dis	Freq	Var	ID
GREY	162/36.2	348	11E	GZW --- .--- .---

Thanks to the Denver ARTCC and all of the other 21 Centers in the country for a job well done!

◆ Denver Air Route Traffic Control Center

Denver Center Frequencies (KZDV) Remote Transmitter Sites

Ainsworth - 127.950, 338.200, 397.850; Alamosa - 128.375, 354.150, 377.050, 379.950; Aspen - 119.850, 125.350, 132.850, 134.500, 306.900, 327.800, 354.050, 363.150; Brush - 133.950, 317.550; Casper - 133.675, 135.600, 322.500, 385.600; Cherokee - 132.100, 254.350; Cheyenne - 125.900, 132.100, 133.175, 134.575, 284.700, 307.100, 319.800, 350.300; Colby - 127.650, 132.175, 288.050, 360.650; Cortez - 118.575, 134.700, 348.700, 363.050; Crawford - 127.950, 135.025, 239.050, 338.200; Denver - 119.850, 125.950, 126.500, 126.875, 128.650, 132.850, 133.400, 225.400, 282.200, 306.900, 353.650, 363.150, 371.850, 387.150; Durango - 118.575, 348.700; Eastonville - 134.975, 263.000; Farmington - 125.675, 128.125, 128.400, 132.650, 118.575, 134.850, 135.700, 290.400, 291.700, 307.800, 307.900, 319.000, 348.700, 352.000, 380.150, 386.800; Goodland - 132.500, 379.150; Grand Island West - 132.700, 397.850; Grand Junction - 134.500, 327.800; Grand Mesa - 125.350, 125.675, 126.725, 134.275, 134.500, 135.125, 275.300, 323.250, 327.800, 354.050, 380.150, 316.125; Gunnison - 125.350, 133.525, 319.000, 354.050; Hanksville - 125.550, 133.600, 271.200, 343.950; Hayden - 128.325, 134.500, 327.800, 397.875; Hayes Center - 127.025, 288.350; Hill City - 132.500, 379.150; Kremmling - 128.650, 132.850, 282.200, 306.900; La Junta - 132.225, 128.375, 133.400, 134.125, 346.250, 354.150; 379.950, 387.150; Laramie - 125.900, 284.700; Lusk - 135.600, 385.600; Medicine Bow - 126.500, 132.100, 133.175, 285.500, 254.350, 350.300; Montrose - 125.350, 354.050; North Platte - 132.700, 397.850; Ogallala - 126.325, 132.700, 381.550, 397.850, 240.300, 269.600; O'Neill - 128.000, 132.700, 135.025, 239.050, 385.500, 397.850; Pueblo - 128.375, 132.225, 135.450, 354.150, 377.050, 379.950, Rapid City - 127.950, 338.200; Rock Springs - 125.750, 128.500, 132.400, 327.800, 346.400, 380.200; Sterling - 135.925, 225.400; Sundance - 133.675, 135.600, 322.500, 385.600; Tuba City - 118.225, 127.550, 132.875, 296.700, 343.950, 353.950, 386.800; Walton Peak - 126.500, 371.850.

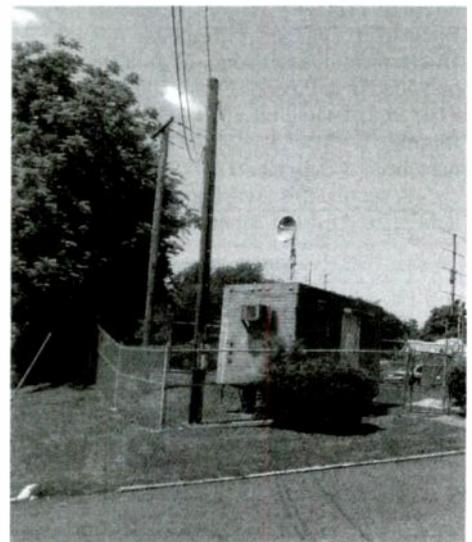
◆ Denver International Airport

ARTCC: Denver Center
 FSS: Denver Flight Service Station
 ATIS: 125.600 (ARR); 134.025 (DEP)
 Denver Approach:

119.300 (North)
 120.350 (South)
 307.300 (North)
 381.500 (South)
 Clearance Delivery: 118.750
 Class B:
 134.850 (North)
 251.125 (North)
 Class B Departures:
 126.100 (West)
 128.250 (East)
 128.450 (South)
 251.075 (South)
 360.750 (West)
 371.950 (East)
 Denver Departure:
 127.050 (North)
 363.250 (North)
 Final Control: 120.800
 Emergency: 121.500/243.0
 Not available at ATCT
 Ground Control:
 21.850 (RYS 08/26)
 17L/35R & 17R & 35L
 127.500 (RYS 07/25 & 16L/34R)
 377.100 (RWYS 08/26)
 17L/35R & 17R/35L
 380.300 (RYS 07/25 & 16/34)
 Denver Tower:
 124.300 (RYS 08/26 & 17L/35R)
 133.300 (RY 16/R & 34L)
 135.300 (RYS 07/25 & 16L/35R)
 239.275 (RYS 08/26 & 17L/35R)
 322.450 (RY 17R/35L)
 351.950 (RYS 07/25 & 16/34)

◆ Outer Marker Beacon

Barry Rowan of Pennsylvania sent a photo of outer marker 204-MD for Harrisburg International Airport, for those who may have wondered what one looks like: Type Outer Marker Beacon and Compass Locator; Name ENOLA; Frequency 204 kHz; Identifier MD (- - .) Location 40-14-622N/076-54-02.005W 6.3 N.M. (38100 feet) from the approach end of Runway 13.



Broadcasters that Aren't

DXers are occasionally confused by stations they can't find on the FCC's website or in the NRC *AM Radio Log*. Don't all stations in the 525-1705 kHz and 87.9-107.9 MHz broadcast bands need a broadcasting license from the FCC? Well – no...

Of course the obvious exceptions are foreign stations. I'm sure many DXers have heard some of the (rapidly vanishing!) Canadian stations. Many of you have heard Mexico, Cuba, and/or other Latin American countries. Canadian stations are in the NRC *Log*, but other countries aren't. You will find foreign stations on the FCC site, but these records are *very* sketchy and there are many errors.

Note that there are a handful of English-language stations in Mexico broadcasting to audiences across the border in the U.S.. Most are in Tijuana (covering San Diego) or Juarez (covering El Paso).

Another category of station operating in the broadcast band that doesn't hold a broadcast license is the "Travelers' Information Station," or "TIS." These are licensed by the FCC's "Wireless Telecommunications Bureau," the same bureau that handles hams and police radio, among many other services. These are low-powered stations in the AM band, originally intended to provide road condition and traffic information to motorists. They have since branched out into providing information about local attractions and now, emergency information to people at home.

Pat Griffith near Denver sent information about a network of TIS stations around the Dow Chemical plant in Freeport, Texas. There are six transmitters, synchronized by GPS, operating on 1610 kHz. WPXH-924 is operated by the Brazosport Emergency Response Agency. The article mentions networks of five transmitters on 940 kHz in Pinellas County, Florida (WPTI-814) and of three on 1610 kHz in Naperville, Illinois (WFPF-929). The Naperville stations have been widely heard by DXers.

A set of TIS stations operates in the Cleveland area. An item forwarded by Jerry None,

"thepolishdude," reviews a station on 1620 kHz at Squire's Castle Park in Willoughby Hills, Ohio. The station provides a five-minute audio tour of the park. More stations operate at five other sites.

You can search for TIS stations on <http://www.fcc.gov/mb/audio/bickel/tis.html> (mention MT or SWD?)

It's a little-known fact that stations operated by the federal government (as opposed to state/local governments) don't require FCC licenses. (This is why the Voice of America doesn't have call letters – though a friend once insisted the VOA's callsign was "W"...) Almost all of the federal government's broadcasting activities are on shortwave, or are based outside U.S. soil.

Almost all, but not quite all. The Military Academies in West Point and Annapolis both operate FM broadcast stations for the benefit of their cadets. West Point's uses the call letters WKDT on 89.3 MHz; Annapolis is on 89.7 as WRNV. KAFA-104.5 used to operate from the Air Force Academy in Colorado Springs, but I can no longer find any record of this station. (I think it got bumped by a new commercial station in nearby Cañon City.) Two FM stations in Puerto Rico broadcast to English-speaking servicemembers on bases on that island. And at least five FMs broadcast for military personnel in isolated parts of Alaska.

One radio service exists that's not quite broadcasting, but not quite not broadcasting either. The FCC authorizes experimental stations for testing new technologies. Safety Cast of Jacksonville, Florida, proposed a rather unusual experimental operation. Their transmitters would broadcast a low-power signal on *every AM and FM frequency simultaneously*. The transmitters would be installed in emergency vehicles, railroad locomotives, and school buses. They'd transmit an alert tone and a message warning motorists that danger is nearby. A distributor of public-safety equipment in South Florida has already agreed to buy 3,000 of Safety Cast's \$1,100 transmitters.

◆ Bits and Pieces

The exotic FM and TV DX continues. Would you believe U.S. FM stations have been heard in Europe? If not, you need to check out <http://www.skywaves.info/fmta.html>. During a trans-Atlantic TV opening on June 26th, Irish Dyer Paul Logan began hearing American accents on 88.5, followed by French-language speech. At first he presumed the American station was one operated by the U.S. military in Germany – until the announcer on the French station said "Radio Canada." Music then faded up, followed, at 1900 UTC, by a full identification announcement for WHCF, Bangor, Maine! There's a link to his recording of the WHCF ID on the [skywaves.info](http://www.skywaves.info) website mentioned above.

Over the next two hours, Paul identified three Canadian stations (two CBC outlets in Newfoundland and CKLE Bathurst, New Brunswick) and another U.S. station (WFRY in Watertown, New York). During the opening, Paul called David Hamilton in Scotland, who also heard some of the American DX. David heard weak French-language signals at the bottom of the dial. His big logging was on 97.1, where the CBC Newfoundland Fisheries Broadcast was heard over CBTB-FM in Baie Verte.

This reception comes close to breaking the all-time FM distance record. Congratulations to these DXers! (Now, when are we going to catch up on our side of the big pond?)

Last month, I wrote that WHITE-1690 has applied to move from Johnson City in downstate Illinois to the Chicago suburb of Berwyn. This application has now been granted. (Over the objections of several Chicago stations.) WHITE will share a tower with WGCI-1390 on Chicago's west side.

Denver has been the last major city to get digital TV. Attempts to build a community tower at the existing site of many of the city's analog stations have been stymied by local opposition. The new tower would consolidate several stations' operations and would result in fewer towers on the mountain. However, it would also (until analog is shut down) result in more signals being radiated from the site. Nearby residents fear RF exposure and tried to prevent the installation of digital transmitters. In late July the Jefferson County Commissioners finally approved the stations' zoning request. KCNC-4, KMGH-7, KUSA-9, and KTVD-20 will share the new tower.

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



Frequency/State Results [ULS DATABASE]

Licensee Name	Callsign / File Num	Status	State	City	County	Service	Station Class	ERP
Southeast Wisconsin Professional Baseball Park District	WPTB72	Active	WI	Milwaukee	MILWAUKEE	PW	Base	10
City of Kenosha	WPU937	Active	WI	Kenosha	KENOSHA	PW	Base	10

2 Row(s) were Retrieved

FCC search results for TIS stations on 1180 kHz in Wisconsin

Finding the Humor in Pirates

Old-timers will remember the days when commercial radio was a hotbed of comedy programming. When television emerged several decades ago, the production of comedy shows migrated to TV, leaving radio with other formats. This is true, of course, only on the licensed AM, FM, and shortwave bands. On the pirate radio bands, comedy formats are still a common staple. Some stations, like **Radio Comedy Club International**, build their format right into the station ID. But, other pirates are slightly more subtle about this, such as the station that we picture here this month.

Most shortwave listeners have heard a signal from India's international broadcaster, **All India Radio**. A currently active comedy pirate uses a pun on this name for its own ID: **Partial India Radio**. Most of the jokes on this comedy station revolve around the shortwave listening hobby. One of the many QSLs issued by the station is a clever photo collage of three DXers who have been instrumental in organizing and operating the annual Winter Shortwave Listeners Festival in Kulpville, PA. Bob Brown and Harold Cones were among the original gang who started the annual Winterfest. Rich D'Angelo, the Executive Director of the North American Shortwave Association, has played a lead role in NASWA's sponsorship of the Fest in recent years.

By the way it's not too early to be thinking about next year's Fest, which will be coming up as usual in March. March 12-13, 2004 is the date of this year's Fest, held at the Best Western Inn at Towamencin in the northern Philadelphia suburbs. The Fest web site at <http://swlfest.com/> contains all the details you need, or you can send a self-addressed stamped envelope through the snail mail for a copy of the same details. The address continues to be PO Box 4153, Clifton Park, NY 12065 in the USA. Many *MT* staff are always at this event, along with hundreds of other radio hobbyists from around the world. Pirate radio is among the topics that are discussed every year at the Fest, and virtually everyone who attends this event will have a good time.

◆ Pirate Frequencies Still Variable

Last month we reported that North American pirate radio operators are playing a game of musical chairs around the "Standard Pirate Fre-

quency" of 6955 kHz. Throughout the summer, several stations continued to use the standard frequency, but a larger number of station moved down somewhat to frequencies like 6950 kHz, 6925 kHz, and related channels. So, if you want to hear pirate radio broadcasts, it is still necessary to tune around this frequency range just below the 40 meter amateur radio band.

◆ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month, despite thunderstorms and the big summer power failure. All pirates operate on a sporadic schedule, but shortwave pirate broadcasting increases noticeably on weekends and during major holiday periods. As we note again this month, you have to tune your dial up and down through the pirate radio band to find the stations.

Big Thunder Radio- Papa Doc-Sapphire has been signing the QSLs on this rock music station. (Uses bighunderradio@hotmail.com e-mail)

Captain Morgan- This one adds to the list of pirate captains who broadcast rock music, sometimes with Twilight Zone audio mixed in. (None, asks for reports on the Free Radio Network)

Grasscutter Radio- They have been announcing that their rock music is transmitted with 113 watts of power. (None)

Iron Man Radio- Here's another rock music operation on the pirate bands. (Belfast)

KDAY- This new operation has been programming sketches about pirate radio. (Uses KDAY6955@Yahoo.com e-mail)

KIPM- Alan Maxwell's complex psychological dramas from the Illuminati are still the most elaborate shows of this genre on the radio today, whether licensed or unlicensed. (Elkhorn)

KROW- Rock, news, and poetry are the eclectic format on this relatively new one. (Elkhorn)

Purple Nucleus of Creation- They are back with space music and elaborate psychedelic fare. (Elkhorn)

Radio Cochiguaz- Although Cachito is in South America and not North America, his Andean pirate radio shows are heard throughout the hemisphere on 11430 kHz and other frequencies, sometimes relaying other pirates. (Santiago)

Radio Pigmeat International- Here's another rock music pirate, albeit with an unusual station name. (Belfast)

Shadow Radio- Sometimes this one airs old time radio dramas from "The Shadow" program, but it has been known to slide into other formats without any advance notice. It sometimes switches IDs to **WSDW** call letters. (Uses shadow6950@hotmail.com e-mail)

Sunshine Radio- Our readers continue to re-

port various identifications for this rock music pirate. But, the conventional wisdom in pirate circles translates their two syllable station name as "Sunshine." Thus far they have not been communicating with listeners to resolve the confusion. (None)

Sycko Radio- With their name pronounced "psycho," this one normally features rock music and professionally produced station jingles. During the summer they occasionally relayed old Radio Bob shows from **RBCN**. (None)

Undercover Radio- Dr. Benway says that he broadcasts from the middle of nowhere, but listeners over all of North America have reported hearing his DX parody transmissions. (Merlin)

Voice of the Tiki- Their Polynesian format is associated with the old Tiki restaurant craze. (Elkhorn)

VUDU- Sometimes known as Voodoo Radio, they have been known to program jazz music in addition to standard rock fare. (None, has been known to reply to postings on FRN)

WANP- This rocker appears to have taken its call letters from the old grocery store chain. (None)

WHYP- The James Brownyard memorial station remains one of the most active pirates on the air today. This very active pirate somehow makes a DX comedy format work while they pretend to be a reincarnation of James Brownyard's North East, PA, licensed radio station. (Providence, and also uses whyp6925@yahoo.com e-mail)

WMFQ- Most of the programming here is standard rock music fare, but their chanting announcers still mix profane identifications into all the shows. (Providence)

WMPR- "Micropower Radio" normally pounds out a techno rock music show, but once in a while they will switch to another format. (Still none, but occasionally QSLs loggings in *The ACE*)

World Cruise- Their varied world music format is normally produced for relay on licensed stations, but they have been heard with pirate band relays lately. (Berkely and/or Elkhorn)

◆ 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 69, Elkhorn, NE 68022; PO Box 293, Merlin, Ontario N0P 1W0; c/o AMPB, PMB22, 2018 Shaddik Avenue, Berkeley, CA 94704; and Box 159, Santiago 14, Chile.

Some pirates prefer e-mail, bulletin logs or

Continued on page 73

Partial India Radio

THANKS TO BROWN, CONES & D'ANGELO FOR 13 YEARS OF RIB PULLS



SATELLITE SERVICES

MT TRANSPONDER GUIDE www.monitoringtimes.com/mtssg.html

All Frequencies MHz

Robert Smathers

robertsmathers@monitoringtimes.com

SES Americom Americom-6

Ku-Band - 72 degrees West longitude

1(V)	11720	Data Transmissions
2(H)	11740	Data Transmissions
3(V)	11760	Data Transmissions
4(H)	11780	Data Transmissions / KTEL-TV Telemundo Carlsbad, NM (digital)
5(V)	11800	Data Transmissions
6(H)	11820	Occasional video
7(V)	11840	Data Transmissions
8(H)	11860	Occasional video
9(V)	11880	Occasional video
10(H)	11900	Occasional video
11(V)	11920	Occasional video
12(H)	11940	Occasional video
13(V)	11960	Data Transmissions
14(H)	11980	Occasional video
15(V)	12000	Data Transmissions
16(H)	12020	Data Transmissions
17(V)	12040	Occasional video
18(H)	12060	Occasional video
19(V)	12080	Occasional video
20(H)	12100	Data Transmissions
21(V)	12120	Occasional video
22(H)	12140	Occasional video
23(V)	12160	Data Transmissions
24(H)	12180	Data Transmissions
25(V)	11535	South-American Beamed Transponder
26(H)	11535	South-American Beamed Transponder
27(V)	11655	South-American Beamed Transponder
28(H)	11655	South-American Beamed Transponder

Panamsat Galaxy 12

C-Band - 74 degrees West longitude

1(H)	3720	(none)
2(V)	3740	(none)
3(H)	3760	(none)
4(V)	3780	(none)
5(H)	3800	(none)
6(V)	3820	(none)
7(H)	3840	(none)
8(V)	3860	(none)
9(H)	3880	(none)
10(V)	3900	(none)
11(H)	3920	(none)
12(V)	3940	(none)
13(H)	3960	(none)
14(V)	3980	(none)
15(H)	4000	(none)
16(V)	4020	(none)
17(H)	4040	(none)
18(V)	4060	(none)
19(H)	4080	(none)
20(V)	4100	(none)
21(H)	4120	(none)
22(V)	4140	(none)
23(H)	4160	(none)
24(H)	4180	(none)

Panamsat SBS-6

Ku-Band - 74 degrees West longitude

T01(H)	11725.0	The Newborn Channel (digital)
T02(M)	11749.5	Occasional video
T03(H)	11774.0	Data Transmissions
T04(V)	11798.5	Occasional video
T05(H)	11823.0	Occasional video
T06(V)	11847.5	The Access Center occasional video
T07(H)	11872.0	Data Transmissions
T08(V)	11896.5	The Access Center occasional video
T09(H)	11921.0	The Access Center occasional video
T10(V)	11945.5	The Access Center occasional video
T11(H)	11970.0	Diversified Communications Inc. occasional video
T12(V)	11994.5	MSNBC/CNBC newsfeeds (digital)
T13(H)	12019.0	Data Transmissions
T14(V)	12043.5	Occasional video
T15(H)	12068.0	Occasional video
T16(V)	12092.5	Occasional video
T17(H)	12117.0	Occasional video

T18(V)	12141.5	Occasional video
T19(H)	12166.0	Occasional video

Hughes Global Systems HGS-5

Ku-Band - 77 degrees West longitude

T01(H)	11725	(none)
T02(H)	11774	(none)
T03(H)	11823	(none)
T04(H)	11872	(none)
T05(H)	11921	(none)
T06(H)	11970	(none)
T07(H)	12019	(none)
T08(H)	12068	(none)
T09(H)	12117	(none)
T10(H)	12166	(none)

SES Americom Americom-5

Ku-Band - 79 degrees West longitude

1(V)	11730.0	Data Transmissions / Utah State University distance learning, Utah Public Radio (digital)
2(H)	11743.0	Data Transmissions
3(V)	11791.0	Data Transmissions
4(H)	11804.0	Oklahoma Educational TV (digital) / Empire Sports Network (digital)
5(V)	11852.0	CBS newsfeeds (digital)
6(H)	11865.0	Occasional video
7(V)	11913.0	Data Transmissions
8(H)	11926.0	Occasional video
9(V)	11974.0	Occasional video
10(H)	11987.0	Occasional video
11(V)	12035.0	CNN newsfeeds (digital)
12(H)	12048.0	Occasional video
13(V)	12096.0	Occasional video
14(H)	12109.0	Occasional video
15(V)	12157.0	Data Transmissions
16(H)	12170.0	New York Network (digital) / Occasional video

SES Americom Americom-9

C-Band - 85 degrees West longitude

1(V)	3720	(none)
2(H)	3740	Occasional video
3(V)	3760	Occasional video / RAI (Italy) International (occasional)
4(H)	3780	Occasional video
5(V)	3800	NASA Contract Channel (analog and digital)
6(H)	3820	(none)
7(V)	3840	Occasional video
8(H)	3860	(none)
9(V)	3880	NASA Television
10(H)	3900	Data Transmissions
11(V)	3920	Occasional video
12(H)	3940	Data Transmissions
13(V)	3960	Data Transmissions
14(H)	3980	Data Transmissions
15(V)	4000	Data Transmissions
16(H)	4020	Data Transmissions
17(V)	4040	Data Transmissions
18(H)	4060	Occasional video
19(V)	4080	Data Transmissions
20(H)	4100	(none)
21(V)	4120	(none)
22(H)	4140	(none)
23(V)	4160	(none)
24(H)	4180	Data Transmissions

SES Americom Americom-9

Ku-Band - 85 degrees West longitude

1(M)	11720	Occasional video
2(H)	11740	NBC newsfeeds (digital)
3(V)	11760	Occasional video
4(H)	11780	NBC newsfeeds (digital)
5(V)	11800	Occasional video
6(H)	11820	Occasional video
7(V)	11840	Occasional video

8(H)	11860	NBC newsfeeds (analog and digital)
9(V)	11880	Occasional video
10(H)	11900	Occasional video
11(V)	11920	Occasional video
12(H)	11940	Occasional video
13(V)	11960	Occasional video
14(H)	11980	Occasional video
15(V)	12000	Occasional video
16(H)	12020	Occasional video
17(V)	12040	Occasional video
18(H)	12060	Occasional video
19(V)	12080	SES Americom AMC-9 Identification Slate
20(H)	12100	Occasional video
21(V)	12120	Occasional video
22(H)	12140	Occasional video
23(V)	12160	Occasional video
24(H)	12180	Occasional video

SES Americom Americom-3

C-band - 87 degrees West longitude

1(H)	3720	Data Transmissions
2(V)	3740	Associated Press Television (APT) (digital) / Data Transmissions
3(H)	3760	Data Transmissions
4(V)	3780	(none)
5(H)	3800	Occasional video
6(V)	3820	Fox Sports North - Minnesota, Fox Sports North - Wisconsin (digital) / Comcast Sports Net Mid-Atlantic (digital)
7(H)	3840	Data Transmissions
8(V)	3860	(none)
9(H)	3880	WPIX-TV, New York WB affiliate (VC2+) 6.80 Talk America Radio Network
10(V)	3900	(none)
11(H)	3920	(none)
12(V)	3940	Occasional video
13(H)	3960	Occasional video
14(V)	3980	Turner Classic Movies (VC2+) 6.20 Descriptive Audio Channel
15(H)	4000	KTLA-TV, Los Angeles WB affiliate (VC2+) 6.80 Spanish-language SAP
16(V)	4020	CNN fn (VC2+)
17(H)	4040	Data Transmissions / Christian Radio (digital)
18(V)	4060	Ambassador Inspirational Radio 1
19(H)	4080	Ambassador Inspirational Radio 2
20(V)	4100	Calvary Satellite Network 1
21(H)	4120	Calvary Satellite Network 2
22(V)	4140	Sounds of the Spirit Radio Network
23(H)	4160	Focus on the Family 1
24(V)	4180	Focus on the Family 2
25(H)	4200	Focus on the Family 3
26(V)	4220	Focus on the Family Radio
27(H)	4240	Information Radio Network
28(V)	4260	Moody Broadcasting 1
29(H)	4280	Moody Broadcasting 2
30(V)	4300	Research Education Foundation Radio
31(H)	4320	Salem Radio Network 2
32(V)	4340	Salem Radio Network 3
33(H)	4360	Salem Radio Network 4
34(V)	4380	Salem Radio Network 5
35(H)	4400	Today's Christian Music
36(V)	4420	The Word in Praise
37(H)	4440	Solid Gospel
38(V)	4460	Skylight Radio 1
39(H)	4480	Skylight Radio 2
40(V)	4500	Songtime
41(H)	4520	Salem News Network
42(V)	4540	USA Radio Network 1
43(H)	4560	USA Radio Network 2
44(V)	4580	USA Radio Network 3
45(H)	4600	USA Radio Network 4
46(V)	4620	VCY America 1
47(H)	4640	VCY America 2
48(V)	4660	Salem Radio Network Program 1
49(H)	4680	Family Life Radio "LifeOne"
50(V)	4700	Horse Racing (digital)
51(H)	4720	(none)
52(V)	4740	University Network - Dr. Gene Scott
53(H)	4760	Occasional video
54(V)	4780	Data Transmissions
55(H)	4800	Data Transmissions
56(V)	4820	Data Transmissions
57(H)	4840	Horse Racing (digital)

LF Noise (Part II: Remedies)

Last month we covered the subject of Radio Frequency Interference (RFI), with an aim toward identifying common types of noise and locating their sources. We mentioned that many noise generators can be found right on your own property. This month we'll discuss possible remedies, and also address dealing with "off-premises" noise, such as from a neighbor's equipment.

One of the first things that should be checked when a device is generating static is for a proper ground connection. I've seen many cases where a loose or missing ground was the cause for radiated LF noise. Fluorescent lights and motors seem to be especially responsive to proper grounding. Some years ago, I was puzzled by static that occurred only when the weather turned cool. I finally zeroed in on a furnace motor as the source of trouble. For kicks, I tried running a wire from a screw on the motor case to a ground point (a cold water pipe). To my surprise, the noise stopped completely.

When dealing with computers or other digital equipment, a check should be made to ensure that all shielding covers are in place. Computers often have metallic shields lining the insides of their cases. If the equipment was serviced recently and the metal tabs for the shielding were not re-installed properly, RF energy could escape, causing broadband noise to appear on your receiver.

Another possible remedy for broadband noise is to install ferrite beads on suspect power supply leads and interface cables (i.e., monitor leads, printer cables, etc.). Beads are designed to fit over cables and break up RF paths, minimizing radiation beyond the wire. Some beads are split into two parts, allowing them to be installed without removing connectors or making awkward splices. With these types, you simply open the bead, wrap a few turns of wire around one half, snap the other half on, and you're done. Ferrite beads are available from many sources, including Amidon Associates (<http://www.amidoncorp.com>) and MFJ (<http://www.mfjenterprises.com>). MFJ, in particular, offers an inexpensive "RF Choke Kit" that contains four of the split-type beads discussed here.

To be honest, I've had only limited success with ferrite beads, but I know other operators who use them extensively and claim a high success rate. As inexpensive as they are, they are

certainly worth trying when tracking a pesky noise problem. For best results, place them close to the device you suspect is generating the RFI.

◆ Widening Your Search

Assuming you've "cleaned house" at your own property and are still experiencing noise, it may be time to expand your hunt, using an AM radio as described last month. If your search leads you to a neighbor's property, a good dose of diplomacy will be in order. Try explaining the situation in non-confrontational terms, and offer your assistance in locating the troublesome device. You might encourage the neighbor to use the AM-radio technique to locate the source of noise, or assist them if appropriate.

Be sure to inform your neighbor that manufacturers typically offer technical assistance in resolving interference problems with their products. The contact data can be found in the owner's manual, or you could help by finding the data in a web search. Manufacturers are usu-

ally making them aware of the problem and letting them work with the manufacturer to find a solution. Should this fail, and severe RFI persists, you would be within your rights to contact the FCC for further assistance.

If you'd like to work on your own equipment to solve interference problems, I recommend getting a copy of the *ARRL RFI Book*, (ARRL #6834) It describes more advanced techniques for curing noise from household devices. The book also covers "communications" interference issues such as intermodulation, harmonics, and front-end overload, which we have not attempted to cover here. You will find the book listed on the ARRL's website at <http://www.arrl.org>.

◆ End Notes

An Alaska amateur, Laurence Howell, KL1X (ex-GM4DMA) has commissioned a new beacon on 136 kHz, under an FCC Part 5 Experimental license. The beacon began 24-hour operation on August 9th, using the call sign WD2XDW, according to a news item on the ARRL website. The station operates in QRSS mode (very slow speed CW) at a rate of one dit every six seconds. Maximum transmitter power is 2 Watts ERP. A brief explanation of QRSS can be found in the July issue of *Below 500 kHz*.

Speaking of QRSS, Dale Parfitt, W4OP (NC) accepted my challenge in July's column to submit an image of a QRSS transmission, shown in Figure 1. The image shows an Argo screen capture of "Hifer" stations MP and GA, who operate under the license-free provisions at 13.555 MHz. Dale reports: "These guys run only a couple of milliwatts and are 579 copy at times." Good show, Dale. A complimentary copy of the 2003 *BeaconFinder* is on its way to you. Dale also sent a nice list of beacons that will be presented in next month's column.

Steve Jeske, N0CRS (MN) passed along a useful website for those who specialize in the low end of the radio spectrum. He recommends visiting <http://www.vlf.it> for information on VLF/ULF natural radio, construction projects, antennas and more. Although some of the material is presented in Italian, many items are also available in English.

That's it for this month. See you in November.

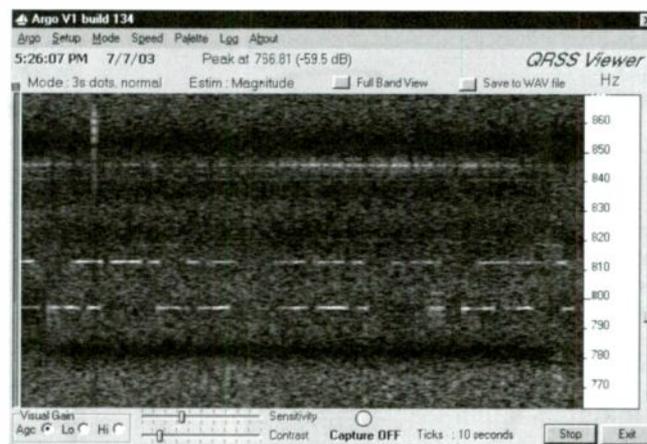


Figure 1. Dale Parfitt (NC) sent this image of a QRSS transmission on 13.555 MHz:

ally interested in resolving complaints quickly, since inaction could bring an FCC inquiry or fine. In a widely publicized case earlier this year, an RV owner was contacted by the FCC and directed to stop using a TV antenna preamp that was generating widespread interference on the ham bands. The manufacturer of the device acted quickly to repair or replace units that were defective.

It is generally unwise to attempt any repair or modification to someone else's equipment. To do so may place you at automatic blame for any future trouble with the gear. Unless you are on very good terms with a neighbor, I suggest

up in the advertised "speeds" of CD recorders you can get a unit for your PC for under \$35. So with a bit of careful shopping and horse trading I now had a complete document management system installed on my desktop PC for around \$100. Now let's look at how you go about pulling a document together that can really go beyond any simple manual you have in your collection.

◆ Making the Electronic Manual

First, as always, *read the manual!* I always tell folks to do this before operating a new piece of equipment. (I even do it myself from time to time.) But this time I want you to read it for its... well... readability. How is the manual organized? Does it have a "Quick Start" guide? Is there a "user tips" page? Start to look at the manual in terms of how you plan to use the radio. Maybe your idea of which features are important deviates from the structure of the printed manual. By taking the time to look the manual over in this way, when you actually sit down to scan the pages, you may change their order if desired.

Next you will scan the pages of the manual that you have chosen (in the order you have chosen as well). Most scanners operating under the PC and Mac operating systems, when properly configured, will work directly from within the Adobe Acrobat software. This results in, essentially, scanning the document right into the desired .pdf format.

Now the fun really begins. The Adobe Acrobat program has dozens of features that allow you to massage the document for your own use. The features I use in all my manuals include the "Highlight" tool. This allows me to mark up the online version of any manual in the same way as a hard copy manual. This feature does not always work with "scanned" documents but in its place you can use the "Pencil" Tool to perform essentially the same function.

The "Free Text" Tool will allow you to add comments into any "white space" on the page you choose. The "Link" Tool allows you to jump from anyplace within a document to anyplace else within a document at the touch of a mouse. You can even use it to call other documents or even Internet sites.

The further uses of these few tools can be left to the imagination, but they only scratch the surface of how a radio manual can be turned into an active document under the .pdf file format. Larger multipage documents can be given active tables of contents to speed their use. Also, pages can be added, extracted, moved, even rotated. This last feature is very useful for those manuals that might have their schematic pages printed in *landscape* mode instead of the more standard *portrait* mode.

Once you have the document built the way you want it, you can then decide where you want to have it for use. You may be happy just maintaining the files on your desktop PC. Part of my goal in doing this was to get these files set up so I could take them on the road with me in an easy to carry system. Using the CD-ROM format I could fit all the manuals I needed on a

single CD with room to spare. If you are using a laptop that does not have a CD-ROM drive, remember, a standard floppy can carry 1.4 MB of data. It shouldn't be too hard to edit a good sized manual down until it fits on a floppy or two.

Another neat way to move stuff around between systems these days are *Jump Drives* (also known as *Key Drives*). These are essential memory sticks that you can hang on a key chain. They come in various sizes from around 64 MB up through 2 GB depending on the size of your wallet (the drives are all the same physical size). These devices transfer data by way of the computer system's USB ports. If your system supports this style of drive you can get a whole mess of manuals on even a modest Jump Drive.

For me, the project resulted in pulling four manuals off of the appropriate Internet sites and scanning in three more. I marked and adjusted them with the tools in Adobe Acrobat (including cross-linking two of the manuals where appropriate). Several of the manuals did not come with "Tip Sheets" so I wrote up my own quick and easy commands in my word processor and converted those to .pdf files as well. I recorded the CD, stuck it in my laptop and went off for a fun weekend of radio.

Once you get the process up and running and you start using your manuals in this electronic format, you'll wonder how people got along in those past Golden Ages without this technology. Of course, you might still want to keep the hard copies around in case the power goes out, but that is a conversation for another column. Have fun. I'll see you on the bottom end of 40 meters.

Outer Limits continued from page 69

internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings with a hope that pirates might QSL them remain *The ACE* (\$2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via niel@ican.net. The Free Radio Network web site, another outstanding source of content about pirate radio, is found at <http://www.frn.net> on the internet.

◆ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Bob Ballantine, Warren, OH; Kirk Baxter, North Canton, OH; Scott R Barbour Jr., Intervale, NH; Jerry Berg, Lexington, MA; Artie Bigley, Columbus, OH; Cachito, Santiago, Chile; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Brian Duddy, Nyack, NY; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; William Hassig, Mount Prospect, IL; Harald Kuhl, Germany; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Bill McClintock, Wellington, OH; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Robert Ross, London, Ontario; Martin Schoech, Merseburg, Germany; John Sedlacek, Omaha, NE; Jerry Strawman, Des Moines, IA; Ed Walsh, AL; Niel Wolfish, Toronto, Ontario; Mike Wolfson, Ashland, OH; and Joe Wood, Gray, TN.

UNCLE SKIP'S CONTEST CORNER

California QSO Party
Oct 4 1600UTC - Oct 5 2200 UTC

QCWA QSO Party
Oct 4 1800UTC - Oct 5 1800 UTC

YLRL Anniversary Party(CW)
Oct 8 1400UTC - Oct 10 0200 UTC

10-10 Day Sprint
Oct 10 0100UTC- 2400 UTC

Pennsylvania QSO Party
Oct 11 1600UTC - Oct 12 0500 UTC
and Oct 12 1300UTC- 2200 UTC

FISTS Fall Sprint
Oct 11 1700UTC- 2100 UTC

YLRL Anniversary Party (SSB)
Oct 15 1400UTC - Oct 17 0200 UTC

ARCI Fall QSO Party
Oct 18 1200UTC - Oct 19 2400 UTC

Illinois QSO Party
Oct 19 1800UTC - Oct 20 0200 UTC

CQ Worldwide DX Contest (SSB)
Oct 25 0000UTC- Oct 26 2400 UTC

10-10 Int. Fall Contest (CW)
Oct 25 0001UTC- Oct 26 2400 UTC

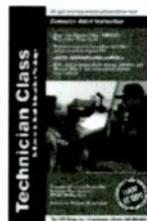
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Standing Wave Ratio

If you do much reading about antennas and their feed lines you have encountered the concept of "standing-wave ratio" (SWR). And most likely you have come across the idea that it is generally good to keep the SWR on your antenna feed line at a low value. Indeed many modern transmitters have circuitry to detect SWR level when transmitting, and to reduce the transmitter's power if an SWR greater than something like 2:1 is detected.

But, you may also read that, in some situations, SWRs as great as 10:1, or even more, can be tolerated without problems. And you may hear that for receive-only antennas at HF or lower-frequencies we needn't be concerned with the SWR value at all. These seemingly contradictory ideas can easily lead to confusion. So let's see if we can make some sense of the situation.

◆ Flat Lines

There's a good way to visualize what happens as RF energy travels on a transmission line. Begin by thinking of a brief pulse of RF energy as it enters the line from its source, such as a transmitter output, and travels along the line. The energy in the pulse will travel the length of the line to the load (antenna). The power in the pulse will be totally absorbed by the load only if the load impedance (opposition to current flow) has the same value as the line impedance. If the impedance of the line is 50 ohms then a load of 50-ohm impedance will accept all the RF energy coming to it from the line. In this case the line and load impedances are said to be "matched."

When a steady RF current flows on such a line then current or voltage measurements anywhere along the line will all yield the same value, and a graph of these values produces a flat line (fig. 1A). Thus the feed line is said to be "flat." Actually, due to the line's resistance, dielectric loss, and radiation loss, the current does decrease in value as it progresses along the line. But in good lines these losses are low, and we can ignore them for the present.

◆ Not So Flat Lines, and Standing Waves

When the load impedance is different from the line impedance then some portion of the pulse of energy arriving at the load will be reflected back into the line. The reflected portion will then travel back along the line toward the source. Now, while the pulse is on its way back down the line, let's start a second pulse of RF from the source toward the load. At some point the second, outgoing pulse and the reflected pulse will meet. At the instant that they pass one another they will momentarily combine in strength. Their combined strength can be more or less than that of either pulse, depending on their individual strength, polarity and phase. Measuring current or voltage at the point where they meet, and at the instant that they meet, would yield their combined value.

Now let's put so many pulses into the mismatched line that they make a continuous current with no spaces in between the pulses. This is essentially what we do when we feed a radio signal to the line. Forward-going pulses will now

be meeting reflected pulses all along the line. As these forward and returning pulses meet, they produce levels of voltage or current which remain stable at each point on the line. That is, although the values of combined voltage and current are different at different points along the line, at any one point on the line the value of combined forward and reflected pulses remains stable, and does not change with time.

Graphing the value of either voltage or current for these combined pulses at points along the length of the line yields a curve such as shown in fig. 1B. Because these combined values remain fixed along the mismatched transmission line the curve representing their values is said to be "standing," and is said to represent "standing waves" on the line.

The ratio of the maximum value to the minimum value of either voltage or current on an SWR curve is known as the "standing wave ratio," or simply "SWR." For example, a curve with a maximum value three times its minimum value gives an SWR of 3:1.

◆ What Level of SWR is Too High?

As stated above, a flat line has no variation in the current or voltage levels along the line, and all power sent from the source is absorbed by the load. Obviously there is no reflected voltage or current. This condition yields an SWR of 1:1. It is when the line is not flat, when SWR is significantly above 1:1 that problems may develop.

Mismatches yielding an SWR significantly above 2:1 can cause problems within the output circuit of solid-state transmitters. Tube-type transmitters can handle higher SWRs for short periods, but matching is still important for efficient power transfer to the feed line in either case. So a matching circuit, antenna tuner or transmatch is often used between a transmitter and feed line. A match here insures that all power is accepted from the transmitter, and none returns to the transmitter. Matching here insures that the transmitter output is matched to the antenna system as a whole.

However, within the antenna system, there will still be power reflected from the antenna back down the line if there is a mismatch between the line and the antenna. In that case, if the feed line is lossy, problems such as overheating or arcing over in the cable are sometimes a concern. But the repeated trips of RF energy from antenna back to antenna tuner, then back to antenna, and so on, cause little loss if very

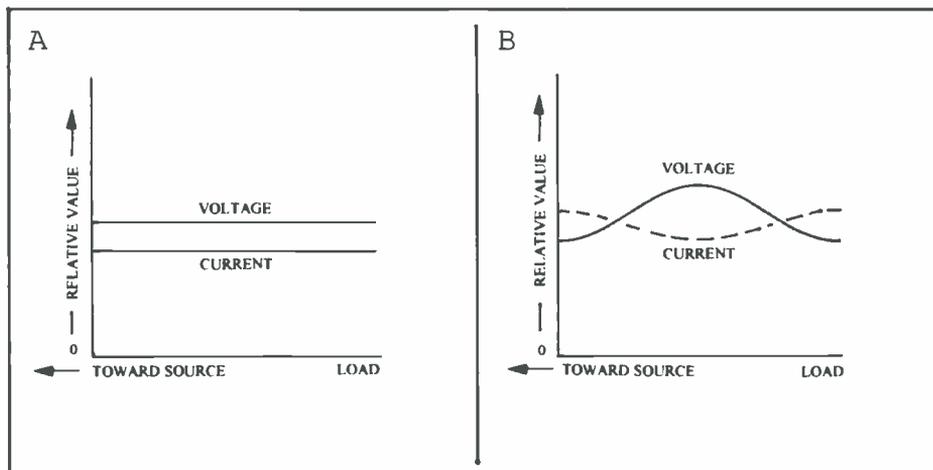


Fig. 1 Curves showing current and voltage levels along the length of a flat feed line (A), and along a mismatched feed line (B).

This Month's Interesting Antenna-Related Web site:

Check this for a discussion of simple antenna systems, diversity, smart antennas, and more:

http://www.iec.org/online/tutorials/smart_ant/topic02.html

little energy is lost each trip. SWRs of 10:1, and sometimes higher, measured at the antenna feed point cause relatively little loss of power at HF and lower frequencies if the line has low losses, and line length is not excessive.

But, losses increase as frequency increases. So, above HF, line loss and matching become increasingly important as frequency increases. At these higher frequencies, as explained below, every dB of signal loss can be important. So matching the line at both the transmitter or receiver, and at the antenna is the general rule at VHF and higher frequencies.

❖ **For Receive-Only Antennas**

Compared to receiver-generated noise, received-noise levels are typically high at frequencies below VHF. With received-noise being the predominant noise in the receiving system, the quality of reception is dictated by the ratio of received signal-strength to received-noise strength (S/N) rather than by absolute signal strength. Increasing signal strength by matching in the antenna system increases received-noise strength just as it does received-signal strength. Thus S/N is not improved, and reception quality is not improved.

At VHF and higher frequencies, received-noise is typically very low compared to receiver-

generated noise, and thus it improves reception to get maximum energy from the antenna onto the feed line, and on to the receiver. At these frequencies we usually want the antenna feed

point impedance and line impedance matched, and the line impedance and receiver-input circuit impedance matched.

RADIO RIDDLES

Last Month:

I said: "Because VHF and UHF signals don't usually reflect well from the ionosphere there is relatively little ionospheric skip communication on these bands. And they don't bend down over the horizon much, so they are known as "line of sight" bands. But DX communication far beyond the horizon is possible on these bands. How is it accomplished?"

Well, there are several ways to support communications beyond the horizon on these bands. Knife-edge propagation occurs when VHF or higher frequency signals graze the top of some "sharp" environmental feature (e.g. a peaked ridge in mountainous terrain) in their path. Grazing the "sharp" edge causes a downward bending in the path of the wave, and communications is possible beyond, or "over the horizon" (OTH).

In another kind of OTH communication the interface between warmer and cooler air masses in the troposphere occasionally create "ducts" which will guide VHF and higher-frequency signals far beyond the horizon. And

from something like 20 to 200 MHz, the E-layer of the ionosphere will occasionally reflect signals to earth (sporadic-E propagation) resulting in OTH communication.

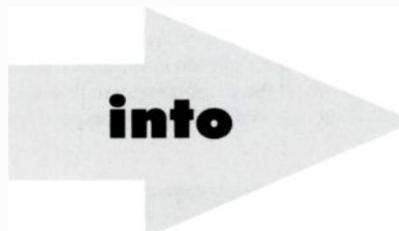
Another means of communicating beyond the horizon involves aiming highly-directional, very-high-gain VHF-UHF antennas at points in the troposphere from which the signals "scatter" in many directions. With very high transmitter power, and very sensitive receivers, a sufficient amount of the signal is scattered over the horizon to support reliable communications. And, of course, communication satellites provide the ultimate in OTH comms.

This Month:

OK, so a mismatched antenna on a feed line causes some portion of the RF energy arriving from the transmitter to reflect back down the line. And a matched antenna accepts all the energy from the line. What would happen if the end of the feed line were connected to nothing? Would the RF energy coming down the line just fly out the open end, and launch itself as a radio wave?

You'll find another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

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S-40A Mechanical Reassembly & Tube Testers

As I write this, the antique radio meet season is in full swing, and tomorrow is one of the major ones: the Antique Radio Club of Illinois swap meet at Elgin, IL. Usually I spend a few days there, but I also have to prepare for my big meet trip of the season: The Antique Wireless Association annual conference at Rochester, NY. Between meet attendance and the variety of outdoor chores that really have to be attended to in our short Chicago-area summer season, my repair bench time has been limited. Progress on the S-40 project has been essentially limited to reassembly of the front panel and checking and reinstallation of the tubes.

◆ Preliminary Steps

Prior to mounting the front panel, the main tuning dial and bandspread bezels, as well as the speaker and speaker grille, needed to be reinstalled on it. You may recall the steps that had already been taken to restore these parts. The speaker grille paint had been freshened up with a cleaner containing a mild abrasive; new dry-transfer numbers had been applied to the main tuning dial window to replace the band-identification numbers that had been accidentally wiped off during cleaning.

The bandspread dial bezel still needed attention, however. Its plastic window had somehow shrunk over the years. The dimensional change was so severe that one end had pulled away from its mounting tab and was visible as a raw edge. Here my S-40 parts set came to the rescue. In spite of the fact that it was actually older than the S-40A and had been stored for years on the open porch of someone's summer cottage, its bandspread window was ok. It was easy to remove and reinstall on the S-40A's bezel.

The bandspread and main tuning dials themselves also had to be installed before the panel was anchored in place. I slipped them onto their shafts but left the setscrews loose. Before tightening them, the dials would need to be positioned so that their maximum and minimum markings, as observed through the dial windows, would coincide with the maximum and minimum positions of their tuning capacitors.

◆ Those Doggone Decorative "Nuts"

If you've been regularly following this restoration, you'll recall that the front panel is held in place only by the mounting nuts for the toggle switches and phone jack. The "nuts" on the front

of the panel (except for the phone jack) are actually decorative threaded rings. Although there must be a special wrench for these, I've never seen one. Ordinarily, to remove and reinstall such switches, I use a flat wrench on the conventional nut that is always threaded onto the switch shaft behind the panel. On the S-40, though, those nuts are inaccessible to a wrench because they are blocked by a lip on the panel.

I may have mentioned this before, but I consider it pretty important! NEVER attempt to loosen one of these decorative ring "nuts" with a pair of pliers. You will almost certainly scar both the panel and the ring. I dismantled the switches in the first place by firmly grasping the back of the switch with one hand and the decorative ring, as best as I could, with the other. Then, while attempting to hold the ring stationary, I moved the switch body in an "unscrewing" direction. There wasn't much wiggle room available because these switches have positioning notches on their shafts that are locked into tabs protruding from the chassis mounting holes. However, there was enough so that I could eventually work the assemblies loose.

Now that it was time to remount the switches, I went through the process in reverse. That was even more of a finger buster than the removal process, but I got the switches reasonably tight. Not factory tight, but tight enough! You really can't get too compulsive about these things when the resources available to you are not what was available on the original assembly line.

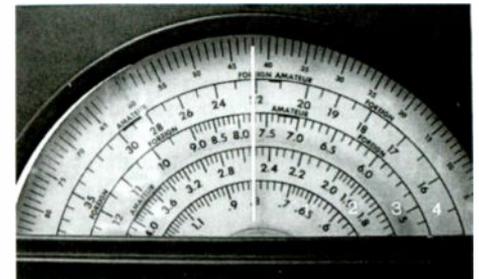


S-40A with front panel reassembled. I think it looks quite sharp now, even though it's far from mint. Unoccupied holes at right are for standby/receive switch and phone jack (see text).

You'll notice from my picture that there are two empty holes at the right of the front panel. The upper one is for the "Standby-Receive" switch. I haven't yet untangled the crude rewiring job on it done by a previous owner. The lower one is for the headphone jack, which would be in the way of my restoration work if installed now.

◆ Finishing Up the Panel

When it came time to correctly position the tuning and bandspread dials so that I could tighten their setscrews, I got a little surprise. The band-identification numbers weren't the only markings that had been accidentally rubbed off the main tuning dial during cleaning. The vertical frequency-indicating line had also been rubbed off, and without it there was no way to set or read the dial! The S-40 parts set's dial window wasn't much help; it was quite yellowed and a little warped.



Close-up of tuning dial showing replacement band identification numbers and frequency indicator line.

Luckily my sheet of dry transfer numbers happened to have a straight rule on it. I don't know if it was actually intended for transfer use or was just there to separate the characters from the trademark information at the bottom of the sheet. I cut out a section of appropriate length, taped it to the window, crossed my fingers, and burnished. Much to my relief, it transferred beautifully.

My main tuning window now has a white indicating line that is a bit thicker than the original fine red line. However, it does have a credible appearance and did make it possible to properly position and read the dial. The bandspread window presented no such problem. Its indicator line was still intact, and it was just the work of a few minutes to place the bandspread dial at the proper position and tighten its setscrew.

The knobs – like most knobs on restoration projects – were caked with finger oil and the grime of the ages...especially in their decorative flutes. In the past, I've gone after this dirt with detergent and a toothbrush, and sometimes found the process to be quite a bit of work. Preparing to do this, I dumped the knobs into a container of laundry detergent solution and went on to something else. It was quite a while before I looked at the knobs again and found the solution brown with dissolved grime and the knobs spank-

ing clean. Moral: as they say about furniture stripping – be patient and let the chemicals do the work.

The large main tuning and bandspread knobs have brass ring inserts that give them and the entire front panel a very smart appearance. One of these was missing (they slide out very easily). Once again, my parts set came to the rescue and I was able to remove a replacement from it. A little rubbing with Brasso brought both rings back to life and they look terrific.

The reassembled front panel looks just great in my book! Forgotten is my discouragement about the marred paint around the AVC switch (see August issue). The overall effect is so trim and good-looking that I could imagine that I was a kid again – studying it on the store and wondering if I should spend my hard-earned money on it.

After carrying out the usual ritual of going over the bandswitch and other controls with cleaner/lubricant, I about ran out of time for further restoration work. However, I did decide to check and replace all of the tubes. I've almost never found weak tubes during a restoration, but this set had two that were seriously so: the 6SG7 r.f. amplifier and 6J5 noise limiter. In addition, a 6V6 audio output tube had been substituted for the original, and more potent, 6F6. My indispensable S-40 parts set once again came to the rescue, and yielded up good replacements for all.

◆ Tube Tester Lore

Long-time readers may wonder why, though we've restored and discussed other test instruments, I've never covered the subject of tube testers. Certainly every complete restoration shop should have a tube tester – yet, as mentioned, tube problems are rare, and even tubes that test weak may still work very well in the set. Tubes that are totally dead usually have burned-out heaters, something easily detectable with a simple ohmmeter.

Beyond cleaning up switch and control

contacts, there isn't much you can do to restore a tube tester. The simple types don't need it and the sophisticated types require special instruments and know-how to trouble-shoot and calibrate.

But this looks like a good time to at least pass on some advice about acquiring a tube tester. First of all rule out those "do-it yourself" testers that used to be common in drugstores and supermarkets (the ones with a sea of tube sockets) as well as those sloping-panel laboratory units loaded with meters and dials. The former are too simplistic for your needs; the latter are too complex; and both would take up way too much space in your shop. I'd also avoid units operated by punched cards – which are probably more sophisticated and expensive than you need.

The testers that might be useful to you fall into two general types. The simpler of these measures the *emission* of the tube; it checks the intensity of the electron stream that flows between the filament or heater and the plate. This is a fair indicator of tube condition – and the only indicator needed for rectifier tubes. However, more sophisticated testers – known as *mutual conductance* or *dynamic mutual conductance* instruments – actually check the performance of amplifier tubes (the great majority) *as amplifiers*.

Emission testers, which are the bulk of the units that turn up in flea markets, can be purchased inexpensively – sometimes in the \$25.00 range. They are lightweight and often very compact. They are also very useful to a radio restorer operating on a budget. If the instrument you are looking at isn't labeled *mutual conductance* or *dynamic mutual conductance*, it is probably an emission tester. There are many brands around and they all work about as well.

Heathkit and several other manufacturers made mutual conductance testers, but the best-known and most reliable maker was Hickock. Look for that name on the i.d. plate. There are several models around. Many restorers, myself included, favor a military unit, the TV-7/U, which is a Hickock design. You should be able to purchase a good tester of this type for under \$100.00. Hold out for one if you can.

Whatever type you consider purchasing, look for quality construction, an included owner's manual, a test settings list (if there is no roll chart), and a trustworthy (hopefully) seller's assurance that the unit is in working condition. Also, *and this is very important*, check to see if the unit is capable of testing those vintage tubes that will be your main concern. Hickock, for example, was ruthless about deleting test information for older tubes from its manuals and rollcharts as new types proliferated.



The military TV-7 is my mainstay tube tester. It covers a very wide range of tubes from the 1920s through the 1960s, and even handles some low-and medium-powered transmitting types.

Supplements including the older information were available for some models. Browse the internet under "Hickock" to find out more about the various models and early tube charts that might be available for them.

As a quick check to see if your prospective purchase has data for vintage types, look up the 01-A, 26, 27, 24, 24-A, and 71-A (these are 1920s types). Also check for the 50s-era "All-American Five" a.c./d.c. set types (35Z5, 12SA7, 12SK7, 12SQ7, 50L6) and their transformer-powered equivalents (80, 5Y3, 6SA7, 6SK7, 6SQ7, 6K6). If all these are present, then probably most of the types introduced during the years between are also there.



Attractively-packaged Eico 628 emission tester has been on my bench for some time because it checks some of the last consumer types manufactured (which are not covered by my TV-7). It's handy for checking out the occasional TV set.

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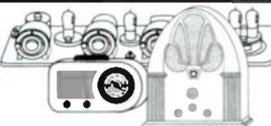
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Scanner Collector Items

I've been interested in radio monitoring and servicing radio equipment since the early 1960s. As you might envision, the shelves in my basement contain radio items which span generations and photographs of many have appeared in earlier columns.

Some items date back to my teenage years, while others have been acquired from various hamfests, donations, and swaps since then.

I've been blessed with both a large basement and a wife who is interested in radio – a combination which has helped fill the house with more and more radio gear.

Bear with me while I share with you some of the more interesting monitoring items I've found in the basement.

◆ Realistic 12-627 Patrolman AM/VHF

Radio Shack marketed several monitor receivers in the Realistic Patrolman series. The 11 transistor model 12-627 combined an AM broadcast radio with a VHF-high band capability and is powered by four AA batteries.



A full, but tiny schematic is glued inside the rear panel.

This Patrolman has no squelch, so your ears are treated to static in between transmissions.

The competing Lafayette Radio models were named Guardians.

◆ VHF Converters

Install two AA batteries in the Clark 450 converter, place it next to an ordinary AM radio, and you can hear police calls.

This two-transistor converter uses an internal ferrite loopstick antenna to couple its output to the radio so no direct connection is required. The



radio's AM detector is used to slope detect the FM signals.

Electra and other companies made similar converters.

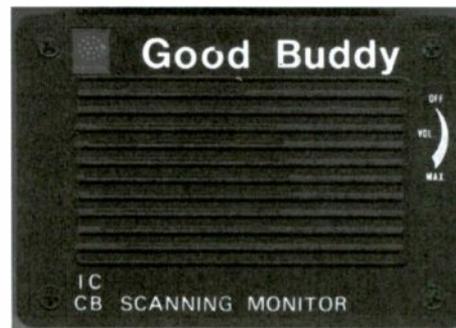
The Tompkins Tunaversers represent another style of converter. They were primarily intended for use in an automobile and were connected between the car radio and antenna using a short coaxial cable jumper.

Tompkins offered several models. The high end models offered both crystal control and a variable frequency tuning.



◆ Fanon/Courier Good Buddy

The Fanon/Courier GB-40 Good Buddy is probably not your idea of a scanner radio, but it is a radio and does receive a set of frequencies without manual channel tuning. That's why I kept this oddball 27 MHz Citizens Band scanning receiver around.



The Good Buddy is powered by a 9 volt battery. A spring steel clip, riveted to the back, serves to hold the receiver to a car's sun visor and a 25 inch wire pigtail functions as the antenna.

◆ Radio Books

Repairing or devising a modification for a receiver is a tough job if you don't have a sche-

matic diagram. Before the 1980s, Radio Shack used to print a schematic diagram in the instruction manual supplied with every one of their GRE-made receivers.

I've collected schematics and servicing data from wherever I could obtain it and this information has become scarce. Sams Publishing sold repair data in the 15 volume set entitled *Sams Scanner-Monitor Servicing Data*, and I've collected 14 of the 15 books.

Another source of schematics and servicing information for Regency, Heathkit, E.F. Johnson, Unimetrics, and Midland scanners is David F. Norman's 1976 book, *VHF/UHF Fire, Police, Ham Scanners - Schematic/Servicing Manual*.

It was published by Tab Books in 1976 (ISBN 0830658351). I've bought a few used copies at hamfests and library sales and I see old copies for sale at <http://amazon.com>.

Despite a Bearcat IV photo on the cover, this book does not cover Bearcat scanners.

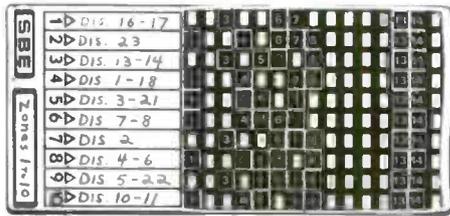
◆ Crystals, Cards, Combs

At its peak, my receiver collection numbered well over 100. Many of them were crystal-controlled and so I collected the crystals they required. Several crystals were obtained from the estate of a former scanner repairman.

The first generation synthesized scanners were programmed using propriety memory de-



vices. The SBE Optiscan, manufactured by GRE, required programming up to 10 channels on a plastic card. Gummied labels were used to cover transparent areas of each card.



A 16 channel variation on the same theme was marketed under the Sears label. Its cards required punching holes (chad) in various combinations.

Users of the Regency WHAMO-10 were required to break teeth off an aluminum comb according to a code book. A different comb was required for each frequency.

There's a fuzzy line between a radio collection and a pile of clutter. This year's spring cleaning campaign is more aggressive than usual and I'm looking through the radio collection piece by piece. The process of examining each piece brings back fond memories.

❖ Frugal Indoor Antenna

Reader Doug Miller writes that he likes to "get by" with inexpensive scanning solutions.

He recently bought a Philips Magnavox MANT-400 Amplified Antenna at the local department store and paid \$29.64. The MANT-400 has two 44 inch telescoping VHF dipole elements, a circular UHF loop, and separate gain controls for VHF and UHF.

Doug writes "I brought it home and rigged up a cable and hooked it up to a Radio Shack PRO-2040. I extended the rabbit ears and cranked up both the UHF knob and the VHF knob on the antenna. This antenna does better than the cheap discone I have mounted on the roof."

Doug says the active antenna is fairly wide band in its range.

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Big Help For Tiny Radios ICOM and IC-R5.com's Cloning Software for the R5

Have you seen the price of FRS (Family Radio Service) 400MHz walkie-talkies?! I was at Wal-Mart the other day and was astounded at the range of tiny, full-featured FRS radios now available. Even more astounding are their incredible low prices starting at \$18 for a *PAIR*.

After managing international electronic businesses for over 25 years I don't know why I am surprised. In the consumer electronic business, where mass production means tens of million units, there are a number of things you can count on:

1. If you get a product life of over 12 months you are very lucky.
2. The next generation of products will have more features and be smaller.
3. The next generation will cost less. (Big factor!)
4. As a result of these factors, last generation's product, having a ripe old age of less than 12 months, will have little or no value.
5. Hang on for a ride! This product cycle will repeat itself a number of times.
6. The madness only stops when either the market becomes saturated (every buyer owns one and is satisfied with what they own) or the cost of the next generation is greatly increased over the last.
7. And, finally, the technological advanced components, that have been developed and incorporated into mass produced products at increasingly lower costs, now enable the introduction of other related products.

In the post-World War Two years of the '50s, '60s and part of the '70s, military R&D and usage led the way for the creation of new consumer electronic products. All that changed with the development of huge CB radios, PCs, and cellphone consumer markets. In fact, now it's quite common for the military to fill their new product needs with COTS (Components Off The Shelf) parts.

◆ Where Did They Come From?

How does this fit in with our topic this month of cloning software for "Tiny Radios"? Simple. Where do you think the technology and active components (i.e., integrated circuits) for these, tiny, wide frequency ranging, under-\$200 little honeys came from? Clearly, these tiny receivers do not have a 100 million-unit market. So they are prime example of number 7 in our list above. I

believe radio monitors are reaping the benefits of the FRS and cellphone components.

For all you engineers out there, this doesn't mean that you can open up one of these tiny receivers and find a plastic IC with the exact numbers on it that are in your FRS walkie-talkies or cellphone. More likely the CAD (computer aided design) device modeling and integrated circuit process technologies developments which went into the FRS and cellphone have been utilized in the critically key active components of your tiny receiver.

Well, now that we know where they suddenly appeared from, let's look at two programs which allows us to utilize the latest of these tiny receivers, ICOM's R-5, to its fullest.

◆ The R5 Enough Said

The R5 has been covered in many paper and Internet publications (July 2003 MT), so we will not cover the details of the receiver here. Let's summarize by saying that it is a replacement for the R2, which enjoyed a longer product life than 12 months.

The R5's "no keyboard" approach is similar to the R2. Its display is larger, making readability easier for us "baby-boomers." A major advantage over the R2 is the R5's internal battery charging capability, which was insanely omitted from the R2 in its rush to market.

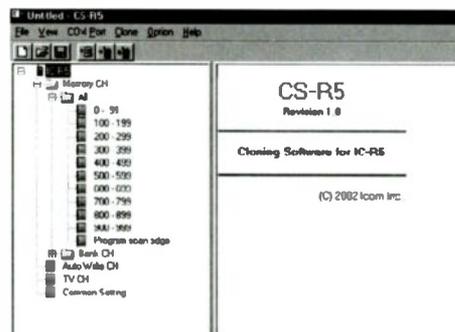


Figure 1 ICOM's CS-R5 Main Screen

All in all the R5 is a neat radio that performs quite nicely. But no keyboard! Connecting the R5 to the serial port of a PC via the R5's dual-purpose earphone jack using an available cable, therefore opens up the real world of monitoring. So let's see how we can do just that.

◆ ICOM's R5 Cloning Software

As you would expect, ICOM sells a cloning program for the R5 appropriately named CS-R5. The CS-R5 version 1.0 software costs around \$35.

You will also need a cable to connect your R5 to your PC. ICOM sells a Serial Cable OPC-478 separately at around \$45. Both are available from Grove at <http://www.grove-ent.com>.

We used the ICOM cable for this review. It is also usable with R2, R3 and R10 radios. Alternatively, you can find "build-it-yourself" details for the cable at <http://www.qsl.net/vk3jeg/opc-478.html>.

CS-R5 Computer Requirements

Its basic computer requirements are modest: PC/AT running Windows 98/2000/Me/XP, 800x600 display and a bit of hard drive space. The minimum amount is about 2 MEG. The maximum depends on how many files you intend to store, with each complete receiver file being about 0.1 MEG additional. Since CS-R5 comes on CD, a CD ROM drive is required. The software was tested on a Pentium I 233 running Windows 98 2nd edition with 128 MEG RAM.

Installation was quick and easy. The ICOM serial cable was plugged into COM 1 on my computer and then into the earphone of the R5. In a few minutes I had the opening screen displayed and told the software that the R5 was on COM port 1. It in turn asked me to turn on the R5. Then a screen, which looks very much like a Browser appears. See Figure 1. Across the top of the screen we can see the Command Menu and along the left side a file-folder-looking structure.

Getting Radio Data into the Computer

Just about every command is accessible from this menu. For example, if we wish to move data that is currently in the R5 into the program for manipulation or storage, all we need do is click the Clone Menu at the top. Then click "Read <- Receiver" and a small box appears indicating loading in progress. The whole process takes about 2 minutes.

Real Control!

On the left of the screen, the user chooses the part of the R5 programming which is of interest. For example, Memory Channel. Now that we have moved the R5 data into the program we can view the information stored in the memory channels by clicking "Memory CH" and then the channel range of interest, in this case 0-99. See Figure 2. The right side of the screen comes alive with the details of each channel.

From here, each element of each row can be edited, copied, pasted, cleared, inserted or deleted. It's just like using a word processor or spreadsheet. Once the data is modified or new data manu-

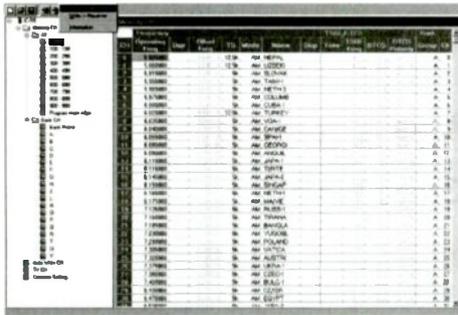


Figure 2 The Heart of CS-R5

ally entered it can be stored on the PC in a file and/or loaded into the R5 in a matter of seconds via the File Command menu.

Files from the PerCon/ICOM online data base at <http://www.perconcorp.com/icom/> can also be loaded into the R5 and saved on the PC.

What about USB Users?

ICOM offers a USB add-on package to the CS-R5 software. This includes an interface box which connects between your R5's ear-phone jack and the PC's USB port. The ICOM USB Cable OPC-478U and driver software will set you back \$50. Of course, then you do not need the serial cable.

USB Driver installation from a 3.5 inch floppy was quick and simple; exactly as instructed by the sheet which was included by ICOM. The software was very well behaved and performed exactly the same.

CS-R5 Summary

Extremely useful software for R5 owners. Well behaved and easy to use. Assuming you buy the ICOM software and one of the cables, the total cost ranges from \$80 to \$85. Keep in mind that this represents 40% additional cost added to the \$200 for the radio. (No, I'm not an accountant by training, but by need!)

◆ HTTP://WWW.IC-R5.COM

If you go to this site you will find an alternate R5 cloning program which we also tried and compared to CS-R5.

IC-R5.com's computer requirements are a bit higher. The makers of IC-R5.com recommend a computer with the same requirements as the CS-R5 software: Pentium running Windows 98/XP, 2000 Pro or Me. However, they recommend that the CPU should have a clock speed of at least 300 MHz. (Not always listening. I tried it on the same Pentium 233 system and it ran slow but fine).

However, first a word of caution: I tried version 2.2.3 on three different Windows 98 PCs without success. So I contacted the company and found out that until version 2.3.0 the program "would not work" under Windows 98 due to a buffer size mismatch. I was given the current version 2.3.4, which is available free to all paying customers ONLY via the update web address sent to you with your program (or via email). We used version 2.3.4 for the review. I strongly suggest that this information be posted on their website in the future along with version fix information.

Using Version 2.3.4

Installation is again, quick and easy with no surprises, just the way I like it!

Running IC-R5.com first brings up Figure 3 where the user can select the cable type being used as well as the COM port. This is a nice programming touch that makes the software more universal in concept. Actually Figure 3 shows the screen during uploading of radio data so some of the keys are "ghosted."

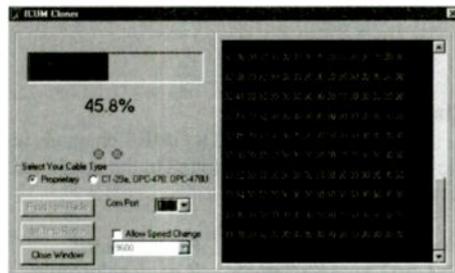


Figure 3 Getting IC-R5.com Set up for File Transfers

To compare operational philosophies we will perform the same "reading radio data into the computer," as we did with the CS-R5 software.

Looking back at Figure 3 we can choose the button on the lower left "Read from Radio." The program then asks us to pick a file to save it to on a floppy or hard drive. Once this is entered it instructs us to manually set the radio into the "clone" mode. If you remember, the ICOM software did this automatically.

As I mentioned, the screen in Figure 3 was captured during a radio data transfer. The large area to the right shows raw as-read data. The bar graph and number underneath the bar, on the left, give percentage completion. The radio data transfer time was just about the same for both programs.

Where the Action Is

Figure 4 is the place where the IC-R5.com user can modify or add data. When a Channel line is clicked on, it appears in the top line of the screen. Here it can be manipulated in just about every way possible. Then it is re-entered into the Channel list below.

Now it can be saved to a file on disk and/or loaded into the R5. This screen is similar in function to Figure 2 in the ICOM software.

IC-R5 VERSION 2.3.4 worked great without any problem. The IC-R5.com program alone is priced at \$19.95 and \$29.95 for the program and serial cable. Although I found it worked with the ICOM USB driver and USB cable, no USB is offered for sale on the IC-R5.com site. IC-R5.com also offers a version for the R2.

◆ What Do I Think ?

Well, thanks for asking. In my humble opinion, either program is a *must-have* for R5 owners! They both are a pleasure to use. I prefer the overall layout and user interface of the IC-R5.com. The labels on its command keys spell out functions without layers of menus to go through.

However, ICOM's CS-R5 has a much faster "screen write" routine which is a plus in its favor.

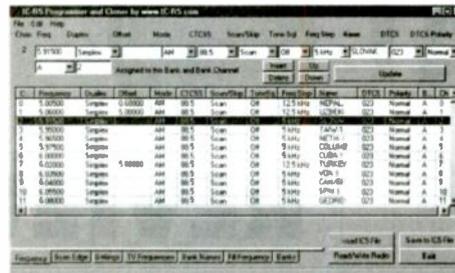


Figure 4 Where the IC-R5.com Action Is!

The Bottom Line: CS-R5 software and RS232 cable priced at \$80 + shipping. IC-R5.com software and RS232 cable priced at \$29.95 + \$2.00 shipping.

I think you have enough facts to make the choice yourself!

◆ Parting Thought

It has been said that we can predict the future by learning from the past. Clearly, tiny, wide range, low-cost portable receivers were made possible as a result of the two huge technology driver products, FRS walkie-talkies and cellphones. Can you predict the next high tech monitoring product surprise? Don't check the stars: Check what's new in the mass-produced consumer electronics markets. Till next time ... keep your crystal ball polished.

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FRS in Perspective

By Bob Grove W8JHD

Over the past couple of years, we've seen many different Family Radio Service (FRS) handy-talkies released to the public. Indeed, they offer many features at an affordable price. Initially costing nearly \$100 apiece when first announced, prices have plummeted as chain discount stores grasp the market. *MT* writer Jock Elliott provided an in-depth review of one set of Midland radios in our May issue.

So what are the differences among the offerings? Why pay \$69.95 when you can find a pair for half the price, or even less? Many features should be considered when selecting a radio, including the number of available channels.

Size:

Most of the new releases are compact and lightweight, easily enclosed by an adult hand, and readily held by a child old enough to successfully operate one.

Batteries:

All models operate from internal batteries. While most models use teeny AAA cells, a few models that accept more-rugged, longer-lasting AA cells.

For short-term emergency use, keep the radios ready to go with alkalines; they store longer (up to three years) without substantially losing their charge, while rechargeables should be boosted at least once a month. And alkalines have higher current capacity than rechargeables, adding to operational lifetime between charges or replacement. For repetitive, long-term use, rechargeable batteries are the better choice, charging them overnight between daily applications.

Chargers:

AC wall transformers plug into a DC jack on the HT, or into drop-in platforms that automatically contact metal elements on the radio. Some allow cigarette-lighter charger cords for mobile applications. All of these chargers work just fine; it's a matter of choice and convenience.

Power:

The Family Radio Service limits transmit power to no more than 500 milliwatts (1/2 watt). This isn't much. Newer – and somewhat more costly – radios add several channels from the General Mobile Radio Service (GMRS), allowing higher transmit power up to 2 watts on those additional frequencies. But with tiny batteries, high-power operation can eat up operational time in a hurry!

Channels:

There are 14 FRS and 8 GMRS channels in the 462/467 MHz bands allotted to the combined services.

Frequency	Service	Power (watts)
462.5625	FRS/GMRS	2 or .5 selectable
462.5875	FRS/GMRS	2 or .5 selectable
462.6125	FRS/GMRS	2 or .5 selectable
462.6375	FRS/GMRS	2 or .5 selectable
462.6625	FRS/GMRS	2 or .5 selectable
462.6875	FRS/GMRS	2 or .5 selectable
462.7125	FRS/GMRS	2 or .5 selectable
467.5625	FRS	.5
467.5825	FRS	.5
467.6125	FRS	.5
467.6375	FRS	.5
467.6625	FRS	.5
467.6875	FRS	.5
467.7125	FRS	.5
462.5500	GMRS	2 or .5 selectable
462.5750	GMRS	2 or .5 selectable
462.6000	GMRS	2 or .5 selectable
462.6250	GMRS	2 or .5 selectable
462.6500	GMRS	2 or .5 selectable
462.6750	GMRS	2 or .5 selectable
462.7000	GMRS	2 or .5 selectable
462.7250	GMRS	2 or .5 selectable

Combining the 22 channels with the 38 squelch tones, you have the potential for 836 different exclusivity settings for mixing groups of users without having to endure listening to other



The old and the new: The Cherokee FR-465 and the Midland G-225.

folks using your channel while you await a call. This is especially handy in large crowds as we attest to shortly, below.

Functions and features:

As with cell phones, manufacturers seem compelled to offer operational capabilities that we never dreamed of – or needed! These include (in no particular order of value or desirability) vibrator alert, musical paging tones, voice activation (VOX), tone squelch (CTCSS), roger-beep tone (Thanks, CB!), back-lit display, keypad lock, high/low power selection, battery status indicator, volume and squelch level adjustment, squelch defeat ("Monitor"), call tone, channel scan, external speaker/mike jacks and more.

Range:

Here's the catch. While manufacturers tout ranges of up to several miles, this may be true on the moon, but in real-life situations and applications, line of sight is often obscured, and conditions are often (usually?) compromised. Trees, buildings, hills, cars, crowds, rain, humidity and other absorptive and reflective obstacles can radically reduce reliable range. It was this one claim – range – that prompted our field tests.

◆ Let's try them out

With the Dayton Hamvention close at hand, we decided this would be an ideal place to test a set of FRS/GMRS HTs. Since Midland had been so cooperative in the past allowing us to review their equipment, we asked them for their recommendations for a good model for our use.

Midland recommended the G-225 along with their optional rechargeable NiMH battery pack, and an optional AVP-2 drop-in desk charger. For our compact application, we did not elect to try their AVP-1 earphone/mike headset. Although the G-225 is equipped with a handy belt clip, it also fits easily into a shirt pocket.

Under normal operating conditions, an alkaline battery set (900 mA/typical capacity) allows an operational standby time (on, but not receiving or transmitting) of up to 60 hours. When receiving a signal, the activation of the audio amplifier circuitry reduces that lifetime to about 12 hours, and when transmitting constantly (low power), you're lucky to get an hour out of the unit. Rechargeable AAA cells reduce these lifetimes further since they don't have the charge capacity of alkalines.

Realistically, my wife, Judy, and I found that we could use the units sporadically all day long without any noticeable degradation in performance,

and when we got back to the motel in the evening, we simply dropped them into the desktop charger and they would be ready for the next day's encounter.

The flea market:

With some 500 dealers in the Hara arena complex, and thousands of tailgaters in the 14-acre flea market, the Dayton Hamvention is quite a spectacle. Historically, as many as 30,000 hams have made the annual pilgrimage, and HTs of every description ionize the environment with their signals! Most use the popular 144-148 MHz two-meter band, but the use of FRS and GMRS is widespread, not only among the attendees, but the facility staff as well.

A casual scan of the frequencies on our FRS/GMRS HTs revealed constant chatter on virtually all channels. Using our radios in normal mode would mean listening to communications of no interest to us, as well as depleting the battery charge lifetime. We switched to tone-encoded squelch.

With the radios now quiet, we were ready to test their versatility. Judy remained in the car, far from the flea market, while I walked through the grounds. Throngs of people, parked vehicles, and about 0.2 of a mile separated us.

Pressing the transmit button, I was able to talk to her, but both of our signals were weak; some drop-outs occurred as we talked, although by pressing the "Monitor" button (squelch defeat) I could understand her in the background hiss. We decided to switch to higher power. While the results weren't dramatic, they did improve overall communications, eliminating the drop-outs.

Inside the buildings, too, we experienced reliable, crisp communications when we drifted apart between buildings.

More important, by using one of the 38 tone-encoded squelch settings, we didn't have to listen to the continuous chatter from other co-channel users.

This didn't mean that occasional interference caused by someone else transmitting simultaneously while we were talking was gone, but listening fatigue was eliminated. Even if someone else had coincidentally chosen the same channel and squelch tone we had, we still had 37 more tones to choose from without even changing channels!

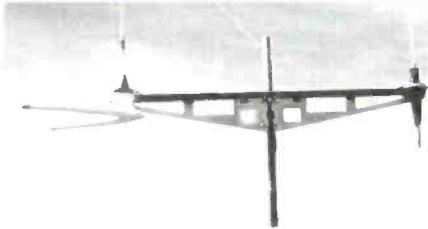
Another test:

With another Dayton experience behind us, we returned home and back to work. Judy drove out of our driveway with one of the HTs as I remained in the house with the other. We live in dense woods, and the trees were in full leaf, a devastating combination for UHF communications, yet we were able to remain in contact for about a half mile at low power under those less-than-ideal conditions.



Two Midlands nestled in their drop-in charger. The two radios plus charger sell for around \$80.

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Side by side:

The final test was performed comparing the Midland with an older Cherokee model. On the road, while a separation of nearly a mile was possible while maintaining communications car to car, the Cherokee could be heard when the Midland couldn't.

The difference was undoubtedly the antenna. As seen in the accompanying photo, the Midland radio has a short stub antenna roughly an inch long, while the Cherokee has a full-length, quarter-wave, rubber duckie. And as any ham will tell you, the antenna is the most important accessory for a radio. In the FRS service, removable antennas are not allowed, so you're stuck with what the factory provides.

So, what's the proper choice? The Midland G-225 is loaded with features, addressable by an on-screen menu. It is an excellent choice for crowded areas - large flea markets, stores, manufacturing plants, sports events, conventions - especially if it's likely that other FRS radios are in use. Car caravanning is a common use for FRS, and here the Midland holds up well. The headset option is recommended where hands-free applications are important, such as traffic control or driving.

But for maximum range applications, choose a radio with a long antenna; in the FRS, that's about three inches. And what is that maximum range? Manufacturers make all sorts of claims, but realistically, plan on a mile or so on the road, a half mile in the woods, and maybe two miles boat to boat, or mountain peak to mountain peak, on a clear, dry day!

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A Great PAL from Tivoli

By Lee Lumpkin KB8WEV

Ken Reitz reviewed the Tivoli Audio (or Kloss) Model One AM/FM radio in March 2001. Now there is a new product from Tivoli Audio called the PAL, or Portable Audio Laboratory. I recently purchased a Tivoli PAL, having been very pleased with Model Ones as kitchen and office radios for a year or two.

◆ Audio Excellence

The PAL differs from the Model One in several respects, but has a Model One inside. The PAL has a slightly smaller speaker and exterior dimensions, improving portability. The PAL is also a closed box speaker rather than the ported speaker alignment in the Model One. This is a necessity for making the PAL weather resistant, and should result in a bass response that starts to roll off at higher frequencies and more gradually than the Model One.

The PAL does sound slightly "brighter" than the Model One, but it is still very listenable. The designer of the Model One and PAL electronics was Henry Kloss, a legend in the audio industry, who helped develop the modern acoustic suspension speaker at Acoustic Research in the 1950s. Kloss also started KLIH, Advent, and Cambridge Soundworks, all of which produced highly respected products.

◆ You CAN Take it with You!

The PAL differs from the Model One most significantly in its portability design features. The box has a rubbery finish that is weather resistant and can be wiped clean with a damp cloth. Two indented areas on the sides provide a good non-slip grip. Power can be provided via a 12V AC adapter, which also acts as a charger for the internal NiMH battery pack. When the PAL is turned on and plugged into the wall, a slow charge rate is activated, and when the PAL is turned off, the batteries are recharged rapidly, in about 3 hours. When the batteries are fully charged, an internal controller turns off the charger.

The playing time on a full charge of the internal batteries is listed as hours, and this will vary significantly with the volume level you use. I got 8 hours on my first charge (before the battery pack was conditioned by several charge cycles), and other reviewers indicate times up to 16 hours. Tivoli says the battery pack should last about 5 years in normal use, and is user replaceable with a battery pack from Tivoli. The pack is a prebuilt unit, so simply installing standard NiMH batteries isn't possible. The green

tuning LED on the front of the PAL does double duty as a charging and low battery indicator.

Power to the PAL can also be provided from other nominal 12VDC sources that can supply 0.5 amps of current. Tivoli indicated by

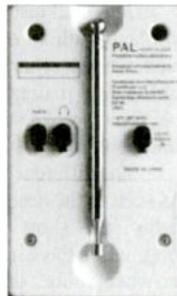


email that this voltage can be in the range from 12 to 16 VDC. This opens up several more uses for the PAL, as it can be powered from a 0.5 amp cigarette lighter adapter or from the typical amateur radio power supply. You could recharge it from a car's cigarette lighter in just a few hours of driving.

I have an amateur shortwave transceiver that supplies 13.8VDC at 0.5 amps from a rear panel jack for running accessories. That's perfect for operating the PAL directly, using the line level audio and power output jacks on the back of the shortwave radio. This HF rig, the TenTec Argonaut V, also has wonderful receive audio that really shines with better speakers like the PAL.

◆ Features and Fine Points

The PAL comes with a rear-mounted telescoping FM rod antenna and an internal AM antenna, but doesn't have external antenna jacks. There are also three connectors on the back of the radio, all of which have hinged rubber plugs to seal them when not in use. One is the power jack and the other two are 1/8 inch stereo audio jacks. One takes a stereo line level input, and the other is an output for headphones or line level audio output, suitable for plugging into a sepa-



Specifications:

Model: Portable Audio Laboratory (PAL)™
Type: Portable, weather resistant AM/FM radio
Driver: 1 x 2.5" treated, magnetically shielded, full range driver
Power: 12vdc nominal - 15vdc maximum, 500mA
Battery Pack: Model MA-1, NiMH, 7.2V, 1200mAh
Battery Current: 500mA
AC Adaptor: Model PAL-PS:
UL: 120V-60Hz, 18W, 12VDC, 500mA, 6VA
CE: 230V-50Hz, 15W, 12VDC, 500mA, 6VA
Dimensions: 3-11/16"W x 6-1/4"H x 3-7/8"D
Weight: 2lbs
Color: Earth Brown, Moonlight Gray, Spring Green, Pearl White, Sunset Red, Electric Blue, Neon Yellow and Basic Black
All specifications subject to change without notice.
Tivoli Audio, the Tivoli Audio logo, PAL and The Henry Kloss Portable Audio Laboratory are trademarks of Tivoli Audio, LLC.
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rate stereo receiver or amplifier.

Plugging an audio source into the input jack disconnects the internal radio tuner, so that the PAL volume control serves the external input. You have to unplug the external source to listen to the internal AM/FM tuner. Although the PAL has a single monaural speaker, the output is in stereo, and the input jack requires a stereo 3 conductor plug: A mono plug will short one of the channels to ground, and so won't work properly.

I plugged the PAL's line output into a good stereo and listened to the FM reception. It equals that of a good midline stereo receiver, with excellent full range audio and a good sense of stereo space. The PAL uses a 5:1 reduction drive radio tuning knob that makes the tuning smooth, accurate, and easy to fine tune.

The PAL comes in a number of colors, including sedate brown, grey, black, and white, but also comes in brighter blue and green and in a red and a yellow suitable for "emergency" use. I chose the yellow because I plan to use it in the field when I do public astronomy sessions and at amateur radio events like Field Day. I figure that way I'll see it if it sprouts "legs," and I won't overlook it when I'm packing up to leave.

The only design "flaw" I can find is the

FM antenna setup. The antenna is designed to be low profile and fit into an indentation on the back of the radio for ruggedness while transporting the radio. This particular arrangement makes it hard to extend the FM antenna when the radio is below a shelf, but it's a minor flaw in an otherwise very versatile and fine sounding product.

The PAL is a portable Hi-Fi AM/FM radio

or amplified speaker, with great power options. Combined with an mp3, portable CD, or minidisc player it makes a great portable "sound system." You could also leave it plugged in and use it as a table radio, and when the power goes out you'll have a fully charged emergency radio that sounds great. Owners' manual, dealer information, direct ordering, and more information are

available on the web at <http://www.tivoliaudio.com>.

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AlphaLab RF Field Strength Meter

By Bob Grove W8JHD

Several years ago, AlphaLab introduced a series of environmental field detectors; these used analog meters to reveal the electric component of electromagnetic and electric fields. These so-called "Trifield meters" have proved sensitive and reliable. Now AlphaLab has released an upgraded, professional meter with digital display and a custom case.

Easy and intuitive to operate, the new, compact meter (securely cradled in an adult hand) is intended for professional applications, but priced low enough for serious consumer assignments as well. While high-end competitors are priced in the thousands of dollars, the AlphaLab is available for \$299.

Powered by a standard 9-volt battery (included) for several hours of continuous duty, the detector provides a low battery reading when the battery voltage drops below reliability (7.6 V). The instrument boasts the widest frequency coverage we've seen to date in an inexpensive meter - 500 kHz to 3 GHz - and up to 10 GHz with reduced sensitivity (-10 dB)! Its 4-1/2 digit display is sensitivity-selectable among three ranges to show field intensities (power densities) from 0.001 to 2000 microwatts per square centimeter.

Its digital readout and internal antenna design assure accurate, flat response over a wide frequency range. A band switch allows frequency range selection of full range or 100 MHz and above (6 dB/octave roll-off below 100 MHz). A timing switch allows immediate response to rapid field fluctuations, or averaging over time for stable readout.

Field calibration for temperature changes is readily accommodated by a simple pushbutton/control rotation procedure, and is not necessary unless substantial (5 degrees or more) temperature changes are experienced and high accuracy readings are required.

◆ Applications

So when might you need this clever device? That depends upon your environmental concerns. Let's take a look at the more common applications:

- Ambient RF field measurement in dense metropolitan areas as well as remote rural sites;
- Measurement of radiation from computers, microwave ovens, amateur radio and CB transmitting antennas, cell towers, radio and TV broadcasting stations, cordless and cell phones;
- Detection of worn or concealed transmitting devices;
- Locating interference sources in power lines, home wiring and accessories;
- Adjusting transmitting antennas for maximum radiation;
- Screening wireless telecommunications installations and environments for interference and operability.

Many other applications may be suitable as well, subject to the user's individual requirements. One clever use is determining the average frequency of the measured field - if you are certain that only one transmitter is producing the reading, its approximate frequency band can be estimated as well. While a rudimentary chart is provided for this, some interpolation will be necessary.

◆ Our Field Test

We decided to test the meter's frequency estimating function. Setting the meter on a desk and adjusting it for narrow-band measurement, we generated a test signal at about 151 MHz at a distance of approximately 20 feet. Following the formula in the instructions, we calculated 162 MHz - not bad for a coarse estimate!

Conditions had to be just right: a steady signal with no other radiating devices in the area. Clearly, the instrument is not a frequency counter, but this bonus allows rough field calculations adequate for helping isolate possible sources of signals under measurement.

The readability of the LCD window is excellent; large, bold characters report the readings. Our microwave oven was clearly detect-

able at 50 feet, radiating some 250 microwatts per square centimeter at around 2.5 GHz; my notebook computer screen (as I type this) was delivering a safe 1 microwatt per square centimeter to my body, and at just a few kHz to drive the LCD; at 100 watts, my ham transmitting antenna at 14 MHz only showed about 2.5 microwatts per square centimeter here in the shack, and 1.5 microwatts per square centimeter at 29 MHz.

◆ What is Dangerous?

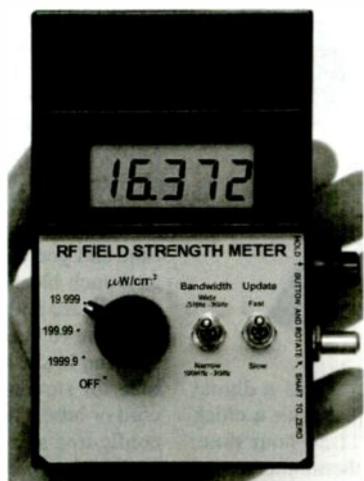
The debate rages on: Are cell phones dangerous and, if so, at what levels of use? And how about power lines, microwave ovens, amateur and CB radios? Are different individuals and their tissues more radiation-absorbent than others? There seem to be no absolutes in this contest, so a few general rules have been proposed.

The most hazardous frequencies to the human body appear to be from 30-300 MHz, the popular VHF portion of the spectrum; human tissues seem to resonate in these ranges, thus absorbing more of the heating effect. Predictably, long-term exposures are more hazardous than short-term. Above and below this swath of spectrum, somewhat increased power levels can be tolerated.

Amateur radio guidelines prescribe no more than 6 minutes average exposure to power densities of 1 milliwatt (1000 microwatts) per square centimeter from 30-300 MHz transmitting sources. Amateurs operating commercial transceivers without external power amplifiers and using overhead antennas are probably in compliance.

It's the unknown sources that provide the disquieting alarm. And the AlphaLab professional RF field strength meter can dispel or confirm those fears.

The AlphaLab Field Strength Meter is available from Grove Enterprises (800-438-8155; <http://www.grove-ent.com>) at \$299.95 plus shipping.



This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.

A walk on the wild side: Survival Tools

The Boy Scouts have it right with their motto: Be Prepared. It's reported on <http://www.usscouts.org> that someone once asked Baden-Powell, founder of the Scouts, "Be prepared for what?" He replied, "Why, for any old thing."

I'm a big fan of being at least a little bit prepared for the possibility that things might go wrong. That's why I am mightily impressed with three neat survival tools I tested recently.

◆ Navitool

The first of these gizmos is something called the Navitool. It's made by Imperial Schrade Corp. and perhaps the best way to describe it is a multi-purpose tool for wilderness travel and survival. The Navitool is 4.25 inches long, 2.5 inches wide, and 2 inches thick and weighs just 8 ounces. At first glance, you might think it was a camera because there is a round, lens-like thing attached to an elongated trapezoidal body.



But as you examine the Navitool, it starts to get very, very interesting. On the left side, you'll find a bunch of tools like a Swiss army knife: philips head screwdriver, flathead screwdriver, cutting blade, scissors, saw, cap lifter, can opener, and cork screw. With the exception of the corkscrew, all of these tools can be flipped out and locked into place.

On the front of Navitool, just below the round thing that looks like a lens, is a pushbutton that activates a bright red LED flashlight. The flashlight is powered by a 2032 button-type battery. Unscrew the round thing, and flip it over, and you'll find that it is a precision liquid-filled compass with a declination ring. With the compass removed

from its socket, underneath you'll find a signaling mirror. On a lanyard attached to the compass is a LOUD signaling whistle (the lanyard comes attached to the Navitool case, but you want to unhook it so the compass isn't influenced by the steel of the knife). And on the opposite side of the case from the compass is a sturdy spring belt clip.

The Navitool is absolutely stuffed with goodies that are useful not just in the wilderness, but in all kinds of situations in everyday life. And just when you think you've seen it all, flip open the hatch on the top of the Navitool case, and there is a compartment that is sized just right for a Bic or other disposable lighter. In short, the Navitool provides a number of handy tools, signaling capabilities, the ability to make fire, and direction-finding, all in one neat package that clips to your belt. Suggested retail of the Navitool is just \$89.95.

◆ I-Quip

The I-Quip is the big brother of the Navitool. It has all the same tools, flashlight, whistle, signal mirror and lighter storage. But when you unscrew the round module on the face of the I-Quip, you find – tah-dah! – a computer module.

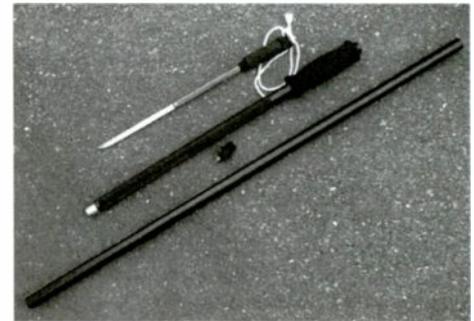


The computer module contains a digital compass with declination adjustment; a clock with backlight, date, alarm, 12/24 hour time, and stopwatch; an altimeter; a thermometer; and a standard/metric barometer that displays the amount of change since the last reading. You can tell that the Schrade people have really done their homework: the computer module and the flashlight use the same type of battery. So if

one battery dies, you can switch to the other one. SRP of the I-Quip is \$225. For more information about the I-Quip or the Navitool, phone Imperial Schrade at 845-647-7600 or visit <http://www.schradeknives.com>.

◆ Survival Staff

The Survival Staff is produced by Crawford knives. At first glance, when fully assembled, the Survival Staff looks like an extremely well made 57-inch hiking staff. At one end there is a cap with a hole for a wrist thong; at the other, a tip with a steel point. Just below the section with the wrist thong is a soft rubber handle. The whole thing weighs about two pounds and feels like it is built solidly enough to withstand the charge of a severely annoyed cape buffalo.



Start unscrewing various sections, though, and you'll discover the Survival Staff's hidden secrets. The short wrist thong section is hollow and can be used for storing medicine. The section below it contains an 11.5-inch knife with a very sharp 5.5-inch triangular blade. Unscrew the steel tip at the end of the staff, screw-in the knife, and you have transformed the staff into a lance (a radio enthusiast could also stab it into the ground and use it to support an antenna.)

Remove both ends from the long lower tube and you have – are you ready for this? – a 32.5-inch blow gun. Darts are included, and it shoots hard enough to stick darts into a wooden block at 10 yards. The darts can be stored inside the lower tube, but you can also use that tube for storage of several yards of parachute cord or other "possibles." The Staff can also be configured as a walking cane, and a special tip with folding barbs for spearing fish is also available as an option.

The Survival Staff is \$224.95 and seems worth every penny. For more information, phone Crawford Knives at 870-732-2452 or visit <http://www.crawfordknives.com>.

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What's NEW

Tell them you saw it in *Monitoring Times*

Digital HF for Hams

AOR USA has introduced the ARD9800, a digital modem unit that brings the advantages of digital voice and communications to the HF ham bands. "The advantages offered by the ARD9800 are many, including 'near FM' quality audio and the likelihood that the digital format can operate at lower signal levels than those of analog SSB, which is important as we approach the solar minimum," said "Taka" Nakayama, KW6I, Executive Vice President of AOR USA.



Best of all, the ARD9800 works with your existing transceiver. The ARD9800 requires only two connections to any ham radio, one through the radio's microphone input port, the other from the rig's "speaker out" jack to the ARD9800's audio input port. No modifications to the radio are necessary. You may use the microphone provided with the ARD9800 or wire your mic to work through the ARD9800.

The operator can listen for digital and analog signals simultaneously. The ARD9800 unit will automatically detect the digital format, decode it and pass it to the self-contained speaker or to an external speaker. To transmit in digital mode, the operator simply moves a switch on the ARD9800 front panel. Setting the switch back in the analog mode allows "normal" use of the transceiver.

The ARD9800 uses the open G4GUO digital protocol, a complex digital format that incorporates elements of phase shifting to transmit the digital signal. The digital tones have been engineered to fit within the normal voice audio passband, making it possible to use unmodified, existing radios for the digital format. (Analog operators will hear the header tones at the beginning of each transmission and then a "buzzing" sound as the digital transmis-

sion continues.)

The ARD9800 can also be used in other modes, such as AM or FM. Users of those formats will also notice improved audio quality; however, audio improvement is most marked on HF in the SSB mode. AOR cautions against using the digital format in mobile FM operations, as the vehicle's motion could cause "picket fencing" that may result in the loss of data and a dropout of the digital signal.

In addition to voice communications, with an optional memory board, the ARD9800 can also be used to transfer still images and even computer files. The unit also has a computer connection port, along with a provided serial connection cable, to allow controlling parameters of the ARD9800 and to facilitate the transfer of files over the air, if desired.

Included with the ARD9800 is the modem unit, a microphone, power cable for connection to 12 VDC, computer connection cable, and a conventional 8-pin round mic input connector. Options include a power cube, the memory expansion board and custom-made cables that fit the microphone input ports of a variety of popular transceivers.

Suggested retail for the ARD9800 is \$549 USD.

RIGrunner 4010S

A RIGrunner is the most convenient and safest way to connect all your 12 Vdc equipment to a power source. It is a 13.8 Vdc power panel that uses the excellent Anderson PowerPole connectors. Standardize all of your 12 Vdc connections using the PowerPole system approved by ham radio organizations ARES, RACES, RSGB, and ARRL.

The New RIGrunner 4010S



has one always on "Master" outlet and 9 automatically or manually controlled switched outlets. Plug your main radio into the master

outlet, turn it ON or OFF to automatically control the other nine 40A (max) switched outlets.

The switching is done with a 100A solid state automatic FET switch with temperature and over current protection. There are no switches to arc or burn out. The FET switch, in its "on" condition, has less than .005 ohms resistance. An audio alert is selectable for over and/or under voltage or may be disabled. The RIGrunner retails for around \$109.95. (See below for contact details.)

Whatt Meter

An accessory which also uses PowerPoles and which is a favorite of electric powered aircraft and battlebot builders is the Whattmeter. It simultaneously reads Volts, Amps, Watts and Amp/hrs. with fully automatic operation. For only \$69.96 the Whattmeter takes the guesswork out of power measurement.



Both these PowerPole compatible accessories are available from West Mountain Radio, 18 Sheehan Avenue, Norwalk, CT 06854; Phone 203.853.8080. Order online at <http://www.westmountainradio.com> where you can also find the PowerPole connectors to adapt the equipment to your connector types for your specific application.

iPod Pirate Radio?

Barry Williams told *MT* about this interesting item: "The iPod is a mini music player from Apple that you store songs on. They are very popular and sell well. Griffin has developed an attachment called iTrip (<http://www.griffintechology.com/products/itrip/index.html>) that allows you to play your iPod songs over your car (or any) FM radio. You just put the iPod somewhere, like the dash or passenger seat and it transmits a low powered FM band frequency. The device has selectable frequencies to help the user avoid



frequencies used by broadcasters. You tune your car FM radio until you find the iPod frequency and then enjoy your stored songs via your car stereo system."

"It seems that Britain, Iceland, and Austria have banned this system. (Maybe they think using headphones & your iPod while driving is a better solution?)"

Unlike the US, these countries have no allowance for license-free low-power broadcasting. The iTrip transmits at very low power on an FM frequency and so in theory could interfere with broadcasts from a radio station. UK importers concluded that using the gadget would mean breaking the law. "The UK authorities have allocated all existing analogue FM bands... Therefore, use of the iTrip in any FM broadcasting bands is strictly prohibited," said the UK importers of the iTrip.

For lucky iPod owners in the US, however, it's a nifty little FM transmitter that requires no batteries and, like the iPod, shuts itself off after 60 seconds of silence.

FM Atlas: A Guide for Travelers, Hi-Fi Listeners, Media People and Hobbyists

By Bruce F. Elving, Ph.D.

We haven't seen a new edition of this standard reference work since last century, December 1999, to be exact. In fact, it wasn't that long ago I was doing some FM broadcast band E-skip DXing, grabbed for my *FM Atlas*, saw the published date, and wondered when Bruce would be coming out with a new edition.

Imagine my surprise when just



What's NEW

Tell them you saw it in *Monitoring Times*

a few days later the new *FM Atlas*, 19th edition crossed my desk. This new edition is bigger and better than ever – 256 pages of all the latest material you have come to expect from Bruce Elving's books, with 118 pages of FMaps that have now been computerized, along with FM broadcast station directories organized by both frequency and geography.

The *FM Atlas* lists program formats, stations that broadcast in stereo, as well as those suffering from the disease of being monophonic! The *FM Atlas* also shows FM translators and booster stations, and any FM subcarriers in use for each station.

New editorial features include a caveat about so-called "HD Radio." Digital audio broadcasting might limit your ability to tune in low power FM stations, small religious and college stations, and certain FM translators.

Whether you are a DXer, traveler, stereo enthusiast or in the FM broadcast media, you should not be without a current copy of the *FM Atlas*.

You can order the new 19th edition of the *FM Atlas* (BOK-2) for \$21.00 plus \$3.00 shipping and handling from Grove Enterprises.

You can find more information on the *FM Atlas* on Bruce's website at <http://members.aol.com/fmatlas/>. And while you are checking out Bruce's website, be sure to stop by his informative FM DX webpage (<http://members.aol.com/fmatlas/home2.html>) and learn how to hear distant (beyond line of sight) FM broadcast transmissions.

– Larry Van Horn, N5FPW

ARRL Books The ARRL Instructor's Manual – For Technician and General Class Courses

For instructors to use with *Now You're Talking!* (5th edition) and *The ARRL General Class License Manual* (4th edition). Three separate courses are compiled in

this one book. Each license course – Technician and General – includes modular lesson plans with a list of materials, instructor preparation, and objectives for each class. Practice exams are included. A separate Morse code course can be used with either license course, or as a stand-alone course. Includes Morse code practice text (letters, words, sentences, and sample QSOs).

This book ships with a 32-page supplement that provides lesson plans, student assignments, and review questions that are compatible with the current Technician exam pool effective July 1, 2003. The supplement is designed for use with the 5th edition of the *Now You're Talking!* study guide.

The 32-page supplement can also be purchased separately if you already have a copy of the first edition *ARRL Instructor's Manual*. And if you have an internet connection it is available as a free Adobe Acrobat PDF download at <http://www.arrl.org/FandES/ead/instructor/InsMan.pdf>.

The ARRL Instructor's Manual is 258 pages (1st edition © 2000) and published by American Radio Relay League (ARRL), Inc. (ISBN: 0-87259-803-9) You should order #8039 – \$15.00 plus shipping and handling. The *ARRL Instructor's Manual Supplement* runs \$5.00 plus shipping and handling. Order publication #8039S.

The ARRL FCC Rule Book – Your Complete Guide to the Amateur Radio Regulations 13th Edition edited by John Hennessee, N1KB

Every ham should have a copy of the Rules that govern the Amateur Radio Service (PART 97). Having a current copy of the FCC Rules means you'll be able to fol-

low important, recent changes to the Amateur Service!

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- The entire text of Part 97, with easy to read explanations and completely updated to include the latest regulatory changes
- An enhanced index with Part 97 cites
- New 60-meter frequency details!
- A new section to guide you through the FCC Universal Licensing System
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The use of the Internet and Amateur Radio, Repeaters, Public Service, and Interference are just a few of the topics

covered in this new edition. The new 13th edition (© 2003) is published by The American Radio Relay League, Inc. (ISBN: 0-87259-900-0). Order book #9000 for \$12.95 plus shipping.

You can order any of these League publications online at <http://www.arrl.org>, or through their toll free order line at 1-800-277-5289. The League snail mail address is ARRL, 225 Main Street, Newington, CT 06111-1494.

– Larry Van Horn, N5FPW

Newsletter of Interest

"Nearly ten years ago, in the September 1993 issue of *Monitoring Times*, you ran a rather prophetic cover story about monitoring the New York Port Authority with a photo of the World Trade Center and the headline 'Target For Terrorism.'

"I was interviewed for part of the story and after picking up a new edition of your magazine I thought I'd pass along something I'm currently involved with you might find of interest. I put together a free daily e-mail publication called the Transportation Communications Newsletter. The newsletter has a rundown of news items and infor-

mation related to all aspects of communications in the transportation field. I thought you, or some of your colleagues, might find the newsletter of interest.

"You may subscribe directly by sending an e-mail to transport-communications-subscribe@yahoogroups.com. You can view previous editions online at <http://groups.yahoo.com/group/transport-communications/messages>.

"There are currently over 4,700 subscribers to the newsletter."

– Bernie Wagenblast

Railfans Welcome!

The Railfans Welcome Database at <http://home.woh.rr.com/n8oay> has been updated with 42 new Railfan-Friendly train watching locations. The Database now includes 179 locations in 27 states and the District of Columbia. I have also made a few corrections and added many new frequencies to the Railscan database and added more train symbols.

– Dave Marshall,
n8oayscan@woh.rr.com

Call for Catalog

Check out accessories for mobile amateur radio operation at ATOC Technologies, Inc., 23 South High Street, P.O. Box 36, Covington, Ohio 45318; Phone: (937) 473-2840; <http://www.atoctechnologies.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**

Basic WXSAT Reception

This month the focus is on continuing my introduction to low-cost weather satellite (WXSAT) reception for the beginner, but first an update on European LRIT.

The flow of LRIT – Low Rate Information Transmission – images from the trial testing phase of the Meteosat Second Generation (MSG-1) European geostationary satellite has brought a new dimension to WXSAT imaging in Europe. Until late July, the only way to receive high resolution “live” (well, retransmitted) imagery from GOES-west, GOES-east, and GMS (now GOES-9) satellites was by using a Primary Data User Station, requiring a 1.8m dish and some expensive hardware. It all changed in late July when the equivalent images from MSG-1 were – after several delays – finally included in the stream of data from MSG-1. For the cost of a near-standard satellite television system, plus the cost of the essential software, we are now getting outstanding images – HRIT, LRIT and Foreign Satellite data.

Figure 1 shows the LRIT format image originating from GOES-east (GOES-12). The three spectral images are retransmitted from MSG-1 every 180 minutes. GOES-west (GOES-10) imagery is also included, as is GMS/MT-SAT. The resolution and quality are considerably higher than those from the WEFAX transmissions that are continuing from Meteosat-7.



Fig 1: LRIT image showing GOES-east August 3, 2003, image retransmitted by MSG-1. Image copyright EUMETSAT 2003.

◆ APT - Automatic Picture Transmission

The world of amateur WXSAT monitoring is indebted to the National Oceanographic and Atmospheric Administration for free access to transmissions from its constellation of WXSATs. Last month I explained how, for the cost of a suitable antenna and WXSAT receiver, we can tune into NOAA's-12, -15 and -17 to receive APT. The usual way that we do this is to use a scanning receiver that sequentially looks at 137.50 and 137.62 MHz. These are the spot frequencies listed at the end of the column.

Older types of WXSAT receivers used individual crystals with manual tuning, but for some years now we have used scanning receivers that lock onto any signal. The most effective receivers are those that only lock on signals that have a 2.4 kHz sub-carrier, and therefore reject most types of interference.

The image received as APT originates from an instrument on the satellite called the Advanced Very High Resolution Radiometer (AVHRR), that is basically a telescope producing an image of the earth below. The image has to be sampled in such a manner that the energy in specific wavebands can be extracted.

The AVHRR instrument has a mirror that rotates at 360 revolutions per minute. Each rotation causes the imager to sample data from three different sources: deep space, a 1.1x3200 km swath of the Earth, and a warmed black body calibration radiator housed in the instrument itself. The radiant energy collected is then passed through the telescope and through five separate optical devices designed to sense radiation in specific wavelength bands (called channels). This produces a fully calibrated set of image data for the channels.

If you monitor the highest resolution data – HRPT (High Resolution Picture Telemetry) – from the 1700 MHz band, you can receive five channels of data.

Ch.	Wavelength	Application
1	0.58 - 0.68m (microns)	Daytime cloud and surface mapping and normalized vegetation index.
2	0.725 - 1.10m	Surface water delineation and normalized vegetation index
3	3.55 - 3.93m	Cloud mapping
4	10.3 - 11.3m	SST (sea surface temperature) and day/night cloud mapping
5	11.5 - 12.5m	SST

All five channels are transmitted in the

HRPT data stream in the 1700 MHz band, and necessitate a sophisticated reception system to receive and decode the image data. The APT data stream, transmitted in the 137 MHz band, is less demanding! Using the hardware described last month, the data can be decoded with the subsequent addition of software.

The APT signal comprises two of the five spectral channels. The signal is transmitted continuously using amplitude modulation on a 2400 Hz carrier. Every half second, an image line containing image data from two AVHRR channels, together with calibration and channel identification information is transmitted. The image lines build up during each pass (see figure 2) to produce two adjacent images from the two channels. Figure 2 shows channel two – visible-light – with additional information.

As the pass continues, synchronized patterns show up as horizontal lines on the left of the image, representing minute intervals, while telemetry data are shown as grey scale wedges carrying calibration and other information on the right. Any two of the AVHRR channels can be chosen by the NOAA ground station for dissemination.

A visible channel is used to provide visible APT imagery during daylight, and one IR (infrared) channel is used continuously as the second channel. During the nighttime portion of the WXSAT's orbit, rather than transmit a blank visible-light channel, one of the alternate infrared channels is switched in.

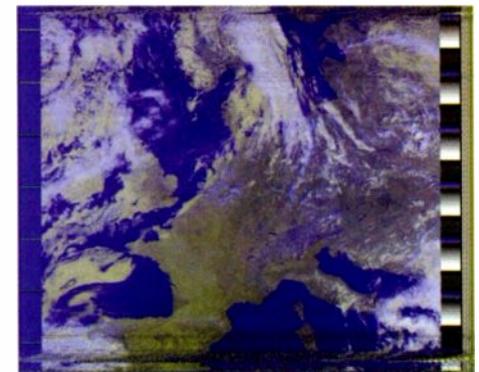


Fig 2: APT image from NOAA-17 1048 UTC 1 July - channel 2

Frequencies

NOAA-12 and -15 transmit APT on 137.50 MHz

[During “overlap” periods, NOAA-12's APT is usually switched off.]

NOAA-17 transmits APT on 137.62 MHz
GOES-10 (west) and GOES-12 (east) use 1691 MHz for WEFAX

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Can't Lead From Behind!

By Larry Van Horn, N5FPW
Monitoring Times Assistant Editor

"The primary mission of MARS is to provide communications support for federal agencies in responding to emergency situations on an international, national, and local basis as an addition to normal military communications. The primary response to an emergency or disaster will be accomplished by local and/or state emergency or disaster officials, with communications support from MARS." Mission Statement of the Uniformed Services MARS Programs.

It has been one year since my *MT* colleague Fred Maia, W5YI, wrote in this column on the findings of a U.S. Army Inspector General's Investigation/Report of fraud, waste and abuse within the U.S. Army Military Affiliate Radio System (MARS), a DoD sponsored and taxpayer funded program. One of the more eye opening comments in that column involves the ability of Army MARS to conduct their primary mission.

"Another issue that the DAIG investigated is the accusation that MARS failed to support military, civil and/or disaster officials during declared emergencies with needed radio communications. Specifically mentioned is the terrorist attack of September 11, 2001, when the city of New York experienced a massive communications failure.

"MARS has the capability of establishing communications in this type of environment, but without planning and training, this capability cannot be realized. Simply stated, no one knew that MARS was there."

"The potential for Army MARS to provide support in the aftermath of 11 September 2001 was phenomenal. Phone links from New York to Washington alone would have relayed critical information to the decision makers and would have helped make up for the loss of key communication links lost in the disaster. The MARS VHF capabilities could have assisted in clarifying the federal emergency response. Computer centers could have been linked via MARS HF links; and phone patches could have placed key individuals in contact with their organizations."

Although Army MARS established a radio net and remained on the air for several days the DAIG found that MARS were not prepared to handle needed communications and did very little in the way of emergency assistance "...except conduct radio checks."

Over the last year many radio hobbyists, current and former MARS members, and others have watched closely the on-the-air activities of all three DoD MARS programs. The purpose of conducting this monitoring surveillance was to see if the Army IG report had any effect in making the MARS programs more effective in the accomplishment of their primary mission.

To quote one member of the MARS program, "In the opinion of many of the individuals who monitored and watched the successes or failures of MARS during the past year, little has improved, and disaster after disaster, emergency after emergency, MARS has done little to show progress in corrective action to

maintain the readiness of MARS for its primary mission."

While a detailed discussion of events of the last year is not possible in this editorial column, the point made above can be illustrated dramatically with their response to just one single major event.

As I pen this, we are still discussing the aftermath of the largest power failure in the history of this country: the blackout in the Northeastern United States the second week of August. This emergency should have had MARS operators present and active in a major way. Critical military bases were affected; local, state and federal government communications by most accounts were marginal at best; and the extended nature and coverage of the event in the media should have had the MARS frequencies buzzing with activity.

So what was the response? From the reports we received here in Brasstown from monitors nationwide and from overseas there was *no* response. Not even a hint of activity on any of their national or major operating frequencies in the immediate aftermath of the power outage.

As one former MARS member puts it, "Despite listening and observing carefully, I have yet to find any significant emergency communications role assigned to MARS by any agency, at any level."

An effective organization is one that has good leadership at the top, and I believe most of the problems occurring within these MARS organizations stems from a lack of quality leadership. As one famous Civil War General pointed out, "You can't lead from behind."

In this age of increased homeland security and terrorism threats maybe the MARS services should take a page from the amateur radio's national organization here in the United States – the ARRL. Time and time again the amateur radio community has been very successful in providing emergency communications services to all levels of government. We see this manifested regularly on the ARRL website (<http://www.arrl.org>), and in articles and newsletters. This stems directly from the leadership at the ARRL and a cadre of trained and enthusiastic volunteers. But, with the three MARS programs, we see nothing of their accomplishments and the reason is simple: There are none.

As one MARS member recently noted in a private communications to me, "We volunteers collectively need to reevaluate our commitment to the organizations we volunteer with. Are we doing our job, are our commanders doing their job, and most importantly, are the systems working as designed and mandated by either the President, Congress or the Department of Defense? If not, then many of the items discussed in the October 2002 issue of *Monitoring Times* remain valid to this day regarding Army MARS."

The options seem clear: if the appropriate changes cannot take place internally, then commanders of higher authority must assume the responsibility for MARS. They should first reexamine the value of the program. If they decide its mission is still valid, they should ensure its effectiveness, including a complete reorganization if necessary. If they decide the program has outlived its mission, they should abolish it. Until that time, MARS appears to be a waste of taxpayer money.

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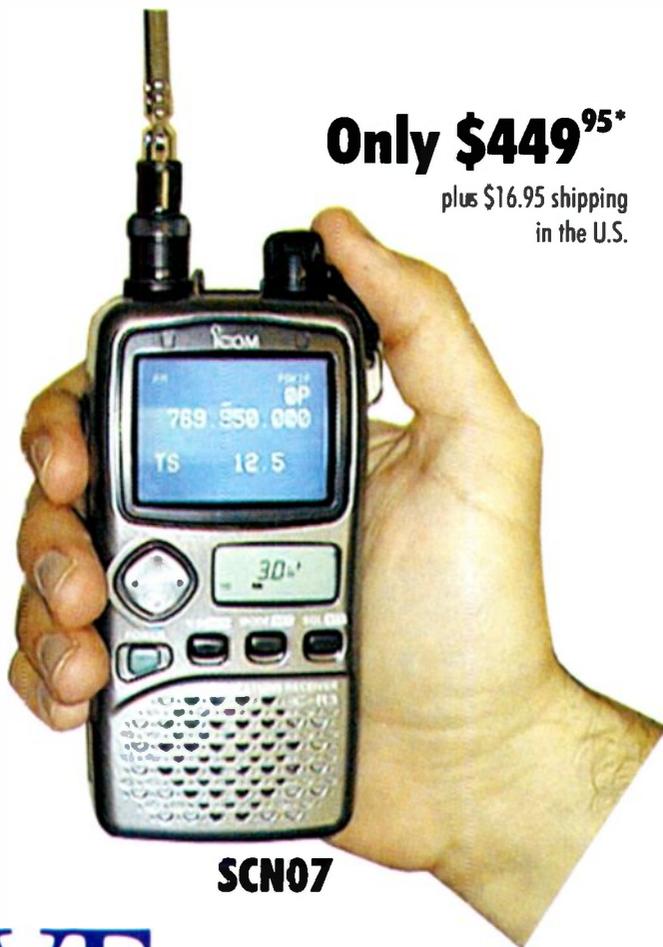
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