

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

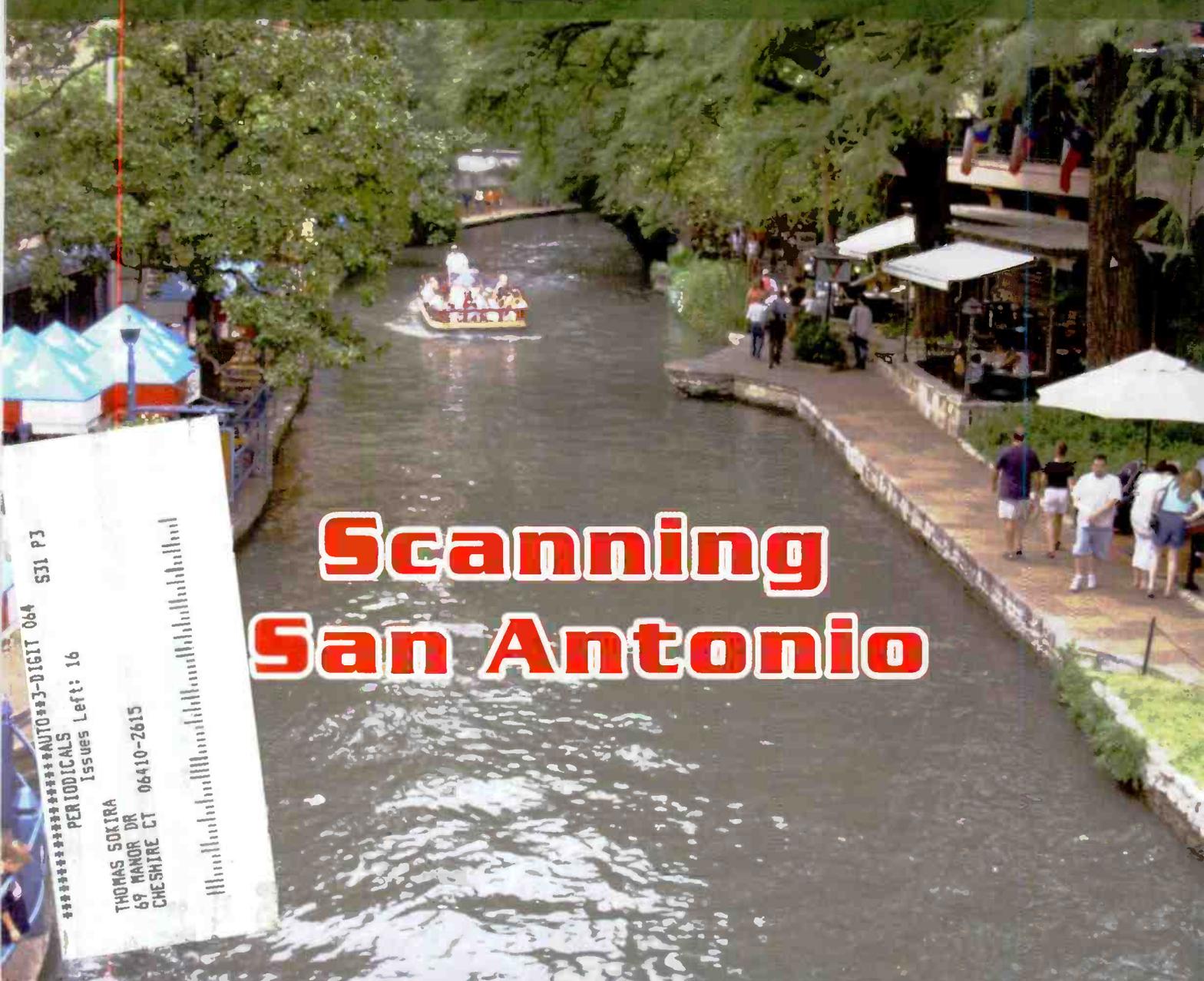


Monitoring Times

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Volume 23, No. 12
December 2004

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



Scanning San Antonio

*****3-DIGIT 064 531 P3
*****AUTO**
PERIODICALS
Issues Left: 16
THOMAS SOKIRA
69 MANOR DR
CHESHIRE CT 06410-2615

**MT Exclusive: Two Revolutionary Radios -
Uniden's BC-246T - An new era in scanning
FlexRadio SDR-1000 Full-Spectrum Radio**



AR5000A+3 Wide Coverage Desktop Communications Receiver

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combined with superb sensitivity
and all mode reception!



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Indulge yourself this season.

receivers ■ software ■ antennas

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WR-G303i receiver

The internal model WR-G303i, has the entire front end of a sensitive shortwave receiver contained on a PCI card. It is well shielded against the effects of PC-generated interference. Demodulation is performed by the PC using advanced digital signal processing techniques. "Plug and Play" installation.



WR-G303e receiver

The WR-G303e is an external software-defined shortwave receiver with USB interface. An optional serial interface is also available. Now there is a portable software-defined HF receiver you can take with you anywhere.



WR-G313i receiver

This is a high performance software-defined HF receiver on a PCI card, 9 kHz to 30 MHz (optionally to 180 MHz). The ultra-sensitive receiver (CW signals under 0.05 μ V can be read) is resistant to strong signal overload.



Remote radio control

The WR-G313i receiver can be controlled remotely via a LAN or WAN (including the Internet) using the WiNRADiO Client/Server Option (CSO). The receiver is connected to the Server computer, while the user can control the receiver via another computer on the network (the Client).



DRM Decoder

A DRM decoder for the G3 series is now available. Enhance your G3 series receiver with the ability to receive and enjoy DRM broadcasts that are thousands of miles away, yet as clear as your local FM station.

Digital Processing Software

Expand the power of your WiNRADiO receiver with the optional Advanced Digital Suite, a collection of digital signal processing modules.

Includes digital processing facilities such as: FAX Decoder, NAVTEX Decoder, Packet Radio Decoder, ACARS Decoder, Signal Classifier, CTCSS and DTMF, Audio Recorder, Audio Oscilloscope, Spectrum Analyzer with waterfall spectra, and a Signal Conditioner with numerous user-defined filters.



Antennas

Amongst our many antennas and accessories, also check out our long wire antenna kit (AX-05E), and an extremely efficient long wire adapter (LWA-0130). Unlike most conventional antenna 'baluns', the WiNRADiO Long Wire Antenna Adapter employs a dual broadband transformer technique which offers an improved performance over single-transformer devices. Add this low cost device to your existing long wire and hear the difference!



Check our website for our entire product range:

WiNRADiO®
www.winradio.com

Monitoring Times

Vol. 23, No. 12 December 2004



Cover Story

Scanning San Antonio

By John Mayson

For a great place to vacation during winter months try sunny San Antonio. There's a lot to see and enjoy besides the Alamo – cultural entertainment, sports, amusement parks, plus several colleges and universities. Pack your scanner with you when you go: Although Bexar County encrypts its EDACS control channel, there's still a lot to be heard from surrounding counties and military bases.

Plug in these frequencies for the San Antonio area and you'll tune in to the true local flavor of the American Southwest. Story starts on page 12.

On our cover: The San Antonio Riverwalk – a pleasure at any time, but especially at Christmas with carolers and luminarias. Photo by John Mayson.

Monitoring Our Earth 18

By Bob Grove

The U.S. Geological Survey is keeping a close ear on a surprising number of active or potentially active volcanoes. More than 50 volcanoes have erupted since the 1800s within the United States. Bob Grove visited one of the most active – Kilauea on the island of Hawaii. Hawaii and the western states are riddled with seismic sensors which register earth tremors and transmit their data. This is truly earth-shaking monitoring!

Shortwave Listeners' Field Day 21

By Virginia Enzor

Hams hold their Field Day exercise in June, and elite groups of hobbyists head out to isolated locations for DXpeditions in the dead of winter. But the Tarheel Scanning/Shortwave Listeners Club in Raleigh, North Carolina, took their hobby into the public eye at a local park on a beautiful spring day for a lot of fun and full-spectrum monitoring.

International DXpedition to Resica Falls 22

By Kris Field

Far from being elite hobbyists, these DXers were all rank beginners, earning a badge during Boy Scout summer camp. Excitement was added as two staff members from other countries joined them to listen and translate broadcasts from their home countries.

Monitoring Logic Trunked Radio 24

By John Wilson

Successfully programming an LTR system into your scanner is trickier than you might think. If no one else has already determined the system configuration, you'll have to figure it out yourself. Here's one method that may seem tedious, but it works!

Reviews:

"Look, Ma, no banks!" Our top review this month is the first look by any magazine at a new era in scanning – the **Uniden BC246T**. Two innovations make this scanner unlike any other: its dynamically allocated memory system, and Close Call™ which not only detects but tunes in nearby transmissions. (See page 78.)

MT continues its look at the ground-breaking **FlexRadio SDR-1000**. A software defined radio is only as good as its software; FowerSDR gives the user flexibility and control only dreamed about in hardware-defined radios. (See page 84.)

MT reviews two accessories: The **WinRadio AX-71C Discone Antenna** wideband, omn-directional antenna for VHF/UHF receiving and transmitting, and the **Icom SP-23 Noise-Reducing Speaker**. (See page 82.)

We continue playing air traffic controller with the AirNav Live Flight Tracker, except it's now version 6 instead of 3 – We're really having fun now! (See page 80.)

Win the Gadget Guy's High Altitude Get-Your-Name-and-Picture in the Gadget Guy Column Contest while using the **High Gear Alti-Tech2**. Check it out on page 86.

How He Knows You've Been

BAD

...Or

Good

(so be good for goodness sake!)

ICOM



R-20-06 Cover, AM/FM radio, TV broadcasts, wireless communications, boaters, aviation, conventional public safety, etc. (U.S. 5-3304.99MHz cell blocked). Features a digital recorder. hours continuous receive 2.28" x 5.5" x 1.27"



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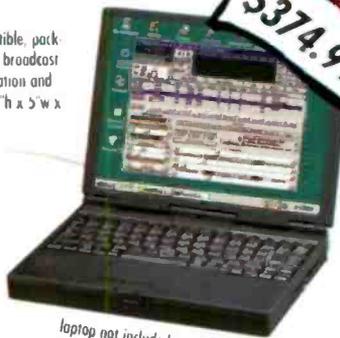


R-10-05 Coverage from 0.5MHz-1300MHz (cell blocked) with all mode receive capability. 5.1" x 2.3" w x 1.2" d, 11 oz



R-5-06 Listen in on car-to-pri calls, look to sites while traveling, or catch a favorite program at home (0.015-1309.995MHz, cell blocked). 3.38" x 2.28" w x 1.06" d, 6.5 oz

PCR-1000-02 80W Laptop/desktop top PC-compatible, packaged with the Bonito Software. Listen in on broadcast radio, television, non stations, marine, aviation and more (U.S. to 1300MHz, cell blocked). 11.9" h x 5" w x 7.94" d, 2.2 lbs.



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R-8500-02 Super wide band, all mode coverage from HF to 2GHz (cell blocked), including shortwave and VHF/UHF. 11.3" w x 4.4" h x 12.2" d, 15.4 lbs.



R-75 Covers 0.03 to 60MHz. Use conveniently in a ham shack, den or vehicle. 9.5" w x 3.69" h x 9.03" d, 6 lbs, 10 oz. Comes with FREE UT-106™ DSP unit.

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Address: 7540 Highway 64 West,
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Telephone: (828) 827-9200
Fax: (828) 827-2216 (24 hours)
Internet Address: www.grove-ent.com or
e-mail: mt@grove-ent.com
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Owners

Bob and Judy Grove
judy@grove-ent.com

Publisher

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor

Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor

Larry Van Horn, N5FPW

Art Director

Bill Grove

Advertising Svcs.

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

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Email fristlast@monitoringtimes.com

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WORLD RADIO TV HANDBOOK

WRTH 2005

Updated with the help of some of the world's leading DXers and BCLs, we are proud to present the 2005 edition of the bestselling directory of world broadcasting on LW, MW, SW & FM

688 pages full of information:

- National and International broadcasts and broadcasters by country with frequencies, powers, languages, station addresses, email, web, phone and fax, leading personnel, QSL policy, and more
- Clandestine and other target broadcasters
- MW frequency listings by region
- International and domestic SW frequency listings
- International SW broadcasts in English, French, German, Portuguese & Spanish, listed by UTC.
- Equipment reviews, and articles on *Ancillary Equipment, Managing the HF Spectrum, World Music Radio*, and more
- TV by country
- Reference section with Transmitter Site Location Table, Standard Time & Frequency Transmissions, DX clubs, Internet Resources, and much more

Available December 2004

SOME COMMENTS ON WRTH 2004:

Again this year, I can recommend serious DX-ers to buy this "DX-ers Bible"! I have all Editions of the WRTH since 1961 in my collection and I am pleased to say that the 2004 Edition is the best!
Anker Petersen, Danish SW Club International

I just got WRTH for 2004. It is so well done, I can't believe it! As I flip thru, picking various stations and countries - it's all there. I thought last year's WRTH was the end of the line, it could not get any better - this 2004 is superb!
H Ragan, USA

The WRTH 2004 is super!
J Slavik, Czech Republic

WRTH is excellent as usual
L Reeves, USA

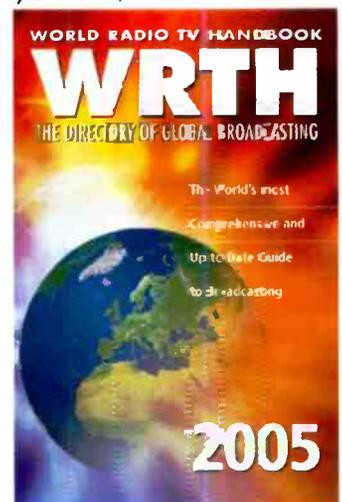
I highly recommend the World Radio TV Handbook as a convenient place to look up addresses - and much else. I often grab my copy and find stuff fast
Glenn Hauser, DX Listening Digest

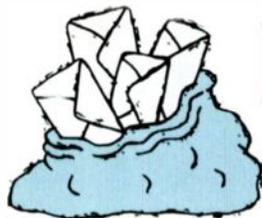
WRTH 2004 is the first world class radio directory I ever came across
M Nanayakkara, Sri Lanka

The bible for DXers is very, very good
P Bouças, S.Tomé and Principe

A great reference work for all radio hobbyists - the World Radio and TV Handbook 2004
Adrian Peterson, AWR Wavescan

Excellent publication
J Easterly, USA





LETTERS TO THE EDITOR

The Spirit of Giving

In our November column we mentioned a museum which accepts donations of radio equipment. But it's rare to know who might want our used equipment that is too good to simply trash. Last summer Alan Simon, a California resident contacted *Monitoring Times* about some radio equipment he wished to give to a worthy recipient. He writes:

After almost 55 years of short wave involvement, I still had several items in my possession that I felt were useful to any person smitten by the radio bug, as I was many years ago. Even though the Internet is all the present rage, basic radio is still a large percentage of communication in many parts of the world, and is also the only means of obtaining news and information for the people who live there. (Not everyone has a TV or a computer.) I still listen to these broadcasts when I can, with my IC-R75.

I contacted *MT* since I felt that they were one of the best sources of knowledge for the purpose of making this type of donation. I was not disappointed; in fact I was treated to a courteous exchange of letters, culminating in a positive donation of my "stuff" to The Southern California Area DXerS (SC ADS).

"I would like to express my appreciation to *MT* for their help. Also I would like to encourage others to likewise donate their unused radio material to others who are in need of these items. Some are hard to find and need a good home."

Alan Simon, KG6ELD

We actually did not know of a specific person in need, but we did know of a club in his area. Although the Southern California Area DXerS (SC ADS) didn't know of a worthy recipient either, they decided to sell the equipment as a fund raiser for the club. Mr. Simon received a nice tax deduction, someone got a bargain on radio gear, and the club got a tidy profit—an excellent solution all around.

Our compliments to Alan Simon for his generosity and to SC ADS for their creativity. Clubs might also raffish used equipment or use it as a door prize. *Monitoring Times* will also donate free ad space for anyone with equipment to donate who would like to find a person or club to give it to. Why not give it some thought next time you're clearing out the radio shack?

Time Shifting

"I enjoyed 'Time Shift Your Listening' by Richard Cuff in the September 204 issue of *Monitoring Times*."

"I recently purchased a Sangean AT-818ACS with a built-in recorder and, frankly, can't understand why I did not get one years ago. It must be admitted, however, that had I known his trick of using a voice-activated recorder with a timer equipped radio I would have been recording programs years ago."

My only complaint concerning the Sangean 818ACS is that it emits a sharp "beep!" whenever one changes bands or enters a frequency that has not been preprogrammed and I find this severely limits its use as a bedside radio. If anyone can tell me how to disarm this feature I would be grateful."

Matthew Weitendorf

"I enjoyed the article on time shifting your shortwave listening, but I use a lower-tech system that works quite well. Instead of the small recorders suggested in the article, I use a good old VCR to tape my favorite shortwave programs for later listening. The VCR can be set for days in advance, with precise timing to begin and end the recordings. I just preset the desired frequency on the receiver. It's easier to do this on a VCR that doesn't need a TV screen to program (which are uncommon these days)."



"In my shack (pictured), I run the 'line out' jack on the Satellit 800 to the 'audio in' on the VCR to make the recordings. Afterwards, I simply dub what's on the VCR to a cassette deck via the 'audio out' jack on the VCR, and can listen to the dubbed cassette in the car or on a Walkman at my convenience. I've been using this method to make excellent recordings of such programs as 'DX Partyline' and 'World of Radio' for years. I've also used it for 'time shift' DXing, when I'm searching for those stations that are on very late or very early in the morning."

"Many of us have older, underused VCRs in the house, so this is a good way to use them to bolster shortwave listening!"

Ben Loveless WB9FJO

"Thank you for publishing Richard Cuff's

fine article, 'Time-Shift Your Listening.' It is good to learn about applying newer technology such as MP3 and webcasting, to the established process of recording broadcasts. Mr. Cuff also writes about using a voice activated cassette machine to record from a radio.

"I'd like to add that newer technology can be applied here, too. Digital voice recorders do a fine job, and several are available for under \$50. I use an Olympus VN-240 set for voice-activated recording and run a patch cord from the mic in jack to the radio's earphone or extension speaker jack. This is pretty much as Mr. Cuff suggests for taping, and the results sound great. The digital voice recorder also has the advantage of being small and lightweight."

Michael Fink

In Deep Appreciation

Thanks to all our readers and subscribers who responded to the short survey in the October issue and online. Your feedback will help us to focus in 2005 on your core areas of interest, and to cut back in some areas where there is little interest. The aspects of radio which garnered the least amount of support so far are the satellite columns, the Canadian scanning column, and the legal column, so December will be last time these will appear in *MT* as regular columns. We expect to run occasional feature articles on legal cases or legislation of importance and on Canadian topics as we did before these topics became regular departments.

Our thanks go out to the authors—it was clear that it was not their competence that was the issue, but a lack of interest in the topic by the majority of readers. Robert Smathers (Satellite Services Guide) first started out with *Satellite Times* in September 1994; Lawrence Harris (View from Above) also started with *ST* in July 1997; John Corby (Scanning Canada) has been writing his column since September 2001, and Jorge Rodriguez (Monitoring and the Law) started in May 2003. Thanks for giving it your best shot, gentlemen. Readers who are faithful followers of these columns can find some advice on where to contact these writers and where to find related information by checking out their columns this month.

Seasons greetings to all our friends out there in radioland! See you in 2005.

Rachel Baughn, editor

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!

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| AR-3000AB | RCV26 | \$1062.95 |



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| VR5000 | RCV51 | \$889.95 |
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| ATS-505P | RCV 7 | \$109.95 |
| ATS-909 | RCV 8 | \$239.95 |
| ATS-818AcS | RCV18 | \$199.95 |
| Travel Pro | RCV 9 | \$59.95 |
| PT-80 | RCV19 | \$159.95 |

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| R8-B | RCV 3 | \$1499.00 |
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| KAITO | KA1102 | RCV 2 | \$89.95 |
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WiNRADiO

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| WR-G313i | RCV31 | \$949.95 |
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Monitoring and the Law

Are You Law-Abiding? Or Ignorant?

An anonymous contributor to the Doing Freedom web site once wrote, "If firearms are liberty's teeth, and cryptography is liberty's voice, then radio scanners must surely be liberty's ears." For the past two years this column has helped keep those ears open. However, this month's column marks the last and final regular column of *Monitoring and the Law*. Early on, the editors and myself suspected that the limited number of states that have laws dealing with scanners and the infrequent arrest of a hobbyist would conspire to limit the life of this column. Although the time has come to say goodbye, we urge readers not to remain complacent.

It is an unfortunate reality that most people ignore the laws and the lawmakers until they have a problem, and the monitor radio hobbyist is no exception. Many a Criminal Defense lawyer has sat for hours explaining to a person who has lived a law abiding life that there is, in fact, a law against what they did, and the prosecutor is not willing to use his or her discretion to see the truth.

This is not to suggest that most people are not law abiding. Rather, it is the very fact that they are law abiding that causes most to go about their daily lives secure in the knowledge that they can't be doing anything wrong until it is too late. For example, ask the average buyer of a police scanner at your local electronics store if he or she is aware of any restrictions on the use of their new purchase and most will tell you no. The assumption is that if the store can sell it; they can buy it and use it.

However, the truth is that there are Federal restrictions that apply in all fifty states on the use of such radios because of the Electronic Communications Privacy Act of 1986 at 18 U.S.C. 2510 et. seq. and both earlier and later Federal laws. Some states and municipalities also have their own laws and ordinances restricting scanners which can make for a patchwork that is difficult to comprehend.

It is not until some unfortunate set of circumstances come together and the law abiding listener is ensnared in the law that the common phrase – "there ought to be a law" – becomes, "Why me?" Why does this law apply to me?

Here is our collection of some of the laws we've covered in past two years; many of these were covered in-depth in past columns and all of those columns will remain available online.

❖ Federal Laws

At the Federal level, Electronic Communications Privacy Act of 1986 (ECPA) makes it illegal to monitor cellular phone transmissions; this in-

cludes early, original analog cellular telephone calls in the 800 MHz band and newer, more recent additions in other areas of the radio spectrum as well as digital cellular telephone calls. ECPA also makes it against the law to manufacture cellular-capable radio receivers and to modify to a radio so it can receive cellular signals. Manufacturers cannot sell or import cellular-capable radio receivers, except to authorized FCC users and law enforcement agencies. Radio receivers manufactured before 1985 were grandfathered in and are exempt.

Federal law in recent years now makes it illegal to monitor cordless telephone calls, and some states, such as South Dakota, have very restrictive wiretap laws that make it a felony to "overhear" a cordless telephone call by almost any means if you are not a party to the call.

In addition to its many cellular telephone restrictions, ECPA makes it illegal to monitor any scrambled, encoded or encrypted radio signals, since they are not considered readily accessible to the public. Also prohibited is the monitoring of what are commonly referred to as subcarrier SCA signals or FM-SCA. A subcarrier, known also as Subsidiary Communications Authority or SCA, is a separate audio or data channel, which is transmitted along with the main audio signal over a broadcast station. According to the Federal Communications Commission, tunable subcarrier receivers are prohibited because they violate Section 605 of the Communications Act of 1934, as amended by ECPA, which states that no one may receive, or assist in receiving, any radio communication to which they are not entitled and use that information for their own benefit. In addition, 18 U.S.C. Sections 2510 through 2521 prohibit the manufacture, assembly, possession, and sale of any device primarily useful for the surreptitious interception of such radio transmissions. These same rules prohibit the monitoring of the audio and the digital data sent across a paging system. Federal law also outlaws the monitoring of remote television and radio signals.

❖ State Laws

Across these United States we've found a mix of laws designed around protecting law enforcement and helping them do their job. Many of these states have exemptions in their laws for authorized personnel to listen to these communications. Usually being a licensed amateur radio operator is all it takes to legally possess a police scanner that would be illegal for others.

In Florida and Rochester, New York, it is

illegal to monitor if you have criminal convictions in your background. Florida and six other states (Indiana, Kentucky, Michigan, Minnesota, Nebraska, New York) make it illegal in one form or another to listen away from your home. Florida even prohibits monitoring in a business establishment. California and five other states have specific laws prohibiting the use of a police radio during the commission of a crime. In addition to this, every state has laws dealing generally with obstruction of justice or law enforcement, which can be applied to the use of a police radio, which is used to aid the commission of a crime.

❖ Monitoring for Gain

Another large category of restrictions deals with the illegal use of intercepted information for private, personal gain. Since the Communications Act of 1934 it has been illegal to disclose or use information heard to a third party, except for signals which are broadcast to and for the public and so are considered readily accessible to the public.

The rationale for some of these restrictions has developed to protect particular industries as much as the police. Early radio dispatched taxi services complained that the taxi would arrive to the address, only to find that competing taxi drivers who were closer had intercepted the dispatch and arrived before them. Similar worries in 1997 prompted Maryland law makers to prohibit towing services from equipping tow trucks with police scanners in that state.

Throughout these columns and in the disclaimer on this page we have always recommended that readers make their own enquiries of their elected representatives or on their own in their local libraries and online, to insure that they have the most compete and up-to-date information on the laws that may apply to them as a monitor radio listener.

Monitoring Times will continue to report on significant developments in the area of Monitoring and the Law from time to time in other areas of the magazine. I can be reached directly at jr@indylawyer.com or by contacting the Indiana Supreme Court's Roll of Attorneys.

Disclaimer

Information in this column is provided for its news and educational content only. Nothing here should be construed as giving specific legal advice. Persons desiring legal advice about their specific situation should consult an attorney license in their jurisdiction.

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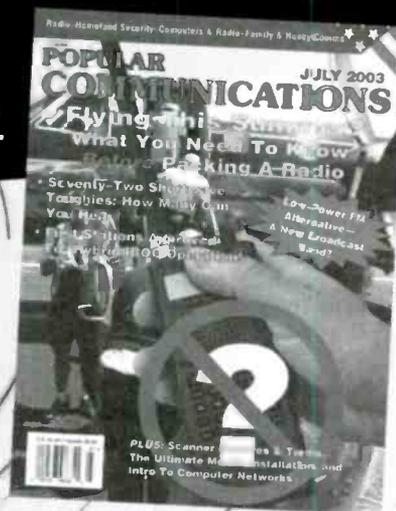
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AMATEUR RADIO

The big story of 2004, at least for Florida residents, wasn't the presidential election or the war in Iraq – it was the hurricanes. Heroes were many, but certainly amateur radio operators were high on the list. Even when most places lost power, amateur radios either used batteries or generators to continue transmitting.

In Jamaica, Florida, the emergency Auxiliary Communications Service was activated two times in September — the only instances in the department's history.

"The ham operators are the unsung heroes of the EOC," said Etta LoPresti, county emergency management planner. "A lot of people say we don't need amateur radios anymore because of the advancements in cellphone technology, but they were our only reliable link to the outside."

BROADBAND OVER POWER LINES

FCC Okays BPL Rules

October 14th the Federal Communications Commission voted its approval of Broadband over Power Lines (BPL) in a revision of Part 15 rules governing unlicensed services. BPL uses radio frequencies between 2-80 MHz to provide the internet over electrical wiring – the same spectrum as HF and VHF radio. Alarmed by the nearly inevitable interference this will cause to the HF bands, the American Radio Relay League and other agencies to whom HF communications are critical spent more than a year battling with the FCC for protection.

The Report and Order contained three points which were in direct response to these concerns: A requirement that equipment be certified rather than merely verified; the creation of a publicly available BPL database; and mechanisms to deal swiftly with interference complaints. BPL must also avoid operating in "excluded frequency bands" to protect aeronautical communications and must avoid certain frequencies in "exclusion zones" close to sensitive operations, such as coast guard or radio astronomy stations.

In a press conference following the meeting, OET Deputy Chief Bruce Franca said some of the BPL equipment now in place may not meet the tighter guidelines. "Some of the technologies that are being deployed today do not have all of the capabilities that we are requiring for BPL systems," he said, "so there'll have to be some adjustments to current deployments."

The Amateur Service frequencies were not among the services protected by exclusion or by "notching," but are to be protected on a complaint basis, "when and if interference occurs." Ham radio hobbyists sought better safeguards, saying they should not have to wrangle with utilities every time they hear static.

Instead, the FCC plans to require utilities simply to ensure they are equipped to stop interference by blocking transmissions on certain

channels, cutting power or remotely turning off gear. Engineers claim that banning power companies from ham-radio bands outright would limit Internet speed and customers served.

BPL in the Real World

In the United States, field tests are on-going in Westchester County, Massachusetts, and Cottonwood, Arizona, and no doubt in other locations we are not aware of. Both these locations are working to mitigate amateur radio complaints, with mixed success. Tests in Penn Yann, New York, and Cedar Rapids, Iowa, were abandoned because of unresolved interference issues. A field test in Raleigh, North Carolina, was discontinued with the power company claiming it a success, though with no immediate plans for deployment.

Manassas, Virginia, and Cincinnati, Ohio, are past the testing stage and are currently providing broadband service to customers. Both region's power companies seem to have experienced few complaints. Many city utilities in Manassas are buried, and a spokesman for Cincinnati's power company said that their system bypasses amateur radio frequencies.

It seems likely that with the FCC's new rules and several companies already marketing turn-key BPL systems, we'll soon see power companies skipping elaborate testing phases, as soon as certification of equipment is complete.

A field trial in California is testing other benefits to BPL besides providing internet access. One program could provide an appliance such as a dishwasher with an IP number so that could be set to run when the price of electricity dropped during off-peak hours.

Internationally, it looks as though several countries which have made use of shortwave broadcasting for reasons of geography are the same ones considering BPL for broadband delivery. The Digital Radio Mondiale consortium, which has hopes of using digital delivery to revive shortwave broadcasting, is very concerned about this potentially devastating interference to shortwave reception. Digital signals are even more vulnerable to interference than analog.

Canada and Australia are considering BPL solutions. Amateurs and CB operators in Australia point out that many other groups may be affected, including the Royal Flying Doctor Service, Emergency Services, School of the Air, outback companies, ministries, fire services, and truckers. The web page <http://homepages.ihug.com.au/~vk5vka/bplworld.htm> lists articles about BPL from ten countries and regions wrestling with the dilemma.

What does this mean for the shortwave listener who doesn't have the protections of the amateur radio operator? Many hobbyists are cautioning patience – that the interest in BPL will be short-lived and that power companies will discover that the technology is not commercially viable and cannot compete with newer wireless solutions.

Hurricanes Activate Beacons

Most airplanes and boats are equipped with an emergency locator beacon that transmits to the first satellite available when it's jarred by a strong force or crash. If the location of the beacon is within the United States, the alert is sent to the Air Force Rescue Coordination Center at Langley Air Force Base, Virginia.

When AFRCC can't locate the owners, they notify the Civil Air Patrol at Maxwell AFB, Alabama, who contacts CAP members or officials in the local area. The local CAP sends out a team to locate the beacon through direction finder equipment and disarm the beacon if it's a false alarm.

Hurricane Charley alone activated 700 to 1,000 beacons from aircraft and boats in the Punta Gorda, Florida, area. Teams from Florida, Arkansas, Alabama and Mississippi worked together by providing aircraft and ground support to locate and disarm the beacons.

Vice Cmdr. Kathy Piersma with the S.C. Civil Air Patrol explained why their immediate response is important, "So many were set off by the hurricane it tied up the satellites, so the real distress signals don't get through."

TV Signals Emergency

As a matter of fact, ninety percent of emergency signals initiated by beacons are false alarms, and Civil Air Patrol teams are accustomed to finding activated beacons in garages or even in the Post Office (just ask Bob Grove). But the CAP team in Corvallis, Oregon, had a new experience recently.

On the night of October 2nd, the international distress signal on 121.5 MHz was picked up by an orbiting search and rescue satellite, which informed the Air Force Rescue Coordination Center at Langley Air Force Base in Virginia. Langley got on the horn to the Civil Air Patrol, who called Benton County Search and Rescue Deputy Mike Bamberger for assistance in locating the source of the signal.

Armed with small receiving devices, Bamberger and a group of Civil Air Patrol volunteers determined the distress signal was coming from an apartment building on the corner of Fourth Street



Nov 27: Evansville, IN

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EMERGENCY LOCATOR BEACONS

and Jackson Avenue, narrowing the possible sources down to a couple of upstairs units.

They knocked on Chris van Rossman's door. Rossman said, "The police officer asked if I was a pilot or had a boat or anything. I said no, and they moved on."

"We narrowed it down to a spot on the wall in the hallway," Bamberger said. "Whatever was behind that spot is what it was." They knocked on van Rossman's door again.

"When he answered the door he turned off the TV, and the guy in the hall said, 'It just stopped,'" Bamberger recalled.

An inspection of the student's 20-inch flat-screen Toshiba TV television confirmed it was the source of the signal. He was instructed to keep his TV turned off or face fines of up to \$10,000 per day for emitting a false distress signal.

Unfortunately, the warranty on the TV had run out 16 days before. However, Maria Repole, director of public relations at Toshiba, is going to get van Rossman a new TV. Toshiba's technicians were mystified. "They've never heard of that before," Repole said. "They don't really have a technical explanation available."

PUBLIC SAFETY

Office of Interoperability and Compatibility

Secretary of Homeland Security Tom Ridge announced the creation of the Office of Interoperability and Compatibility (OIC), part of the Science & Technology directorate, to oversee the wide range of public safety interoperability programs and efforts currently spread across Homeland Security. These programs address critical interoperability issues relating to public safety and emergency response, including communications, equipment, training, and other areas as needs are identified.

The Office will be responsible to help create interoperability standards; establish a comprehensive research, development and evaluation program; coordinate grant guidance across all DHS grant making agencies; oversee development and implementation of technical assistance; conduct pilot demonstrations; create an interagency interoperability coordination council; and work closely with the new National Incident Management System (NIMS) Integration Center.

The goal of the Office is to reduce duplication of efforts and expense — not another government bottleneck.

OTHER RADIO NEWS

ELF Radio Transmitters Shut Down

The Navy has shut off its controversial, extremely low frequency (ELF) radio transmitters in northern Wisconsin and Michigan, saying the 15-year-old system is outdated and no longer needed. The Navy now will use 12 "very low frequency" transmitters located worldwide.

The antennas for the two huge transmitters

in the Chequamegon National Forest near Clam Lake and in Upper Michigan's Escanaba State Forest were strung on 600 40-foot poles across dozens of miles of forest.

Now that terrorism rather than Soviet submarines is of primary concern (and expense), ELF communications are another relic of the Cold War. (For more on this story, see *Utility World*.)

Balloon Collides with Radio Tower

On the last day and in the last hours of the Albuquerque International Hot Air Balloon Fiesta, a hot air balloon carrying three people got tangled into the top of one of the transmitter towers for 50 kW KKOZ AM.

A gust of wind blew Bill Chapel, who was piloting the Smokey Bear balloon, into the radio tower. Although the hot-air balloon's canopy got wrapped up around the 700-foot triangular tower, the pilot and two passengers Aaron Whitacre, 10, and Troy Wells, 14, were able to climb out of the gondola and climb down the tower's internal ladder. A newsman from the radio station indicated that management saw the accident and ordered the station to stop transmitting. At the time of the incident it would have been at full power.

Chapel and the boys met emergency workers at about 100 feet off the ground where they were helped into a utility bucket and lowered to the ground. One TV report said it takes about 30 minutes for a tower climber to get from the top to the bottom. The station was off the air for several hours until the balloon and its propane tanks were safely removed. (Steve Keithley contributed to this report.)

BWI Opens Wireless Lot

If you've done much flying lately, you will have noticed the mad rush to make cellular phone calls the minute the plane touches ground. So many of those phone calls are to people notifying their rides, that Baltimore Washington International Airport has set aside a free, 50-space parking lot for people waiting to pick up those passengers. Drivers waiting for airline passengers must stay at the car and can wait in the lot for up to one hour. The lot is an attempt to ease congestion by vehicles circling the airport.

Flying Wireless

Actually, it looks like it won't be long before cellular phones and internet access will both be available in flight as well as on the ground. Will you soon have to book your seat in the "quiet section" like the quiet car on commuter trains?

Communications is compiled by editor Rachel Baughn from newscippings submitted by our readers. This month we received a bonanza of news from these fine reporters: Anonymous, Skip Arey, Tim Ayris, Norman Hill, Mary Anne Kehoe, Steve Keithley, Rick Lindquist, Allen Lutins, Sterling Marcher, Dave Marshall, Terry Mefford, Jerry None, Ker Reitz, Michael Reynolds, Doug Robertson, Brian Rogers, Hugh Stegman, Robert Thomas, Larry Van Horn, Barry Williams, Robert Wyman, Ed Yeary, George Zeller.

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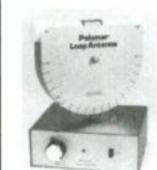


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Scanning San Antonio

By John Mayson

In 1716 the viceroy of Mexico authorized the construction of a Catholic mission to be used to convert local Native Americans to Christianity. This was one of the first in a string of missions constructed by the Spanish Empire during the 18th century along the San Antonio River. As the century came to a close, missionary activity began to wane and by 1793 the Church had completely abandoned the mission. Ten years later in 1803, a company of Spanish soldiers from Álamo de Parras, Coahuila, Mexico, occupied the buildings, turning it into a fort.

After the first decade of the 19th century, the Tejano people who lived in the area began to rise up against the Spanish government. The people in the area saw hard economic times, so they began earning a meager living by selling wild mules and mustangs to Louisiana. The Spanish Crown declared all wild animals to be property of the king, making this practice illegal. Finally in 1821, Mexico won her independence from Spain.

About this time a man named Stephen F. Austin visited the region, called "Tejas" after the Caddo Indian word meaning "friend." He described it as the land of milk and honey, bringing many Anglo, Scots, Irish, and German settlers to the area still controlled by Mexico. Within three years, 18,000 settlers had moved to "Tejas" – called Texas by the English speakers. The Mexican government was disturbed by the numbers of settlers moving to the area, so they decided to merge the area with

the Mexican state of Coahuila.

Mexican General Antonio López de Santa Anna saw the settlers as a plot that would have the Americans take over Mexico, so he moved against them. Battles began in 1834 between Santa Anna's forces and American and Tejano troops. On February 22, 1836, Santa Anna's forces were seen approaching San Antonio, causing settlers to flee or to seek refuge in a building known as the Alamo.

William Barret Travis led a group of 188 soldiers, who included Jim Bowie and a US Congressman from Tennessee named David Crockett. These brave men stood against thousands of Mexican soldiers. On March 6, 1836, Santa Anna's soldiers stormed the Alamo, killing every man, woman, and child. This so outraged the Texans that the battle cry "Remember the Alamo!" could be heard across Texas.

The following month on April 22, 1836, Santa Anna was captured by Sam Houston's forces, giving Texas her independence. On December 29, 1845, after nine years as an independent country, Texas was admitted to the United States as the 28th state of the union.

San Antonio Today

Today San Antonio is a vibrant metropolitan city. It's the second largest city in Texas, part of the third largest metropolitan area in the state, and the tenth largest in the country. It is home to two Army posts (Fort Sam Houston and Camp Bullis)

and five Air Force bases (Randolph AFB, Kelly Annex, Randolph AFB, Brooks City Base, and Lackland AFB). There are two large amusement parks in the city (Sea World Texas and Six Flags Fiesta Texas), many downtown attractions, several colleges and universities, and the world's largest private office building (the USAA Building). With so much going on, you can expect to hear plenty on your scanner.

However, not all is rosy in the Alamo City when it comes to scanning. San Antonio/Bexar County operates an EDACS trunked radio system. They encrypt the control channel, meaning trunk tracking scanners will not operate. Only a few talkgroups have encryption, so the system can be monitored conventionally. But don't despair, there's still plenty to hear in San Antonio. The military bases offer exciting trunking and milair monitoring, and the adjacent counties offer plenty of activity.

San Antonio/Bexar County TRS

San Antonio is the principle city and county seat of Bexar (pronounced "Bear") County. The city relied on a Motorola type I trunked radio system for many years and recently upgraded to the EDACS Pro-Voice TRS. As we mentioned above they have decided to encrypt the control channel which effectively disables the trunk tracking capability of scanners. But life could be worse. Even though the system is Pro-Voice digital, they

operate in analog. Additionally, the San Antonio Police Department (SAPD) does not share their frequencies with any other agency, so listeners will hear only the SAPD and not the dog catcher or city workers.

The system is actually made up of two networks, one called "Blue" and the other "Gold." SAPD operates exclusively on the "Blue" system while the remaining agencies use the "Gold" system.

As is the case with all EDACS systems, the frequencies must be entered in a specific order. Even though trunk tracking won't work, we'll list the frequencies in the proper order.

Blue System frequencies

- 1 - 856.4375
- 2 - 856.7125
- 3 - 856.7625
- 4 - 856.9875
- 5 - 857.4375
- 6 - 857.7625
- 7 - 857.9875
- 8 - 858.2125
- 9 - 858.4375
- 10 - 858.7625
- 11 - 858.9875
- 12 - 859.2125
- 13 - 859.4375
- 14 - 859.7625
- 15 - 859.9875
- 16 - 860.2125
- 17 - 860.4375
- 18 - 860.7625
- 19 - 860.9875

Gold System frequencies

- 1 - 856.2625
- 2 - 856.4875
- 3 - 856.9375
- 4 - 857.2625
- 5 - 857.4875
- 6 - 857.7125
- 8 - 858.2625
- 9 - 858.4875
- 10 - 858.7125
- 11 - 858.9375
- 12 - 859.2625
- 13 - 859.4875
- 14 - 859.7125
- 15 - 859.9375
- 16 - 860.2625
- 17 - 860.4875
- 18 - 860.7125
- 19 - 860.9375

We could use the entire page to list the talkgroups active on this system. However, since scanners can't track the system, we decided to dedicate the space to discussing other aspects of scanning the Alamo city.

EDACS systems use what's known as fleet mapping. Talkgroups are expressed in AFS (Agency, Fleet, and Subfleet) format. An example is the San Antonio PD Channel 1-A North Patrol. The talkgroup is 02-021. The Agency code is "02", the Fleet code is "02", and the Subfleet code is "1".

With this in mind, we'll list agencies using the San Antonio/Bexar County TRS by their Agency codes.

| Code | Agency |
|--------|--|
| 02-xxx | San Antonio PD |
| 03-xxx | San Antonio Park PD |
| 04-xxx | San Antonio FD/EMS |
| 06-xxx | San Antonio Aviation Department, County Government, Alamo Dome |
| 07-xxx | Miscellaneous |
| 08-xxx | Bexar County Sheriff's Office and Constable |
| 10-xxx | Parks Department |
| 14-xxx | Interagency |

Should they ever disable control channel encryption, readers will have some idea of what they're hearing.

Live Oak TRS

Some of the cities along IH-35 in San Antonio's northeast suburbs share their own EDACS Trunked Radio System. Unlike San Antonio's, this one can be trunk tracked.

Frequencies

- 1 - 866.3250
- 2 - 866.8250
- 3 - 867.5875
- 4 - 867.8875
- 5 - 868.1125
- 6 - 868.3375
- 7 - 868.5625
- 8 - 868.6750
- 9 - 868.7875
- 10 - 868.9125

Talkgroup Description

| | |
|--------|-------------------------------------|
| 02-063 | Live Oak/Converse FD Dispatch |
| 02-083 | Converse FD Response |
| 02-103 | Selma FD Dispatch |
| 02-021 | Live Oak/Converse/Selma PD Dispatch |

| | |
|--------|------------------------------------|
| 02-022 | Live Oak/Converse PD Ops |
| 02-023 | Live Oak/Converse PD Ops |
| 02-024 | Live Oak/Converse Special Events |
| 02-025 | Live Oak/Converse Warrants/Traffic |
| 02-061 | Live Oak PD Channel 2 |
| 02-081 | Converse PD Channel 2 |
| 02-082 | Converse PD CID |
| 02-101 | Selma PD Channel 2 |
| 02-102 | Live Oak/Converse PD Ops |
| 02-121 | Live Oak/Converse PD Ops |
| 02-122 | Live Oak/Converse PD Ops |

A number of agencies in Bexar County still operate on conventional frequencies.

| Output | Input | Tone | Description |
|----------|----------|----------|---|
| 155.4300 | 159.0750 | 032 DPL | Alamo Heights PD Channel 1 * |
| 155.1000 | | 203.5 Hz | Alamo Heights PD Channel 2 |
| 154.3700 | | 203.5 Hz | Alamo Heights/Olmos Park/Terrell Hills FD/EMS |
| 155.9100 | | 74.4 Hz | Balcones Heights PD Channel 1 |
| 155.5350 | | 74.4 Hz | Balcones Heights PD Channel 2 |
| 154.9950 | | 156.7 Hz | Balcones Heights FD |
| 156.1800 | 154.2500 | | Bexar County FD Alarm Dispatch |
| 153.7700 | | CSQ | Bexar County FD Alarm TAC-3 |
| 155.7450 | 158.8350 | 136.5 Hz | Castle Hills PD |
| 154.2200 | | 136.5 Hz | Castle Hills FD |
| 159.4650 | | | Hill Country Village PD |
| 155.7600 | 158.7900 | CSQ | Hollywood Park PD Channel 1 |
| 155.8350 | 158.8950 | CSQ | Hollywood Park PD Channel 2 |
| 154.8600 | 159.3900 | 203.5 Hz | Kirby PD |
| 154.0700 | 159.1950 | 203.5 Hz | Kirby FD |
| 154.7250 | 155.5800 | 203.5 Hz | Leon Valley PD Dispatch |
| 153.7850 | 158.9250 | 203.5 Hz | Leon Valley PD Channel 2 |
| 154.1450 | 151.1000 | 203.5 Hz | Leon Valley FD Dispatch |
| 154.8900 | 153.8450 | 203.5 Hz | Live Oak PD Dispatch |
| 153.9950 | 153.9950 | 203.5 Hz | Live Oak PD Channel 2 |
| 155.5650 | 155.5650 | 203.5 Hz | Live Oak PD Channel 7 |
| 154.1750 | | | Live Oak FD/EMS Dispatch |
| 155.8350 | | | Shavano Park PD Channel 1 |
| 155.6700 | | | Shavano Park PD Channel 2 |
| 155.9775 | 153.7925 | 136.5 Hz | Shavano Park FVD |
| 155.4300 | 159.0750 | 032 DPL | Terrell Hills PD Channel 1 * |
| 155.0400 | 155.1000 | 203.5 Hz | Terrell Hills PD Channel 2 |
| 453.1000 | 458.1000 | 210.7 Hz | Universal City PD Channel 1 |
| 453.5500 | 458.5500 | 210.7 Hz | Universal City PD Channel 2 |
| 453.7750 | 458.7750 | 91.5 Hz | Windcrest PD Channel 1 |
| 453.5000 | 458.5000 | 91.5 Hz | Windcrest PD Channel 2 |
| 460.5250 | 465.5250 | 173.8 Hz | Windcrest PD Channel 3 |
| 463.6250 | 468.6250 | 203.5 Hz | Windcrest PD Channel 4 |
| 159.8850 | | 203.5 Hz | Airlife |
| 409.1500 | 417.7500 | | Airlife Phone Patches via Lackland AFB |
| 464.0250 | 469.0250 | | Critical Air |

* Alamo Heights PD and Terrell Hills PD share a dispatch frequency

San Antonio's Military Bases

Without a doubt, San Antonio is a military town. The US Air Force and US Army are well represented here. All of the area military facilities operate on the San Antonio Military TRS which has five sites around town. The system is a 400 MHz Motorola TRS using both analog and APCO-25 modulation.

Lackland AFB/Kelly Annex

Lackland AFB (LAFB) is considered the Gateway to the Air Force as it hosts the USAF basic training. LAFB also hosts the 37th Mission Support Group, the 37th Training Group, the 737th Training Group, the Inter-American Air Forces Academy, and the Defense Language Institute English Language Center.

Kelly Annex is the Air Force's oldest, continuously active airfield. On July 31, 2001 it officially went from being Kelly AFB to the Kelly Annex of Lackland AFB. Kelly hosts the Texas Air National Guard's 149th Fighter Wing and the Air Force Reserve's 433rd Airlift Wing.

LAFB/Kelly TRS Frequencies
406.3500

406.5500
406.7500
406.9000
408.1500
408.5500
408.7500
409.1500
409.9500
410.1500

Spacing=25 kHz, Base=406.0000 MHz

LAFB/

Kelly Talkgroups

32080 PBX and Energy Systems
32112 Maintenance Operations
32368 Wilford Hall Security
40144 Kelly Fire/Crash Channel 1
40224 Kelly Police Channel 1
40240 Kelly Police Channel 3 Talk
40256 Kelly Ground Control Channel 1
40320 Kelly Police Patrol
40464 Kelly Annex Base Ops
40480 Aircraft Fueling Operations
40640 Air Terminal Ops Center
40736 Public Information Officer
40752 Kelly Annex Aircraft Repair
40768 Kelly Annex Aircraft Repair
40944 Lackland AFB Cargo Ops
40960 Aircraft Fueling Operations
41136 Trans Dispatch
41520 Flightline/Maintenance Operations
48032 Maintenance/Trash Channel 1
48048 Maintenance/Trash Channel 2
48080 Lackland AFB Fire/Crash Channel 1
48096 Lackland AFB Fire/Crash Channel 2 Exercises
48272 Deathcon Training Net
48288 Lackland AFB Police Channel 1 (Eagle)
48304 EMS Exercises
48368 Lackland AFB EMS Dispatch 1
48464 Lackland AFB Police Channel 2
48560 Lackland AFB EOD Dispatch
48816 Lackland AFB Police Patrols
48832 Lackland AFB Police Ops
48896 Security Training Net Alpha
48912 Security Training Net Whiskey
48928 Lackland AFB Security Training Net
48992 Airlife Operations
49056 Squadron Ops
56080 Lackland Drill Sergeants

Randolph AFB

Randolph AFB (RAFB) is one of the few bases in the USAF that does instructor pilot training. It is home to the 12th Mission Support Group, 340th Flying Training Group, and six Flying Training Squadrons (99th, 558th, 559th, 560th, 562nd, and the 563rd).

RAFB Frequencies

407.8125
409.0250
409.3125
410.5625
410.7625

Spacing=12.5 kHz, Base=407.8125 MHz

RAFB

Talkgroups
56816 Base Operations
56832 Security Forces Channel 1
56864 Fire/Crash Channel 1
56880 Fire/Crash Channel 2
57032 Air Operations
57168 Aircraft Maintenance Operations

Brooks City Base

Brooks City Base is home to the 311th Human Systems Wing whose mission is to protect and enhance human capabilities and human-systems performance. Their four areas of responsibility are: aerospace medicine; crew systems; human resources; and environment, safety, and occupational health.

Brooks Talkgroups

16272 Base Police Channel 1



Monument to the heroes of the Alamo.

16304 Base Police Channel 2

Fort Sam Houston

Fort Sam Houston is a medical training and support post and is home to the HQ of the 5th Army, the 5th Recruiting Brigade, Brooke Army Medical Center, and the Institute of Surgical Research. Fort Sam was named for General Sam Houston, hero of the battle of San Jacinto and the first president of the Republic of Texas.

Fort Sam Houston Frequencies

406.9500
407.1500
407.3500
407.9500
408.3500
409.5500

Spacing=25 kHz, Base=406.0000 MHz

Fort Sam Houston Talkgroups

80 Brooke Army Medical Center EMS
752 Brooke Army Medical Center PD 1
1488 Brooke Army Medical Center Maintenance Channel 1
16272 Post Patrols Channel 14
16336 Post Patrols
16816 Fort Sam Houston FD Channel 1 DISP
16848 Fort Sam Houston FD Channel 2
16880 Fort Sam Houston FD Channel 3
18320 Fort Sam Houston PD TAC-2 Dispatch
18352 Fort Sam Houston PD TAC-3 Talk
18554 Fort Sam Houston PD

Camp Bullis

Camp Bullis is relatively small with 130 military personnel. Its job is to train security police in ground combat skills.

Camp Bullis Frequencies

408.0500
408.1000
408.1750
408.9500
409.1000
409.3750

Spacing=25 kHz, Base=406.0000 MHz

Camp Bullis Talkgroups

16528 Bullis Range Control Channel 1
16560 Bullis Range Control Channel 2
16976 Fire Department
19024 Base Operations
19056 Operations Channel 2
27344 Training Net
49328 Security Training

Camp Bullis also makes use of a handful of conventional frequencies.

| Frequency | Tone | Description |
|-----------|----------|----------------------------------|
| 166.675 | | Camp Bullis Security (Encrypted) |
| 34.200 | | Camp Bullis Range Control |
| 163.100 | 136.5 Hz | Camp Bullis Operations |
| 299.900 | | Camp Bullis Range Control |

San Antonio VA Hospital

The final San Antonio Military TRS site is located at the VA Hospital.

VA Hospital Frequencies

406.5500
407.1750
407.8375
408.0000
409.3000

Spacing=12.5 kHz, Base=406.5500 MHz

Aviation

With so many military bases and a major international airport you can expect to hear a lot on the air band!

Frequency Description

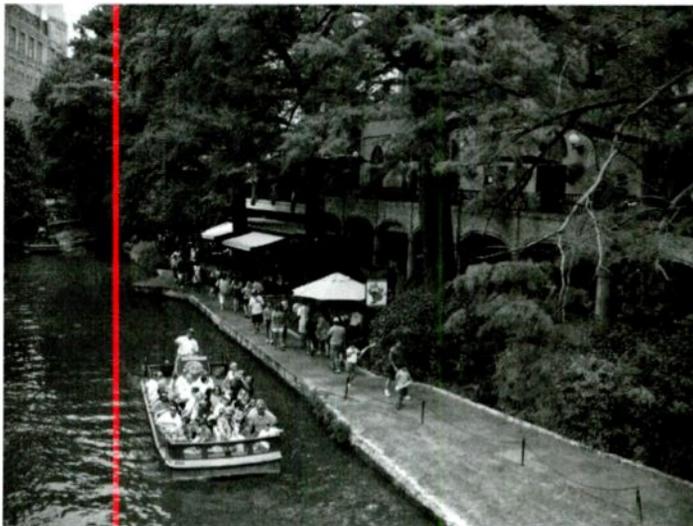
118.050 San Antonio APP-DEP (141°-270°)

118.900 San Antonio IAP ATIS
 119.325 Randolph AFB AWOS
 119.800 San Antonio IAP Tower
 120.500 Hangover (Randolph AFB) ATC Tower
 121.800 Kelly Ground Control
 121.900 San Antonio IAP Ground Control
 124.150 Kelly Radar Approach
 124.300 Kelly Field Tower
 124.450 San Antonio APP-DEP (360°-090°)
 124.750 Hangover (Randolph AFB) Training Ground Control
 125.100 San Antonio APP-DEP (271°-359°)
 125.700 San Antonio APP-DEP
 126.700 San Antonio IAP Clearance Delivery
 127.100 San Antonio APP-DEP
 128.050 San Antonio APP-DEP (091°-140°)
 128.250 Hangover (Randolph AFB) Training Tower/APP-DEP
 130.650 Kelly PTD
 134.050 Hangover (Randolph AFB) ATC Ground Control
 134.100 Kelly Radar Approach
 134.100 Randolph AFB Radar Approach
 139.900 Kelly Radar Approach
 143.800 Kelly 433rd AW Reserve Command Post
 239.800 Kelly PMSV
 239.800 Randolph AFB PMSV
 251.125 San Antonio APP-DEP
 252.100 Kelly 433rd AW Reserve Command Post
 253.800 Hangover (Randolph AFB) Training Tower/APP-DEP
 257.800 San Antonio IAP Tower
 271.800 Randolph AFB ATIS
 289.400 Kelly Ground Control
 290.525 Randolph AFB ATIS
 299.900 Camp Bullis Range Control
 307.000 San Antonio APP-DEP (271°-359°)
 318.100 San Antonio APP-DEP (091°-140°)
 320.100 Kelly Field Tower
 327.500 Kelly Radar Approach
 338.350 Hangover (Randolph AFB) Clearance Delivery
 338.600 Kelly Radar Approach
 348.600 San Antonio IAP Ground Control
 353.500 San Antonio APP-DEP (141°-270°)
 372.200 Kelly PTD
 372.200 Randolph AFB PTD
 381.400 San Antonio APP-DEP
 389.900 Kelly Radar Approach
 392.100 San Antonio APP-DEP (360°-090°)
 396.100 Kelly Radar Approach

Amusement Parks

San Antonio is Texas' answer to Orlando and southern California. It's no wonder the city is the number one tourist destination in the state.

| Output | Input | Tone | Description |
|----------|-------|------|--------------------|
| 462.0625 | | | Sea World of Texas |
| 462.0875 | | | Sea World of Texas |
| 464.0875 | | | Sea World of Texas |
| 464.1875 | | | Sea World of Texas |
| 464.2125 | | | Sea World of Texas |



The Riverwalk

| | | | | |
|----------|----------|----------|--|---|
| 466.6875 | | | | Sea World of Texas |
| 464.4625 | | 123.0 Hz | | Sea World of Texas Medical Responses |
| 461.1250 | 466.1250 | D465 | | Six Flags Fiesta Texas |
| 461.6125 | | | | Six Flags Fiesta Texas |
| 461.7625 | | | | Six Flags Fiesta Texas |
| 462.1125 | | | | Six Flags Fiesta Texas |
| 462.8625 | | | | Six Flags Fiesta Texas |
| 462.8875 | | | | Six Flags Fiesta Texas |
| 462.9000 | | | | Six Flags Fiesta Texas |
| 463.2125 | | | | Six Flags Fiesta Texas |
| 463.3875 | | | | Six Flags Fiesta Texas |
| 463.7375 | | | | Six Flags Fiesta Texas |
| 464.3000 | | | | Six Flags Fiesta Texas |
| 466.4375 | | | | Six Flags Fiesta Texas |
| 466.7875 | | | | Six Flags Fiesta Texas |
| 463.7000 | 468.7000 | D465 | | Six Flags Fiesta Texas Front Gate Ops/Marketing |
| 461.1000 | 466.1000 | D465 | | Six Flags Fiesta Texas Maintenance/Ride Ops |
| 464.8500 | 469.8500 | D465 | | Six Flags Fiesta Texas Security/Safety |
| 462.7375 | | | | Six Flags Fiesta Texas Shows |
| 463.2375 | | | | Six Flags Fiesta Texas Shows |

Atascosa County

Atascosa County lies to the south of Bexar County. IH-37 passes through it. Anyone traveling to Corpus Christi or South Padre Island will more than likely pass through this county.

| Output | Input | Tone | Description |
|----------|----------|----------|----------------------------------|
| 155.1225 | 158.9476 | P25 | Atascosa County Sheriff Dispatch |
| 155.7300 | 154.7700 | 203.5 Hz | Atascosa County Sheriff |
| 155.6700 | | P25 | Atascosa County Sheriff |
| 153.9500 | 159.000 | 203.5 Hz | Atascosa Fire Dispatch |
| 155.9475 | 153.9275 | P25 | Pleasanton Police |
| 154.8150 | 158.9250 | | Pleasanton Police |

Bandera County

Bandera County lies to the northwest of Bexar County and is part of Texas' beautiful Hill Country.

| Output | Input | Description |
|---------|---------|----------------------------------|
| 155.610 | 158.910 | Bandera County Sheriff Channel 1 |
| 155.970 | 158.790 | Bandera County Sheriff Channel 2 |
| 154.430 | 153.770 | Bandera County Fire |

Comal County

Comal County uses both conventional frequencies and the Lower Colorado River Authority (LCRA) TRS. The LCRA system is a 900 MHz EDACS TRS.

Comal County LCRA Frequencies

- 1 - 935.7000
- 2 - 936.7000
- 3 - 937.2500
- 4 - 937.7250
- 5 - 939.9375
- 6 - 935.2000
- 7 - 936.9500

Comal County LCRA Talkgroups

- 04-151 New Braunfels PD Dispatch 1
- 04-152 New Braunfels PD Dispatch 2
- 04-153 New Braunfels PD Ops
- 04-154 New Braunfels PD Ops
- 04-155 New Braunfels PD Ops
- 04-156 New Braunfels PD Event Channel
- 05-001 New Braunfels FD Dispatch
- 05-002 New Braunfels FD TAC 1
- 05-003 New Braunfels FD TAC 2
- 05-005 New Braunfels EMS
- 10-105 New Braunfels Police Ops
- 10-111 Comal County Sheriff's Department South Dispatch

| Output | Input | Tone | Description |
|---------|---------|----------|--------------------------------|
| 155.595 | 154.710 | 203.5 Hz | Comal County Sheriff Channel 1 |
| 156.000 | 153.965 | 203.5 Hz | Comal County Sheriff Channel 2 |
| 154.295 | 153.830 | 203.5 Hz | Comal County Fire Dispatch |

| | | | |
|---------|---------|----------|-------------------|
| 155.190 | 155.805 | 203.5 Hz | New Braunfels PD |
| 154.130 | 151.040 | 203.5 Hz | New Braunfels FD |
| 154.205 | 156.045 | 203.5 Hz | Spring Branch VFD |
| 151.250 | 153.950 | 100.0 Hz | Canyon Lake VFD |
| 154.445 | 153.890 | 203.5 Hz | Bracken FD |

Guadalupe County

Some of the communities on the extreme western edge of Guadalupe County use the Live Oak TRS. However, much of the county still relies on conventional VHF frequencies.

Guadalupe County Sheriff's Department

| Output | Input | Tone | Description |
|----------|----------|----------|--------------------|
| 155.4375 | 158.7675 | 546 DPL | Dispatch Channel 1 |
| 155.9025 | 153.8675 | 546 DPL | Ops Channel 2 |
| 155.0700 | 158.9400 | 210.7 Hz | Old Dispatch |
| 155.5500 | 155.5500 | | Talkaround |

Guadalupe County Fire Departments

| Output | Tone | Description |
|---------|----------|-------------|
| 154.310 | 203.5 Hz | Dispatch |
| 159.780 | 146.2 Hz | TAC-1 |
| 159.810 | 146.2 Hz | TAC-2 |
| 159.840 | 146.2 Hz | TAC-3 |
| 160.065 | 146.2 Hz | TAC-4 |
| 160.170 | 146.2 Hz | TAC-5 |

Cities of Schertz and Cibolo

| Output | Input | Tone | Description |
|---------|---------|----------|-------------------------------------|
| 159.120 | 156.030 | 203.5 Hz | Police Dispatch |
| 155.625 | 153.920 | 203.5 Hz | Police Talk-Around |
| 156.015 | 153.935 | 203.5 Hz | Schertz EMS Dispatch |
| 453.100 | 458.100 | 210.7 Hz | Schertz/Universal City EMS Dispatch |

City of Seguin

| Output | Input | Tone | Description |
|---------|---------|----------|------------------------------|
| 155.520 | 156.210 | 203.5 Hz | Seguin PD Dispatch Channel 1 |
| 154.785 | 156.030 | 203.5 Hz | Seguin PD Dispatch Channel 2 |
| 155.715 | 153.860 | 203.5 Hz | Seguin Fire/EMS Dispatch |

Kendall County

Like Comal County, Kendall relies on both conventional frequencies and the LCRA TRS.

Kendall County LCRA Frequencies

- 1 - 935.4875
- 2 - 935.9500
- 3 - 937.0000
- 4 - 938.9625
- 5 - 939.9125
- 6 - 936.9625
- 7 - 938.9000
- 8 - 939.4125

Kendall County LCRA Talkgroups

| | |
|--------|--------------------------------|
| 04-080 | Kendall County All Call |
| 04-081 | Kendall County Sheriff Primary |
| 04-082 | Kendall County TAC 1 |
| 04-083 | Kendall County TAC 2 |
| 04-084 | Kendall County/Boerne 1 |
| 04-085 | Kendall County/Boerne 2 |
| 04-086 | Kendall County 1 |
| 04-087 | Kendall County 2 |
| 10-115 | Kendall County Sheriff Ops |

| Output | Input | Tone | Description |
|---------|---------|----------|-------------------------|
| 155.085 | 158.955 | 203.5 Hz | Kendall County Fire |
| 155.400 | 150.790 | 203.5 Hz | Kendall FD/EMS Dispatch |

Medina County

Medina County lies to the west of Bexar County. US-90 runs through here on its way to Del Rio and Texas' Big Bend Country.

| Output | Tone | Description |
|---------|-------|-----------------------------|
| 155.640 | 203.5 | Medina County Sheriff |
| 154.755 | 203.5 | Medina County Sheriff |
| 158.760 | 203.5 | Medina County Fire Dispatch |

Wilson County

Wilson County lies to the southeast of Bexar County and offers

routes to Victoria and the Matagorda Bay area.

| Output | Input | Tone | Description |
|----------|----------|------|--------------------------------|
| 155.6625 | 153.8825 | P25 | Wilson County Sheriff Dispatch |
| 155.5500 | 154.8300 | | Wilson County Fire Dispatch |
| 154.4450 | | | La Vernia FD |

San Antonio Area Colleges and Universities

And last but not least – the San Antonio area is home to several institutes of higher education. Here is a list of some of the larger schools with police departments.

| Output | Input | Tone | Description |
|----------|----------|---------|---------------------------------------|
| 858.8875 | 813.8875 | | Alamo Community College PD |
| 155.1150 | 153.7400 | 203.5 | Texas Lutheran University PD |
| 460.4125 | 465.4125 | | Trinity University PD |
| 453.5125 | 458.5125 | 365 DPL | UT Health Science Center PD Channel 1 |
| 453.3125 | 458.3125 | CSQ | UT Health Science Center PD Channel 2 |
| 155.7000 | | 136.5 | UT San Antonio PD |
| 159.1050 | | 123.0 | UT San Antonio Downtown PD |

We hope to see you soon in San Antonio. Remember the Alamo and your scanner!

Table 1. Abbreviations Used in this Article

| | |
|---------|--|
| AFS | Agency, Fleet, Subfleet |
| APP-DEP | Approach/Departure |
| ATC | Air Traffic Control |
| ATIS | Automatic Terminal Information Service |
| AW | Airlift Wing |
| AWOS | Automatic Weather Observation System |
| EMS | Emergency Medical Services |
| FD | Fire Department |
| IAP | International Airport |
| IH | Interstate Highway |
| LAFB | Lackland Air Force Base |
| LCRA | Lower Colorado River Authority |
| P25 | Shorthand for APCO-25 Digital Modulation |
| PD | Police Department |
| PTD | Pilot to Dispatcher |
| RAFB | Randolph Air Force Base |
| SO | Sheriff's Office |
| TRS | Trunked Radio System |
| USAF | United States Air Force |
| UT | University of Texas |
| UTSA | University of Texas at San Antonio |
| VA | Department of Veterans Affairs |
| VFD | Volunteer Fire Department |

An art structure with the World's Fair Tower in the background.



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AOR



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Frequency Coverage: 25,000-512,000 MHz, 806,000-823,987.5 MHz, 849,012.5-868,987.5 MHz, 894,012.5-956,000, 1240,000-1300,000 MHz

When you buy your Bearcat 785D state-of-the-art Digital Cable TrunkTracker III package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC785D scanner purchase, you also get a **free deluxe scanner headset** designed for home or race track use. The Bearcat 785D has 1,000 channels and the widest frequency coverage of any Bearcat scanner ever. When you order the optional **BCI25D, APCO Project 25 Digital Card** for \$299.95, when installed, you can monitor Public Safety Organizations who currently use conventional, trunked 3,600 baud and mixed mode APCO Project 25 systems. APCO project 25 is a modulation process where voice communications are converted into digital communications similar to digital mobile phones. You can also monitor Motorola, EDACS, EDACS SCAT, and EF Johnson systems. Many more features such as S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control with RS232 port, Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, operate your scanner from your computer running Windows. Order Scantool Gold for Windows, part number **SGFW** for \$99.95 and magnetic mount antenna part number **ANTMBNC** for \$29.95. Not compatible with 9,600 baud APCO digital control channel with digital voice, AGEIS, ASTRO or ESAS systems. For fastest delivery, order on-line at www.usascan.com.

Bearcat® 895XLT Trunk Tracker
Manufacturer suggested list price \$499.95
Less - \$320 Instant Rebate / Special \$179.95

300 Channels • 10 banks • Built-in CTCSS • S Meter
Size: 10^{1/2}" Wide x 7^{1/2}" Deep x 3^{3/8}" High
Frequency Coverage: 29,000-54,000 MHz, 108,000-174 MHz, 216,000-512,000 MHz, 806,000-823,995 MHz, 849,012.5-868,995 MHz, 894,012.5-956,000 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
Trunk Lockout • Trunk Delay • Cloning Capability
10 Priority Channels • Programmed Service Search
Size: 2^{1/2}" Wide x 1^{3/4}" Deep x 6" High
Frequency Coverage:

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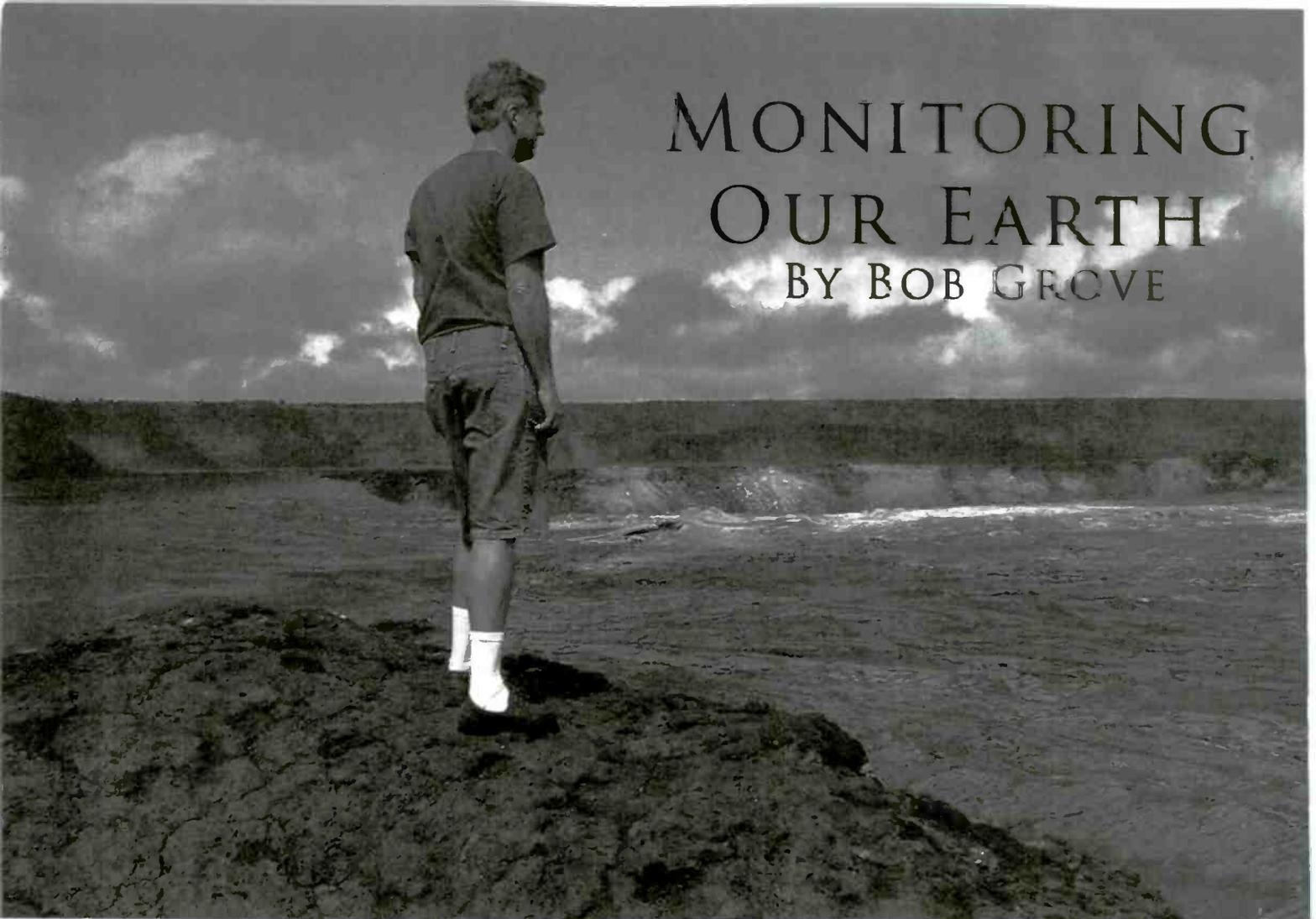
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MONITORING OUR EARTH BY BOB GROVE

Bob overlooks the summit of the volcano

Listening to our earth is far more than casual interest. Hard to believe, the U.S. Geological Survey has listed nearly 70 active and potentially-active volcanoes in the United States, of which more than 50 have erupted since 1800. Predictions and forecasts can often be made to prevent loss of life and property as well. A recent trip to one of those USGS observatories provided some interesting insights.

Most volcanism occurs along the Pacific Coast, the historic "Ring of Fire" that girdles the Pacific Ocean. But Hawaii is nearly in the middle of this ring, not on the fiery edge, so why does it have so many volcanoes?

Geologists theorize that deep under the ocean floor, there are "hot spots" that are more likely to spew lava than at other places. Such sub-marine eruptions gradually built the island of Kauai, the northernmost of the island chain, which emerged above the ocean's surface some six million years ago.

As the giant Pacific plate (the crustal segment that supports the Pacific Ocean) slowly drifted northwest (a few inches per year), the hot spot stayed in its original position beneath the crust, opening up new fissures in the ocean floor, and forming new volcanic islands south of the first. Thus, the most recently-formed and most active island, Hawaii, is only about one million years old.

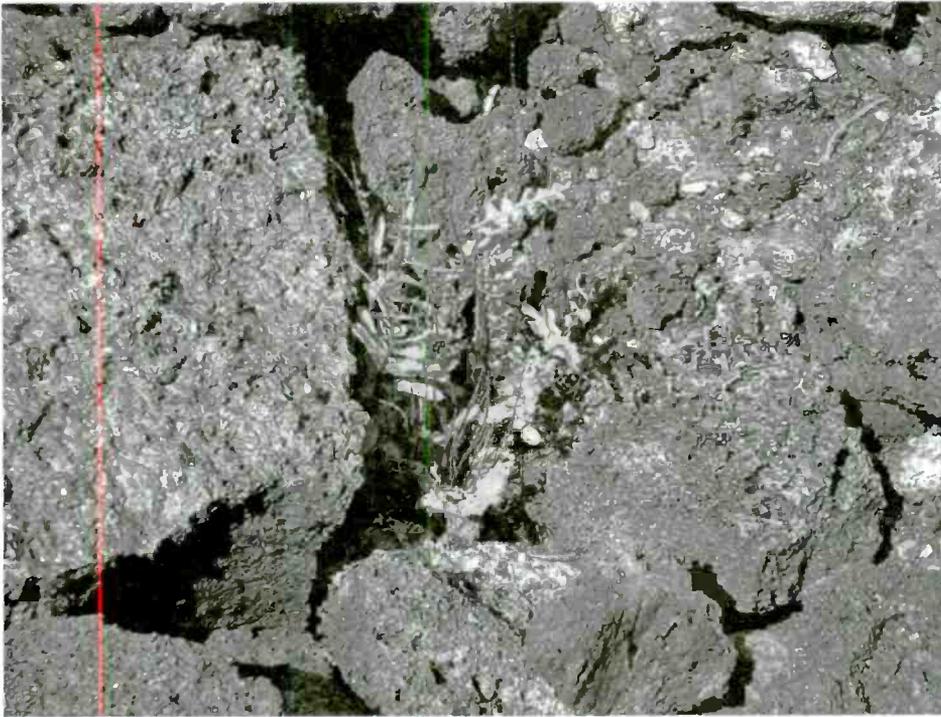
And yet a new island, still beneath the surface of the ocean's waters, is forming just south of Hawaii. But you will have to wait a few thousand years before you can visit it!

Taking a Trip to a Volcano

Although Kilauea, or one of its peripheral vents, is in virtually continuous eruption, not all events are spectacular. During my visit, a



Sulfurous fumes remind us that this is an active volcano



Indomitable ferns sign! the rebirth of life after an eruption

recent lava flow and the formation of several small cinder cones had subsided. Still, hot steam vents with their tell-tale sulfurous fumes were numerous around and in the crater.

Kilauea is by far the largest of several vents, or openings, below the distant, enormous, shield cone of Mauna Loa, the mother of all volcanoes in the lush Hawaiian tropical paradise, and one of the largest volcanoes on Earth. Mauna Loa is currently quiet.

The drive to Kilauea is a good two hours from the Kona airport on the island of Hawaii, "The Big Island." It's an interesting ride, punctuated by a few quaint, small towns, alternating

between immense stretches of stark, dark lava flows of the past, and the contrast of luxuriant, green, tropical rain forests.

Approaching the rim from any of several scenic overlooks, the visitor sees what appears to be a distant mountain range; then he gets a little closer and looks down to discover that he's on the edge of a gaping crater in the earth! It's quite an experience.

A Visit to the Observatory

Although the observatory is not open to the public, there is an adjacent, excellent museum on the rim of the crater that provides enough history

Geology

While many of us might presuppose that the Hawaiian Islands are geologically drab – that ugly, brown and black must be the official state color – that's far from true.

Although dark-colored, basalt lava flows are all over the islands, and vegetation – beginning first with green ferns – takes over, the rocky cover has a character of its own.

The Hawaiians named the formations eons ago: Pahoehoe is characteristically ropery in texture, formed as the hot lava begins to cool, first on the surface, forming wrinkles as the cooler, less fluid outer surface folds while the more liquid inner flow continues to move down the cone.

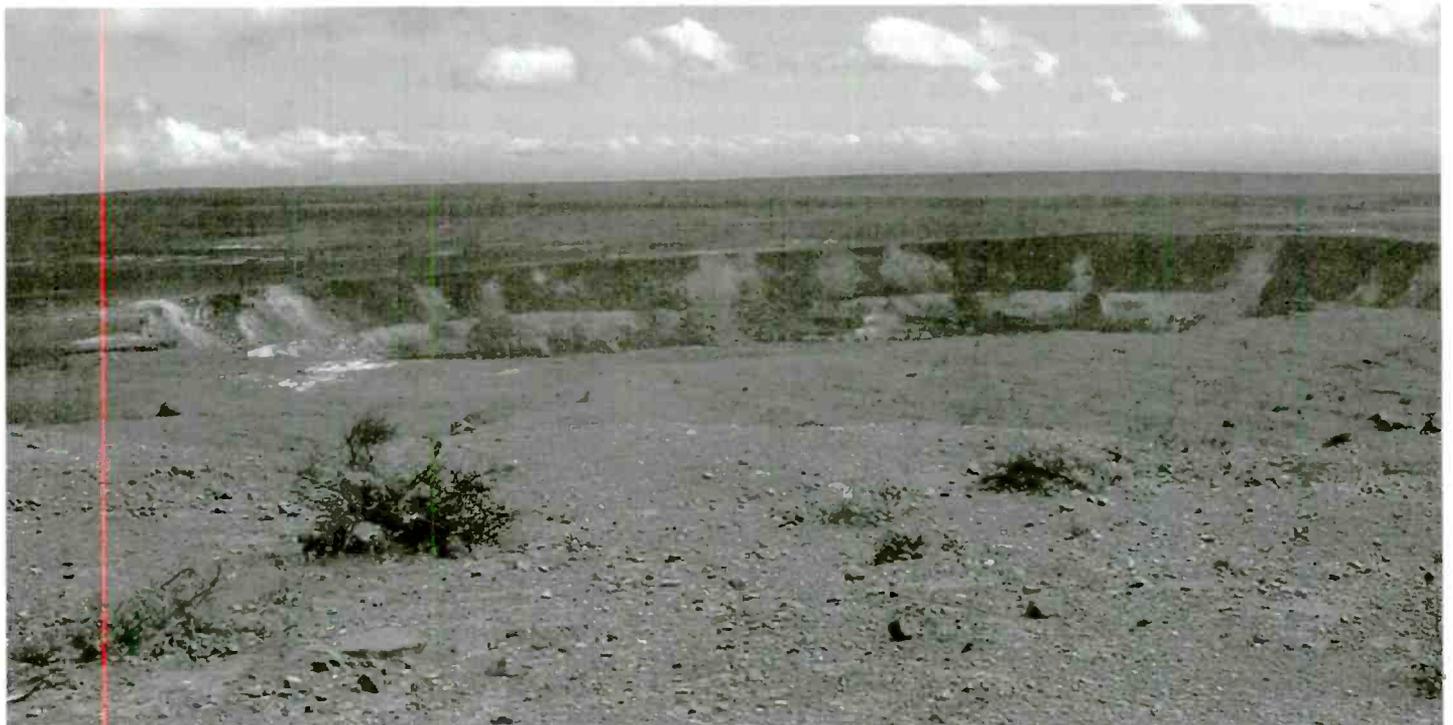
A-a, on the other hand, is coarse and cindery, chunks of hardened lava riding on the upper surface of the flow. Legend has it that it was named for the sound someone would utter as he ran barefoot across the sharp rocks!

But those rocks have more than interesting morphology; they also have minerals – beautiful, green, shimmering peridot is often found in the historic lava rock, as are crystals of other colors as well. And the beaches' sands come in many colors, with some of the most famous glittering like black diamonds in the sunlight.

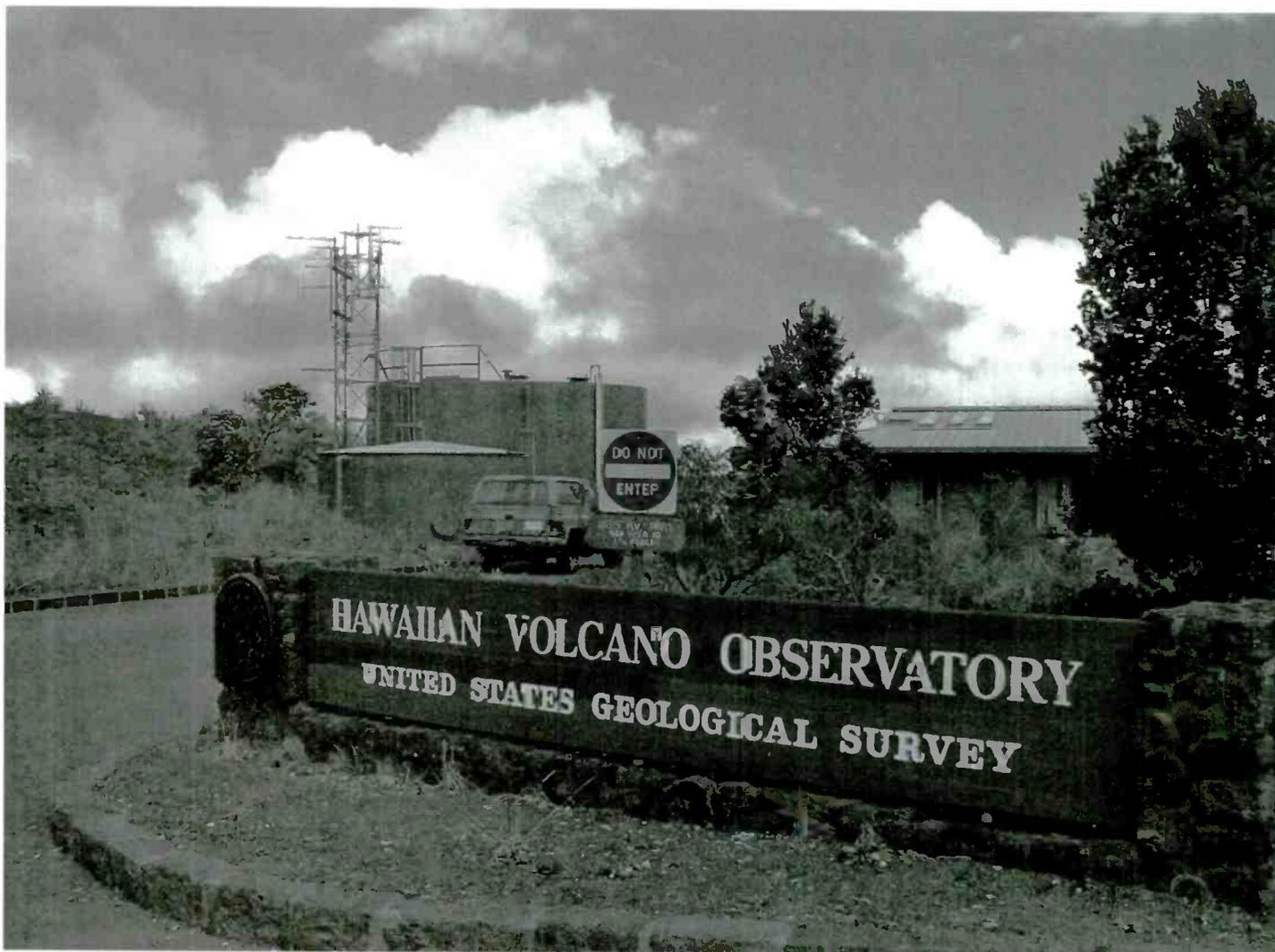
and science for anyone. With full journalistic courtesy, staff scientists at the USGS Hawaiian Volcano Observatory graciously answered a number of questions of interest to our readers.

While there is no satellite uplink for telemetry signals to be monitored over wide areas, nor are they made available on the Internet, the array of VHF and UHF Yagi antennas on the observatory reveals extensive monitoring of remote seismic sensors across the island.

Frequencies used to relay the analog sig-



The sunken caldera dominates the landscape



nals are in the federal government 162-174 and 406-420 MHz bands. Nothing is encrypted; it's straightforward frequency-shift keying (FSK) of the carrier by seismic events shaking the sensors and analog-modulating the voltage-controlled oscillator (VCO). Anyone within range of the radiotelemetry can easily listen to the signals and demodulate the FSK.

A VHF/UHF receiver with a product detector (or BFO) for SSB/CW reception is needed to provide a tone, or the actual frequency shift from the demodulator could be detected to drive

offset op-amps and a chart recorder.

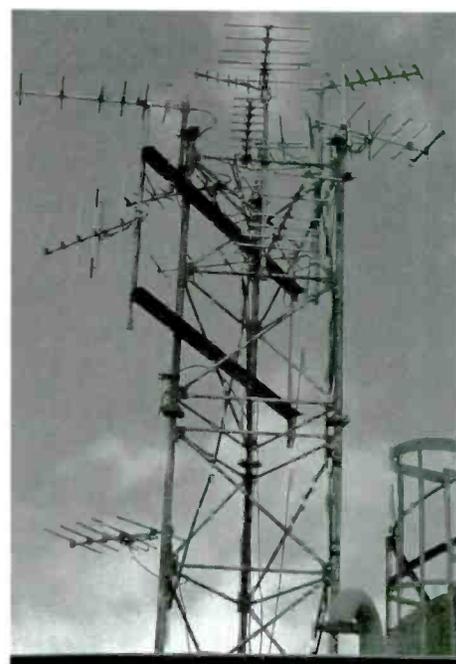
A conventional scanner could be used as well, but it must be equipped with a demodulator output or product detector/BFO.

The detected signals could also be displayed on an oscilloscope to show voltage offset as the FSK is modulated, but all observations would be in real time with no recorded reference. Of course an alarm could be rigged to alert the observer.

It's not what you'd call earth-shaking monitoring - or at least you hope not!



The observatory complex at the rim of the crater



The observatory antenna array receives data from seismic sensors across the island

Tarheel Scanner/Shortwave Listeners' Field Day

By Virginia Enzor NC4VA



Tarheel Scanner & Shortwave Listeners' Field Day: Front row: Virginia Enzor KG4PFA, Robert Pierpoint KG4BDX, Frank Bridges AE4MY, Dennis Mason K4DAM, Linda Gibson KD4JMJ. Back row: Tom McKee K4ZAD, Bob Zeher KE4JVV, Noble Phelps-Breedin N4UOQ, Bob Breedin N4SSU, George Richards WA4EKJ, Wayne Blackwell KD4SLQ, John Garrett N4YFU, Mark Gibson N4MQU.

“Attention all operatives, the Potomac River is at high tide; the Potomac River is at high tide.” That was just one of the catches that perked listeners' ears at the Tarheel Scanner/Shortwave Listeners' Field Day at Baileywick Park in Raleigh, North Carolina, on Saturday, May 15, 2004. It appeared to be a Spy Numbers Station relaying a message to intelligence operatives in the field. What did it mean? We may never know, but it was an exciting log that sparked the imagination!

Approximately 12 listeners gathered with radios, antennas, scanners, headphones, log books, *Passport to World Band Radio* guides, *Monitoring Times*, and more for some serious listening. Among the radios were a Kenwood R-5000, an Icom IC-R71A, an IC R75, a Yaesu FRG-100, a Grundig Satellit 800, a Radio Shack DX-390 and several Sangean portables.

Some participants hooked onto a wire antenna strung up by Wayne Blackwell (KD4SLQ), John Garrett (N4YFU), and Field Day Chairman Tom McKee (K4ZAD). Some brought loop antennas to enhance the reception of AM broadcast stations. Others simply hooked an alligator clip to the metal roof of the shelter. The roof appeared to be as good an HF antenna as the long wire strung up in the trees.

Early in the afternoon, Robert Pierpoint (KG4BDX) and Tom McKee (K4ZAD) picked up quite a few beacons on long wave (198-350 kHz). John Garrett (N4YFU) wowed us with weather map images on his computer which were received by radio signals from polar orbiting satellites. Later, distant stations around the world caught our attention. A voice would ring out, “Here’s Radio Australia,” and many would switch to that frequency. Then someone would announce another catch, and enthusiasts would

change frequencies again.

Listeners could only be lured away from their posts by the aroma of hamburgers on the grill and pizza from a nearby pizzeria. Several participants also took time away to check into the 8:00 p.m. Raleigh Amateur Radio Society 2-meter net.

Field Day brought visitors out as well. Mark Gibson (N4MQU) and his family, Dennis Mason (NC4VA), and Frank Bridges (AE4MY), and others came by to socialize and check out the radios. A young lad of 14 rode up on his bike and asked to listen to a station in Germany. Talk in German was heard on Deutsche Welle, and the young man translated the spoken word to the delight of those around. Virginia Enzor (NC4VA) gave him the opportunity to speak as a third party to Mike George (KC4WUH) on the 146.64 repeater following the RARS net. He was thrilled; maybe he’s a future ham and shortwave listener in the making!

The weather couldn’t have been better, and the steady, gentle breeze made the afternoon

and evening quite comfortable. Hopefully, the weather will be equally pleasant as the thrill of DXing draws us out again at the next field day in the fall. Below are some loggings the group made at field day.

The “Tarheel Scanner/Shortwave Listeners” Group meets the third Monday of every month at the El Rodeo Restaurant at 4112 Pleasant Valley Road in Raleigh. The meal begins at 6:30 p.m. and the meeting starts at 7:30 p.m. Visitors are welcome! The Tarheel Scanner/Shortwave Listeners’ Net is held every Monday at 9:00 p.m. on the 146.64 repeater.

Bob Zeher (KF4JVV) and Wayne Blackwell (KD4SLQ) also contributed to this article.



John Garrett N4YFU (right) explains to Charlie Broyles how weather images are received from polar orbiting satellites.

| Time (UTC) | Freq (kHz) | Station | Notes |
|------------|------------|---------------------------------------|-------------------------------------|
| 20:20 | 17,735 | Radio Netherlands | Talk |
| 21:20 | 13,780 | Germany – Deutsche Welle | Music |
| | 11,740 | VO Islamic Republic Iran | Music |
| | 12,080 | Radio Australia | News |
| | 11,905 | Germany – Deutsche Welle | Talk (German language) |
| 22:55 | 13,785 | Radio Canada International | “Media Zone” |
| 23:34 | 21,740 | Radio Australia | Talk |
| 23:35 | 9,875 | Radio Vilnius Lithuania | Talk on Euro-elections |
| 23:37 | 9,550 | Radio Habana Cuba | DXers Unlimited w/ Arnie C. |
| | 9,655 | Radio Habana Cuba | New Freq, Spanish, +40/9! |
| 23:47 | 17,815 | Brazil Radio Cultura | Music (São Paulo) |
| 23:55 | 13,855USB | Armed Forces Network | Racing |
| | 15,720 | New Zealand | News |
| 00:00 | 13,630 | Radio Australia | Music |
| | 5,446USB | US Armed Forces Radio | Baseball game |
| | 7,507USB | US Armed Forces Radio | Baseball game |
| | 12,134LSB | US Armed Forces Radio | Baseball game |
| | 13,855USB | US Armed Forces Radio | Automotive repair program |
| | 6,160 | CKZN St. Johns, Nfld Canada | Music |
| | 6,915 | Spy numbers station | “The Potomac River is at High Tide” |
| | 9,625 | CBC Canada (Sackville) | Oldies show – Finkelman |
| 00:29 | 9,640 | Germany – Deutsche Welle | Traditional German music |
| 00:40 | 5,450USB | Volmet (Aero Weather) | Belfast Ireland? |
| 00:56 | 9,615 | Brazil, São Paulo Radio | SAWA interference |
| | 9,615 | USA Radio SAWA | US propaganda (Middle East) |
| 01:00 | 11,800 | Italy, RAI | Rome news in English |
| 01:13 | 3,220 | HCJB Quito Ecuador | Flute Music – VO the Andes |
| 01:15 | 3,320 | S. Africa | |
| 01:17 | 6,915 | Spy numbers | Female voice |
| 01:20 | 9,870 | Australia Radio | “Report from Austria” prog. |
| 01:22 | 11,690 | Finland | |
| | 5,930 | Slovakia | |
| 01:25 | 4,875 | Brazil R. Difusora Roraima, Boa Vista | |
| | 4,885 | Brazil | Several different stations |
| 01:35 | 4,908 | Jammer? | Sweeping noise |
| 01:38 | 4,916 | Unid | Spanish instrumental music |

Remember the thrill of hearing music from the other side of the globe; a call to prayers from the Mideast; the drums of Africa? How about the wonder of all of the different languages; the hope of hearing secret signals from government agents? All this brought many of us to shortwave – and it's still there. Ask any of these boys. Adventure awaits you each time you turn on the radio. You never know what you'll hear.



An International DXpedition to Resica Falls

By Kris W. Field, ASM Hatboro Troop 3

This year Hatboro Troop 3's Boy Scouts traveled to beautiful Resica Falls in the Pocono Mountains of Pennsylvania for a week of summer camp. The week was filled with many other activities and merit badges such as swimming, camping, cooking, hiking, wilderness survival, rifle and shotgun shooting, archery, canoeing, First Aid, Tenderfoot, 1st Class, 2nd Class and many other important scout skills.

This is my third summer teaching the Radio Merit Badge at Camp for Troop 3. Each camp presents an opportunity for unexpected listening adventures. This year was no different.

I always enjoy teaching shortwave listening to the Boy Scouts. Before camp, I had two scouts sign up for the badge – Rob Walls and Eric Schaefer. By the end of the week, three more scouts – Joe Allard, Andrew Yale, and Tony Rombola – and two scouters enjoyed having a chance to travel the world via the HF bands.

I took along two receivers: a Lowe HF 150 and an ample supply of batteries, plus a Grundig FR-200 emergency AM/FM/SW radio as a backup. As it turned out, the Lowe was all that was necessary and proved more than adequate. The HF 150, while no longer being manufactured, is built like a brick – tough and nearly indestructible; it has good AM, sideband, and



synchronous detection; and uses the detachable telescoping whip antenna or an external antenna like the 35- feet of 14 gauge wire I brought along. The Lowe is an extremely rugged and sensitive radio with features and reception that rivals many good tabletop receivers. Plus, it's very compact and is easily packed and transported.

During our sessions, we spent half our time learning basic theory, and the other half letting the boys do what they enjoyed most – spinning the dials and finding programs from different countries.

The basic theory consisted of discussing the many different types and uses of radios for broadcast, commercial and non-commercial communications. We also learned some basic propagation theory – such as using WWV on 5, 10, 15 and 20 MHz to determine which bands are most likely to be open at the time you're listening; the use of Q-codes and phonetics; safety; and some basic electronics, schematic and block diagrams.

Then we'd spend time tuning in programming from all over the world. We had the time to hear ham radio operators, digital communication signals, aeronautical traffic from pilots, and some Canadian Coast Guard communications along with the International broadcasters we found.

On the first day of listening, several scouts who hadn't selected this merit badge wandered over to the table we were at to discover just what we were doing: what are those strange whistles, beeps and foreign languages that we're hearing? By day two, three more scouts, ages 12-16, became intrigued enough to sign up to take the merit badge with the original two.

Messages from Home

We also discovered that along with the 200 or so people at camp that week, there were camp staff members from two different countries: Tsai

Yu-lun, a teacher of social science from Taiwan who has been in Scouting for 8 years; and Moshik Shecter, an 11th grade student from Israel, who has been in scouting for 7 years.

Thus another challenge and adventure was presented – let's find programming from their native countries in their native language and ask them to listen in with us and translate! It was a good thing I bought along recent copies of the *The Journal**, published monthly by the North American Shortwave Association (NASWA). I was first able to find a schedule of programming from the Republic of Taiwan. We invited Tsai Yu-lun to our campfire, that evening in hopes of hearing their broadcast.

Luck was with us and she was very happy to hear programming from Taiwan; upon tune-in at 0154 UTC, the program was in the Hakka dialect. At the top of the hour there was a brief announcement in Chinese, then an hour of English programming. Imagine you are one month into a two-month stay, and a long way from home. The smile on her face when she heard her homeland told us how pleased she was to listen with us.

We kept trying to catch up with Moshik, when he wasn't working at Scoutcraft, and when Kol Israel had a broadcast in Hebrew. On July 22 at 1332 UTC we were successful. Moshek translated for us, telling us the announcers were talking about breads and wines.

As you can see from his picture, he was very happy to hear programming from home while in the U.S.

The most fun for me this year was, first, having boys get interested enough in SW to ask to join us. That's a lot better than wondering if



the boys taking the badge are really enjoying it. And, second, being able to bring a little bit of home to the two scouters who were far away from their families and friends. I can only hope and believe that we were able to do a good turn for them and repay some of the kindness they showed by giving so much of themselves to the boys and adults they helped at camp this summer.

The rest of the week, our listening sessions and theory classes continued. We listened mostly in the afternoon and once after dark. So, the scouts got to experience signals and atmospheric conditions from the 60-meter band as well as 20 and 30 meters at different times of the day.

What We Heard

The boys logged and heard identifications from the following stations (all times listed are Universal Coordinated Time or UTC):

4915 kHz GHANA Accra-Tema **Ghana BC 1**, Jul 20, 2310 - Pop song by female singer. Man with ID "This is Radio Ghana." (Schaefer Troop 3 Resica Falls, PA).

4985 kHz BRAZIL Goiania **R.Brasil Central**, Jul 23, 0124 - Male announcers in Portuguese. (Allard, Schaefer, Troop 3 Resica Falls, PA).

5950 kHz USA via Okeechobee **CBS TAIPEI** until 0200; **R.TAIWAN INT.**, Jul 21, 0154 - Man in Hakka dialect. Man in Chinese with ID @ 0200. Then into English with ID. Candidate Kerry wants resolution of Taiwan Strait issue favorable to Taiwanese. (Tsai Yu-lun- Troop 3 Resica Falls, PA).

6000 kHz CUBA La Habana **R.HABANA CUBA**, Jul 23, 0045 - Dr. Tony Montero of Philadelphia talks. (Allard, Rombola Troop 3 Resica Falls, PA).

6090 kHz ANGUILLA The Valley **WORLD UNIVERSITY NETWORK**, Jul 23, 0140 - Dr. Gene Scott with 1-800-338-3030 to call in. (Allard, Rombola, Yale Troop 3 Resica Falls, PA).

6175 kHz CANADA Sackville **VOICE OF VIETNAM**, Jul 23, 0043 - Man and woman announcers with many mention of Vietnam & Kampuchea. (Allard, Walls, Schaefer Troop 3 Resica Falls, PA).

9895 kHz NETHERLANDS Flevo **R.NEDERLAND**, Jul 22, 2024 - Man with English program about Weapons of Mass Destruction. ID @2030 by man. (Rombola- Troop 3 Resica Falls, PA).

11530 kHz VATICAN STATE St.Maria Galeria **VATICAN RADIO**, Jul 23, 1518 - Female in Spanish/Italian ID by man @1520. (Walls, Allard Troop 3 Resica Falls, PA).

11930 kHz USA Greenville **R.MARTI**, broadcasting to Cuba. Jul 23, 1526



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- ID by man. Jammer in background. (Allard, Walls, Schaefer Troop 3 Resica Falls, PA).

13645 kHz GERMANY Juelich **SWISS RADIO INT.**, Jul 20, 2057 - Polka Music on accordions; female then male announcer with ID in German then French. (Schaefer- Troop3 Resica, PA).

15120 kHz NIGERIA Ikorodu **VOICE OF NIGERIA**, Jul 21, 1942 - Man in English with news about Nigerian government. (Yale Troop 3 Resica Falls, PA).

15205 kHz RWANDA Kigali **DEUTSCHE WELLE**, Jul 19, 2128 - Male announcer with ID in German @2130. (Walls, Troop 3 Resica, PA).

15220 kHz GUIANA Montsinery **SWISS RADIO INT.**, Jul 21 0034 - Female with US pop song. Female announcer with ID. // 13645 @1941. (Allard-Troop 3, Resica Falls, PA).

15280 kHz MOROCCO Tanger-Briech **VOICE OF AMERICA**, Jul 21, 1947 - News in Slavic language. Basketball news - mentions Shaq O'Neal. ID @2000. (Allard Troop 3 Resica Falls, PA).

17535 kHz ISRAEL Tel Aviv-Yavne **VOICE OF ISRAEL**, Jul 22, 1332 - Men in Hebrew talking about wine and breads. (Schechter-Troop 3 Resica Falls, PA).

** To get a sample copy of The Journal, write to Bill Oliver, NASWA, 45 Wildflower Road, Levittown, PA 19057 or go on the web to <http://www.anarc.org/naswa/> NASWA is North America's oldest shortwave broadcast-only radio club and has been active in the business of sharing information about shortwave radio since 1961. The club sponsors an annual Shortwave Listener Festival each year in March in Kulpsville, PA.*

About the Author

The author, Kris W. Field is an assistant scoutmaster with Troop 3 Hatboro, PA ; Pack Trainer and Unit Commissioner for Pack 410 in Horsham, PA. His wife, Elaine, is co-committee chair for Pack 410. They have three boys in scouting: Alex is an Eagle scout; Matt is a Life/pre-Eagle scout; and Dan is a Star Scout.

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Monitoring Logic Trunked Radio

By John Wilson, W4UVV

What's a regular Logic Trunked Radio system (LTR)? It is a shared multi-user trunk radio system relatively simple in design and operation and therefore affordable. A maximum of 20 frequencies (channels) can be configured per system. The typical system configuration is five frequencies. Each system frequency is a stand-alone repeater with its own non-dedicated controller called a "home" channel. One frequency, designated by the installer, is the main system controller. Its purpose is to synchronize user utilization of system frequencies.

How to identify an LTR individual transmission

Have you tuned the 450-454 MHz and 461-465 MHz range and heard a sound like a carrier being keyed and then silence? If so, you heard one LTR frequency in a system. Each home channel repeater transmits a data burst at random intervals to maintain connection with radios configured to it. You may hear the analog transmission that may or may not include the other party.

With few exceptions, the majority of LTR users will be businesses. However, some local governments and law enforcement entities may supplement their primary communications systems as an LTR user for special purpose applications such as surveillance or for cost savings.

How to identify an LTR system

One quick way is to search the internet. Go to <http://www.radioreference.com> and select "RR Database." Select the state of interest and the link that displays all in-state trunked systems. Select a listing of interest that's geographically close to you. Part of the information displayed is the trunk system type. Look for "LTR Regular."

(*Caution:* Most website listings depend upon individual submissions of frequency information. Some listings may not be 100% correct regarding total system frequencies and logical processing sequence or users.)

Another option, assuming one local LTR frequency has already been identified, is to search the FCC database by "Frequency/State." Go to <http://gullfoss2.fcc.gov/cgi-bin/ws.exe/genmen/index.htm>. Select a call sign with a close geographical location and a "YG" service code. Check to see if your identified frequency is among the frequencies licensed for this system. Although LTR systems may be operational on other VHF/UHF frequency ranges, the majority of users will be in the 450-465 MHz range.

LTR System Potential Programming Problem

Now that the LTR system has been identified, there is a programming issue that can adversely

impact successful reception. In this case, the scanner I was using is the Uniden BC796D digital Trunking base/mobile scanner, which requires that system frequencies be programmed in "logical processing sequence."

The particular system sequence used depends on how the installer configured the system. Typically, but not always, a five frequency (channel) system has a programming sequence of channels 1, 5, 9, 13 and 17.

A second issue of concern is that one or more frequencies in the licensed group may not be active. For testing/searching it is recommended that one BC796D bank be selected and all other banks be deselected. I chose bank 10, channels 901-1000. The LTR system of interest was a five channel business system in Richmond, Virginia, which used the frequencies: 452.2375, 453.0125, 461.6125, 461.8125 and 462.0625 MHz.

What Not To Do

Do *not* program the aforementioned frequencies in ascending sequence in channels 901, 902, 903, 904, and 905, respectively. I did, and although subsequent initial reception appeared correct, it wasn't. 462.0625 MHz would not track as a trunked frequency but only as a conventional frequency. That was not the desired solution.

Fortunately, I had additional analog receivers/scanners that permitted programming each trunked frequency separately and sight checking each when active to determine whether or not the frequencies tracked correctly on the BC796D. Additionally, I confirmed 461.6125 MHz and 461.8125 MHz were inactive frequencies (channels).

How did I know? Remember, each LTR frequency is a stand alone repeater with a random data burst approximately every 10-15 seconds. No home channel data bursts were detected on these frequencies.

What to Do

After trying all frequency programming combinations and still no total success, I tried a different approach. I considered every LTR as a 20 channel system. I programmed 452.2375 MHz in all channels 901-920 as a trunk frequency and scanned in the trunk mode. When the frequency activated, I pressed the "trunk" button, observed the BC796D channel number 901, which I noted.

That indicated to me 452.2375 MHz most likely was the main controller channel. 461.6125 MHz and 461.8125 MHz were not programmed at that

time because they were not active home channels. 453.0125 MHz was programmed in channels 901-920, scanned, and when activated, the "trunk" button was pressed, and the channel number 913 observed and noted.

Finally, 462.0625 MHz was programmed, scanned, observed activated in channel 914, and noted.

Now I knew the logical frequency (channel) processing sequence except for 461.6125 MHz and 461.8125 MHz.

I programmed the LTR frequencies as follows:

| Channel | Frequency |
|---------|--------------|
| 901 | 452.2375 MHz |
| 905 | 461.6125 MHz |
| 909 | 461.8125 MHz |
| 913 | 453.0125 MHz |
| 914 | 462.0625 MHz |

In this configuration, 462.0625 MHz, channel 914, did not match the typical logical processing scheme that would otherwise have it programmed in channel 17.

I am sure there are other ways to determine the correct logical processing sequence for frequencies, but this is one method which does work, although it's time consuming. If 461.6125 MHz and 461.8125 MHz subsequently become active, each frequency will be entered separately in all 20 channels, scanned, observed when activated, and the channel location changed as appropriate.

Additional Notes

Purchased ARC250 software was used for BC796D bank file editing using a standard RS232 cable for transferring data at 57600 bps. ARC250 software is available at <http://www.butel.com>.

Although the target scanner was the BC796D, comparable logic processes can be related to other scanner brands that support the LTR scanning option. Some scanners may not require logical frequency (channel) programming sequences, but there may be a performance trade-off impacting signal acquisition time and possible missed transmissions.



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SWLers QSLing HAMS

If the above title seems a little cryptic, you need to read on! SWL is radio shorthand for Short Wave Listening. One who does this is called an SWLer. Usually this refers to monitoring the international broadcast portion of the high frequency (HF) bands, but it is also used to refer to listeners who monitor the ham radio portions in the same bands. A QSL is a card verifying that you monitored a ham, shortwave broadcaster or other radio station.

Monitoring the ham bands is a way for radio enthusiasts to enjoy the amateur radio hobby without having to obtain a license or the need for a good transmitting antenna. It can also be seen as the very first step to becoming a licensed ham. I started monitoring the ham bands in the mid '60s when I was a kid, tuning them in on a Knight Kit Star Roamer 5 band shortwave receiver. Even now I enjoy monitoring amateur nets such as the Antique Wireless Net, because the net content is interesting and the hams checking into the net are extremely well informed on the subject.

Monitoring the ham bands for DX (long distance stations) requires the listener to have a) a good antenna; b) a sensitive receiver; and c) the discipline it takes to scan the bands looking for exotic call signs, logging the traffic, and sending off for QSL cards.

❖ What's the Frequency?

Just scanning the bands you might stumble onto a DX station, but the easiest way to find out where the DX is, is to check out a web site known as a "DX cluster" (<http://oh2aq.kolumbus.com/dxs/>). Here active hams and SWLers post the frequency and call sign of any DX stations heard on any of the ham bands. This site is updated every three minutes so you know the information is the latest.

Now tune your receiver to a frequency posted and see if you can hear the station. Remember that the postings are submitted from hams all over the world, so a ham in one region of the world might report a station which is impossible for you to hear where you are, given the time of day and band conditions.

If you do hear the station, he or she may be operating simplex (transmitting and receiving on the same frequency) or "split" (transmitting on one frequency and listening on another). The DX station will indicate where he or she is listening by every now and then announcing something like "...listening up 5" which means listening up the band 5

kHz from the transmitting frequency.

If it's a rare DX station from a DXpedition, they may specify a set of frequencies "...listening 196 to 200." This means that if they're transmitting on 14.195 MHz (the 20 meter DX window) they'll be listening for calls between 14.196 and 14.200 MHz.

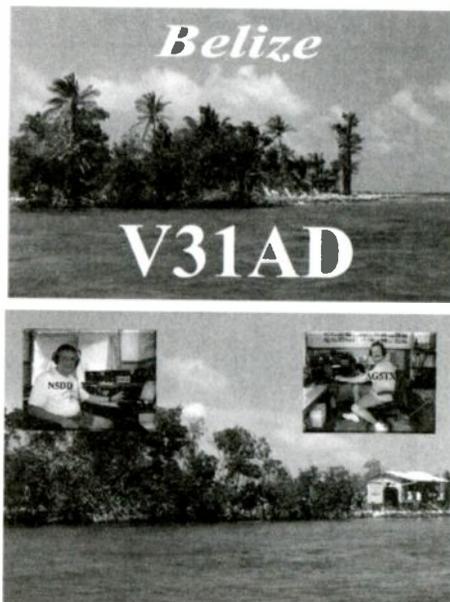
Some hams resent DXpeditions taking up so much band space and they'll register their complaints on the air in a number of unfriendly, hostile or down right illegal ways. If you monitor enough of these "pile ups" (where it seems like everyone with a license is keying up at once and announcing their calls) you'll get a good idea of the range of abuse which can be showered on the frequency on these occasions.

You may also come across the "DX Police." These are self-appointed characters who hang around the DX transmitting frequency and, without announcing their own call signs, shout "He's listening up!" or "...up, up, up!" or similar harangues intended to help those who aren't paying attention to how the DX operator is taking calls. They don't actually help, but they do add to the confusion and general chaos.

If you are SWLing, monitor only the DX transmitting frequency and log the calls as he or she acknowledges them, noting the call sign, time (UTC) and signal report as well as the frequency of the DX station and the date. This log is what you'll use when sending for QSLs from both the transmitting DX station and any other interesting DX calls you may hear. If you are a ham with HF privileges, note the DX call sign, date, frequency, time, signal report and QSL route - *i.e.*, whether you're

supposed to send the QSL direct, via the bureau or through a specified QSL manager (more on this later).

If you are a ham and new to DX pileups do this: monitor the DX frequency until you can figure out how the DX station is operating. Take notes on where he or she is listening, name, QTH (location), QSL route, etc. before you try to make contact. I'm always amazed when I hear someone finally able to break through the pileup and ask "What's your call?" or "What's your QTH?" These questions are fine during a "rag chew" contact where folks are just chatting, but in the DX window it



The V31AD expedition was put together by my ham friends, James, A69TX, and Don N5DD and our XYL's Renee, KD5V6C and Amy, KC5DJI. The expedition took place in the rental shack of V31AD in Placencia.

V31AD was operational from March 13-20 2004. During this time we made 3,900 QSOs with 3,000 unique stations. QSOs were made in the 80, 40, 30, 20, 17, 15, 12 and 10 meter bands using SSB, CW and RTTY.

Belize is just below Mexico on the Caribbean coast. It offers a mix of tropical fantasy with wildlife, majestic mountains, mysterious Mayan temples, and water sports. Belize's major industries are Sugar, bananas, fish products, garment production, food processing, lumber, tourism, and construction.

Placencia is at the southern tip of a long, narrow sandy peninsula in Southern Belize. It's a laid-back beach town. All commerce and activity used to be carried out by boat thus the village's main street is just a narrow concrete footpath less than 1m (3ft) wide. The main attractions are the beaches and water sports, there's also fishing, bird and monkey watching and excursions to jungle rivers and wildlife sanctuaries.

Equipment:
Kenwood TS-850s
Amstron ALS-800
Yaesu FT-100d
Dentron Clapperton L
Cushcraft A3
Bultermut HF 98 (located in the saltwater lagoon)
Writelog (with MMTTY plugin)



V31AD
QSL direct or bureau via
Don Osze, N5DD
8706 Winingham Lane
Houston TX 77055
USA



KS4ZR
Date: 14-Mar-2004 UTC | Band: 15m | RTTY: 2X | 15:19 | 12m | 9B | 95B

The QSO 73 V31AD



CQ Zone: 7 web: www.dxpileup.net email: n5dd@arrl.net

V31AD was the call sign used by a recent DXpedition to the Central American nation of Belize which issued this QSL card. The back side shows T-shirt clad hams with undisguised smiles on their faces. Inside is a short but thorough description of the DXpedition, its members, the location and equipment used. (Courtesy Author)

simply slows down the contact process and exposes the questioner as a "Lid" (poor operator).

❖ How to QSL Hams

Receiving QSL cards is one of the fun aspects of monitoring the bands, whether it's AM, International Broadcasters or hams. The cards are a tangible result of an ethereal activity. Cards from DX stations tend to be colorful and informative. Recently, DXpeditions have begun designing four sided QSL cards with full color on all sides featuring photos of the location, the participating hams, a surprisingly long essay about the place, and the obligatory logos of the various companies and organizations which laid out the funding for the DXpedition. Collecting these cards is especially satisfying and most expeditions encourage reception reports by shortwave listeners.

When you monitor a DX station they'll often state the preferred QSL route. The phrase "my QSL for you 100% by the bureau" is memorized by most DX hams even if they know little or no English. That means that you can send your report to them using your country's QSL bureau. You might hear "QSL direct only." That means that you have to find their actual address and send your reports there. They might say "QSL via my manager EA5KB." This means that you send the card to the holder of that call sign and they'll forward it to the DX station. They might say, "QSL instructions on QRZ.com." This means that if you go to <http://www.qrz.com> and type in their call sign you'll find instructions for receiving their QSL. These instructions can be very specific and you'll have to adhere to them in order to receive a card.

QSL bureaus are all volunteer organizations run by the national amateur radio organization in that country. In the U.S. it's the ARRL (American Radio Relay League). The more organized a country's ham population, the more likely their bureau is running well, too. The U.S. has an excellent system, as does Brazil, Germany, the U.K. and many others. Some countries require hams and SWLers to be members of their national amateur radio organization to be able to receive QSLs through the bureau. The U.S. does not; however, you must be an ARRL member to use the outgoing QSL service. Many DX hams can't afford the dues and so cannot receive reports by the bureau.

Some DX countries' postal systems operate marginally as well. Some are rife with problems and some workers may be on the lookout for foreign mail which might contain U.S. currency or International Reply Coupons (IRCs) which may be exchanged for postage.

One DX ham states on QRZ.com : "...do not put your call sign or my call sign on the outside of the envelope." Another says: "...my postal system does not accept IRCs. Send only *Green Stamps* (U.S. currency)." Some specify the amount of money to send. Foreign exchange rates vary and the U.S. dollar has taken a beating in Europe where \$2 will just cover postage. Some DX stations ask for 2 IRCs (1 IRC is \$1.75) or \$2 cash. Send the cash and save \$1.50. The bottom line is: If you want the card, do as they ask.

Whether you're an SWL or ham, when you send your listening report or QSL card directly to the station heard, you must include return postage and a self-addressed envelope (SAE). It's getting harder to buy IRCs. Some local post offices don't carry them. If you send cash, put it inside the SAE and use only security envelopes which guard the contents from prying eyes. If you don't include IRCs or cash, you will either receive no card at all or your QSL will be sent via the bureau (if one is available). The bureau will take anywhere from six months to two years depending on how prompt the sender is in getting your QSL into the system and how active the bureau at the foreign country is.

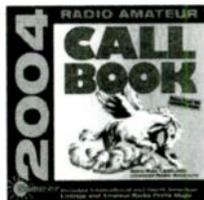
To find the address of the foreign ham you wish to QSL or the address of their manager you must have access to <http://www.qrz.com> or similar CD ROM database such as those sold commercially by Buckmaster Publishing <http://hamcall.net/> or CallBook.com. (<http://www/CallBook.com>)

The cheapest way to QSL a DX ham is when they are using a stateside manager. For the V31AD DXpedition to Belize this past spring, the QSL manager was N5DD. It costs only the price of two first class stamps (one for the SAE and one to send the report) to receive the card. In addition, stateside managers usually reply more quickly because there isn't an overseas postal lag. However, with DXpeditions there is often a printing lag as the commemorative QSL card has to be produced after all the photos have been developed and the card layout designed. Even though you may not be required to shell out for the overseas postage, it's still good practice to slip a dollar or two in the SAE to help defray DXpedition related costs.

❖ Resources

For complete details about the ARRL's Incoming and Outgoing bureaus and how to use them see: <http://www.arrl.org/qs/qslin> and <http://www.arrl.org/qs/qsout>. There is also an updated list of the 54 DX entities which are not served by the bureau. It is specifically stated on this web site that SWL cards can be forwarded through the QSL service. Membership in the ARRL is \$39/year and is open to all hams and non-hams alike.

Interested in supporting DXpeditions around the world? Consider joining an organization such as the Northern California DX Foundation. Founded in 1972, they've provided many rare DX call signs on the ham bands. <http://www.ncdxf.org/>



The "Flying Horse" Callbook, an amateur radio original, provides a call sign database via their CD ROM which is available for \$49.95. (Courtesy Callbook.com)

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Q. Have you ever tested one of the little stickers that go behind a cell phone battery that are supposed to boost the signal? Do they work? (Brian Eisenhauer, Wickenburg, AZ)

A. Yes, I have, and no, they don't. These little printed pieces of paper don't even conduct a signal, and even if they did, they don't stand a ghost of a chance of doing anything behind the battery! They are a scam and a fraud.

Q. What effect does sloping a shortwave dipole have on its directivity toward the horizon? (Gus Stellweg, Orangeburg, NY)

A. A vertical antenna has an omnidirectional pattern (a uniform, circular pattern); an elevated, horizontal antenna favors the two broadsides of the antenna (virtually zilch to signals arriving off the two ends of the wire); and if it angles toward the ground, it favors the direction of the lower end.

Q. A fan in my heating system causes a lot of electrical static in my shortwave radio. How can I reduce the interference? (KA3KEV, email)

A. Most motor noise of this type can be considerably reduced by simply connecting a capacitor across the AC wiring leads as close to the fan as practical. I'd use a 0.05 microfarad, 600 working volt capacitor.

Q. I saw an antenna atop a stream gauging system at a local recreational area. What frequencies are used for this, and is it for flood control? Mark Burns, Terre Haute, IN)

A. The hydrotelemetry link that you see is part of the IFLOWS (Integrated Flood Observing and Warning System) network run by NOAA (National Oceanic and Atmospheric Administration). They use frequencies between 169-172 MHz most of the time, and occasionally 406.xxx and 412.xxx MHz ranges. Yes, it's used for flood control, and also sends data

to the NWS (National Weather Service).

Q. I would like to construct a multi-antenna array for UHF-TV reception in my deep-fringe area (more than 100 miles). What considerations should I keep in mind? (Tom Whitmore, San Antonio, TX)

A. Doubling the number of antennas in an array adds a maximum of 3 dB gain; thus, the first two antennas improve by 3 dB, and adding two more for a total of four will add another 3 dB. Use the same length of coaxial cable from each antenna to your coupler to make sure signals arrive in phase, and be sure your coupler (actually a splitter connected in reverse) is specified for UHF. A low-noise, mast-mounted preamp will help overcome cable-length loss in your down lead which should be RG-6/U, not RG-59/U.

Unless your distant stations are all in the same direction, you will need a rotator since such an array is quite directional. The array should be erected as high as practical, without nearby obstacles to block the signals.

Q. What causes the characteristic, musty smell that comes from an electric heating system when it's turned on after being off for the season? (Mark Burns, Terre Haute, IN)

A. The familiar odor is caused by colonies of fungus, algae and molds which like their cool, dark quarters in the summer - until you cook 'em in the fall!

Q. How do you hook a single-wire feed line to a radio that has a coax connector or push terminals? Do I need a ground as well? And won't there be considerable impedance mismatch causing signal loss? (Louie Gombar, Guam)

A. For shortwave reception, a single-wire feed line can be attached directly to the center hole of a coax connector, or to the "antenna" terminal of a push or screw terminal. If you don't want to simply stick the wire in the receiver's coax connector, you can acquire the appropri-

ate plug and connect the lead-in wire to it. While there will be an impedance mismatch, shortwave antennas are so large and any loss is so small that this is not a problem, even with weak signals.

On shortwave frequencies, there is so much natural background noise (all that hiss is from simultaneous lightning discharges all over the earth) that both signal and noise will be reduced the same amount, so even with some attenuation of the signal level, you will still hear the same amount of signal above the noise. Better yet, the receiver's automatic gain control (AGC) circuitry will readjust the apparent signal strength so that you would be hard pressed to notice much difference.

The ground is optional. It may reduce local electrical noise in some cases, but it won't make signals stronger.

Q. I seem to recall a simple formula that can be used to calculate the distance an AM broadcaster can be heard. Can you tell me what that is? (John R. Wallace, Sr., Syracuse, NY)

A. There are many factors entering into the expected maximum distance an AM broadcast signal will reach including weather, presence of obstacles, frequency, adjacent- and co-channel interference, antenna gain, antenna pattern, ground conductivity, antenna efficiency, transmitting power, time of day or night, season, sensitivity and selectivity of the receiving equipment, and receiving antenna height, directivity, polarization and gain, as well as other factors.

For example, at these low frequencies, we factor in three types of wave fronts moving from the antenna: ground waves, space waves and sky waves, all of which are subject to natural fluctuations which affect distance. At higher frequencies, just the direct space wave is considered, and it's the one used for VHF/UHF distance calculation.

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

Getting Started



Bright Ideas

Gary Webbenhurst

P. O. Box 344, Colbert, WA 99005-0344

garywebbenhurst@monitoringtimes.com

For this holiday season column, I suggest some bright ideas that could appear under your Christmas tree, or in your stocking over the fireplace. Many ideas are under \$30, but hey, this is Christmas, you deserve a BIG gift. Many items are available on the internet, and I have given web addresses where appropriate. Other items are available at Radio Shack, or large discount houses like Best Buy, K-Mart, Target, or Wal-Mart. Here goes:

GPS is the hot new technology. Whoa, you gotta get one of these! OK, I admit it. I could not wait. Santa bought two for me! The Garmin Rhino 130 is an FRS radio, *and* GPS unit. It has the ability to identify your exact position, and send it to other Rhino users automatically. Hunters and campers, this is mandatory. There are many models to choose from. Don't get the cheapest, get one with some onboard memory space for downloading additional map details. Research this website: <http://www.bestpricegps.com>.

Antennas are the key to any good listening station. What do you have on your roof?

Every desktop, listening station, or repair bench needs a power source such as the Radio Shack adjustable 1.5v-12 volt wall wart #273-1662. RS also has a new DC to DC cigarette model #273-1817. This new model is less than half the size of their old model, and has an output of up to 1.2

amps. The new model has selectable settings of 3, 4.5, 6, 9, or 12 volts. It takes their standard two prong plugs. Round up your old plugs, and throw them in a reclosable freezer bag, and you are set for any power combination you might encounter. Just remember to get your polarity (+/-) right. Already have one? Well, what about a back-up for your "Go Bag"?

I have always said that my best "radio" is my Scout Frequency Finder™ from Optoelectronics. Slap a magmount whip on your roof and drive around town. You will be amazed at all the frequencies you will catch out of the air! The Scout has a feature that no other counter has. Its memory can store up to 400 different frequencies, and the number of hits for every frequency. It also fits in your back pocket with a stubby antenna for discrete situations. Try <http://www.optoelectronics.com>.

A small LCD color TV for use in the car or at home during power failures. Watch for sales, and it is yours for under \$80. Very useful when follow-

ing big disasters with live news coverage. I used mine extensively last October for Mt. St. Helens coverage when I camped out with the media in the nearby forest. (Talk about a frequency rich environment!)

Computer USB Memory stick. The *MT* October issue had an article about one that needs a fingerprint to access. Whoa, I gotta get one of those for myself! Always, always back up your radio-related files, and this is a good way to accomplish that bright idea. You won't be sorry if you visit <http://www.bcprofessional.com/gear>.

If you are considering a major purchase like a radio, search the web for reviews, and best prices. Buy the "right" new radio for your listening application. Digital? APCO 25? Not certain? A last minute idea? Call Grove Enterprises. They know radios! Their personal service means you can count on quick delivery service, and follow-up technical service. Grove Enterprises at 1-800-438-8155.

My personal recommendation? The Alinco DJ-X2000. Yeah I know, it does not "trunk." But it has several modes, even stereo FM. If you look at a map, you will see that 2/3 of America is either public lands with the Forest Service, BLM, National Park Service, or small cities and counties still using the traditional VHF low, high and UHF. Nothing fancy here. No encryption, nothing digital, just plain voice traffic.

This is a great receiver, with an admittedly slow scan rate, but a wide range of features including a built in digital recorder! It has user selectable 7.5 kHz steps for VHF, and 6.25 kHz for UHF – the new federally mandated channel spacing. This re-farming effectively doubles the number of frequencies in those public safety spectrum allocations.

So you already have an expensive radio or two? Protect your investment by using a hard-sided Pelican carrying case. Best price is directly from the manufacturer at <http://www.pelican.com>.

Don't be afraid to buy your own gift and put it under the tree. You have been good this year right? Go head, do it! Blame it on the elves, or the mojo ghosts.

Rayovac has a new 15 minute recharger for their new Nickel Metal Hydride batteries. It comes with special 15 minute rechargeable AA batteries rated at 2000 mAh. The 15

minute claim is accurate, but watch out, as those batteries get really hot. Hence the charger has a built-in fan. About \$30 at Wal-Mart or Radio shack.

I am getting really lazy. I often work from my recliner with the laptop computer. I found a new gizmo for the USB port on the back of my laptop computer. It is an adjustable adapter that goes just about any direction you want. It protects my USB connection and the memory stick from accidental breakage. Anyone who travels or moves their laptop around needs one of these. At RS, item #260-0705.

The new 2005 *Police Call*, or other books that directly fit your specific field of interest, e.g., trains, amateur, aircraft, or military frequencies.

A gift subscription for a magazine such as *Monitoring Times* for yourself or a radio buddy.

Need to give a buddy an inexpensive gift? I use the business card template in my word processor to make a custom "business card/travel luggage tag." I use my laminator (about \$25 at Staples). Remember, no home address on the luggage tag. Use bigger fonts, pick a bright color, and then bold the letters.

This summer/fall has proved to be another exceptional season for hurricanes, tornadoes, and otherwise extreme weather events. While many radios now have a weather alert option, I prefer the dedicated monitors. They are on all the time, sitting in silence waiting for an alert. I have one by my bed and another out in the kitchen.

Completely run out of ideas? Thumb through the pages of *MT* and carefully consider all the products that are offered by various dealers. Read the small ads. Last resort? A Gift Certificate at Radio Shack? From heat shrink to the new Cool-Hot soldering iron, there are always lots of goodies at RS. In fact, RS is now selling a new line of quality tools.

So how will Santa know what you want? Well, you tear out this page of wherever you find it, and circle your wishes with a highlight marker. Just leave it where Santa is sure to see it. Let's hope Santa has a credit card. I look forward to a new, and exciting year for 2005. Happy Holidays.

Aeronautical Scanning

In this final month of the year we'll continue to answer reader mail and go into some detail on what kind of activity you can hear on various airport frequencies. We'll finish up with some upgrade information for the PRO-96 scanner.

❖ Washington, D.C.

The Washington Transit Authority Metro is upgrading their radios. They appear to be similar to the analog trunk radios now in use.

- 496.6125 Police and Bus Operations
- 496.3375 Rather quiet now, former police
- 496.5625 Bus Operations
- 496.4875 D.C. Bus Operations
- 496.4625 Mobile Data Terminals (analog tones, not usual digital hiss or buzz)

Frequencies noted at recent Arlington festivals and fairs:

- GMRS and FRS
- 462.550 - 462.725
- 467.550 - 467.925
- 464.500 - 464.550
- 469.500 - 469.550
- 151.625 - .955 (.925, .820, .940, .625, .880, .955)
- 154.490 - .625



Courtesy WMATA

- Norman in Virginia

The Washington Transit Authority ("Metro") operates the public transportation (subway, buses, etc.) in and around the nation's capital. Arlington is a city in Virginia located just south of D.C.

❖ Lincoln, Nebraska

Enclosed please find a list of EDACS talk group numbers for Lincoln, Nebraska. I know you probably already have the 20 EDACS channel frequencies in your database there.

Speaking of data, I need a little help from you. I would like to know what the UHF frequencies are used here at the airport in Lincoln. I would call the tower and ask, but in these days of "security" concerns, I doubt they would tell me.

12 = Lincoln Police

- 12-041 West Dispatch
- 12-042 Car to Car (channel 2)
- 12-043 East Dispatch/LSO Dispatch
- 12-044 Car to Car (channel 4)
- 12-045 Expanded Dispatch

- 12-046 Car to Car (channel 6)
- 12-050 BNSF (Burlington) RR Police
- 12-061 LPD Tactical (channel 20)
- 12-062 LPD Tactical (channel 21)
- 12-087 University Police (UNL)
- 12-090 University Police
- 12-092 UNL PD (parking)
- 12-093 UNL shuttle bus
- 12-101 Nebraska State Patrol
- 12-103 Nebraska State Patrol
- 12-121 LPD Detectives
- 12-122 LPD Detectives
- 12-123 LPD Detectives
- 12-124 LPD Detectives
- 12-125 LPD Detectives (Narcotics?)
- 12-126 LPD Detectives
- 12-127 LPD Detectives
- 12-130 LPD Channel 12
- 12-137 LPD Information (channel 50)

13 = Lancaster County Sheriff (LSO)

- 13-004 County Emergency Management
- 13-005 SWAT/Special Operations
- 13-006 LSO Administration and Car to Car
- 13-007 LSO Civil Defense

14 = Lincoln Fire and EMS Ambulance (Medic)

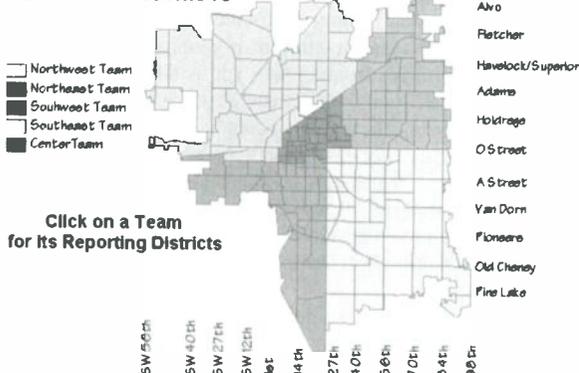
- 14-022 Deputy Chiefs
- 14-023 Training Center
- 14-024 Maintenance Shop
- 14-041 Fire Dispatch
- 14-042 Tactical 2
- 14-043 Tactical 3
- 14-044 Tactical 4
- 14-045 Tactical 5
- 14-046 Tactical 6
- 14-047 Tactical 7
- 14-050 Tactical 8 (patch to rural ambulance)
- 14-051 Talk Around
- 14-061 Fire and EMS Dispatch
- 14-063 Paramedic talk around
- 14-064 Medic Transfer Dispatch
- 14-075 Bryan Hospital
- 14-076 Lincoln General Hospital
- 14-077 St. Elizabeth Hospital
- 14-081 LFD Hazmat 1
- 14-082 LFD Hazmat 2
- 14-083 LFD Hazmat 3
- 14-084 LFD Hazmat 4
- 14-101 Engine 1 Workgroup
- 14-102 Engine 2 Workgroup
- 14-103 Engine 3 Workgroup
- 14-104 Engine 4 Workgroup
- 14-105 Engine 5 Workgroup
- 14-106 Engine 6 Workgroup
- 14-107 Engine 7 Workgroup
- 14-110 Engine 8 Workgroup

- 14-111 Engine 9 Workgroup
- 14-112 Engine 10 Workgroup
- 14-113 Engine 11 Workgroup
- 14-114 Engine 12 Workgroup
- 14-115 Engine 13 Workgroup
- 14-116 Engine 14 and Air 14 Workgroup
- 14-141 Truck 1
- 14-142 Truck 5
- 14-143 Truck 7
- 14-144 Truck 8
- 15-004 Unit on scene (LFD)
- 15-005 Unit on scene
- 15-010 Unit on scene
- 15-012 Unit on scene
- 15-022 Unit on scene
- 15-024 Unit on scene
- 15-025 Unit on scene
- 15-121 Nebraska Air National Guard Crash Rescue

02/04 = Public Works

- 02-041 Startran Buses
- 02-042 Startran Buses
- 02-043 Startran Buses
- 02-044 Startran Buses
- 02-051 Startran Buses
- 02-081 Lincoln Public Works
- 02-082 Lincoln Public Works
- 02-083 Lincoln Public Works
- 02-084 Lincoln Public Works
- 02-085 Lincoln Public Works
- 02-121 Street Repair
- 02-123 Lincoln Public Works
- 02-124 Traffic Engineering
- 02-127 Lincoln Public Works
- 02-130 Lincoln Public Works
- 03-001 Snow Removal
- 03-002 Special Operations
- 03-003 Lincoln Public Works
- 04-042 Water Pollution Control
- 04-043 Lincoln Public Works

LINCOLN POLICE REPORTING DISTRICTS



Click on a Team for Its Reporting Districts

- 04-044 Lincoln Public Works
- 04-046 Lincoln Public Works
- 04-050 Lincoln Public Works
- 04-081 Lincoln Public Works
- 04-082 Lincoln Public Works
- 04-084 Lincoln Public Works

- 06 = Lincoln Municipal Airport
- 06-080 Airport All
- 06-081 Airport Security
- 06-082 Airport Communications
- 06-083 Airport Maintenance
- 06-084 Airport Security

- 08 = Street Department
- 08-041 Lincoln Street Department
- 08-042 Lincoln Street Department
- 08-043 Lincoln Street Department
- 08-044 Lincoln Street Department
- 08-045 Lincoln Street Department
- 08-046 Lincoln Street Department
- 08-050 Lincoln Street Department

- 10 = County Health Department
- 10-041 County Health Department
- 10-043 Animal Control

Miscellaneous

- 00-001 Crosspatch Channel
- 00-002 Crosspatch Channel
- 00-003 Crosspatch Channel
- 00-007 LPD all points bulletins
- 00-010 Southwest Rural Fire
- 00-011 All Rural Fire
- 01-121 Radio Maintenance Testing
- 07-121 Juvenile Detention
- 11-001 Police Mutual Aid

- Jeff in Nebraska

The capitol of Nebraska and home to a quarter of a million residents, Lincoln is located in the southeastern part of the state. The city is also home to the University of Nebraska at Lincoln. The Federal Communications Commission (FCC) shows the city's EDACS radio system to be licensed as WNDX299 on the following 20 frequencies. Remember that frequencies for EDACS must be entered into your scanner in Logical Channel Number (LCN) order.

| LCN | Frequency |
|-----|-----------|
| 1 | 856.2125 |
| 2 | 857.2125 |
| 3 | 858.2125 |
| 4 | 859.2125 |
| 5 | 860.2125 |
| 6 | 856.7125 |
| 7 | 857.7125 |
| 8 | 858.7125 |
| 9 | 859.7125 |
| 10 | 860.7125 |
| 11 | 856.4625 |
| 12 | 857.4625 |
| 13 | 858.4625 |
| 14 | 859.4625 |
| 15 | 860.4625 |
| 16 | 856.9625 |
| 17 | 857.9625 |
| 18 | 858.9625 |
| 19 | 859.9625 |
| 20 | 860.9625 |

There are two transmitter site locations for this system, one in town at the 1900 block of North 14th and the other in Cheney near the 9000 block of Yankee Hill Road.

❖ **Monitoring Airports**

Although some sources of radio informa-

tion have dried up after 9/11, airport and air traffic frequencies remain available – they must be, since pilots are almost always required to communicate with towers and controllers when they fly.

There are many sources for such frequency information, including the *Boats, Trains and Planes* column in *Monitoring Times*. If you have a specific airport in mind, numerous web sites on the World Wide Web can provide frequencies. More useful, perhaps, might be to purchase what's called a *Sectional Chart* (or "sectional" for short). This is a colorful map that shows all of the airports and navigational aids in a particular geographic area and for each one lists the relevant radio frequency information. It takes a bit of practice to be able to read one, but with some study and the use of the legend key on each map you should quickly become proficient at finding the relevant radio frequencies to put into your scanner.

As you begin to monitor aircraft activity, you'll discover that there's a whole new language to learn. Pilots refer to this as "phraseology" and are encouraged to follow the words and phrases found in a publication entitled the *Aeronautical Information Manual*. You can find this in many of the larger bookstores as the *AIM/FAR*, a combined reference that includes Federal Aviation Regulations. The publication is updated at least twice a year, but even older editions will have plenty of helpful information.

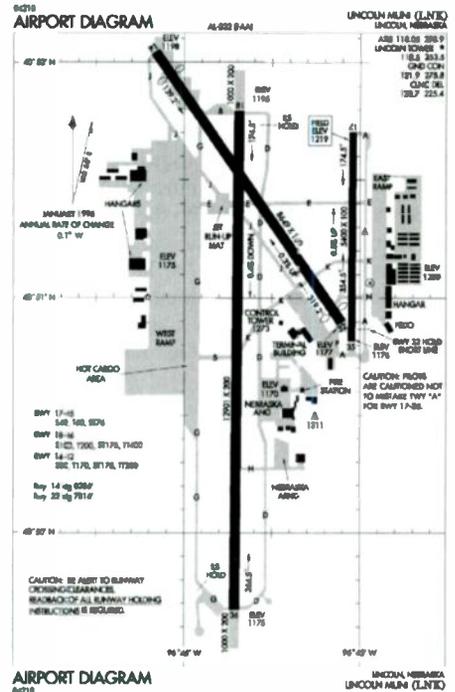
If you're interested in monitoring the activities of larger airports, such as the Lincoln Airport, you can download diagrams from the Federal Aviation Administration (FAA) website at http://www.naco.faa.gov/ap_diagrams.asp. In addition to listing radio frequencies in use at the airport, these diagrams also provide runway, taxiway and general location information that can be very useful in understanding the activities and instructions you might hear.

Just like radio stations, airports have identifiers. Lincoln Airport has a FAA identifier of "LNK" and entering it in the Airport ID search box will result in a link to the diagram (above right).

Airport Frequencies

At the top of the diagram you'll find several frequencies along with some abbreviations. You'll also notice that there are two frequencies for each abbreviation. Civilian aircraft use the lower frequency (in the 118 to 123 MHz range) and military units use the higher one (in the 200 to 400 MHz range).

The first line reads ATIS 118.05, 290.9. ATIS stands for Automatic Terminal Information Service and can be heard on 118.05 MHz and 290.9 MHz. These are recorded announcements that continuously broadcast weather information, active runways, specific



procedures and other pertinent information for arriving and departing pilots. Each announcement is identified by a letter from the phonetic alphabet (Alpha, Bravo, Charlie, etc.). A simple ATIS announcement for the Aurora Municipal Airport (identifier ARR) in suburban Chicago might sound like this:

"Aurora Municipal Airport information Kilo. 1430 Zulu weather: winds 260 at 5, visibility 10 miles, 5,000 broken, temperature 54 dewpoint 49, altimeter 29.73. Landing and departing runway 27. Readback of all runway holding instructions is required. Advise controller on initial contact you have information Kilo."

This message informs pilots that the weather conditions at 1430 hours Greenwich Mean Time ("Zulu", where 1430 translates to 8:30 am local time) had the wind blowing at five knots from the west-southwest and visibility on the ground was 10 miles with a broken cloud layer at 5,000 feet. The temperature was 54 degrees Fahrenheit and the dew point was 49 with a barometric pressure of 29.73 inches

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of Mercury. It also lets the pilot know that the active runway is 27, meaning aircraft are landing and taking off to the west from the 9-27 runway.

ATIS is usually the first frequency that arriving and departing pilots tune to, allowing them to get a good idea of the airport situation without having to ask a controller. When they make their first contact with the tower (sometimes referred to as "initial call-up") they let the controller know they've heard the ATIS broadcast by saying the phonetic letter:

"Aurora Tower, Cherokee Niner Three Three Seven Juliet, 10 miles north, inbound for landing with Kilo."

The next line on the airport diagram indicates that the Lincoln tower can be reached on 118.5 MHz and 253.5 MHz. These are usually the most interesting frequencies to listen to, as the controller coordinates the landings and take-offs of each aircraft.

A sectional chart will indicate the hours of operation for the control tower, if there is one. The control tower at Lincoln opens at 5:30 in the morning and closes at midnight. When it's open, the tower can be heard on 118.5 MHz (as well as 253.5 and 125.7 MHz) and ground control at 121.9 MHz (and 275.8 MHz). At very large and busy airports the tower and ground control frequencies may be divided into sectors (i.e. north side of the airport has one frequency and the south side has a different frequency) in order to handle the volume of radio traffic.

The next pair of frequencies is for Ground Control, which can be heard at Lincoln on 121.9 MHz and 275.8 MHz. Prior to take-off or after landing, pilots talk to a ground controller to receive authorization to move around on the surface. You may also hear a pilot ask for "progressive taxi instructions," indicating that the controller needs to give the pilot turn-by-turn instructions on how to get somewhere. Because of numerous runway incursions (pilots crossing runways without proper authorization) over the past few years, the FAA has become very strict about proper ground control procedures.

The last set of frequencies is for Clearance Delivery, on 120.7 MHz and 225.4 MHz. When the weather is bad, aircraft must fly according to Instrument Flight Rules (IFR). Part of the IFR procedure for pilots is to file a flight plan and wait for it to be approved and activated. Rather than clog up the tower frequency, pilots waiting for "IFR release" sit in their airplanes listening to Clearance Delivery. Their departure authorization comes in the form of a list of altitudes, headings, and waypoints they must follow as they take-off and leave the airport area. These instructions can be difficult to understand if you don't have a Sectional or other map of the local IFR navigational waypoints.

Smaller Airports

If you're looking for more information, or for frequencies in use at smaller airports that don't have a diagram, there are plenty of references you can use. The FAA publishes an *Airport Facilities Directory (AFD)* con-

taining relevant information for a particular geographic region of the country. Traditionally these green-and-black books are full of relevant data, including frequencies and hours of operation. There are also numerous Internet web sites with similar information, including a popular one called <http://www.airnav.com>.

For Lincoln, the AirNav page is <http://www.airnav.com/airport/LNK> and in the section entitled Airport Communications you will find a list of relevant frequencies, including ones called "CTAF" AND "UNICOM."

Common Traffic Advisory Frequency (CTAF) is used by aircraft to inform others of their activities and intentions when at or near the airport. These are busy frequencies at air fields that don't have control towers, or at airports when the tower is closed. Pilots will "self-announce" their location and actions as in this sample CTAF transmission:

"Gaithersburg traffic, Cherokee Three Seven Juliet on final for runway 14, Gaithersburg."

This indicates that a Piper Cherokee (a single-engine general aviation airplane) with an N-number ("tail number") ending in "37J" is on the last leg of the landing pattern to runway 14 at Gaithersburg airport. Because it is possible for an aircraft at one airport to hear CTAF transmissions from a different airport, saying the name is critical. The airport name is repeated in case another pilot missed the first part of the transmission.

For Lincoln, the tower is open between 5:30am and midnight, meaning their CTAF frequency of 118.5 MHz might be in use during the overnight hours.

The FAA refers to UNICOM as Aeronautical Advisory Stations. They are non-governmental radios often operated by a Fixed Base Operator (FBO) at the airports. These FBOs usually offer fuel, oil and other aircraft services, and operate the UNICOM as an additional (free) service to pilots. Traffic on UNICOM will be mostly related to wind direction, the current runway in use, and weather conditions. For the Lincoln airport, you can hear UNICOM on 122.95 MHz.

❖ Minneapolis, Minnesota

My boss just got a Radio Shack PRO-96 scanner from his wife. Ever since the Hennepin County dispatch went to Trunking system he has been lamenting that he can no longer hear the dispatch for his small suburb of Champlin.

It replaces a 20-channel handheld and the new one has his eyes glazed and he is frustrated. Are there any clubs in the Twin Cities where he could hook up with a Pro-96 fan? Any ideas or websites that can help him?

Ron in Minneapolis

The town of Champlin sits right next to the border of Anoka and Hennepin Counties, north of the Twin Cities of Minneapolis and Saint Paul. Champlin is still listed as sharing the Anoka County fire dispatch frequency of 154.280 MHz, but in the past few years many towns around Minneapolis have been moving their public safety radio services to an all-



digital APCO-25 trunked radio network. This Metro 800 MHz Radio System is based in the seven-county metropolitan area and uses more than 40 repeater sites.

As readers of this column know, I like the PRO-96 scanner. It performs very well on the numerous analog and digital trunked systems in my area and it even uses regular batteries. However, many of the features it offers can be complicated to program. GRE, the manufacturer of the PRO-96, tried to make it easier for users by including a feature called Virtual Scanner (V-Scanner), which contained pre-loaded frequency information for various regions of the country. Unfortunately, Minnesota was not one of the included areas, so users are left to program the scanner themselves.

Specific to your question, a good website for Minnesota scanning is <http://www.scannerfan.com>, which has a good deal of detailed information on the Metro Radio System. It also has a number of discussion forums that might prove useful to your boss. He may also be able to find another PRO-96 owner that has already entered the frequencies. With the proper cable, the settings can be copied from one PRO-96 to another through the use of a "cloning" feature.

PRO-96 Upgrades

There is an important consideration regarding the PRO-96 and scanning the Minnesota system. You will need to be sure that the scanner has received a "firmware upgrade" to version 1.2. If not, the scanner will probably be unable to reliably decode the audio - you'll only get a few seconds of clear voice from each transmission before it turns into a digital hiss. The firmware upgrade, available for download on the Radio Shack support web site, can take care of this problem. To make finding these files easier, I have created links to them on my web site, <http://www.signalharbor.com>. You can check the current version by pressing the '3' key immediately after turning the scanner on.

In addition to the 1.2 upgrade released earlier this year, Radio Shack has recently announced an in-warranty hardware upgrade for the PRO-96, which will bring it to version 1.3. It requires bringing the scanner to your local Radio Shack store, and I've got more information about the process on my web site as well.

That's all for this month. Have a peaceful holiday season and a Happy New Year!

ScanCan Goes Inside a Fire Dispatch Center

ScanCan made contact with an insider at the Region of Peel emergency services dispatch center in the western suburbs of Toronto recently. Through this contact your humble northern correspondent managed to squeeze an opportunity to sit with the fire department dispatchers for a couple of hours and get an insider's view of how emergency services dispatching works.

Peel is a very large regional municipality combining the cities of Brampton and Mississauga with the Town of Caledon. Located in the Peel Region Police headquarters building in Brampton, the 911 call center dispatches police and fire services throughout the region. Ambulance services are routed to a CACC (Central Ambulance Communications Center) in the city of Mississauga.

The fire dispatchers have a lot of responsibility and take their jobs very seriously. The Computer Aided Dispatch (CAD) system automates part of their task and expedites selection of the appropriate response equipment for emergency calls. Despite my eager fingers reaching for the abundance of radios at the console in front of me, I was not allowed to interfere with the equipment, but I was allowed to ask questions and take pictures. I am grateful to the communications center staff for their kind and helpful cooperation.

Fire Department Radio Equipment

The main radio system is a Motorola Centracom Gold Series. The Centracom is described by Motorola as the "next generation of dispatch control products for large radio systems." Centracom allows central dispatchers to communicate with multiple field personnel over many channels in wide area systems. The dispatcher works from a flat screen console with a Microsoft Windows based graphical user interface. The system supports analog or digital, conventional or trunked communications and allows dispatch by pager, phone and radio.

Each dispatcher also has a backup radio. These radios are compact Motorola MCS2000 systems that are capable of operating on VHF or UHF and are compatible with conventional, simulcast, AMSS, StartSite™, SMARTNET, SECURENET™, StatAlert™, and SmartZone. The radio systems have a broadband mode to facilitate interoperability with other emergency service agencies.

There is also a portable Motorola handheld radio linked to the main systems for use when dispatchers have to leave the communications room.

For the information of scanner operators

in the Greater Toronto Area, the Region of Peel Fire Department currently uses unencrypted analog trunked radio systems. The Peel Region Smartnet system also covers other users in the region.

Frequencies to monitor

| | | | |
|----------|----------|----------|----------|
| 151.070 | 172.290 | 172.980 | 866.0875 |
| 866.1875 | 866.2125 | 866.3375 | 866.4375 |
| 866.4625 | 866.5875 | 866.6875 | 866.7125 |
| 866.8375 | 866.9375 | 866.9625 | 867.0875 |
| 867.1875 | 867.2125 | 867.3375 | 867.4375 |
| 867.5875 | 867.6875 | 867.8375 | 867.9375 |

Dispatch Console Equipment

Each dispatch console has five screens. The first screen is the E911 calling station identification screen. The second screen displays street maps to aid in incident site and routing identification. A third screen displays the emergency call details; the fourth screen shows what equipment is available at each fire station and the fifth screen is the main radio control console.

Fire Department Equipment

While monitoring fire department action on a scanner you will hear references to the type of equipment being used. In Peel Region there are several different classifications of fire equipment available:

Pumpers - The most common vehicles, typically carrying 500 gallons of water, foam and ground ladders.

Tankers - Usually used in rural areas where there are no hydrants. A tanker typically holds about 8-9000 liters of water.

Aerial - A pumper truck with an aerial ladder system. The ladder extends up to about 100 feet and contains a high capacity waterway for fighting high level fires.

Squad - Special tools vehicles

District Chief - The boss

Air/Light - Portable powerful lighting and air bottle refill

Command Post - Command and technical support functions at major incidents. Provides computers and communications, a remote camera on a 530 foot mast, generators, beverage and rest room facilities.

Technical Rescue - May include a small powerboat on the truck as well as a telescopic 6000 watt lighting unit.

Haz Mat - (Hazardous Materials) Truck - special equipment for treating chemical spills and other dangerous situations. I was warned that if I saw one of these vehicles on the road, I should head in the opposite direction - as quickly as possible!

There are a total of 41 fire halls in the Region of Peel. Twenty of these are in Mississauga, 12 are in Brampton, and 9 are in Caledon. Caledon claims to have the largest volunteer firefighting force in Canada.

Vehicles and stations can be identified by the first of three numerals in their vehicle code. A leading numeral of 1 denotes Mississauga, 2 denotes Brampton and 3 denotes Caledon. So, for example, "Pumper 208" would be a Brampton fire truck.

One interesting little snippet that I learned during my visit was that the Region of Peel has the ability to adjust municipal water pressure to divert flow to the site of a fire. The same is probably true in other cities throughout North America. So, if your home water pressure drops unexpectedly, it may signal an opportunity to turn on a scanner and listen to the local fire department.

Thanks

This will be the final regular appearance of the Scanning Canada column in Monitoring Times. I'd like to thank MT for the opportunity to write about our great country and to thank my readers for their loyalty. I can be reached by email at scancan@sympatico.ca

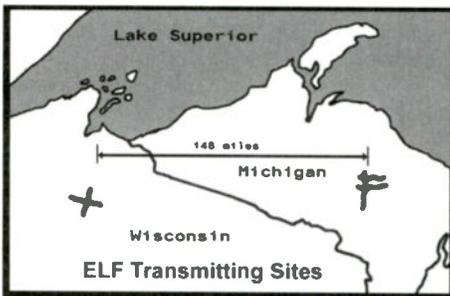


Peel Region Fire Dept. Dispatch Console

US Navy Closes the "World's Biggest Station"

We have some more station closures to talk about this month. The biggest one, in geographical size at least, is Project ELF, the US Navy's Extremely Low Frequency (ELF) submarine communications system. This once-essential part of the Cold War nuclear missile deterrent occupies a multi-state antenna farm near Lake Superior. It ceased operation in late September 2004.

ELF's primary frequency had a channel center of 0.076 kilohertz (kHz), or in other words, 76 hertz (Hz). Secondary frequency was believed to be a mind-boggling 44 Hz. There's not much else down this low, except for a Russian research facility, a similar submarine station also in Russia, the electric power distribution system, and several poorly-understood natural phenomena.



homemade map of the ELF transmitting site

The extreme wavelength, over 2400 miles long at 76 Hz, is what's good and bad about this system. A wave longer than the continental United States isn't going to have much trouble with salt water shorting out its electric field before it gets to a missile sub a few hundred feet down. However, it forces a transmission speed measured in minutes per word. This limited ELF's role to a "bellringer" station, sending out short, heavily encrypted codes telling a sub to come nearer the surface for further instructions on other channels.

Since a dipole stretching the length of this continent was hardly practical, the original plan envisioned a huge grid buried deep in the bedrock of the whole northern two-fifths of Wisconsin. But, like a ham settling for a backyard-sized antenna, the Navy came to settle for an installation "only" 148 miles across, with wireline-linked transmitting sites near Clam Lake, Wisconsin, and Republic, Michigan. These used a 14-mile "X" shaped array, and a 28-mile "F" shaped antenna, respectively, strung on thousands of poles and working off a monumental ground system drilled

miles down into the rock.

In the last few years, both transmitters were operated at once, in 8-hertz minimum-shift keying, giving "tones" of 72 and 80 Hz. This improved global coverage.

ELF never really overcame environmental and public health uncertainties related to electromagnetic fields at these frequencies. The Navy concluded a years-long ecological study in 1993. It wasn't definitive either way, and few were satisfied. Finally, the argument stuck that the money was better spent on counter-terrorism, and ELF was closed. Instead, submarines will listen to the Very Low Frequency TACAMO (TAKE CHARGE AND MOVE OUT) system, which does not penetrate as deeply, but which allows much longer messages.

❖ Bern Radio Drops Voice and SITOR

Also in September came the abrupt disappearance of all Simplex Telex Over Radio (SITOR) teleprinting services at Switzerland's Bern Radio, call signs HEB and HEC. A couple of weeks later, voice services in upper-sideband (USB) also terminated.

This was no real shock, since the station is currently owned by Globe Wireless, which for about a year has been converting all of its many transmitters worldwide to its proprietary computer network system. Globe uses a modified version of PACTOR (Packet Teleprinting Over Radio) to provide high-end commercial customers with fairly seamless computer connectivity integrating radio and satellite.

What's less understood at press time is the status of Bern's aeronautical station, which identified on-air as "Berna." This was added in 1971 as a Long-Distance Operational Control service (LDOC). Once it was a fixture on the aero bands, patching Swissair and other companies to ground personnel.

When the Swiss government telephone company privatized in 1998, Berna's old Schwarzenburg site was closed and largely dismantled. Its two big Siemens transmitters, which had been modified for USB and quick switching, were purchased by Nexus-IBA, the International Broadcasting Association. One is currently used by Nexus' Italian Radio Relay Service.

The LDOC went off the air, but in 2001 it came back on all frequencies, between 0700 and 2300 local time. Loggings were rare, however. Is it gone again? We don't know. Bern Radio's web site appears down, and Globe Wireless is

occupied with recovery from the hurricanes in Florida.

Those wanting to help answer this question can check out Berna's primary frequencies. These are 5395, 6643, 8936, 10069, 13205, 15048, 18023, 21988, and 23285 kHz, all USB.

❖ New Raytheon Sea Radars

We have more action on the high-frequency (HF) radar front. Defense giant Raytheon is into HF surveillance equipment in a big way, both in Relocatable Over-The-Horizon Radar (ROTHR), and High-Frequency Surface-Wave Radar (HF-SWR). These complement one another, with the surface-wave radar filling in the skip zone left by the over-the-horizon station's ionospheric bounce.

Both use HF for greater range and coverage than conventional microwave radar. Relocatable OTHR, as the name implies, can be moved to where it's needed. This is an important difference from the older backscatter radars, which were designed for early missile warning and used giant antenna arrays many miles long. It also sounds a bit less threatening, with short, buzz-saw-like, pulse bursts jumping around HF.

Raytheon has installed ROTHR sites in Texas, Virginia, and Puerto Rico, covering most of the Caribbean for the anti-smuggling and counter-terrorist operations of the Joint Interagency Task Force-South (JIATF-S). ROTHR uses separate transmit and receive antennas, both with impressive rows of verticals. Raytheon proposes three more sites farther north, to widen US coverage for homeland security purposes.

The HF-SWR surface-wave radar is a newer technology, having in the past been used mostly by another company in an oceanographic version called CODAR (Coastal Ocean Dynamics Radar). This was and is the sweeper around 4.5 megahertz (MHz), which became infamous for its wide-ranging harmonics zipping through entire amateur bands. The surveillance version, now being tested in Canada, often uses less equipment. However, it retains the distinctive zwoop, zwoop, zwoop sound as it sweeps a pulsed carrier once or twice a second across a range of up to 80 kHz.

Frequencies here are between 10 and 18 megahertz, and average power is only 800 watts. This is good, because if everything gets funded, these will be deployed along the entire US coastline.

Happy holidays, and we'll be back next year!

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 |
| CAMSLANT..... | Communication Area Master Station, Atlantic |
| Coq-B..... | Coquelet-8, French teleprinting system |
| CW..... | Morse code telegraphy ("Continuous Wave") |
| DEA..... | US Drug Enforcement Administration |
| DSC..... | Digital Selective Calling |
| EAM..... | Emergency Action Message |
| EOC..... | Emergency Operations Center |
| FAX..... | Radiofacsimile |
| FEC..... | Forward Error Correction teleprinting system |
| FEMA..... | Federal Emergency Management Agency |
| HF-GCS..... | High-Frequency Global Communications System |
| M22..... | Israeli Navy; CW traffic, weather, and "numbers" |
| MARS..... | Military Affiliate Radio System |
| Meteo..... | Meteorological |
| MFA..... | Ministry of Foreign Affairs |
| RCC..... | Rescue Coordination Center |
| RSA..... | Republic of South Africa |
| RTTY..... | Radio Teletype |
| SAR..... | Search And Rescue |
| SHARES..... | SHARED RESOURCES, US Federal net |
| SITOR-A..... | Simplex Teleprinting Over Radio, ARQ mode |
| SITOR-B..... | Simplex Teleprinting Over Radio, FEC mode |
| UK..... | United Kingdom |
| Unid..... | Unidentified |
| US..... | United States |
| V2..... | Spanish female "Atencion" & 5-number groups |
| VFT..... | Voice Frequency Telegraphy |
| VOLMET..... | Flying Weather (loosely from French) |

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time).

- 2187.5 Witowo Radio, Poland, DSC call at 0132. RCC Falmouth, UK, DSC call at 0216. Aasiaat Radio, Greenland, DSC at 0301. RCC Aberdeen, UK, DSC at 1710. Varna Radio, Bulgaria, DSC at 2058. Turku Radio, Finland, DSC at 2216. (Ary Boender-Netherlands)
- 2872.0 Gander-North Atlantic air route control, Canada, working Speedbird 248, British Airways, at 0935. (Allan Stern-FL)
- 2899.0 United 904-Airliner with position for Shonwick, North Atlantic air control, Ireland, at 0500. (Patrice Privat-France)
- 3476.0 Boxer 41-DC Air National Guard C-40C, working Shanwick at 0417. (Stern-FL)
- 4372.0 Juliet-US Navy, working Hotel and others in a tracking link coordination net, at 0150. (Rick Baker-OH)
- 4555.2 DLVB-German Customs vessel, position report in German for Schleswig-Holstein, SITOR-A at 2000. (Privat-France)
- 4739.0 Fighting Tiger 20-US Navy P-3C, working Golden Hawk (Brunswick, ME) at 0200. (Baker-OH)
- 4924.5 HQ703N-US National Guard headquarters, VA, calling C010TN (Connecticut), also on 5847, ALE at 1212. (Ron Perron-MD)
- 5000.0 YVTO-Venezuelan standard time signal, identifying in Spanish at 0445. (Privat-France)
- 5211.0 WGY 912-FEMA Special Facility, Mt. Weather, VA, working NNN0AUH, US Navy/Marine Corps MARS, said he was monitoring 14483.5 and the national emergency frequency on 4041, at 0252. WGY 944, Georgia State EOC, checking in with WGY 912, at 0253. (Baker-OH)
- 5236.0 KNY 91-US National Communications System, working WWJ 40S (Federal Highway Administration, PA), PENNCAP 240 (Civil Air Patrol), and several MARS stations, in hurricane Frances SHARES net, at 1245. (Baker-OH)
- 5320.0 CAMSLANT-US Coast Guard, VA, calling cutter *Decisive*, at

- 2035. (Mark Cleary-SC)
- 5550.0 Teal 14-US Air Force Reserve 53rd Weather Recon "Hurricane Hunter" aircraft, working New York while investigating Jeanne, at 0715. (Stern-FL)
- 5616.0 Continental 004-Boeing 767 flight with position for Shanwick, at 0500. (Privat-France)
- 5696.0 Rescue 6042-US Coast Guard helicopter, radio guard with CAMSLANT while hoisting persons from a distressed sailing boat off VA, at 0042. Rescue 1504-US Coast Guard, working CAMSLANT in a hurricane-related SAR off Florida, at 0407. (Baker-OH)
- 5708.0 580128-US Air Force KC-135 tanker, calling Elmendorf AFB in ALE, at 1835. (Privat-France)
- 5717.0 Halifax Military-Canadian Forces, patching Canforce Rescue 328, a C-130, to Halifax Rescue Coordination Center, in a SAR operation, at 0345. (Baker-OH) Halifax Military patching 328 to RCC, probably the same contact, at 0352. (Perron-MD)
- 5732.0 CAMSLANT Chesapeake-US Coast Guard, Norfolk, VA, working aircraft J39 and J40 in ALE and voice, on SAR related to hurricane Ivan, at 0030. (Perron-MD) J18-Aircraft calling OPB in ALE, then identified as 18C and passed position to Panther, DEA, Bahamas, at 2230. (Cleary-SC)
- 5760.0 Cuban AM Spanish "numbers" (V2), distorted audio at 0226. (Camilo Castillo-Panama)
- 5789.0 Parnuyip-Estonian Army, Parnu, calling Kuperjanoviyip in ALE, at 2148 and 2158. (Watson-UK)
- 5847.0 HQ703N-US National Guard headquarters, VA, calling D030EN (Delaware), ALE at 1221. (Perron-MD)
- 6586.0 New York-North Atlantic air route control, position and fuel from Continental 5031, at 0456. (Stern-FL)
- 6628.0 Reach 1004-US Air Force AMC, working Santa Maria, Azores, at 0830. (Stern-FL)
- 6697.0 Equality-US military, with two EAMs, simulcast on 8992 and 11244, hour plus 07/37 broadcast, at 2007. (Jeff Haverlah-TX)
- 6993.0 Andrews-US Air Force, Andrews AFB, MD, working Anthology in voice and data modes, at 0500. (Haverlah-TX)
- 7508.0 ZSJ-South African Navy, FAX 6-day weather forecast at 1105. (Bob Hall-RSA)
- 7527.0 D23-US Customs, raising CS3 in ALE, then identifying in voice as Omaha 23SK working Ping Pong, at 2140. (Cleary-SC)
- 7611.0 FAAZJX-US Federal Aviation Agency, Jacksonville, FL, ALE sound at 0213 and 0313. (Watson-UK)
- 7621.6 CGD9-US Coast Guard District 9, Cleveland, OH, colling NRKP (Cutter Mackinaw, WAGB-83), at 0030. (Perron-MD)
- 8026.0 Andrews-US Air Force, MD, working Anthology, moved him to 11181, at 0452. Andrews, working Snow Plow at 0758. (Haverlah-TX)
- 8045.0 Unid-Egyptian air defense, 7 slow ARQ transmissions in VFT, at 2215. (Watson-UK)
- 8103.0 4XZ-Israeli Navy, Haifa (M22), CW markers at 1238. (Watson-UK)
- 8156.0 Unid-Royal Bahamas Self Defence Forces, working "C-6-R," Romeo 266, and Romeo 267, in a hurricane-related SAR at 0315. (Baker-OH)
- 8397.5 UCBM-Russian vessel *Mekhanik Pustoshnyy*, SITOR-A traffic with Arkhangelsk Radio, at 1405. (Privat-France)
- 8414.5 Jeddah Radio, Saudi Arabia, DSC call at 0032. US Coast Guard, New Orleans, DSC at 0501. Karachi Radio, Pakistan, DSC at 1606. Yangon/Rangoon Radio, Myonmar/Burma, DSC at 2004. Iqaluit Radio, Canada, DSC at 2034. USCG Boston, DSC at 2217. USCG Miami, DSC at 2226. (Boender-Netherlands) 636010462-Libarian registry vessel *Belguardian*, callsign ELSZ9, testing in DSC at 0845. (Privat-France)
- 8417.0 XSV-Tianjin Radio, China, CW identifier in SITOR-A marker at 1918 (Watson-UK)
- 8419.0 IAR-Rome Radio, Italy, CW marker at 0205. (Castillo-Panama)
- 8422.0 NRV-US Coast Guard, Guam, CW identifier in SITOR-A marker at 0824. (Watson-UK)
- 8422.5 UDB2-Kholmok Radio, Russia, CW identifier in SITOR-A marker at 1851. (Watson-UK)
- 8424.0 SVO-Olympia Radio, Greece, CW marker at 0201. (Castillo-

- 8430.0 Panama
TAH-Istanbul Radio, Turkey, CW marker at 0202. (Castillo-Panama)
- 8433.0 XSG-Shanghai Radio, China, working ships in SITOR-A at 2216. (Watson-UK)
- 8444.0 Unid-Murmansk Meteo, grainy FAX weather charts, 90 lines per minute, at 1230. (Watson-UK)
- 8504.0 NMG-New Orleans Meteo, hurricane Ivan tracking FAX at 0620. (Hall-RSA)
- 8549.0 UCE-Arkhangelsk Radio, Russia, SITOR-A traffic with UBSW, Russian vessel *Tekhnolog Konyukhov*, at 0605. (Privat-France)
- 8834.0 SARMN-Brazilian Air Force SAR, Manaus, ALE sound, also 13978, at 0517. (Perron-MD)
- 8906.0 New York-North Atlantic air route control, handing KLM 754 off to Gander, at 2216. (Stern-FL)
- 8912.0 Panther-US DEA, Bahamas, position from aircraft 52A, at 1846. (Cleary-SC)
- 8918.0 Reach 66-US Air Force AMC, position for New York at 2119. (Stern-FL)
- 8965.0 PNR400-Panther 400, US DEA, Bahamas, ALE sound at 0220. (Perron-MD)
- 8971.0 Wafer 21-US Navy P-3C, working Golden Hawk, ME, clear and secure at 2042. (Cleary-SC)
- 8983.0 Coast Guard 2105-US Coast Guard Falcon Jet, doing a pre-storm survey over FL before hurricane Jeanne, at 0055. (Stern-FL) Rescue 2121-US Coast Guard, radio guard with CAMSLANT while dropping marker buoys in a debris field, at 2128. (Baker-OH) Coast Guard 1706-US Coast Guard HC-130, sent to working frequency "3A17" (10993.6) by Clearwater for Sector Key West, at 1925. Oceana Radio-US Coast Guard Auxiliary, VA, position from Rescue 1706 at 2233. (Cleary-SC)
- 8992.0 Prompter-US military, with a 28-character EAM simulcast on 6697 and 11244, at 1731. Soda Pop-US military, same net, calling Mainsail (any ground station this net), at 1742. (Haverlah-TX) Reach 693-US Air Force AMC, patch via Andrews HF-GCS, MD, to Lightning Ops at MacDill AFB, at 1807. (Stern-FL)
- 9025.0 Coast Guard 1705-US Coast Guard, ALE-initiated voice check with District 7 Command Center, Miami, FL, then working ADW, Andrews AFB, MD, in ALE as "705," at 1730. (Cleary-SC)
- 9295.0 EAATS-US Eastern Army Aviation Training Site, PA, ALE sound at 0016. (Perron-MD)
- 10125.0 Cuban AM Spanish "numbers" (V2), strong but low modulation, at 1415. (Castillo-Panama)
- 10493.0 WGY 9494-FEMA Auxiliary Station, CO, radio check with WGY 912 at 0355. (Baker-OH)
- 10600.0 DESTAFAC23-Detachment 23, Venezuelan National Guard, calling CUFAN3 in ALE, also on 9052, at 0301. (Perron-MD)
- 10780.0 Cape Radio-US Air Force, Cape Canaveral, working contract freighter Air Transport 300, at 2243. (Stern-FL)
- 10993.6 "U-7-Z"-Probably Coast Guard 1706 from 8983, setting up secure mode with Sector Key West, at 1927. Herk 20-US Coast Guard, requesting Sector Key West come up in secure mode, at 2317. (Cleary-SC)
- 11010.0 ERMRI0-Brazilian Navy Radio Station, Rio de Janeiro, calling NTMRJO (Oiler *Marajo*), ALE at 0050. (Perron-MD)
- 11039.0 DDH8-Hamburg Meteo, RTTY weather with odd 450-kHz shift, at 1958. (Perron-MD)
- 11175.0 PNR400-Panther 400, DEA, Bahamas, ALE sound on Air Force HF-GCS primary, at 2111. (Perron-MD) [Oops. -Hugh]
- 11175.0 Researcher 674-US Navy, repeated Mainsail calls for radio check, no joy, at 1758. Reach 186T-US Air Force AMC, patch via Andrews HF-GCS to Meteo office, at 2129. (Stern-FL)
- 11232.0 Canforce 2851-Canadian Forces C-130, setting up with Trenton Military, given secondary of 13257, at 2145. (Stern-FL)
- 11244.0 Mischief-US military, with a 28-character EAM, simulcast on 8992 and 13155, 07/37 mode, at 0337. (Haverlah-TX)
- 11330.0 Teal 99-US Air Force Reserve "Hurricane Hunter" returning from Jeanne, handed off to Miami Center by New York, at 2202. (Stern-FL)
- 11396.0 Teal 54-US Air Force Reserve "Hurricane Hunter" working Jeanne, told New York the aircraft would be in "storm environment" for the next six hours, at 1610. Teal 54, position for New York at 1620. Teal 54, handed back to Miami Center by New York, for return to Keesler AFB, at 1820. Teal 99, other "Hurricane Hunter" on Jeanne, ops-normal for New York at 1830. (Stern-FL)
- 11494.0 Juliet 16-US Customs Service, patch via Service Center to Clearwater Air, at 0108. (Cleary-SC)
- 12577.0 RCC Canberra, Australia, DSC call at 1652. (Boender-Netherlands)
- 12828.8 UTQ-Kiev Radio, Ukraine, FAX weather chart for Atlantic hurricane zone off Africa, at 1700. (Watson-UK)
- 13015.5 IAR-Rome Radio, Italy, CW bulletins at 1755. (Perron-MD)
- 13197.0 UUI-Odessa Radio, Ukraine, patch in Russian from unheard ship, at 2015. (Perron-MD) [Vessels use 12350. -Hugh]
- 13264.0 Shannon VOLMET, Ireland, aviation weather at 1805. (Perron-MD)
- 13291.0 Gander-North Atlantic air control, Canada, working Delta 109 at 1355. (Perron-MD)
- 13586.0 SARBR-Brazilian Rescue Coordination Center, Brasilia, with ALE sound, also on 16355, at 0000. (Perron-MD)
- 13927.0 AFN2AC-US Air Force MARS, Miami, FL, working Rock 52, an Air Reserve C-130E, at 1839. AFA4DD, MARS, morale patch for King 21, a C-130, at 2128. (Stern-FL)
- 13972.0 SA4-Brazilian Air Force, working CERRADO in ALE and voice, at 2122. (Perron-MD)
- 14265.0 WAOSLB-Control in SATERN (Salvation Army Team Emergency Radio Network), CO, amateur hurricane traffic with WOXL, N9AL, and others, at 1500. (Perron-MD)
- 15025.0 Shark 80-US joint task force, patch via Skywatch, US Army in Honduras, to Aeromaster for a mechanical problem, at 0008. (Cleary-SC)
- 16962.0 FUF-French Navy, Fort de France, testing in RTTY, also on 13031.6, at 2040. (Perron-MD)
- 16986.4 CTP-Portuguese Navy, RTTY calling loop at 2044. (Perron-MD)
- 17982.0 51-Brazilian Air Force, asking an unidentified ground station to relay flight information for "Bravo India Sierra," at 2110. (Perron-MD)
- 18012.0 Circus Vert-French Air Force, Villacoublay, unsuccessful relay from Circus Orange, Dakar, Senegal, finally sent him to frequency "Marjolaine 2," (6712), at 1620. (Perron-MD)
- 18018.0 Architect-UK Royal Air Force, passing airfield color states to Celebrity, at 1930. (Perron-MD)
- 18033.0 Station 40-Unknown female passing numbers in Spanish to Station 41, at 1940. (Perron-MD)
- 18226.7 Unid-Egyptian MFA, Cairo, with ARQ traffic in Arabic, at 0630. (Hall-RSA)
- 18594.0 Service Center-US Customs Service, working helicopter Juliet 25, who is returning to base with a mechanical problem, at 1441. CAMSLANT Chesapeake-US Coast Guard, working aircraft "J-4-Z" at 1929. (Baker-OH)
- 18757.0 RFGW-French MFA, Paris, FEC traffic in 5-letter groups, at 0635. (Hall-RSA)
- 19036.4 Unid-Algerian Embassy, Dakar, Senegal, Coq-8 press stories in French to Algiers, at 1238. Algerian Embassy, Dar es Salaam, Tanzania, Coq-8 traffic in French at 1257. (Watson-UK)
- 19130.0 Unid-Probable US broadcast feeder, with news in Spanish concerning Fidel Castro and Cuba, at 1745. (Stern-FL)
- 19709.0 NEBRSL-Brazilian Navy Training Frigate *Brasil*, with ALE message "FAXDATA CK" to ERMNAT (Brazilian Navy Radio, Natal), followed by encrypted data FAX, also on 15932, at 1941. (Perron-MD)
- 20400.0 BNARCO-Commander, Venezuelan Navy Base "Amaro," calling BRION (Frigate *Almirante Brion*), at 1119. (Perron-MD)
- 22168.0 ERMBEL-Brazilian Navy Radio, Belem, calling BTLCMC1, Brazilian Marine Special Forces, also on 14780, 16607, 17010, and 22168, ALE at 1840. (Perron-MD)
- 22537.0 FUF-French Navy, Fort-de-France, RTTY test loop at 1300. (Perron-MD)
- 22575.5 PKX-Jakarta Radio, Indonesia, CW marker at 1440. (Perron-MD)

Bucharest Calling

This month we lead off with Ministry of Foreign Affairs (MFA) Bucharest, which has been a long established user of HF radio for its diplomatic communications.

Although operations converted rapidly from their proprietary ROU-FEC system to high speed MIL-188-110A PSK modems during 1999, the legacy system can still be heard on occasion. And, as you might expect, even if you're not equipped to decode either ROU-FEC or the 110A modem, you can still identify the Romanian network through the MIL-188-141 A ALE (Automatic Link Establishment) triggering that is used. Frequently, CW (Morse code) is also used to coordinate transmissions, especially when using the old system.

Let's start with the old system. The MFA always broadcasts using the 164.5 baud ROU-FEC variant, with replies from the embassies using the 218.3bd system. The tone shift is always 400 Hertz. Many of the transmissions use a bitmask to provide an elementary type of encryption. With 32 combinations of bitmask to select from in this system, without the right setting, regular text looks like gibberish. Fortunately, transmissions tend to stick to bitmask 24 most of the time, though 16, 10, 11 and 18 have also been seen.

ROU-FEC is an incredibly robust system, made so by long interleaving: sending the same characters more than once, spreading them apart in time, and assembling them again at the receiver. The receiver therefore gets several chances at decoding the same text, resulting in fewer errors. This can make ROU-FEC decode perfectly even under terrible noise and ionospheric conditions and weak signals.

The price for this, however, is that sending the same text more than once of course increases the overall size of the transmission, and because the receiver has to wait to see all repeats of the text in order to decide which is correct and which is not, there can be a considerable delay between sending the text and decoding it. In the case of ROU-FEC at 164.5bd, the delay in printing can be about 15 or 20 seconds. Since message text is sent more than once during the same transmission, this type of scheme to reduce errors is called redundancy.

The MFA always identifies using the fictitious callsign V5G when using the ROU-FEC system. Embassies use a mixture of three-letter fictitious callsigns, or ITU-registered callsigns from the Romanian YPM+2 digit series, or sometimes the callsign issued by the country in which the embassy is located: for example,

PPR910 for the embassy in Brasilia, Brazil.

Here is a typical broadcast from the MFA to embassies over ROU-FEC:

v5g v5g v5g msg nr. 567 qft 1 fr p: 38 39 40
42 48 50 52 53 56 57 59 61 62 70 73 75 76
77 78 81 82 83 85 86 88 89 90 92 94 96 97
98 99 101 102

::::: v5g v5g v5g msg nr. 568 qft 1 fr p: all
/rpt fr p: all/ ministerul afacerilor externe nr.e-
01/12570 din 29.12.1995/19,30 radiograma
- circulara

domnule sef de misiune, rezultatele bune ob-
tinite in anul 1995, in organizarea sar- batoririi
"pomului de craciun" pentru copiii salariatilor
mi- nisterului, s-au datorat in mare masura
sprijinului primit din partea misiunilor diplo-
matice care au raspuns la solicitarea centralei
in asigurarea unui fond necesar desfasurarii
acestei actiuni. cu aceasta ocazie conducerea
ministerului va multumeste si va ureaza un
calduros "la multi ani" /semnul exclamarii/
marcel dinu
567 :::::

Note the use of "p" followed by numbers to denote the addressee embassies and the "::::" message lead-in and trailer. Messages from the embassies follow the same kinds of formatting rules with "ambasada romaniei" followed by the name of the city in which the embassy or consulate resides.

A sign-off in CW is usually sent something like the following:

qru all = qrx lmw gb 73/88 = = = v5g v5g v5g
= op c 18 qsp gd fr all = nw hr

The New System

The Romanian channels have stayed largely the same during their transition to high speed modems. As we mentioned, ALE is used to trigger activity, with the MFA using the identifiers CENTR1 to CENTR8. Many of the embassy callsigns have remained the same during the transition, but many new ones have been added.

Here are a few to look out for:

| | |
|-----------|------------------------|
| YPM22/PHG | Berne, Switzerland |
| CAM | Budapest, Hungary |
| ONN33 | Brussels, Belgium |
| 8EH67 | Jakarta, Indonesia |
| ZUP | Prague, Czech Republic |
| BLJ | Tel Aviv, Israel |
| KNY25 | Washington DC, USA |
| Z2H98 | Harare, Zimbabwe |
| FOL | Cairo, Egypt |

Here are some frequencies on which the Romanian MFA network operates:

CENTR1: 9123, 10850, 11425, 13496, 14360,
14680, 15900, 20503kHz USB
CENTR2: 10180, 11550, 13508, 14683,
16235kHz USB
CENTR3: 6875, 7815, 7973, 11494, 16319,
16321kHz USB
CENTR4: 8058, 10180, 11420kHz USB

CENTR5: 7973, 9114, 9115, 11425, 16235,
16321, 16393, 17471kHz USB

CENTR5: 14406kHz USB

CENTR6: 6820, 7512, 10486, 13507, 14689kHz
USB

CENTR7: 5101, 11425, 12210, 13550, 15890,
20882kHz USB

CENTR8: 5742, 6835, 7844, 8015, 8095,
9088, 9130, 9315, 10850, 11425, 11458,
11550, 13496, 14470, 16321, 19505,
20330kHz USB

Should you have a MIL-188-110A decoder, although traffic is encrypted, it can be recognized by a characteristic "xxxxxxxp!" or "xxxxxxxq!" lead-in.

❖ Aid Operations in Sudan

In late summer 2004, an ALE network using identifiers matching many locations in Sudan and the war-torn region of Darfur became operational. Investigation on the web indicated that these activities are likely being coordinated by UNJLC (United Nations Joint Logistics Center) which is an interagency nongovernmental organization working for the United Nations High Commissioner for Refugees (UNHCR), United Nations Children's Fund (UNICEF) and WFP (World Food Program).



The network has been heard on 14420 and 12225kHz USB using the following identifiers:

| | |
|-----------|------------|
| BABANUSA | Babanusa |
| DALANG | El Dalang |
| DMAZIN | Damazin |
| GADARAF | Gadaraf |
| GIRBA | Girba |
| OBIED | El Obied |
| MADANI | Wad Medani |
| NYALA | Nyala |
| PORTSUDAN | Port Sudan |

That's it for this month. Enjoy the good winter months of digital DXing.

Resources:

Romanian Ministry of Foreign Affairs:
<http://www.mae.ro>
UN Joint Logistics Center:
<http://www.unjlc.org>
UN Sudan Information Gateway:
<http://www.unsudanig.org>

A Modest Proposal for Coping with Jamming

China continues to jam the daylights out of VOA, RFA and other broadcasters daring to contradict the party line; the Chicom must really think we're wimps for allowing them to do this without consequences, and even sell them the transmitters used for jamming! A modest suggestion:

IBB transmitters at Greenville and Delano are idle much of the time, so fire them up with some loud American "Fire Drake" music on CRI frequencies to North America – but since censorship is totally contrary to American principles, include announcements referring listeners to a CRI broadcast, with time and frequency, say one of the crummy Cuban relays, which is deliberately not jammed, explaining that the

music clashing with other China frequencies is nothing but reprisal for Chinese jamming of American services, and will be stopped as soon as China relents. Our transmitters would not necessarily need to be run at full power to make CRI unlistenable; or DRM tests could be scheduled to blot out China, just as they have done to other broadcasters.

Ha! The Cubazuelans, thanks to their frequency management wizards, were doing this for us: despite my warning last month, Venezuela-Cuba colliding with China-via-Canada (in English), both on 13680 at 2300 during October. *Editorial commentary by Glenn Hauser.*

AFGHANISTAN [non] From Oct. 1, Internews Radio / Salaam Watandar was via Russian transmitters:

0130-0300 on 11795 Armavir 250 kW / 110 deg, ex Dhabbaya,

UAE

1330-1500 on 15195 Samara 250 kW / 140 deg, ex Rampisham,

UK

(Observer, Bulgaria)

Altho Salaam Watandar was expected to close its SW service as of Oct 15, in the VT B-04 schedule is:

17720 1330-1500 daily Rampisham 500 95

7230 0130-0300 daily Dhabbaya 250 45 (gh)

Salaam Watandar will continue after 15 October. The producers expect the service to run throughout the winter, but the transmissions were funded only for another month (Bernd Trutenau, Lithuania, *DX LISTENING DIGEST*)

ALBANIA R. Tirana tentative B04 English: Mon-Sat Eu 1945-2000 6115 7210; 2230-2300 7130; Tue-Sun NAm 0245-0300 & 0330-0400 6115 7160; also check Albanian to NAm daily at least for the music: 0000-0130 6115 7270 (ARTV via BCDX via WWDXC)

AUSTRALIA The Labor opposition proposed to spend \$6 million to restore R. Australia, and to wrest the Cox Peninsula transmitters back from Christian Vision as soon as the lease is up in 2010 (*The Australian* via Alokesh Gupta, Bill Westenhaver) Unfortunately, Labor lost the Oct. 9 election

HCJB B04 English: EAs (Sat/Sun 2230)0000-0100 15525; SAs 0100-0230(Sun 0300) 15560; SPac 0800-1100 11750; SEAs 1100-1230 15425; SEAs 1230-1300 15405; SAs Sun 1330-1400 15405; SAs 1430-1800 15390 (Douglas Weber, HCJB, via Alokesh Gupta, DXLD) HCJB has obtained permission to buy more land next to its Kununurra site in order to erect more and more antennas (HCJB press)

BELARUS R. Belarus (ex R. Minsk), Oct. 1 replaced 7210 with 7280 at 1900-2200, 150 kW, 270 degrees, but for B-04 was to move to 7340 at 2000-2300 (Observer, Bulgaria)

BELGIUM [non] RvI English B-04 on SW: 0800-0830 Eu 5965-Jülich; 1130-1200 As/Au 9945-Irkutsk; 1830-1900 Eu 5910-Jülich, 7490-Krasnodar; 2030-2100 Eu 7490-Krasnodar; 2200-2230 N&SAm 11730-Bonaire; 0500-0530 N&SAm 9590-Bonaire (via Jean-Michel Aubier, Swopan Chakroborty, Alan Roe) Even tho RvI only has one program going at a time, the entire language schedule shows a total of eleven different transmitter sites used during the day, none of them their own nor in Belgium (gh) Probably more as "Moscow" covers three sites (Kai Ludwig, Germany, DXLD)

BOLIVIA 6135 happened to be clear of ISWBC stations around 0050, so we could hear what was presumably R. Santa Cruz on 6134.8 with Andean music, but before any ID or sign-off could be heard, it was blasted into oblivion by DRM on 6140 from 0100 sharp, China via Canada, and the DRM buzz could be heard as far down as 6080. Complaints may go to Digital Radio Mondiale, to RCI/Sackville, and to China Radio International. But they won't make a @#*1 bit of difference (Glenn Hauser, OK, DXLD)

BRAZIL R. Gaúcha, Porto Alegre, 11915, is also heard on a very strong FM spur between 12940 and 12980, the final amplifier of the transmitter mistuned. When 11915 signs off, so does this (Adán Mur, Paraguay, @atividade DX)

R. Nacional da Amazônia, nominal and still announcing 6180 (Paul Miled, radioescutas) Not only jumps to 6170 or 6190, but also to 6185, clashing with Mexico at 0800 (Ron Howard, CA, DXLD)

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-04=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

Dominating 6185 at 0040 with romantic talk and music, but by 0130 XEPPM on top (gh)

Radio Marumby, Florianópolis SC, on new 11750 at 1325-1400, "Estúdio RDE", 1400 announcing this frequency and equally good on // 9665 (Arnoldo Slaen, Argentina, Noticias DX)

Rádio Inconfidência, Belo Horizonte MG, 6010, also heard on 5950 at 0832 past 1310. Jaime Soares phoned the station and was told they were testing after being off the air for a month when the transmitters burned up. Much better on 6010 (Adalberto Marques de Azevedo, MG, Noticias DX)

BURKINA FASO French service of R. Taiwan International announced that ROC had aided with new SW transmitters and antennas here and in Chad, so should soon be better heard (Christian Ghibaud, France, DSWCI DX Window) R. Burkina Faso broadcasts on SW only during sports competitions, usually Wed and Sat, heard at 2025 on 5030 (Rumen Pankov, R. Bulgaria DX via John Norfolk, DXLD)

CENTRAL AFRICAN REPUBLIC [non] B-04 R. Ndeke Luka via VT Communications: 1830-1930 on 11785 Woofferton, UK, 250 kW, 152 degrees in French/Singo (Observer, Bulgaria)

CHAD Technicians from Taiwan repaired the RNT SW transmitter and put it back in service Sept. 2; other foreign engineers had recommended replacing it, since repairs would be so complex. SW is important in covering this large country. As a result, RNT may rebroadcast some RTI programs (RTI via Jean-Michel Aubier)

CHINA [non] Altho some Habana transmitters came back weeks earlier, it took a sesquimonth after Hurricane Charley for some CRI relays to resume, Sept 27 at 0100 on 9580 and 1300 on 9570 in English; by Sept 30, the 1400 relay on 13740 returned, altho irregularly (gh) The latter to be replaced by 17730 for B-04 (Wolfgang Büschel, BC-DX)

Altho it is not in clandestine listings, I have been monitoring at least since April, "Sound of Hope" on 11765 at 1600-1700; it's jammed but on occasion not very heavily; opening ID in Mandarin is "Xi Wang Zhi Sheng"; then news on conditions of Chinese workers and society. It has a style like "Radio Free Asia" or another clandestine Voice of China. Sound of Hope says it is based in Bay Area, San Francisco and has a blocked homepage at <http://www.soundofhope.org> (Eric Zhou, Yangzhou, China, World Of Radio)

Sound of Hope Radio Network was established by Chinese immigrants in the US in June 2003, and is a "global non-profit provider of Chinese language news and culture programming." It might be "clandestine" according to the Chinese definition, but is actually a program producer based in San Francisco whose programs are distributed through "online streaming and FM/AM/SW radio stations". (Andy Sennitt, Holland, *ibid.*) But what transmitter site? Our inquiry to SOH was unanswered. RFA is on 11765 from Tinian in Mandarin until 1600, so could be an extension of that, or maybe Taiwan. KNLS also uses 11765 in Chinese at other times. All we heard at 1600 on 11765 was Fire Drake (gh)

COSTA RICA After several months of negotiation, the Pacific Board of Directors voted unanimously Oct. 1 to help re-establish RFPI's SW operation at a cost of \$250,000, in six to twelve months. RFPI resumed streaming in mid-October, including upgrade to MP4 suitable for dial-ups.

Charlie Wilkinson has also set up a new interactive website <http://www.rfpionline.org/> (RFPI Newsletter)

CROATIA [non] Hrvatska Radio Televizija, B04 via Germany is among several European stations blatantly invading the 40m hamband with broadcasts to the Americas. This winter it's 7285, which is scheduled on three overlapping 100-kW

transmitters: 2300-0400 230 degrees, 0000-0400 300 degrees, 0200-0600 325 degrees. These include some English and Spanish segments; the other relays to the Pacific also overlap, on 9470: 0500-0800 230 degrees, 0600-1000 270 degrees (gh, from skeds via Wolfgang Büschel, Alokesh Gupta, Alan Roe)

CUBA DST of UT -4 was originally scheduled to end one hour earlier than in the US on Oct 31, but the Chicago Tribune (via Hans Johnson, Cumbre) reported Oct 4 that due to energy shortage and frequent blackouts, hora de verana would remain in effect all winter. This should not affect RHC scheduling, but domestic services on SW should remain at the same UT as in the summer (gh)

R. Rebelde, La Emisora de la Revolución, has a good music show, Hecho en Cuba, M-F at 1630-1700 on 15570 and 11655, not 6140 and 9600 as announced (gh) See also VENEZUELA

CZECH REPUBLIC R. Prague, B-04 English to NAM: 1400-1429 21745; 2100-2127 & 2230-2257 5930; 2330-2357 5930, 7345; 0100-0127, 0200-0227, 0400-0427 6200, 7345 via Swapan Chakrobarty, India, DXLD

ECUADOR Allen Graham announced on DX Partyline Oct 2 that dismantling had begun of HCJB's largest antenna at Pifo, which together with its reflective curtain was most obstructive of air traffic at the new airport under construction nearby. It was used for long-haul services with 500 kW to Europe and Asia, but is no longer needed anyway now that HCJB focuses only on serving Latin America, from Ecuador (gh)

HCJB is awaiting a frequency assignment from CONARTEL to start DRM service on a tropical band (HCJB Press Sept 30)

unID LA on 3449.75, at 0947-1037, pleasant music, 5 x 690 harmonic? (Dave Valko, PA, Cumbre DX) 3449.76 is La Voz de Riobamba, Ecuador, with a recording at <http://www.malm-ecuador.com> (Björn Malm, Quito, DXLD) So it's the third harmonic of HCG85 on 1150v, per WRTH 2004 (gh)

On 4918.97, R. Quito (presumed), 0942 horribly distorted nice tropical music; may have been off for a while (Dave Valko, PA, Cumbre)

FINLAND Nuntii Latini on Radiophonia Finnica Generalis, B-04: per <http://www.yleradio1.fi/nuntii> includes Sun 1655-1700 on 13665 NAM, 17730 SAM; Special Finnish other days (via John Carson, OK)

FRANCE [and non] Coinciding with a visit to China by Pres. Chirac with a large business delegation, Reporters Without Borders pointed out that a French firm, Thalès, has sold China a number of high-power SW transmitters which were installed near the western Chinese city of Kashi, and used for jamming VOA, RFA, BBCWS and V. of Tibet. "It is regrettable that a French company is involved in setting up a "great wall of sound" that violates the right of free access to information for hundreds of millions of people." (RSF)

GEORGIA R. Georgia external service will not be closed. The German department thanks DXers for their support which contributed to the final, positive decision of the management of the Georgian National Broadcasting Corporation (A-DX via Bernd Trutenau, Lithuania, DXLD) But remained as difficult as ever to hear. Contrary to posted schedule, evening broadcasts have not been heard for years, and the morning broadcasts are irregular, including English at 0630 on 11805, which actually varies on the high side, such as 11805.21 to 11805.27; however, German at 0700 is on a slightly lower offset! English again scheduled at 0830 and 0930, on 11910.05 or so (via Wolfgang Büschel, Germany, Bernd Trutenau, Lithuania, Noel Green, UK, DXLD)

GERMANY [and non] From DW B-04 English we pick a few broadcasts to elsewhere which ought to be audible in NAM: 0000 7290 Wertachtal to SAs; 0400 9545 Rwanda to C&EAF; 0500 9565 & 12035 Rwanda to C&SAF; 0600 15410 Rwanda, 7225 Portugal & Germany to C&WAF; 1900 11865 Portugal to EAF; 2000 13780 & 15205 Germany to C&SAF; 2100 15410 Rwanda to WAF, the last one probably best.

And look what we find at 2200: 6225 Almaty, Kazakhstan to EAs, also at 2300 in Chinese, despite our October Closing Comments pointing out that last year this caused interference to Lindblad ships in the Antarctic on 6224 (from full DW schedule via Alokesh Gupta, Mike Terry, DXLD)

Die Welt reports threatening cuts at Deutsche Welle. For 2005 a budget loss of 8.5 million Euro is expected, combined with increasing wages/fees resulting in a deficit of more than 10 million Euro. It is already planned to cancel further radio services if this scenario becomes reality.

Südwestrundfunk confirmed that both 6030 and 7265 would be shut down as of October 19 (A-DX via Kai Ludwig) However, DW planned to start using 7265 a few days later for DRM at 0700-1200 (Andreas Volk, A-DX via Ludwig) And Bayerischer Rundfunk plans to discontinue the AM service on 6085 by the end of this year (Kai Ludwig, Germany, DXLD)

HUNGARY [and non] R. Budapest closed one of its three SW sites, Diasd, a few years ago. And now another one, Székesfehérvár, is off as of Oct. 31; it had been used only on 6025. Some broadcasts on that frequency are now relayed from Rimavská Sobota (RSO), Slovakia.

The Slovak relays for B-04 are 6025 0400-0500, 1700-1900 and 2000-2230 but also 1900-2000 on 11675 and 2230-2300 on 7160. This site was (and probably still is) in danger of losing its only other customer, Slovensky Rozhlas. It was earlier considered an option by R. Polonia, but new management decided to continue with the poor Leszczynka facilities in Poland. The remaining Hungarian site is Jászberény, with transmitters considerably older, from 1974, and they should be proprietary designs, manufactured at Budapest (Kai Ludwig, Germany, DXLD) It seems the transmitters at Székesfehérvár will be moved to Jászberény and reactivated next season when temporary Slovakian relay will cease (Wolfgang Büschel, *ibid.*)

R. Budapest B-04 28-minute English: Eu Sun 1600 6025 9580; rest daily: 2000 3975 6025-RSO; 2200 6025-RSO; Saf 2200 12010; NAm 0200 & 0330 9775 (Observer, Bulgaria)

IRAN [non] Looking for the Voice of Khmer Krom at 1400-1500 via Vladivostok on 15660, via a DX Tuner in Edinburgh, I heard instead at 1430-1459 R.

Sedaye Mellat-e Iran, ex 1330-1400 on 15670 (Luca Botto Fiora, Italy, DXLD) To compensate for Iran's shift from summer to winter time on Sept 20 (gh) Had to shift 10 kHz to avoid Egypt on 15670 at 1430 (Wolfgang Büschel, BC-DX) Jammer followed it, intermittently (Finn Krone, Denmark, BC-DX) It's Voice of Iranian Nation, with Iranian bubble jammer on 15661.0 (Observer, Bulgaria) Best heard in LSB ECSS detection (Edward Kusalik, Alberta, Cumbre DX) See last month for more about this station

ISRAEL Totally distorted Kol Israel in Hebrew, 0400-0500 varying between 9987.7 and 9988.8 (Wolfgang Büschel, Germany, DXLD) 9988 is a Cairo frequency at other times; is 9988 on current IBA schedule, or where are they supposed to be? (gh)

ITALY RAI B-04 English: 0445-0500 5965 6000 7230; 1935-1955 6035 9760; 2025-2045 6040 11880; 2205-2230 11895; 0055-0115 11800 (via Andrea Borgnino, Roberto Scaglione, BCLNEWS.IT)

LAOS [non] Hmong Lao Radio, 0100-0200 Wed & Fri, VT relay via Rampisham UK, was 9515 in A-04; B-04 tentatively moved to 6040 for zones 4, 7-11, 500 kW, 300 degrees. \ 15260 still via Taiwan (Wolfgang Büschel, BC-DX)

LIBYA [non] B-04 LJB Voice of Africa (via France):

1000-1100 21695

1100-1230 17695, 21485, 21675, 21695

1230-1400 21675, 21695

1400-1500 21675

1600-1700 15220, 17840

1700-1800 15220, 15615, 15660

1800-1900 9485, 11635, 11715

1900-2030 11635, 11715

2030-2130 11635 (Observer, Bulgaria)

Includes brief English newscasts

MALDIVIVE ISLANDS [non] Minivan Radio, brakered by Radio Miami International, via Jülich, Germany, B-04 moving from 12015 to 11810 daily at 1600-1700 (via Wolfgang Bueschel, Alan Roe, World DX Club)

MÉXICO XERTA, 4810, had been missing since Sept 18, so I e-mailed them Oct 9 and got a quick reply from Rubén Castañeda Espindola saying they had been off the air because of heavy rains, but hoped to return Oct 15, scheduled weekends only from Fri 2000 to Mon 1200 [now 2100, 1300] (Ron Howard, CA, DXLD)

MONACO [and non] After 44 years of operations, Trans World Radio plans to close its offices and studios in Monte Carlo at the end of 2004. TWR personnel and program production are being moved into the receiving areas, further implementing a policy that began with the fall of the Iron Curtain in the early 1990s. Closing TWR's Monte Carlo office will have no impact on broadcast activities via facilities of Monte Carlo Radiodiffusion (MCR). TWR will continue to air programs via SW, MW, LW and FM transmitters from MCR sites (TWR via Dr. Hansjoerg Biener, BC-DX)

NETHERLANDS Altha RN canceled the mailbox Sincerely Yours last year, some listener letter-answering fills between programs, such as 1955-2000 weekdays on 9895, 17810 to Africa (Will Martin, MO, DXLD)

NEW ZEALAND RNZI B-04 with azimuths:

1651-1750 9870 035

1751-1850 11980 000

1851-2239 15265 000

2240-0359 17675 000

0400-0759 15340 000

0800-1059 9885 000

1100-1259 15530 325

1300-1649 9870 000

(Observer, Bulgaria)

RNZI is definitely purchasing a new 100 kW DRM-capable transmitter from Thalès, operational in early 2006 (RNZI via Wolfgang Büschel, DXLD)

NIGERIA VON revised its schedule, monitored in mid-Oct with only one transmitter operational:

0500-0700 15120 English to Europe

0700-0800 15120 French to Europe and North Africa

*0800- 7255 Hausa, possibly followed by other West African languages

1000-1500 15120 English

1500-1530 11770 Arabic

1600-1630 9690 Kiswahili?

1700-2100 7255 English

2100-2200 15120 French to Europe

(Thorsten Hallmann, Germany)

NORTHERN MARIANAS In Sept, R. Free Asia was missing some frequencies from Tinian and Soipan due to severe damage from a typhoon. Some channels were taken over by other sites but not all frequencies were covered. The damage has been extensive and it will be quite a while before things get back to normal (Craig Tyson, Perth, Australia, BC-DX) BBG was advertising for a contractor to manage these stations from next July (Andy Sennitt, Media Network)

PAPUA NEW GUINEA The Wantok Radio Light project is still on track, with SW 7120 to be added to FM in Port Moresby within the first two weeks of January 2005 (Joseph C. Emert, President, Life Radio Ministries, Inc., Radio Station WMVV, Griffin, GA via Dr. Hansjoerg Biener, Germany, BC-DX) CRN 4960 beat them to the air (gh)

PERÚ R. Melodia, Arequipa, has been "on the road" the last 2-3 years, logged on at least five frequencies: 5940.06, 5995.25, 5996.63, 6106.95 and 5939.36 kHz. On weekdays it's a talk station with news, sports and ads but on weekends more music and less news. Comments and Recordings at: <http://www.malm-ecuador.com> (Björn Malm, Quito, DXLD)

unID on 3168, at 2334-0007, Spanish, fast-paced OM with talks be-

Shortwave Broadcasting

tween nice Spanish musical selections (Scott R. Barbour, Jr., NH, DXLD) It's R. Noylamp, Lambayeque, on 3168.29, better sound quality on new frequency; harmonic of drifting MW 1575-1585 (Björn Malm, Ecuador, DXLD)

SCOTLAND [non] R. Six International, Glasgow, doubled its airtime Oct. 1 via WBCQ 5105, to two hours every day at 2300 [now from 0000] (Tony Currie, Programme Director, DXLD)

SEYCHELLES [non] FEBA's extensive multilingual B-04 includes only this in English, daily: 1400-1415 *Spotlight* on 9445 Novosibirsk; 1500-1515 *Spotlight* and 1515-1600 other programs on 7340 Irkutsk (FEBA UK via Alokesh Gupta, India, DXLD)

SLOVAKIA RSI B04 English: 0700-0730 Au 15460 13715; 1730-1800 WEu 5915 6055; 1930-2000 WEu 5915 7345; 0100-0130 NAM 7230, SAm 9440 (via Wolfgang Büschel, DXLD) ! Yet another European broadcasting to the Americas inside our 40m hamband! What is going on here?! (gh) see also HUNGARY

SRI LANKA On 22 September the order went from the Director General, Engineering at SLBC to Ekala SW transmitting station to stop all domestic SW due to the high cost of electricity. With it a long journey of domestic SW has come to an end. MW ceased last year. The SLBC has very effective FM coverage. However, we are making representations to the SLBC to restore at least a domestic service relay for Sri Lankans working in the Maldiv Islands and in neighbouring countries where Internet radio will still be prohibitive (Victor Goonetilleke, Media Network) External service still heard around 1400 on 15748.50 (gh, OK)

SUDAN [non] B-04 Sudan Radio Service via VT Communications, all M-F, Wooferton UK, 300 kW in English, Arabic, various: 0300-0500 9625 126 deg; 0500-0600 11795 126 deg; 1500-1700 15530 140 deg; 1700-1800 11715 140 deg (Observer, Bulgaria)

SWAZILAND TWR Swaziland celebrates 30 years on the air in November 2004 and has a new QSL card; B-04 morning English with kW, degrees: 0300-0330 Sun 3200 35 003; 0430-0600 M-F & 0500-0600 Sat/Sun 4775 25 233; 0430-0900 M-F & 0600-0900 Sat/Sun 6120 50 233; 0500-0900 daily 9500 100 005 (James Burnett, Swaziland, Frequency Manager, via Dr. Hansjoerg Biener, BC-DX)

SWEDEN [and non] R. Sweden B-04 English on SW: Eu/Af/ME: 1330-1430 7420 (40°), 11550 (85°); 1430-1500 11550 (70°); 1830-1900 6065 (140°-240°); 2030-2100 6065 (140°-240°), 7240 (70°); 2230-2300 6065 (140°-240°). Asia & Pacific: 0130-0200 11550 (50°); 1330-1400 7240 (40°), 11550 (85°); 1430-1500 11550 (70°); 2030-2100 7240 (70°). NAM: 0230-0300 6010 (268°) via Sackville; 0330-0400 6010 (277°) via Sackville; 1330-1400 15240 (305°); 1430-1500 15240 (272°) via Sackville (SCDX/MediaScan, Wolfgang Büschel) Using a relay instead of direct for the second morning broadcast is new (gh)

TURKEY VOT B-04 English: 1330-1420 15155 15195; 1930-2020 6055; 2130-2220 9525; 2300-2350 7275; 0400-0450 6020 7240 (Observer, Bulgaria) NAM frequencies are 7275, 6020. As Observer points out, 9655 was used last winter instead of 7275. Another station invading the 40m hamband! (gh)

UKRAINE RUI tentative B-04 English hours: 1200 WEu 15620 277 degrees; 2200 WEu 5840 290 degrees; 0100 & 0400 NAM 7440 314 degrees. Site Kharkiv except 7440 Mykolaiv (Alexander Yegorov, Kyiv, Ukraine via Alokesh Gupta, New Delhi, DXLD)

UNITED NATIONS [non] UN Radio B-04 English, 1740-1745 M-F on 7170 Meyerton, South Africa, 100 kW, 5 degrees to Eaf; 9565 Skelton, UK, 300 kW, 110 degrees to ME; 17810 Ascension, 250 kW, 65 degrees to W&Caf (VT via Alokesh Gupta, DXLD) One continues to wonder why UN Radio restricts its SW output to this tiny service, accompanied by some in French and Arabic (gh)

U S A VOA announced in mid-October that from Nov 1, *Talk to America* would shift an hour earlier to 1600 (Mike Cooper, DXLD) As English hours further contract (gh) Hardly any VOA English is broadcast from US sites any more; during A-04, 1900-2200 to Africa was via Greenville on 15445, providing excellent reception in mid-America too. Unfortunately on at least one occasion the transmitter was slightly mistuned and warbling heavily on 15197v instead; we tried to notify VOA by e-mail but never got any response (gh)

US Senator Joe Biden, the leading Democrat on the Senate Foreign Relations Committee, called for an expansion in US radio and TV broadcasts around the Muslim world outside the Middle East to help improve America's worsening "image problem." He estimated that the startup cost would be some 220 million dollars, with an additional 345 million per year to keep the program going. He said similar initiatives have been "o gigantic success" - including Radio Sawa (Media Network blog)

I'm an Arab/Muslim DXer in Coiro, Egypt. If I wanted to tune in to music, there are a dozen radio stations playing better music than R. Sawa, and if I wanted to tune in to the news - I'd rather tune in to BBC. Some of my friends think Sawa is an Israeli station. I remember those days when there was an Arabic section of VOA. I used to pay attention to that segment about the point of view of the US Government. I may agree/disagree with it, but at least that'd make me think. They used to have a call-in show where you can spit it out and say your point of view - but now that's history! (Tarek Zeidan, DXLD)

One of the frequencies abandoned by WHRI when broadcasts were moved to WSHB in South Carolina, was 5745. WWRB wasted no time in getting authorization for it in the evenings. Then WHRI reactivated one of the Indiana transmitters, probably at reduced power, but since 5745 was no longer available, appeared on 5835 instead. The latter frequency had been reserved for several years by KIMF, a station supposedly under in construction in New Mexico (gh) WHRI, 5835, 0000-0500 at 42 degrees (Observer, Bulgaria)

KJES, Vado, NM, was missing from its scheduled broadcasts in late

September, after being noted with very low modulation in mid-September (gh) KJES told me a broken transformer was being repaired (Hans Johnson, Cumbredx) It returned Oct. 18. Time-shifted B-04 schedule is likely: 1400-1700 11715, 1900-2100 15385, 0200-0330 7555 (gh)

The Los Angeles Times ran a series of articles in September exposing the lavish lifestyle of Paul and Jan Crouch, of the Trinity Broadcasting Network, which includes KLTN shortwave from Salt Lake City. Crouch, the 70-year-old founder of the world's largest Christian TV empire, TBN, is reported to have paid an employee \$425,000 to keep quiet about a homosexual tryst. In addition to the hush-money report, the Times has been looking into finances of TBN, which is based in Orange County, CA, and into the lifestyles of the Crouches. The newspaper cites spending of millions on lavish homes and furnishings, fancy cars, a private jet and other perks. Sound familiar? (Mike O'Brien, Springfield [MO] News-Leader via Bill Wilkins; LA Times via Jim Moats)

WYFR was hit by one more hurricane Sept. 25, Jeanne, which caused even more damage, putting it off the air for more than another week due to power outages and antenna damage. Dan Elyea of WYFR told us, "Much above 35 or 40 [mph], the movement of the transmission lines slapping around in the wind makes operation impractical. Power outages seem to happen around 45. In deciding when to close down, we also have to consider the safety of our staff as they travel back to their homes." When Hurricane Frances hit three weeks before, part of the roof of the transmitter building was torn off, and this time even more was torn off. Power was restored on Oct. 3 and a few transmitters could be reactivated then (Dan Elyea & Evelyn Marcy, WYFR, via Jeff White, DXLD) By Oct. 13, WYFR was back up to full strength, all 14 transmitters (George Thurman, DXLD)

FCC cleared WWRB to use new 3185 from Oct. 12. Our rhombic antennas are 150+ feet above ground level; this is a half wavelength (above the ground) at 3 MHz; as a result, the rhombic used for 3 MHz is very directive. Reception reports in the main lobe say the signal is blasting; not as strong elsewhere but very usable. We are thinking about placing motorized winches on each tower suspending the rhombic antenna we are using at 3 MHz. When we switch to 3 MHz we can drop the rhombic's radiating cable to be less than less than 80 feet above the ground, smoothing the coverage. Before we can do this, we may need regulatory approval and/or a waiver from the FCC (Dave Frantz, WWRB, DXLD) 3185, weaker than WWCW 3210, noted // 5085 around 0100-0400, while WWRB 5050 and 5745 were // to each other (gh)

For B-04, WWCW drops any usage of 9475 in favor of 9985, by three different transmitters: 1000-1100 WWCW-1, 1300-1600 WWCW-3, 1600-2100 WWCW-4, 2100-2300 WWCW-1. This means our *Mundo Radial* Spanish DX news is on 9985, Tue 2230, Wed 2200 and Fri 2215, as well as *World of Radio*, Dec-Feb, Thu 2130 and Wed 1030.

[non] Adventist World Radio's English language service will convert from a centralized global service to a regionalized one in January 2005, according to AWR president Ben Schoun. Local studios primarily in Africa and the Asia/Pacific region will produce their own English programs, consistent with the format for AWR's other services. English language production operations in England will end late this year. Wavescan, for SW hobbyists, will be shifted to a studio location in the Asia/Pacific region, where the largest DX communities are found [sic]. AWR's DX editor, Dr. Adrian Peterson will continue to participate. The final Wavescan produced in England will be aired at all usual times and frequencies on Sunday, December 26, 2004. In the new year, Wavescan will be broadcast [only] from KSDA, Guam (via Adrian Peterson, DXLD) And maybe WRMI

URUGUAY [non] Radio Cimarrona, Cologne, Germany, started in Oct, Sun 2200-2300 on 9480, repeated Mon same hour, produced by Allerweltshaus Köln e.V., in Spanish: La Casa de todos los Mundos. Via Jülich [also in B-04 schedule] Thanks to tip by Victor Castaño, Uruguay in ConDig list. See http://www.flok.de/intern/hoerens_2/news.htm It's a collaboration with the independent radio collective Testimonios, <http://www.testimonios.org/> which has produced programs on Uruguayan stations (Horacio Nigro, Uruguay, DXLD)

VANUATU Can anybody confirm that R. Vanuatu is now on 7260.11? I have a carrier on this frequency, nothing on 7260.0, strongest around 0630 (Karel Honzik, Czechia, hard-core-dx) No, on 7260.12, R. Vanuatu, at 0917-0933, Pidgin-like language, sounded like an editorial, then singing (Dave Volko, PA, Cumbre DX)

VENEZUELA [non] Antena Internacional de Radio Nacional de Venezuela, relays via Cuba: On Sept 30 for the first time I was hearing all four frequencies on the 2000 UT broadcast, except I found them first on 17750, not the announced 17705! Lysexdia seems to be another problem among the Cubazuelans, a drawback when frequencies need to be conveyed accurately. This is the one which would be totally blocked by Greece-via-Delano if it were really on 17705. And 17750 buried by reactivated WYFR. At 2000, RNV also on 15230, but it was not \ to 17750. Could be some program but a duplicate recording played back a few seconds or minutes apart. 13680 and 9550 were also heard, and these two were synchronized with each other, but not with 15230 nor 17750. So three different versions of the show were going out at the same time, on four frequencies. Audio most distorted on 17750, and weakest there; the others were good. See also CHINA (gh)

WALES [non] Wales Radio International B-04 via VT Communications: Fri 2130-2200 to Eu, 3955 Skelton 250 kW, 105 degrees, and 7110 Moosbrunn, Austria, 100 kW, 300 degrees; UT Sat 0300-0330 to NAM on 6005 Rampishom, UK, 500 kW, 300 degrees; Sat 1130-1200 to As/Au, 17625 Rampisham 500 kW, 62 degrees (Observer, Bulgaria) Until the Next, Best of DX and 73 de Glenn!

0010 UTC on 11725

EGYPT: Radio Cairo. Fairly good audio for Egyptian travelogue program. (Frank Hillton, Charleston, SC) 9990, 2219-2231+ with Arabic vocals to English news and pop music bumpers. SIO 553 with usual muted signal, though less so than in the past. (Harold Frodge, Midland, MI)

0030 UTC on 21455 USB

ECUADOR: HCJB. Spanish religious program *Estudia de la Biblia* to identification; 3220, 0830 // 6080 Spanish /Quechua. (Fernando Garcia, Baltimore, MD). **Radio Oriental** 4781,33, 1034-1043. (Arnaldo Slaen, Buenos Aires, Argentina)

0055 UTC on 11800

ITALY: RAI. News on Italian soldier's role in Iraq; 9605 at 1950 with pop music program to 1955*. (Bob Fraser, Belfast, ME)

0130 UTC on 5955

GUATEMALA: Radio Cultural. Spanish church calendar for the weekend. Marimba music in Quechua at 0145. Signal lost to Radio Japan at 0200. **Radio Cultural Coatan** 4780, 1150 with IDs and local time checks. (Garcia, MD; Slaen, ARG)

0225 UTC on 9820

AUSTRIA: AWR relay. Strauss waltzes to English ID. (Sheryl Paszkiewicz, WI) 15130, 2144-2159* with *Mailbag* program, bible references to "This is AWR, the Voice of Hope" ID. (Scott Barbour, Intervale, NH)

0245 UTC on 7400

BULGARIA: Radia Varna. English text and talk by women. Bulgarian pop music to abrupt 0258 sign-off. (Paszkiewicz, WI)

0310 UTC on 15455

RUSSIA: Voice of. Station ID to item on government budget surplus from oil exports. (Howard Moser, Lincolnshire, IL) VOR 12070 // 9890 at 1945 with *Moscow Yesterday and Today*. (Fraser, ME)

0315 UTC on 6350

CLANDESTINE: Ethiopia-Voice of Peace and Democracy. Announcer's text in Tigrigna into African drum music // 15500. Abruptly off at 0350. Additional clandestines observed: Ethiopia-Voice of **Tigray** 6350, 0356 // 5500; **Eritrea-Voice of the Broad Masses** 7100, 0400 in Arabic. (Garcia, MD)

0318 UTC on 15240

AUSTRALIA: Radio. Sports news roundup with fair signal quality. (Moser, IL) **HCJB Australia** 11750, 0857-0903. (Barbour, NH) **Radio Australia** 9580, 1110. (Fraser, ME) 9560, 1327 but not // on 9580. Not sure if R. Australia or a Radio Thailand relay, who sometimes carries their programs. (Paszkiewicz, WI)

0330 UTC on 4985

BRAZIL: Radio Brasil Central. Portuguese. Station info: "ondas moduladas 90.1 frecuencia media, 4895 ondas tropicais." Oldies music from the Platters to, "Radia Brasil Central Comunicando con el mundo." (Garcia, MD) Brazilians monitored: **Radio Marumby** 9664.98, *0901; **Radio Nacional** 4915, 0902-0910; **Radio Alvorado** 4865, 0922-0935 (Slaen, ARG) **Radio Difusora** 4885, 0930-0942 (Slaen, ARG) **Radio Rural** 4765, 0937+; **Radio Difusora do Amazonas** 4805, 0945+; **Radio Nacional** 3375, 0948-1002; **Radio Mundial** 4975, 1003-1005; **Radio Educacao Rural** 4925, 1010+; **Radio Difusora** 5055, 1022-1031; **Radio Jornal A Critica** 5055, 1022-1031; **Radio Aparecida** 5035, 2239, // 6135 (Barbour, NH)

0406 UTC on 11590

ISRAEL: Kol Israel. News on continuing Middle Eastern conflicts. (Moser, IL) Israel's **Galei Zahal** in Hebrew 6973, 0025. (Larry Van Horn, NC)

0522 UTC on 11625

VATICAN CITY: Vatican Radio. Text on the sanctity of marriage followed by religious music. (Moser, IL)

0540 UTC on 9460

TURKEY: Voice of. Traditional Turkish music to featured segments. ((Moses, IL) 9830, 2234-2243+ with *Cultural Parade & Turkey* feature. SIO 453. (Frodge, MI)

0730 UTC on 6185

MEXICO: Radio Educacion. Spanish. "Musica para recordar" into big band music. Station identification at 0800. (Garcia, MD)

0800 UTC on 6020

PERU: Radio Victoria. Portuguese. Iglesia Pentecostal calendar

(cities, time) into prayers by Pastor Bustamante. Spanish religious crusade by **Dios es Amar Church** // 9720. **Radio Del Pacifico** 4975, 0800; **Radio Quillabamba** 5025, 1000; **Radio Horizonte** 5019, 0959 (Garcia, MD) **Radio Oriente** 6188.03, 1003. (Slaen, ARG) **Radio Ilucan** 5678.5, 0213-0245*. (Barbour, NH)

0911 UTC on 4990

SURINAME: Radio Apintie. Dutch. Male/female with banter to presumed reporter's field report. Station identification at 0919 poor amid noisy signal. (Barbour, NH)

1000 UTC on 4904.2

BOLIVIA: Radio San Miguel. Spanish. Local time check and identification into newscast. Bolivians monitored: **Radio Yua** 4716, 1030 in Spanish/Quechua. (Garcia, MD) **Radio Municipal** 4845.03, 0912 (Slaen, ARG) **Radio Mosoj Chaski** 0925-0945. Poor signal in Spanish with music, ads and station promo. (G. Van Horn, NC) **Radio Pio Doce** 5952.45, 0920; **Radio Illimani** 6025, 1018-1027. (Dave Valko, PA/Cumbre DX) **Radio Paititi** 4684.31, 1040+; **Radio Chica** 4763.31, 1053-1103; **Radio Fides** 9624.95, 1150-1205. **Radio Juan XXIII** 6054.32, 2203-2213. (Slaen, ARG)

1000 UTC on 4934.46

VENEZUELA: Radio Amazonas. Sign-on with national anthem and local anthem to "Radia Amazonas" identification. Regional music with SINPO 33422. Venezuelan's noted; **Radio Tachira** 4830, 2216-2231. (Slaen, ARG) **Radio Nacional de Venezuela** 11875, 1730 with Spanish ID and Hugo Chavez speech to 1830*. (Garcia, MD)

1024 UTC on 7260

MONGOLIA: Voice of. Mongolian text and presumed ID at 1030. Asian wind instruments and brief talk and ballads at 1032. Fair/weak signal continuing through tune-out. (Barbour, NH)

1315 UTC on 9625

CANADA: CBC Northern Svc. *Sunday Morning Special* to ID including Sackville transmitter reference. **China Radio Intl Canadian relay** 9650, 1340 In the Spotlight. (Fraser, ME)

1315 UTC on 9525

INDONESIA: Voice of. Indonesian text to gamelan music. English identification and website reference to pop vocals. (Paszkiewicz, WI)

1349 UTC on 4800

INDIA: AIR-Hyderabad. Signal battling with China Natl Radio and swooshier interference. Both reasonably strong! **AIR-Thiruvananthapuram** 5010, 1351 in Indian dialect. (Walter Salmaniw, Victoria, BC Canada/HCDX) **AIR-Delhi** 13605, 1815-1820 in English. (David Weronka, Benson, NC)

1740 UTC on 17745

GERMANY: Deutsche Welle. French service with world news. (Weronka, NC) DW's **Rwanda relay** 15205, 2110 with *Religion in Society* to "DW Radio, Rwanda" identification. (Fraser, ME)

1743 UTC on 15695

GERMANY: IBRA Radio (via Juelich). Vernacular talks and phone call. Afro pops music with announcers' "talk-over." Several mentions of "studio" and "Tanzania", presumed this program was produced in Tanzania. Germany's **Deutschland Radio** 6005, 2134-2147; **Deutschlandfunk** 6190, 2258-2312. (Barbour, NH)

1910 UTC on 11655

NETHERLANDS: Radio. Documentary: *A Bohemian in Amsterdam* on the 17th century Bishop of Bohemia. (Fraser, ME)

2255 UTC on 4010

KYRGYZSTAN: Kyrgyz Radio. (Tent) Russian/Kyrgyz. Test tones at tune-in to presumed interval signal of light instrumental music at 2300. Choral like music possibly an anthem. Lady's text sounding like program intros followed by continuous classical opera vocal music to 2326. Though audible at tune-out, signal remained poor and weak. (Barbour, NH)

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.

Ring Their Bell!

Here's an idea I notice occasionally which might warrant a try if you're still playing the QSL waiting-game. In place of the cost of remailing reports, consider a long distance phone call to the station. A brief international call is not as outrageous as it may first appear, and collectors have successfully used this alternative with results. It is something for those instances where you have reached the point of desperation. Phone numbers may be found in *Passport to World Band Radio*, and *World Radio Handbook*.

With pre-planning you should be able to keep the call down to a

minute or two. If the native language is one in which you can't converse, you will of course have a problem. You can try to find someone who speaks the language to do the talking for you, as a translator.

One DXer, who recently phoned a station, was abruptly put on the air for a live interview. Needless to say, in a week, he received an impressive "goodie-package" of cards and souvenirs, plus his verification! If you have reached a level of desperation where letters, follow ups, or email have failed, try ringing their bell!

BRAZIL

Radio Aparecida 9630 kHz. Full data card unsigned. Received in 36 days for a Portuguese report and one IRC. Station address: Av. Getulio Vargas 185, 12570-000 Aparecida, Brazil. (Frank Hillton, Charleston, SC) 6135 kHz studio card in 34 days for English report, one dollar and prepared card. (Scott Barbour, Intervale, NH)



Radio Educacao Rural de Tefe, 4925 kHz. Full data prepared card and postcard. Received in 26 days after follow-up report and one US dollar. Station address: Caixa Postal 21, 69470-000 Tefe AM, Brazil. (or) 21 Praca Santa Tereza 283, Centro, 69470-000 Tefe, AM Brazil. (Sheryl Paskiewicz, WI)

CHINA

China Huayi Broadcasting Corp., 6185 kHz. Aqua/green colored CHBC logo card signed by Qiao Xiaoli-QSL Manager, plus handwritten note. Mandarin service noted as 15 kW. Received in 27 days for an English report and one IRC. Station address; P.O. Box 251, Fuzhou, Fujian 350001 China. (or) Qiao Xiaoli, Feng Jing Xin Cun 3-4-304, Changshu, Jiangsu 215500, China. (Barbour, NH)

CNR-CPBS, Lingshi, 7935 kHz. Full data CNR Tower card unsigned. Received in 24 days for an English report and one US dollar. Station address: 16A Shijingshan Street, Beijing 100040, China. (or) P.O. Box 4216, CRI-2 Beijing 100040 China. (Barbour, NH)

HUNGARY

Radio Budapest, 6025 kHz. Full data station logo card unsigned. Received in 45 days for an English report and one US dollar. Station address; Brody Sandor utca 5-7, H-1800 Budapest, Hungary. (Duane Hadley, Bristol, TN)



MEDIUM WAVE

CKKY, 830 kHz AM. No data letter signed by Jeff Murray, plus Key 83 Cat County bumper sticker. Received in 25 days for an AM report.

Station address: 2nd Floor, 1037 2nd Avenue, Wainwright, Alberta, Canada T9W 1K7. (Patrick Griffith NONNK, Springfield, CO)

KNAX, Fort Worth, TX-1630 kHz AM. Full data card and letter signed by Dennis Blair-Chief Engineer, plus stickers from two Kentucky stations. After several attempts, sent my report to station headquarters in Kentucky, upon the advice of DXer Terry Palmershire. Received in ten days for a taped report and SASE. Headquarters address: Mortenson Broadcasting Company, 3270 Blazer Parkway, Suite 101, Lexington, KY 40509-1847. (Patrick Martin, Seaside, OR)

KULY, Ulysses, KS-1420 kHz AM. Partial data letter signed by Gil F. Wohler-General Manager, on Western Kansas Broadcast Center letterhead, plus business card. Received in 15 days for an AM report and one US dollar. Station address: 1402 E. Kansas Ave., Garden City, KS 67846. (Griffith, CO)

SOUTH AFRICA

Radio Sondergrense via SENTECH, 3320 kHz. Full data verification letter signed by Kathy Otto-Broadcast Planning. Received in 18 days for an English report and one US dollar. Station address: Shortwave Services, Private Bag X06, Honeydew 2040, South Africa. (Barbour, NH)

SYRIA

Radio Damascus, 13610 kHz. Full data station logo map card with illegible signature, plus station sticker. Received in 56 days for an English report. Station address: Syrian Radio & TV, P.O. Box 4702, Damascus, Syria. (Sam Wright, Biloxi, MS)



USA

KNLS, 11765 kHz. Full data card signed by Rob Scobey-Senior Producer, English Service, plus broadcast schedule. Received in 36 days for an English report. Report sent to: KNLS@aol.com. Station address: P.O. Box 473, Anchor Point, AK 99556. (Tom Banks, Dallas, TX)

WBOH, 5920 kHz. Full data card signed by A. Robinson, plus schedule and sticker. Received in 11 days for an English report. Station address: Grace Missionary Baptist Church, 520 Roberts Rd., Newport, NC 28570. Email reports: fbn@CLIS.com. (Paskiewicz, WI)

UTILITY

AAC, US Army MARS, Lexington, KY, 7363 kHz LSB. Partial data Armed Forces Day 2004 card signed by Robert L. Sutton, Chief, Army MARS. Received in 11 days for a utility report, souvenir post card and SASE (not used). Report sent to; HQ 1st BDE, 100th DIV (IT) MARS Station AAC, Barrow Army Reserve Training Center, 1051 Russell Cave Pike, Lexington, KY 40504. Reply received from; CDR NETCOM 9th/ASC, Attn: NETC-OPE-MA (MARS) Bldg. 90551 Jim Ave. MARS Station, Ft. Huachuca, AZ 85613-5000. (Bill Wilkins, Springfield, MO)

WUG-231, Army Corps of Engineers (ACE), Mariana, AR, 6826 kHz LSB. Full data color card W.G. Huxtable Pumping Plant unsigned, plus pamphlet about ACE ship M/V Mississippi. Received in four years and three months for a utility report on station's participation in the May 2000 Armed Forces Day MARS crossband tests. Station address: Memphis District, Corps of Engineers, 167 N. Main St., B-202, Memphis, TN 38103-1894. (Wilkins, MO)

December Holiday DXing

Central African Rep., Rep. Day Dec. 1
Laos Republic Day, Dec. 2
UAE Independence Day, Dec. 2
Thailand King Phumiphon Birthday, Dec. 5
Finland Independence Day, Dec. 6
Cuba Independence Day (from Spain) Dec. 10
Burkina Faso Republic Day, Dec. 11
Kenya Independence Day, Dec. 12
Bahrain Independence Day, Dec. 16
Bangladesh Victory Day, Dec. 16
Japan Emperor Akihito Birthday, Dec. 23

QSL
CARD

The Holidays on Shortwave

Congratulations! You've made it to the end of another year! (Well... almost.) As your reward, here's a compendium of holiday programming for you to enjoy.

A word of caution about what you are about to read. Because of all that needs to be done to put this magazine into your hands, the information has to be prepared some seven weeks earlier. This would be okay if international broadcasters employed that much lead time into their announcements about future programming plans. Unfortunately, they don't.

So, what we've done here is examine what stations have done in prior years and made some educated projections about what they're likely to do this time. You can supplement the intelligence here with more definite information as we get closer to the season. It is recommended that you monitor Glenn Hauser's broadcasts and web site [<http://worldofradio.com>] and consider joining the SWPROGRAMS e-mail list [<http://dallas.hard-core-dx.com/mailman/listinfo/swprograms>], where timely program information is posted regularly by individual members. You also might check the web sites of favorite broadcasters as the holidays approach for the precise schedule of programs we mention, as well as specials. As usual, check the frequency section of the SWG for where to tune.

Now, on with the show!

❖ Seasons Greetings

There are some rather longstanding traditions on the shortwave bands where the holidays are concerned. The BBC World Service always presents a broadcast of the *Festival of Nine Lessons and Carols* from King's College in Cambridge on Christmas Eve, with a rebroadcast on Christmas Day. It's a lovely ceremony consisting of scriptural readings and choral music, and it has been a part of my family's celebration for decades.

Furthermore, what would Christmas Day in the Commonwealth (and around the world) be without the annual *Queen's Christmas Message*? And with Christmas falling on a Saturday this year. Boxing Day – that most civilized of (non-American) holidays giving its celebrants an extra day of rest and relaxation – will provide an extra day of sports action on Monday, the 27th in the UK and, indeed, throughout much of the world. As in other years, *Sportsworld* will cover that

action.

During December, *In Praise of God* is likely to cover Christmas preparatory Advent services, as well as to highlight the Jewish festival of Hannukkah. The daily magazine program *Outlook* also can be expected to give its listeners the flavor of a British Christmas, which today has many multicultural facets.

Radio Canada International, whose broadcasts now consist almost entirely of CBC Radio One domestic network programs, offers its listeners an ample serving of Canadian Christmas. All of the CBC's regular schedule is replaced by special programming during much of Christmas Eve and throughout Christmas Day and is, in turn, relayed by RCI in all its English and French language transmissions. Folk music, native and first nations' meditations and musings, regional and ethnic variations on the Holiday, storytelling, reminiscences, and traditional carols have always been a part of the CBC radio celebration, reflecting the quietly unique character of this vast and diverse country.

In the days and weeks leading up to all this, *As It Happens* clears a part of its regular news interview pallet for seasonal stories and greetings from and to home by Canadian military personnel stationed abroad. This culminates on Christmas Eve in a recorded reading of the haunting story "The Shepherd" by the late Alan Maitland, a former AIH host who began the tradition that is now a holiday mainstay of the program. In the event that RCI's ten daily hours to North America proves only to whet your appetite for more (and it might), listeners can tune in the CBC North Quebec service on 9625 kHz, which suspends its multilingual schedule for carriage of the entire English CBC Radio One slate on major holidays.

In that same vein, while the character of "Down Under" celebrations are markedly different from their northern hemisphere mostly snowbound counterparts, Radio Australia and Radio New Zealand International each turn their schedules over to a relay of domestic programming that serves to highlight just how unique those celebrations are. Most of us can't imagine Christmas as a midsummer holiday, but the beach and barbecue are well integrated into the tableau of Santa and reindeer in the regions underneath the Southern Cross.

On Radio Australia, many of those programs are interactive, designed to foster a dialogue among people living across the vast

continent and beyond. If you listen, consider sending an e-mail to say hello. They seem to enjoy stories about all the snow and cold being experienced by their less (or is it more?) meteorologically well-off correspondents.

Radio New Zealand International relays National Radio, which gives itself over to a wave of seasonal stories and dramatic performances around the holidays. Many of these evoke the British traditional ideas of Christmas; but others add a unique South Pacific and Pacific Islands perspective, both ethnically and aesthetically.

Deutsche Welle *English Service* no longer targets North America, but its *German Service* still does and it's well heard. The latter airs enough holiday music and concerts, as well as liturgical services, to give you a strong sense of German Christmas even if you don't have a working knowledge of the language. Tune in on 6075, 6100, 9640, 11990 kHz (among others) Christmas Eve and Day. DW *English Service* (with some broadcasts audible here) also can be expected to have special programs on and around Christmas Day. Last year, it offered a special programs on Christmas music and traditions, along with a review of the year's events.

Last year, VOA *News Now* offered a special "12 Hours of Christmas" that was broadcast twice around the world on Christmas Day. It offered classics from yesteryear, seasonal vignettes and several enjoyable features highlighting the holidays in the US. Now that its schedule doesn't even cover twelve hours and commitment to the service overall appears nonexistent, it's hard to know just what will be on the schedule this year.

Radio Netherlands offered a lyrical celebration of "Snow" on Christmas Day last year. Produced by Anne Blair Gould, it was a delightful compendium of snowmen, snowflakes and wintry wonderlands with lots of little known facts about the white stuff. It would be nice if this were to become an RN tradition each year.

I could go on, but actually, I can't. I'm out of space. It's fair to say that nearly all stations will mark this special season in some way that reflects its meaning in their home country and cultures. Seek out as much of it as you can. I can't think of a better gift to give yourself.

The best of the Season to you and yours.

HOW TO USE THE SHORTWAVE GUIDE

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

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7 or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. 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

Gayle Van Horn John Figliozzi
 Frequency Manager Program Manager
 gaylevanhorn@monitoringtimes.com johnfigliozzi@monitoringtimes.com

Daniel Sampson
 danielsampson@monitoringtimes.com

Program Highlights

John Figliozzi

NEW YEAR BY RADIO

The new year arrives progressively around the world, an hour (or, in some cases, a half hour) at a time, starting from the international date line and moving westward. A fun way to start the new year is to hear how it's rung in, in as many places as possible using your radio. Here's a short list to get you started. With a little forward planning and resources like *MT, Passport to Worldband Radio* and the *WRTH*, you should be able to find stations, frequencies to target and augment and adjust this list to make it more useful for your particular listening location and equipment. You have a whole month, so don't procrastinate!

UT - December 31st

- 1100 - New Zealand
- 1300 - Australia (Victoria state), Solomon Is.
- 1330 - South Australia, Northern Territory
- 1400 - Australia (Queensland), Papua-New Guinea
- 1500 - Japan, Korea
- 1600 - China, Western Australia, Singapore, Indonesia (west), Philippines
- 1700 - Vietnam, Thailand, Indonesia (east)
- 1800 - Bangladesh
- 1830 - India
- 1900 - Pakistan
- 2000 - Dubai, Oman
- 2030 - Iran
- 2100 - Russia (Moscow), Kuwait, Saudi Arabia, East Africa
- 2200 - Turkey, Greece, Egypt, Syria, South Africa, Zambia, Israel, Jordan, Finland
- 2300 - Most of continental Europe, Algeria, Tunisia, Libya, Nigeria

UT - January 1

- 0000 - UK, Portugal, West Africa
- 0200 - Brazil (east/coastal)
- 0300 - Brazil (Manaus), Argentina, Chile
- 0330 - Newfoundland
- 0400 - Brazil (Acre), Venezuela, Caribbean, Nova Scotia, New Brunswick, PEI
- 0500 - Cuba, Colombia, Ecuador, Peru, Eastern time zone
- 0600 - Central America, Central time zone, eastern Mexico
- 0700 - central Mexico, Mountain time zone
- 0800 - Pacific time zone, western Mexico
- 0900 - Alaska
- 1000 - Hawaii

And with a nod to the new technologies, Lou Josephs has a fabulous internet site <http://www.ibcworks.net> that directs users to live audio and webcams of worldwide New Year celebrations. If you're open to multitasking, the radio and the computer could really enhance your festivities this year.

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

| | | | | | | | |
|------|------|-------|-----------------------------------|----------|----------|----------|---------|
| 0000 | 0007 | vl | Sierra Leone, SLBS | 3316do | | | |
| 0000 | 0015 | vl | Cambodia, National Radio | 11940as | | | |
| 0000 | 0030 | vl | Croatia, Croatian Radio | 7285co | | | |
| 0000 | 0030 | | Egypt, Radio Cairo | 11725na | | | |
| 0000 | 0030 | | Japan, Radio | 13650as | 17810as | | |
| 0000 | 0030 | | Serbia & Montenegro, Intl Radio | 9580na | | | |
| 0000 | 0030 | | Thailand, Radio | 5890va | 9570va | | |
| 0000 | 0030 | | UK, BBC World Service | 3915as | 5970as | 5970as | |
| | | | 9410me | 9740as | 11945as | 11955as | |
| | | | 15280as | 15310as | 15360as | 17615as | |
| | | | 17790as | | | | |
| 0000 | 0030 | | USA, Voice of America | 7215va | 11995va | | |
| | | | 15185va | 17820va | | | |
| 0000 | 0045 | | India, All India Radio | 9705as | 9950as | 11620as | |
| | | | 11645as | 13605as | | | |
| 0000 | 0057 | | Canada, Radio Canada Intl | 9640as | 15205as | | |
| 0000 | 0057 | | Netherlands, Radio | 9845na | | | |
| 0000 | 0059 | | Germany, Deutsche Welle | 6030as | 7290as | | |
| 0000 | 0059 | | Spain, Radio Exterior Espana | 15385na | | | |
| 0000 | 0100 | | Anguilla, Caribbean Beacon | 6090am | | | |
| 0000 | 0100 | | Australia, ABC NT Alice Springs | 2310ir | 4835do | | |
| 0000 | 0100 | | Australia, ABC NT Katherine | 5025do | | | |
| 0000 | 0100 | | Australia, ABC NT Tennant Creek | 4910do | | | |
| 0000 | 0100 | | Australia, HCJB | 15525as | | | |
| 0000 | 0100 | | Australia, Radio | 9660pa | 12080va | 13630pa | |
| | | | 15240pa | 17750pa | 17775as | 17795as | |
| | | | 21725as | | | | |
| 0000 | 0100 | | Canada, CBC Northern Service | 9625do | | | |
| 0000 | 0100 | | Canada, CFRX Toronto ON | 6070do | | | |
| 0000 | 0100 | | Canada, CFVP Calgary AB | 6030do | | | |
| 0000 | 0100 | | Canada, CKZN St John's NF | 6160do | | | |
| 0000 | 0100 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 0000 | 0100 | | China, China Radio Intl | 6145va | | | |
| 0000 | 0100 | | Costa Rica, University Network | 5030am | 6150am | | |
| | | | 7375am | 9725sc | | | |
| 0000 | 0100 | mtwhf | Germany, Bible Voice Broadcasting | | 6010as | | |
| 0000 | 0100 | | Guyana, Voice of | 3290do | | | |
| 0000 | 0100 | | Japan, Radio | 6145co | | | |
| 0000 | 0100 | | Malaysia, RTM | 7295as | | | |
| 0000 | 0100 | | Namibia, Namibian BC Corp | 6060af | 3270af | 3290af | |
| | | | 6060af | | | | |
| 0000 | 0100 | | New Zealand, Radio NZ Intl | 17675pa | | | |
| 0000 | 0100 | | Sierra Leone, Radio UNAMSIL | 6137af | | | |
| 0000 | 0100 | | Singapore, MediCorp Radio | 6150do | | | |
| 0000 | 0100 | vl | Solomon Islands, SIBC | 5020do | 9545da | | |
| 0000 | 0100 | | UK, BBC World Service | 5975co | 6010na | | |
| | | | 12095co | | | | |
| 0000 | 0100 | | USA, AFRTS | 4319usb | 5446usb | 5765usb | |
| | | | 6350usb | 7507usb | 10320usb | 12133usb | |
| | | | 13362usb | 13855usb | | | |
| 0000 | 0100 | | USA, KAIJ Dallas TX | 13815va | | | |
| 0000 | 0100 | | USA, KTBN Salt Lake City UT | 7505na | 15590na | | |
| 0000 | 0100 | | USA, KWHR Naalehu HI | 17510as | | | |
| 0000 | 0100 | | USA, WBCQ Kennebunk ME | 5105na | 7415na | | |
| | | | 9330na | | | | |
| 0000 | 0100 | | USA, WBOH Newport NC | 5920am | | | |
| 0000 | 0100 | | USA, WEWN Birmingham AL | 5825na | 7425na | | |
| | | | 13615va | | | | |
| 0000 | 0100 | | USA, WHRA Greenbush ME | 7580va | | | |
| 0000 | 0100 | | USA, WHRI Noblesville IN | 7315am | 7535am | | |
| 0000 | 0100 | | USA, WINB Red Lion PA | 9320am | | | |
| 0000 | 0100 | | USA, WJIE Louisville KY | 13595am | | | |
| 0000 | 0100 | as | USA, WRMI Miami FL | 9955am | | | |
| 0000 | 0100 | mtwhf | USA, WRMI Miami FL | 6870na | | | |
| 0000 | 0100 | | USA, WTJC Newport NC | 9370na | | | |
| 0000 | 0100 | | USA, WWCR Nashville TN | 3210na | 5050na | | |
| | | | 5935na | 7465na | | | |
| 0000 | 0100 | | USA, WWRB Manchester TN | 3185na | 5050na | | |
| | | | 5085na | 5745na | | | |
| 0000 | 0100 | | USA, WYFR Okeechobee FL | 6065na | 9505na | | |
| | | | 11720sa | | | | |
| 0000 | 0100 | twf | Zambia, Radio Christian Voice | 4965af | | | |
| 0005 | 0030 | twf | Austria, Radio Austria Intl | 9870sa | | | |
| 0030 | 0100 | | Australia, Radio | 9660pa | 12080va | 13630va | |
| | | | 15240pa | 15415as | 17750pa | 17775as | |
| | | | 17795as | 21725as | | | |
| 0030 | 0100 | | Canada, Radio Canada Intl | 9755am | 11990am | | |
| | | | 13710am | | | | |
| 0030 | 0100 | s | Germany, Pan American BC | 9740eu | | | |
| 0030 | 0100 | | Iran, Voice of the Islamic Rep | 9905sa | | | |
| 0030 | 0100 | | Lithuania, Radio Vilnius | 11690na | | | |
| 0030 | 0100 | | Sri Lanka, SLBC | 6005as | 15745as | | |
| 0030 | 0100 | | Thailand, Radio | 5890na | 15395na | | |
| 0030 | 0100 | | UK, BBC World Service | 5970as | 6195as | | |
| | | | 9740as | 11955as | 15280as | 15310as | 15360as |
| | | | 17615as | 17790as | | | |
| 0030 | 0100 | | USA, Voice of America | 7215va | 11760va | | |

| | | | | | | |
|------|------|----|-----------------------------|---------|---------|---------|
| 0035 | 0100 | sm | 15185va | 15290va | 17740va | 17820va |
| 0045 | 0100 | | Austria, Radio Austria Intl | | 9870co | |
| 0055 | 0100 | | Pakistan, Radio | 9340as | 11565as | |
| | | | Italy, RAI Intl | 11800na | | |

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

| | | | | | | | |
|------|------|--------|-----------------------------------|---------|----------|----------|--------|
| 0100 | 0115 | | Italy, RAI Intl | 11800na | | | |
| 0100 | 0115 | | Pakistan, Radio | 9340as | 11565as | | |
| 0100 | 0127 | | Czech Rep, Radio Prague Intl | | 6200na | 7345na | |
| 0100 | 0128 | | Vietnam, Voice of | 6175na | | | |
| 0100 | 0130 | vl | Croatia, Croatian Radio | | 7285na | | |
| 0100 | 0130 | mtwhf | Germany, Bible Voice Broadcasting | | | 5925me | |
| 0100 | 0130 | s | Germany, Universal Life | | 9485as | | |
| 0100 | 0130 | mtwhfa | Serbia & Montenegro, Intl Radio | | 9580na | | |
| 0100 | 0130 | | Slovakia, Slovak Radio | | 7230am | 9440am | |
| 0100 | 0130 | | Uzbekistan, Radio Tashkent Intl | | 9715as | 7190as | 6165as |
| | | | 9715as | | | | |
| 0100 | 0156 | | Romania, Radio Romania Intl | | 9690na | 11940na | |
| | | | 15430na | 17760na | | | |
| 0100 | 0157 | DRM | Netherlands, Radio | 15525na | | | |
| 0100 | 0157 | | Netherlands, Radio | 6165na | | | |
| 0100 | 0159 | | Canada, Radio Canada Intl | | 9755am | 11990am | |
| | | | 13710am | | | | |
| 0100 | 0200 | | Anguilla, Caribbean Beacon | | 6090am | | |
| 0100 | 0200 | | Australia, ABC NT Katherine | | 5025do | | |
| 0100 | 0200 | | Australia, ABC NT Tennant Creek | | 4910do | | |
| 0100 | 0200 | | Australia, HCJB | | 15560as | | |
| 0100 | 0200 | | Canada, CBC Northern Service | | 9625do | | |
| 0100 | 0200 | | Canada, CFRX Toronto ON | | 6070do | | |
| 0100 | 0200 | | Canada, CFVP Calgary AB | | 6030do | | |
| 0100 | 0200 | | Canada, CKZN St John's NF | | 6160do | | |
| 0100 | 0200 | | Canada, CKZU Vancouver BC | | 6160do | | |
| 0100 | 0200 | | China, China Radio Intl | | 9580am | 9790co | |
| | | | 11770va | | | | |
| 0100 | 0200 | | Costa Rica, University Network | | 5030am | 6150am | |
| | | | 7375am | 9725sc | | | |
| 0100 | 0200 | | Cuba, Radio Havana | 6000na | 9820na | | |
| 0100 | 0200 | | Guyana, Voice of | 3290do | | | |
| 0100 | 0200 | | Indonesia, Voice of | 9525as | 11785as | 15150al | |
| 0100 | 0200 | | Iran, Voice of the Islamic Rep | | 9905sa | | |
| 0100 | 0200 | | Japan, Radio | 6025va | 11860as | 15325as | |
| | | | 17560va | 17685pa | 17810as | 17835am | |
| | | | 17845sa | | | | |
| 0100 | 0200 | | Malaysia, RTM | 7295as | | | |
| 0100 | 0200 | | Namibia, Namibian BC Corp | 6060af | 3270af | 3290af | |
| | | | 6060af | | | | |
| 0100 | 0200 | | New Zealand, Radio NZ Intl | | 17675pa | | |
| 0100 | 0200 | | North Korea, Voice of | | 3560as | 7140as | |
| | | | 9345am | 9720as | 11735am | 13760as | |
| | | | 15180as | | | | |
| 0100 | 0200 | | Russia, Voice of | 5945me | 7180na | 15595na | |
| | | | 17660na | | | | |
| 0100 | 0200 | | Sierra Leone, Radio UNAMSIL | | 6137af | | |
| 0100 | 0200 | | Singapore, MediCorp Radio | | 6150do | | |
| 0100 | 0200 | vl | Solomon Islands, SIBC | | 5020do | 9545do | |
| 0100 | 0200 | | Sri Lanka, SLBC | 6005as | 11905as | 15745as | |
| 0100 | 0200 | | UK, BBC World Service | 5975co | 6195as | | |
| | | | 9825co | 11955co | 12095as | 15310as | |
| | | | 15360as | 17790as | | | |
| 0100 | 0200 | | Ukraine, Radio Ukraine Intl | | 5840na | | |
| 0100 | 0200 | | USA, AFRTS | 4319usb | 5446usb | 5765usb | |
| | | | 6350usb | 7507usb | 10320usb | 12133usb | |
| | | | 13362usb | | | | |
| 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 | mtwhf | USA, Voice of America | | 7115va | 9885va | |
| | | | 11705va | 11725va | | | |
| 0100 | 0200 | | USA, WBCQ Kennebunk ME | | 5105na | 7415na | |
| | | | 9330na | | | | |
| 0100 | 0200 | | USA, WBOH Newport NC | | 5920am | | |
| 0100 | 0200 | | USA, WEWN Birmingham AL | | 5825na | 7425na | |
| | | | 13615va | | | | |
| 0100 | 0200 | | USA, WHRA Greenbush ME | | 7580va | | |
| 0100 | 0200 | | USA, WHRI Noblesville IN | | 7315am | 7535am | |
| 0100 | 0200 | | USA, WINB Red Lion PA | | 9320am | | |
| 0100 | 0200 | | USA, WJIE Louisville KY | | 13595am | | |
| 0100 | 0200 | | USA, WRMI Miami FL | | 6870na | | |
| 0100 | 0200 | | USA, WTJC Newport NC | | 9370na | | |
| 0100 | 0200 | | USA, WWCR Nashville TN | | 3210na | 5070na | |
| | | | 5935na | 7465na | | | |
| 0100 | 0200 | | USA, WWRB Manchester TN | | 3185na | 5050na | |
| | | | 5085na | | | | |
| 0100 | 0200 | | USA, WYFR Okeechobee FL | | 6065na | 9505na | |
| 0100 | 0200 | | Zambia, Radio Christian Voice | | 4965af | | |
| 0105 | 0130 | sm | Austria, Radio Austria Intl | | 9870na | | |

SELECTED PROGRAMMING BEGINS ON PAGE 57

Shortwave Guide



| | | | | | |
|------|------|-------|-----------------------------|---------|---------|
| 0115 | 0120 | mtwhf | Kyrgyzstan, Radio Kyrgyz | 4010irr | 4795irr |
| 0115 | 0130 | whfa | Austria, Radio Austria Intl | 9870am | |
| 0130 | 0145 | s | Germany, Pan American BC | 9495eu | |
| 0130 | 0200 | | Australia, Radio 9660pa | 12080va | 13630pa |
| | | | 15240pa | 15415as | 17750as |
| | | | 17795as | 21725as | |
| 0130 | 0200 | | USA, Voice of America | 9775am | 13740am |
| 0135 | 0150 | sm | Austria, Radio Austria Intl | 9870am | |
| 0140 | 0200 | | Vatican City, Vatican Radio | 9650as | 12055as |
| 0145 | 0200 | | Austria, Radio Austria Intl | 9870am | |

| | | | | | |
|------|------|------|-----------------------------|---------|---------------|
| 0230 | 0258 | | Vietnam, Voice of | 6175na | |
| 0230 | 0300 | s | Australia, HCJB | 15560as | |
| 0245 | 0300 | whfa | Albania, Radio Tirana | | 6115eu 7160eu |
| 0245 | 0300 | | UK, BBC World Service | | 11865af |
| 0250 | 0300 | | Vatican City, Vatican Radio | | 7305am 9605am |
| 0250 | 0300 | | Zambia, Radio | 4910do | |

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

| | | | | | |
|------|------|-------|---------------------------------|---------|-----------------|
| 0200 | 0227 | | Czech Rep, Radio Prague Intl | 6200na | 7345na |
| 0200 | 0228 | | Hungary, Radio Budapest | 9775na | |
| 0200 | 0230 | | Australia, HCJB | 15560as | |
| 0200 | 0230 | | Austria, AWR Europe | 9820as | |
| 0200 | 0230 | vl | Croatia, Croatian Radio | 7285na | |
| 0200 | 0230 | | Iran, Voice of the Islamic Rep | 9905sa | |
| 0200 | 0230 | | USA, KJES Vado NM | 7555na | |
| 0200 | 0230 | a | USA, WRMI Miami FL | 9955am | |
| 0200 | 0257 | | Canada, Radio Canada Intl | 15510as | 17860as |
| 0200 | 0300 | | Anguilla, Caribbean Beacon | 6090am | |
| 0200 | 0300 | whfa | Argentina, RAE | 11710na | |
| 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, Radio 9660pa | 12080va | 13630pa |
| | | | 15240pa | 15415as | 17750as |
| | | | 17750as | 21725as | |
| 0200 | 0300 | | Bulgaria, Radio 9700na | 11700na | |
| 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 | | China, China Radio Intl | 11770va | |
| 0200 | 0300 | | Costa Rica, University Network | 5030am | 6150am |
| | | | 7375am | 9725sa | |
| 0200 | 0300 | | Cuba, Radio Havana | 6000na | 9820na |
| 0200 | 0300 | | Egypt, Radio Cairo | 11855na | |
| 0200 | 0300 | | Guyana, Voice of | 3290do | |
| 0200 | 0300 | | Malaysia, RTM | 7295as | |
| 0200 | 0300 | | Myanmar, Radio | 7185do | |
| 0200 | 0300 | | Namibia, Namibian BC Corp | 3270af | 3290af |
| | | | 6090af | | |
| 0200 | 0300 | | New Zealand, Radio NZ Intl | 17675pa | |
| 0200 | 0300 | | North Korea, Voice of | 4405as | 11845as |
| | | | 15230as | | |
| 0200 | 0300 | as | Philippines, Radio Pilipinas | 11885me | 15120me |
| | | | 15270me | | |
| 0200 | 0300 | | Russia, Voice of | 5945me | 7180na 9860na |
| | | | 15595na | 17660na | |
| 0200 | 0300 | | Sierra Leone, Radio UNAMSIL | 6137af | |
| 0200 | 0300 | | Singapore, Mediacorp Radio | 6150do | |
| 0200 | 0300 | vl | Solomon Islands, SIBC | 5020do | 9545do |
| 0200 | 0300 | | South Korea, Radio Korea Intl | 9560na | 11810na |
| | | | 15575na | | |
| 0200 | 0300 | | Sri Lanka, SLBC | 6005as | 11905as 15745as |
| | | | 11875as | 15465as | 9680na |
| 0200 | 0300 | | Taiwan, Radio Taiwan Intl | 5950na | |
| | | | 11875as | 15465as | |
| 0200 | 0300 | | UK, BBC World Service | 5975ca | 6195as |
| | | | 9525ca | 9750af | 11955as |
| | | | 12095ca | 15310as | 15360as |
| | | | 12095ca | 15310as | 17790as |
| 0200 | 0300 | | USA, AFRTS | 4319usb | 5446usb 5765usb |
| | | | 6350usb | 7507usb | 10320usb |
| | | | 13362usb | | 12133usb |
| 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 | mtwhf | USA, Voice of America | 7115va | 9885va |
| | | | 11705va | 11725va | |
| 0200 | 0300 | | USA, WBCQ Kennebunk ME | 5105na | 7415na |
| | | | 9330na | | |
| 0200 | 0300 | | USA, WBOH Newport NC | 5920am | |
| 0200 | 0300 | | USA, WEWN Birmingham AL | 5825na | 7425na |
| | | | 13615va | | |
| 0200 | 0300 | | USA, WHRA Greenbush ME | 7580va | |
| 0200 | 0300 | | USA, WHRI Noblesville IN | 7315am | 7535am |
| 0200 | 0300 | | USA, WINB Red Lion PA | 9320am | |
| 0200 | 0300 | | USA, WJIE Louisville KY | 13595am | |
| 0200 | 0300 | | USA, WRMI Miami FL | 6870na | |
| 0200 | 0300 | | USA, WTJC Newport NC | 9370na | |
| 0200 | 0300 | | USA, WWCR Nashville TN | 3210na | 5050na |
| | | | 5935na | 7465na | |
| 0200 | 0300 | | USA, WWRB Manchester TN | 3185na | 5050na |
| | | | 5085na | | |
| 0200 | 0300 | | USA, WYFR Okeechobee FL | 5985na | 6065na |
| | | | 9505na | 11855ca | |
| 0200 | 0300 | | Zambia, Radio Christian Voice | 4965af | |
| 0215 | 0230 | | Nepal, Radio | 3230as | 5005as 6100as |
| | | | 7165as | | |

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

| | | | | | |
|------|------|-----------|---------------------------------|---------|-------------------------|
| 0300 | 0315 | | Vatican City, Vatican Radio | | 17590va |
| 0300 | 0330 | | Egypt, Radio Cairo | 11855na | |
| 0300 | 0330 | as | Philippines, Radio Pilipinas | 11885me | 15120me |
| | | | 15270me | | |
| 0300 | 0330 | s | Swaziland, TWR | 3200af | |
| 0300 | 0330 | | Thailand, Radio | 15395na | |
| 0300 | 0330 | a | UK, Wales Radio Intl | 6005na | |
| 0300 | 0330 | | Vatican City, Vatican Radio | | 9660af |
| 0300 | 0359 | | New Zealand, Radio NZ Intl | | 17675pa |
| 0300 | 0400 | | Anguilla, Caribbean Beacon | | 6090am |
| 0300 | 0400 | | Australia, ABC NT Alice Springs | | 2310irr |
| 0300 | 0400 | | Australia, ABC NT Katherine | | 5025do |
| 0300 | 0400 | | Australia, ABC NT Tennant Creek | | 4910do |
| 0300 | 0400 | | Australia, Radio 9660pa | | 12080va |
| | | | 15240pa | 15415as | 17750as |
| 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 | | China, China Radio Intl | | 9690am 9790ca |
| | | | 11770va | 13720va | 15110va 17500va |
| 0300 | 0400 | | Costa Rica, University Network | | 5030am 6150am |
| | | | 7375am | 9725sa | |
| 0300 | 0400 | | Cuba, Radio Havana | 6000na | 9820na |
| 0300 | 0400 | vl | Guatemala, Radio Cultural | | 3300am |
| 0300 | 0400 | | Guyana, Voice of | 3290do | |
| 0300 | 0400 | | Japan, Radio | 21610pa | |
| 0300 | 0400 | | Malaysia, RTM | 6175as | 7295as 9750as |
| | | | 15295as | | |
| 0300 | 0400 | | Namibia, Namibian BC Corp | | 3270af 3290af |
| | | | 6090af | | |
| 0300 | 0400 | | North Korea, Voice of | | 3560as 7140as |
| | | | 9345as | 9720as | |
| 0300 | 0400 | | Oman, Radio | 15355af | |
| 0300 | 0400 | | Russia, Voice of | 7180na | 7300na 9860na |
| | | | 15595na | 17660na | |
| 0300 | 0400 | | Sierra Leone, Radio UNAMSIL | | 6137af |
| 0300 | 0400 | | Singapore, Mediacorp Radio | | 6150do |
| 0300 | 0400 | vl | Solomon Islands, SIBC | | 5020do 9545do |
| 0300 | 0400 | | South Africa, Channel Africa | | 3345af 7390af |
| 0300 | 0400 | | Sri Lanka, SLBC | 6005as | 11905as 15745as |
| 0300 | 0400 | | Taiwan, Radio Taiwan Intl | | 5950na 15215na |
| | | | 15320as | | |
| 0300 | 0400 | vl | Uganda, Radio | 4976do | 5026do 7196do |
| 0300 | 0400 | | UK, BBC World Service | | 3255af 5975ca |
| | | | 6005af | 6195eu | 7160af 9420eu 9525af |
| | | | 9750af | 11760as | 11765af 12035af 15280as |
| | | | 15310as | 15360as | 15575af 17760as |
| | | | 21660as | | |
| 0300 | 0400 | vl/ mtwhf | UK, Sudan Radio Service | | 9625va |
| 0300 | 0400 | | USA, AFRTS | 4319usb | 5446usb 5765usb |
| | | | 6350usb | 7507usb | 10320usb 12133usb |
| | | | 13362usb | | |
| 0300 | 0400 | | USA, KAIJ Dallas TX | 5755va | |
| 0300 | 0400 | | USA, KTBN Salt Lake City UT | | 7505na |
| 0300 | 0400 | | USA, KWHR Naalehu HI | | 17510as |
| 0300 | 0400 | mtwhf | USA, Voice of America | | 6080af 7105af |
| | | | 7290af | 7340af | 9885af 12080af 17895af |
| 0300 | 0400 | | USA, Voice of America | | 9620va 11695va |
| 0300 | 0400 | | USA, WBCQ Kennebunk ME | | 5105na 7415na |
| | | | 9330na | | |
| 0300 | 0400 | | USA, WBOH Newport NC | | 5920am |
| 0300 | 0400 | | USA, WEWN Birmingham AL | | 5825na 7425na |
| | | | 13615va | | |
| 0300 | 0400 | | USA, WHRA Greenbush ME | | 7580va |
| 0300 | 0400 | | USA, WHRI Noblesville IN | | 7315am 7535am |
| 0300 | 0400 | | USA, WINB Red Lion PA | | 9320am |
| 0300 | 0400 | | USA, WJIE Louisville KY | | 13595am |
| 0300 | 0400 | | USA, WMLK Bethel PA | | 9465eu |
| 0300 | 0400 | smtwhf | USA, WRMI Miami FL | | 6870na |
| 0300 | 0400 | | USA, WTJC Newport NC | | 9370na |
| 0300 | 0400 | | USA, WWCR Nashville TN | | 3210na 5050na |
| | | | 5770na | 5935na | |
| 0300 | 0400 | | USA, WWRB Manchester TN | | 3185na 5050na |
| | | | 5085na | | |
| 0300 | 0400 | | USA, WYFR Okeechobee FL | | 6065na 9505na |
| | | | 11740va | | |
| 0300 | 0400 | | Zambia, Radio | 4910do | |
| 0300 | 0400 | | Zambia, Radio Christian Voice | | 4965af |
| 0300 | 0400 | vl | Zimbabwe, ZBC Corp | | 5975do |
| 0330 | 0358 | | Hungary, Radio Budapest | | 9775na |

Shortwave Guide



| | | | | | | |
|------|------|--------|-----------------------|---------|---------|---------|
| 0330 | 0358 | | Vietnam, Voice of | 6175ca | | |
| 0330 | 0400 | twhfcs | Albania, Radio Tirana | 6115eu | 7160eu | |
| 0330 | 0400 | mtw ia | Belarus, Radio | 5970eu | | |
| 0330 | 0400 | | UK, BBC World Service | 3255af | 6190af | |
| | | | 7160af 9750af | 11765af | 12035af | 15420af |
| | | | 15575af | | | |
| 0345 | 0400 | | Tajikistan, Radio | 7245srr | | |

| | | | | | | |
|------|------|-------|---------------------------------|---------|---------|---------|
| 0430 | 0500 | | Nigeria, Radio/Lagos | 3326do | 4990do | |
| 0430 | 0500 | | Serbia & Montenegro, Intl Radio | | 9580va | |
| 0430 | 0500 | mtwhf | Swaziland, TWR | 6120af | | |
| 0430 | 0500 | mtwhf | USA, Voice of America | | 4960af | 6080af |
| | | | 7290af 9575af | 11835af | 12080af | 17895af |
| 0445 | 0500 | | Italy, RAI Intl | 5965af | 6000af | 7230af |

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

| | | | | | | |
|------|------|-----------|---------------------------------|---------|----------|----------|
| 0400 | 0427 | | Czech Rep, Radio Prague Intl | 6200na | 7345na | |
| 0400 | 0430 | vl | Croatia, Croatian Radio | 7285na | 12105va | |
| | | | 12110va | | | |
| 0400 | 0430 | | France, Radio France Intl | 9550af | 9805af | |
| | | | 11955af | 13610af | | |
| 0400 | 0430 | | Sri Lanka, SLBC | 6005as | 11905as | 15745as |
| 0400 | 0430 | mtwhf | USA, Voice of America | 4960af | 6080af | 17895af |
| | | | 7290af 9575af | 9885af | 12080af | 17895af |
| 0400 | 0445 | | USA, WYFR Okeechobee FL | 6065na | 9505va | |
| 0400 | 0450 | | Turkey, Voice of | 6020va | 7240va | |
| 0400 | 0456 | | Romania, Radio Romania Intl | 11820na | 15140na | |
| | | | 15235na | 17860na | | |
| 0400 | 0457 | | Netherlands, Radio | 6165na | 9590na | |
| 0400 | 0457 | DRM/as | Netherlands, Radio | 15400au | | |
| 0400 | 0459 | | Germany, Deutsche Welle | 6180af | 9545as | |
| | | | 9710as | | | |
| 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 | 13630pa | |
| | | | 15240pa | 15515va | 17750as | 21725as |
| 0400 | 0500 | | Canada, CBC Northern Service | 9625do | | |
| 0400 | 0500 | | Canada, CFRX Toronto ON | 6070do | | |
| 0400 | 0500 | | Canada, CKZN St John's NF | 6160do | | |
| 0400 | 0500 | | Canada, CKZU Vancouver BC | 6160do | | |
| 0400 | 0500 | | China, China Radio Intl | 6190am | 9560am | |
| | | | 9755am | 13720am | 17490am | 17650am |
| 0400 | 0500 | | Costa Rica, University Network | 5030am | 6150am | |
| | | | 7375am | 9725sa | | |
| 0400 | 0500 | | Cuba, Radio Havana | 6000na | 9820na | |
| 0400 | 0500 | | Guyana, Voice of | 3290do | | |
| 0400 | 0500 | | Malaysia, RTM | 6175as | 7295as | 9750as |
| | | | 15295as | | | |
| 0400 | 0500 | | Namibia, Namibian BC Corp | 3270af | 3290af | |
| | | | 6090af | | | |
| 0400 | 0500 | | New Zealand, Radio NZ Intl | 15340pa | | |
| 0400 | 0500 | | Nigeria, Radio/Enugu | 6025do | | |
| 0400 | 0500 | | Russia, Voice of | 7180na | 15595na | |
| | | | 17660na | | | |
| 0400 | 0500 | | Sierra Leone, Radio UNAMSIL | 6137af | | |
| 0400 | 0500 | | Singapore, MediCorp Radio | 6150do | | |
| 0400 | 0500 | vl | Solomon Islands, SIBC | 5020do | 9545do | |
| 0400 | 0500 | | South Africa, Channel Africa | 3345af | | |
| 0400 | 0500 | vl | Uganda, Radio | 4976do | 7196do | |
| 0400 | 0500 | | UK, BBC World Service | 3255af | 5975ca | |
| | | | 6010na | 6190af | 7160af | 11765af |
| | | | 12035af | 15420af | 15575af | |
| 0400 | 0500 | vl/ mtwhf | UK, Sudan Radio Service | 9625va | | |
| 0400 | 0500 | | Ukraine, Radio Ukraine Intl | 5840na | | |
| 0400 | 0500 | | USA, AFRTS | 4319usb | 5765usb | |
| | | | 6350usb | 7507usb | 10320usb | 12133usb |
| | | | 13362usb | | | |
| 0400 | 0500 | | USA, KAIJ Dallas TX | 5755va | | |
| 0400 | 0500 | | USA, KTBN Salt Lake City UT | 7505na | | |
| 0400 | 0500 | | USA, KWHR Naalehu HI | 17780as | | |
| 0400 | 0500 | | USA, Voice of America | 9620va | 11695va | |
| 0400 | 0500 | | USA, WBCQ Kennebunk ME | 5105na | 7415na | |
| | | | 9330na | | | |
| 0400 | 0500 | | USA, WBOH Newport NC | 5920am | | |
| 0400 | 0500 | | USA, WEWN Birmingham AL | 5825na | 7425na | |
| | | | 13615va | | | |
| 0400 | 0500 | | USA, WHRA Greenbush ME | 7580va | | |
| 0400 | 0500 | | USA, WHRI Noblesville IN | 7315am | 7535am | |
| 0400 | 0500 | | USA, WJIE Louisville KY | 7490am | 13595am | |
| 0400 | 0500 | | USA, WRMI Miami FL | 6870na | | |
| 0400 | 0500 | | USA, WTJC Newport NC | 9370na | | |
| 0400 | 0500 | | USA, WWCR Nashville TN | 3210na | 5050na | |
| | | | 5770na | 5935na | | |
| 0400 | 0500 | | USA, WWRB Manchester TN | 3185na | 5050na | |
| | | | 5085na | | | |
| 0400 | 0500 | | USA, WYFR Okeechobee FL | 9715va | | |
| 0400 | 0500 | | USA, WYFR Okeechobee FL | 6855va | 7355va | |
| 0400 | 0500 | | Zambia, Radio | 4910do | | |
| 0400 | 0500 | | Zambia, Radio Christian Voice | 6065af | | |
| 0400 | 0500 | vl | Zimbabwe, ZBC Corp | 5975do | | |
| 0415 | 0420 | mtwhf | Kyrgyzstan, Radio Kyrgyz | 4010irr | 4795irr | |
| 0430 | 0445 | | Israel, Kol Israel | 11590va | 17660va | |
| 0430 | 0457 | | Czech Rep, Radio Prague Intl | 9865as | 11600va | |
| 0430 | 0500 | | Nigeria, Radio/Ibadan | 6050do | | |
| 0430 | 0500 | | Nigeria, Radio/Kaduna | 4770do | 6090do | |

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

| | | | | | | |
|------|------|-----------|---------------------------------|---------|----------|----------|
| 0500 | 0530 | | Belgium, Radio Vlaanderen Intl | 9590na | | |
| 0500 | 0530 | vl | Croatia, Croatian Radio | 9470na | 12105va | |
| | | | 12110va | | | |
| 0500 | 0530 | | France, Radio France Intl | 11850af | 13610af | |
| | | | 15155af | | | |
| 0500 | 0530 | | UK, BBC World Service | 6005af | 7160af | |
| | | | 11765af | 11940af | 11955as | 15280as |
| | | | 15310as | 15360as | 15420af | 15575as |
| | | | 17640af | 17760as | 17790as | 17885af |
| | | | 21660as | | | |
| 0500 | 0530 | | Vatican City, Vatican Radio | 9660af | 11625af | |
| | | | 13765af | | | |
| 0500 | 0555 | | South Africa, Channel Africa | 7240af | 11875af | |
| 0500 | 0557 | | China, China Radio Intl | 6190am | 9560am | |
| | | | 11740va | 13720am | 15350va | 17490am |
| 0500 | 0559 | | Germany, Deutsche Welle | 7285af | 12035af | |
| | | | 15410af | | | |
| 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 | 13630pa |
| | | | 15160pa | 15240as | 15415va | 15515as |
| | | | 17750as | 21725as | | |
| 0500 | 0600 | | Canada, CBC Northern Service | 9625do | | |
| 0500 | 0600 | | Canada, CFRX Toronto ON | 6070do | | |
| 0500 | 0600 | | Canada, CKZN St John's NF | 6160do | | |
| 0500 | 0600 | | Canada, CKZU Vancouver BC | 6160do | | |
| 0500 | 0600 | | Costa Rica, Jniversity Network | 5030am | 6150am | |
| | | | 7375am | 9725sa | | |
| 0500 | 0600 | | Cuba, Radio Havana | 9550ca | 9655pa | 9820pa |
| 0500 | 0600 | | Guyana, Voice of | 3290do | | |
| 0500 | 0600 | | Japan, Radio | 5975va | 6110na | 7230va |
| | | | 15195va | 17810va | 17815va | |
| 0500 | 0600 | | Malaysia, RTM | 6175as | 7295as | 9750as |
| | | | 15295as | | | |
| 0500 | 0600 | | Namibia, Namibian BC Corp | 6060af | 6175af | |
| 0500 | 0600 | | New Zealand, Radio NZ Intl | 15340pa | | |
| 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 | 15120af | |
| 0500 | 0600 | | Russia, Voice of | 21790pa | | |
| 0500 | 0600 | | Sierra Leone, Radio UNAMSIL | 6137af | | |
| 0500 | 0600 | | Singapore, MediCorp Radio | 6150do | | |
| 0500 | 0600 | vl | Solomon Islands, SIBC | 5020do | 9545do | |
| 0500 | 0600 | mtwhf | Swaziland, TWR | 6120af | | |
| 0500 | 0600 | | Swaziland, TWR | 4775af | 9500af | |
| 0500 | 0600 | vl | Uganda, Radio | 4976do | 5026do | 7196do |
| 0500 | 0600 | | UK, BBC World Service | 6135ca | 6195eu | |
| | | | 9410eu | 11760me | 15565eu | |
| 0500 | 0600 | vl/ mtwhf | UK, Sudan Radio Service | 11795va | | |
| 0500 | 0600 | | USA, AFRTS | 4319usb | 5446usb | 5765usb |
| | | | 6350usb | 7507usb | 10320usb | 12133usb |
| | | | 13362usb | | | |
| 0500 | 0600 | | USA, KAIJ Dallas TX | 5755va | | |
| 0500 | 0600 | | USA, KTBN Salt Lake City UT | 7505na | | |
| 0500 | 0600 | | USA, KWHR Naalehu HI | 11565as | 17780as | |
| 0500 | 0600 | mtwhf | USA, Voice of America | 6035af | 6080af | |
| | | | 6180af 7290af | 12080af | | |
| 0500 | 0600 | | USA, WBCQ Kennebunk ME | 5105na | 7415na | |
| 0500 | 0600 | | USA, WBOH Newport NC | 5920am | | |
| 0500 | 0600 | | USA, WEWN Birmingham AL | 5825na | 7425na | |
| | | | 13615va | | | |
| 0500 | 0600 | | USA, WHRA Greenbush ME | 7580va | 11730na | |
| 0500 | 0600 | | USA, WHRI Noblesville IN | 7315am | 7535am | |
| 0500 | 0600 | | USA, WJIE Louisville KY | 7490am | 13595am | |
| 0500 | 0600 | | USA, WMLK Bethel PA | 9465eu | | |
| 0500 | 0600 | | USA, WRMI Miami FL | 6870na | | |
| 0500 | 0600 | smtwhf | USA, WTJC Newport NC | 9370nc | | |
| 0500 | 0600 | | USA, WWCR Nashville TN | 3210nc | 5070na | |
| | | | 5770na | 5935na | | |
| 0500 | 0600 | | USA, WYFR Okeechobee FL | 6855va | 7520na | |
| 0500 | 0600 | | Zambia, Radio Christian Voice | 6065af | | |
| 0500 | 0600 | vl | Zimbabwe, ZBC Corp | 5975do | | |
| 0505 | 0530 | s | Austria, Radio Austria Intl | 17870me | | |
| 0515 | 0525 | | Rwanda, Radio | 6005do | | |
| 0525 | 0525 | vl | Ghana, Ghana BC Corp | 3366do | 4915do | |
| 0530 | 0545 | | UK, BBC World Service | 6010eu | 9815eu | |
| 0530 | 0600 | | Serbia & Montenegro, Intl Radio | 9580va | | |
| 0530 | 0600 | | Thailand, Radio | 21795eu | | |

Shortwave Guide



| | | | | | | |
|------|------|-------|-----------------------------|---------|---------|---------|
| 0530 | 0600 | | UAE, Radio Dubai | 15435va | 17830va | 21700va |
| 0540 | 0600 | mtwhf | UK, BBC World Service | 7160af | 6005af | 6190af |
| | | | 11765af | 11765af | 17640af | |
| | | | 17885af | | | |
| 0530 | 0600 | | UK, BBC World Service | 15360as | 11955as | 15310as |
| | | | 17760as | 17790as | 21660as | |
| 0535 | 0600 | s | Austria, Radio Austria Intl | | 17870me | |

| | | | | | | |
|------|------|----|-----------------------------|---------|---------|---------|
| 0630 | 0700 | | Bulgaria, Radio | 11600eu | 13600eu | |
| 0630 | 0700 | vl | Georgia, Radio Georgia | | 11805eu | |
| 0630 | 0700 | | UK, BBC World Service | 6005af | 6190af | |
| | | | 11765af | 11940af | 15400af | 17640af |
| | | | 178851af | | | |
| 0630 | 0700 | | Vatican City, Vatican Radio | | 5890va | 11625af |
| | | | 13765af | 13795af | 15570af | 15595af |
| 0645 | 0700 | as | Albania, TWR | | 11865eu | |
| 0645 | 0700 | as | Monaco, TWR | | 9870eu | |

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

| | | | | | | |
|------|------|--------|---------------------------------|---------|----------|----------|
| 0600 | 0605 | as | South Africa, TWR | 11640af | | |
| 0600 | 0620 | | Vatican City, Vatican Radio | 7250eu | 4005eu | 5890eu |
| 0600 | 0630 | | France, Radio France Intl | 15155as | 11665as | 11725as |
| | | | 17800as | 21620as | | |
| 0600 | 0630 | as | UK, BBC World Service | 11765af | 6005af | 6190af |
| | | | 11940af | 17640af | 17885af | |
| 0600 | 0630 | mtwhf | USA, Voice of America | 12080af | 6035af | 6180af |
| 0600 | 0635 | mtwhf | South Africa, TWR | 11640af | | |
| 0600 | 0657 | | China, China Radio Intl | 13720va | 11740as | 13620va |
| | | | 15350va | 15465va | 17540va | |
| 0600 | 0659 | | Germany, Deutsche Welle | 11785af | 6140eu | 7225af |
| | | | 15410af | | | |
| 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 | 11880pa | 12080va |
| | | | 13605pa | 13630pa | 15160pa | 15240as |
| | | | 15415va | 15515va | | |
| 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 | | Costo Rica, University Network | 7375am | 5030am | 6150am |
| | | | 9725sa | 11870sa | | |
| 0600 | 0700 | | Cuba, Radio Havana | 9550ca | 9655pa | 9820pa |
| 0600 | 0700 | DRM | Germany, Deutsche Welle | 21675af | | |
| 0600 | 0700 | vl | Ghana, Ghana BC Corp | | 3366do | 4915da |
| 0600 | 0700 | | Guyana, Voice of | 3290do | | |
| 0600 | 0700 | | Japan, Radio | 7230va | 11715va | 11740va |
| | | | 11690va | 11760va | 13630va | 15195va |
| | | | 17870va | 21755va | | |
| 0600 | 0700 | | Liberia, ELWA | 4760do | | |
| 0600 | 0700 | | Malaysia, RTM | 6175as | 7295as | 9750as |
| | | | 15295as | | | |
| 0600 | 0700 | | Namibia, Namibian BC Corp | | 6060af | 6175al |
| 0600 | 0700 | | New Zealand, Radio NZ Intl | | 15340pa | |
| 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 | 7255al | 15120af | |
| 0600 | 0700 | | Papua New Guinea, NBC | | 4890do | |
| 0600 | 0700 | | Russia, Voice of | 21790pa | | |
| 0600 | 0700 | | Sierra Leone, Radio UNAMSIL | | 6137af | |
| 0600 | 0700 | | Singapore, Mediacorp Radio | | 6150do | |
| 0600 | 0700 | vl | Solomon Islands, SIBC | | 5020do | 9545do |
| 0600 | 0700 | | South Africa, Channel Africa | | 7240af | 15220af |
| 0600 | 0700 | | Swaziland, TWR | 6120af | 9500af | |
| 0600 | 0700 | | UK, BBC World Service | | 6195eu | 7160eu |
| | | | 9410eu | 11955as | 12095eu | 15310as |
| | | | 15360as | 15565eu | 15575me | 17760as |
| | | | 17790as | 21660as | | |
| 0600 | 0700 | | USA, AFRTS | | 5446usb | 5765usb |
| | | | 6350usb | 4319usb | 10320usb | 12133usb |
| | | | 13362usb | | | |
| 0600 | 0700 | | USA, KAIJ Dallas TX | 5755va | | |
| 0600 | 0700 | | USA, KTBN Salt Lake City UT | | 7505na | |
| 0600 | 0700 | | USA, KWHR Naalehu HI | | 11565as | 17780as |
| 0600 | 0700 | | USA, Voice of America | | 6080af | 7290af |
| 0600 | 0700 | | USA, WBCQ Kennebunk ME | | 5105na | 7415na |
| 0600 | 0700 | | USA, WBOH Newport NC | | 5920am | |
| 0600 | 0700 | | USA, WEWN Birmingham AL | | 5825na | 7425na |
| | | | 7580va | 13615na | | |
| 0600 | 0700 | | USA, WHRA Greenbush ME | | 11730na | |
| 0600 | 0700 | | USA, WHRI Noblesville IN | | 7315am | 7535am |
| 0600 | 0700 | | USA, WJIE Louisville KY | | 7490am | 13595am |
| 0600 | 0700 | | USA, WMLK Bethel PA | | 9465eu | |
| 0600 | 0700 | smtwhf | USA, WRMI Miami FL | | 6870na | |
| 0600 | 0700 | | USA, WTJC Newport NC | | 9370na | |
| 0600 | 0700 | | USA, WWCR Nashville TN | | 3210na | 5070na |
| | | | 5770na | 5935na | | |
| 0600 | 0700 | | USA, WYFR Okeechobee FL | | 5850eu | 7355eu |
| | | | 9680eu | 11530na | | |
| 0600 | 0700 | vl | Vanuatu, Radio | 4960do | 7260do | |
| 0600 | 0700 | | Yemen, Rep of Yemen Radio | | 9780me | |
| 0600 | 0700 | | Zambia, Radio Christian Voice | | 6065af | |
| 0600 | 0700 | vl | Zimbabwe, ZBC Corp | | 5975do | |
| 0630 | 0645 | as | UK, BBC World Service | | 9875eu | |

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

| | | | | | | |
|------|------|-------|---------------------------------|---------|----------|----------|
| 0700 | 0720 | as | UK, BBC World Service | | 6190af | 11765af |
| | | | 11940af | 15400af | 17885af | |
| 0700 | 0726 | | Romania, Radio Romania Intl | | 11830na | 15150na |
| 0700 | 0730 | | Slovakia, Slovak Radio | | 13715ou | 15460ou |
| 0700 | 0730 | a | Tibet, Xizang PBS | 6110as | 9490as | 9580as |
| 0700 | 0745 | | USA, WYFR Okeechobee FL | | 5985va | 7355va |
| 0700 | 0750 | as | Albania, TWR | | 11865eu | |
| 0700 | 0750 | as | Monaco, TWR | | 9870eu | |
| 0700 | 0759 | | New Zealand, Radio NZ Intl | | 15340pa | |
| 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 | 9580pa | 9660pa | 11880pa |
| | | | 12080va | 13630pa | 15160pa | 15240as |
| | | | 15415va | 15515as | 17750as | |
| 0700 | 0800 | | Canada, CFRX Toronto ON | | 6070do | |
| 0700 | 0800 | | Canada, CFVP Calgary AB | | 6030do | |
| 0700 | 0800 | | Canada, CKZN St John's NF | | 6160do | |
| 0700 | 0800 | | Canada, CKZU Vancouver BC | | 6160do | |
| 0700 | 0800 | | China, China Radio Intl | | 13720va | 15350va |
| | | | 15465va | | | |
| 0700 | 0800 | | Costa Rica, University Network | | 5030am | 6150am |
| | | | 7375am | 9725sa | 11870sa | |
| 0700 | 0800 | | Eqt Guinea, Radio Africa | | 1518af | |
| 0700 | 0800 | | France, Radio France Intl | | 15605af | |
| 0700 | 0800 | DRM | Germany, Deutsche Welle | | 6140eu | |
| 0700 | 0800 | | Germany, Deutsche Welle | | 21675af | |
| 0700 | 0800 | | Germany, Overcomer Ministries | | 6110eu | |
| 0700 | 0800 | vl | Ghana, Ghana BC Corp | | 3366do | 4915do |
| 0700 | 0800 | vl/as | Guyana, Voice of | 3290do | 5950do | |
| 0700 | 0800 | | Italy, IRRS13840va | | | |
| 0700 | 0800 | | Liberia, ELWA | 4760do | | |
| 0700 | 0800 | | Malaysia, RTM | 6175as | 7295as | 9750as |
| | | | 15295as | | | |
| 0700 | 0800 | | Myanmar, Radio | 9730do | | |
| 0700 | 0800 | | Nigeria, Radio Enugu | | 6025do | |
| 0700 | 0800 | | Nigeria, Radio/Ibadan | | 6050do | |
| 0700 | 0800 | | Nigeria, Radio/Kaduna | | 4770do | 6090do |
| 0700 | 0800 | | Nigeria, Radio/Lagos | 3326do | 4990do | |
| 0700 | 0800 | | Nigeria, Voice of | 7255al | 15120af | |
| 0700 | 0800 | | Papua New Guinea, NBC | | 4890do | |
| 0700 | 0800 | | Russia, Voice of | 17495pa | 17525pa | 17635pa |
| | | | 21790pa | | | |
| 0700 | 0800 | | Sierra Leone, Radio UNAMSIL | | 6137af | |
| 0700 | 0800 | | Singapore, Mediacorp Radio | | 6150do | |
| 0700 | 0800 | vl | Solomon Islands, SIBC | | 5020do | 9545do |
| 0700 | 0800 | | South Africa, Channel Africa | | 11825af | |
| 0700 | 0800 | | Swaziland, TWR | 6120af | 9500af | |
| 0700 | 0800 | | Taiwan, Radio Taiwan Intl | | 5950na | |
| 0700 | 0800 | | UK, BBC World Service | | 6195eu | 9410eu |
| | | | 11955as | 12095eu | 15310as | 15360as |
| | | | 15485eu | 15565eu | 17640eu | 17760va |
| | | | 17830eu | 21660as | | |
| 0700 | 0800 | | USA, AFRTS | | 5446usb | 5765usb |
| | | | 6350usb | 4319usb | 10320usb | 12133usb |
| | | | 13362usb | | | |
| 0700 | 0800 | | USA, KAIJ Dallas TX | 5755va | | |
| 0700 | 0800 | | USA, KTBN Salt Lake City UT | | 7505na | |
| 0700 | 0800 | | USA, KWHR Naalehu HI | | 11565as | 17780as |
| 0700 | 0800 | | USA, Voice of America | | 6080af | 7290af |
| 0700 | 0800 | | USA, WBCQ Kennebunk ME | | 5105na | 7415na |
| 0700 | 0800 | | USA, WBOH Newport NC | | 5920am | |
| 0700 | 0800 | | USA, WEWN Birmingham AL | | 5825na | 7425na |
| | | | 7580na | 11875va | | |
| 0700 | 0800 | | USA, WHRA Greenbush ME | | 11730na | |
| 0700 | 0800 | | USA, WHRI Noblesville IN | | 7315am | 7535am |
| 0700 | 0800 | | USA, WMLK Bethel PA | | 9465eu | |
| 0700 | 0800 | mtwhf | USA, WRMI Miami FL | | 6870na | |
| 0700 | 0800 | | USA, WTJC Newport NC | | 9370na | |
| 0700 | 0800 | | USA, WWCR Nashville TN | | 3210na | 5070na |
| | | | 5770na | 5935na | | |
| 0700 | 0800 | | USA, WYFR Okeechobee FL | | 5850eu | 7355eu |
| | | | 9715va | 9985va | | |
| 0700 | 0800 | vl | Vanuatu, Radio | 4960do | 7260do | |
| 0700 | 0800 | | Zambia, Radio Christian Voice | | 9865af | |
| 0715 | 0800 | mtwhf | Albania, TWR | | 11865eu | |
| 0715 | 0800 | mtwhf | Monaco, TWR | | 9870eu | |
| 0720 | 0800 | as | UK, BBC World Service | | 6190af | 11765me |
| | | | 11940af | 15400af | 17885af | |

Shortwave Guide



| | | | | | | |
|------|------|-------|-----------------------------|---------|---------|---------|
| 0730 | 0745 | | Vatican City, Vatican Radio | 4005va | 5890va | |
| | | | 6185va7250va | 9645va | 11740va | 15595va |
| 0730 | 0800 | | Georgia, Radio Georgia | 11910eu | | |
| 0730 | 0800 | as | Guam, TWR/KTWR | 15255as | | |
| 0740 | 0800 | mtwhf | Guam, TWR/KTWR | 15225as | | |
| 0755 | 0800 | s | Monaco, TWR | 9870eu | | |

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

| | | | | | | |
|------|------|--------|----------------------------------|---------|----------|----------|
| 0800 | 0820 | smtwhf | Albania, TWR | 11865eu | | |
| 0800 | 0820 | mtwhfs | Monaco, TWR | 9870eu | | |
| 0800 | 0827 | | Czech Rep, Radio Prague Intl | 7345eu | 9880eu | |
| 0800 | 0830 | | Australia, ABC NT Katherine | 5025do | | |
| 0800 | 0830 | | Australia, ABC NT Tennant Creek | 4910do | | |
| 0800 | 0830 | | Belgium, Radio Vlaanderen Intl | 5965eu | | |
| 0800 | 0830 | | Malaysia, RTM | 6175as | 9750as | |
| 0800 | 0830 | | Myanmar, Radio | 9730do | | |
| 0800 | 0845 | | USA, WYFR Okeechobee FL | 9985va | | |
| 0800 | 0857 | | China, China Radio Intl | 13720va | 15350va | |
| | | | 17490am | 17540am | | |
| 0800 | 0900 | | Anguilla, Caribbean Beacon | 6090am | | |
| 0800 | 0900 | | Australia, ABC NT Alice Springs | 2310irr | 4835do | |
| 0800 | 0900 | | Australia, HCJB | 11750au | | |
| 0800 | 0900 | | Australia, Radio | 5995pa | 9580va | 9590as |
| | | | 9710pa | 12080va | 15415as | 15415as |
| | | | 15515va | 17750as | | |
| 0800 | 0900 | | Canada, CFRX Toronto ON | 6070do | | |
| 0800 | 0900 | | Canada, CFVP Calgary AB | 6030do | | |
| 0800 | 0900 | | Canada, CKZN St John's NF | 6160do | | |
| 0800 | 0900 | | Canada, CKZU Vancouver BC | 6160do | | |
| 0800 | 0900 | | Costa Rica, University Network | 5030am | 6150am | |
| | | | 7375am | 9725sa | | |
| 0800 | 0900 | | Eqt Guinea, Radio Africa | 15184af | | |
| 0800 | 0900 | | Germany, Deutsche Welle | 6140eu | | |
| 0800 | 0900 | DRM | Germany, Deutsche Welle | 21675af | | |
| 0800 | 0900 | vi | Ghana, Ghana BC Corp | 3366do | 4915do | |
| 0800 | 0900 | | Guam, TWR/KTWR | 15225as | | |
| 0800 | 0900 | | Guyana, Voice of | 3290do | | |
| 0800 | 0900 | | Indonesia, Voice of | 9525as | 15150al | |
| 0800 | 0900 | vi/as | Italy, IRRS13840va | | | |
| 0800 | 0900 | | Liberia, ELWA | 4760do | | |
| 0800 | 0900 | | Malaysia, RTM | 7295as | 15295as | |
| 0800 | 0900 | | New Zealand, Radio NZ Intl | 9885pa | | |
| 0800 | 0900 | | Nigeria, Radio Enugu | 6025do | | |
| 0800 | 0900 | | Nigeria, Radio/Ibadan | 6050do | | |
| 0800 | 0900 | | Nigeria, Radio/Kaduna | 4770do | 6090da | |
| 0800 | 0900 | | Nigeria, Radio/Lagos3326do | 4990do | | |
| 0800 | 0900 | | Nigeria, Voice of | 7255al | 15120af | |
| 0800 | 0900 | vi | Pakistan, Radio | 15100eu | 17835eu | |
| 0800 | 0900 | | Papua New Guinea, Catholic Radio | 4890do | 4960vc | |
| 0800 | 0900 | | Papua New Guinea, NBC | 4890do | | |
| 0800 | 0900 | | Russia, Voice of | 17495pa | 17525pa | 17635pa |
| | | | 21790pa | | | |
| 0800 | 0900 | | Sierra Leone, Radio UNAMSIL | 6137af | | |
| 0800 | 0900 | | Singapore, Mediacorp Radio | 6150do | | |
| 0800 | 0900 | vi | Solomon Islands, SIBC | 5020da | 9545do | |
| 0800 | 0900 | | South Korea, Radio Korea Intl | 13670eu | | |
| 0800 | 0900 | | Swaziland, TWR | 6120af | 9500af | |
| 0800 | 0900 | | Taiwan, Radio Taiwan Intl | 9610au | | |
| 0800 | 0900 | | UK, BBC World Service | 6190af | 9410eu | |
| | | | 11940af | 11955as | 12095eu | 15310as |
| | | | 15360as | 15400af | 15485eu | 15565eu |
| | | | 17640eu | 17760as | 17790as | 17830af |
| | | | 17885af | 21470af | 21660as | |
| 0800 | 0900 | as | UK, BBC World Service | 11760me | 15575as | |
| 0800 | 0900 | | USA, AFRTS | 4319usb | 5446usb | 5765usb |
| | | | 6350usb | 7507usb | 10320usb | 12133usb |
| | | | 13362usb | | | |
| 0800 | 0900 | | USA, KAIJ Dallas TX | 5755va | | |
| 0800 | 0900 | | USA, KNLS Anchor Point AK | 9690as | | |
| 0800 | 0900 | | USA, KTNB Salt Lake City UT | 7505na | | |
| 0800 | 0900 | | USA, KWHR Naalehu HI | 11565as | 17780as | |
| 0800 | 0900 | | USA, WBCQ Kennebunk ME | 5105na | 7415na | |
| 0800 | 0900 | | USA, WBOH Newport NC | 5920am | | |
| 0800 | 0900 | | USA, WEWN Birmingham AL | 5825na | 7425na | |
| | | | 7580na | 11875va | | |
| 0800 | 0900 | | USA, WHRI Noblesville IN | 7315am | 7535am | |
| 0800 | 0900 | | USA, WJIE Louisville KY | 7490am | 13595am | |
| 0800 | 0900 | | USA, WMLK Bethel PA | 9465eu | | |
| 0800 | 0900 | smtwhf | USA, WRMI Miami FL | 6870na | | |
| 0800 | 0900 | | USA, WTJC Newport NC | 9370na | | |
| 0800 | 0900 | | USA, WWCR Nashville TN | 3210na | 5070na | |
| | | | 5770na | 5935na | | |
| 0800 | 0900 | | USA, WYFR Okeechobee FL | 5950na | 6855va | |
| | | | 7455va | | | |
| 0800 | 0900 | vi | Vanuatu, Radio | 4960do | 7260do | |
| 0800 | 0900 | | Zambia, Radio Christian Voice | 9865af | | |
| 0815 | 0900 | | Guam, TWR/KTWR | 11840as | | |
| 0830 | 0850 | | Bangladesh, Bangla Betar | 7185as | 9550as | |
| 0830 | 0900 | | Australia, ABC NT Katherine | 2485do | | |
| 0830 | 0900 | | Australia, ABC NT Tennant Creek | 2325do | | |

| | | | | |
|------|------|--|--------------------------|---------|
| 0830 | 0900 | | Georgia, Radio Georgia | 11910eu |
| 0830 | 0900 | | Lithuania, Radio Vilnius | 9710eu |

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

| | | | | | |
|------|------|--------|----------------------------------|---------|----------|
| 0900 | 0915 | vi | Ghana, Ghana BC Corp | 3366do | 4915do |
| 0900 | 0930 | | Guam, TWR/KTWR | 11840as | |
| 0900 | 0930 | | Russia, Radio Ezra | 17590va | |
| 0900 | 0959 | DRM | Germany, Deutsche Welle | 21675af | |
| 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 | 11750au | |
| 0900 | 1000 | | Australia, Radio | 9580va | 9590as |
| | | | 12080va | 13630pa | 15415as |
| 0900 | 1000 | | Australia, Voice Intl | 11955as | 15415as |
| 0900 | 1000 | | Canada, CFRX Toronto ON | 6070do | |
| 0900 | 1000 | | Canada, CFVP Calgary AB | 6030do | |
| 0900 | 1000 | | Canada, CKZN St John's NF | 6160do | |
| 0900 | 1000 | | Canada, CKZU Vancouver BC | 6160do | |
| 0900 | 1000 | | China, China Radio Intl | 15210pa | 17490va |
| | | | 17690va | | |
| 0900 | 1000 | | Costa Rica, University Network | 5030am | 6150am |
| | | | 7375am | 9725sa | 11870am |
| | | | | | 15184af |
| 0900 | 1000 | | Eqt Guinea, Radio Africa | 6140eu | |
| 0900 | 1000 | | Germany, Deutsche Welle | 6140eu | |
| 0900 | 1000 | vi/as | Guyana, Voice of | 3290do | 5950do |
| 0900 | 1000 | | Italy, IRRS13840va | | |
| 0900 | 1000 | | Malaysia, RTM | 7295as | 15295as |
| 0900 | 1000 | DRM | Netherlands, Radio | 9815eu | |
| 0900 | 1000 | | New Zealand, Radio NZ Intl | 9885pa | |
| 0900 | 1000 | | Nigeria, Radio Enugu | 6025do | |
| 0900 | 1000 | | Nigeria, Radio/Ibadan | 6050do | |
| 0900 | 1000 | | Nigeria, Radio/Kaduna | 4770do | 6090do |
| 0900 | 1000 | | Nigeria, Radio/Lagos3326do | 4990do | |
| 0900 | 1000 | vi | Pakistan, Radio | 15100eu | 17835eu |
| 0900 | 1000 | | Papua New Guinea, Catholic Radio | 4890do | 4960va |
| 0900 | 1000 | | Papua New Guinea, NBC | 4890do | |
| 0900 | 1000 | | Singapore, Mediacorp Radio | 6150do | |
| 0900 | 1000 | vi | Solomon Islands, SIBC | 5020do | 9545do |
| 0900 | 1000 | s | UAE, Radio UNMEE | 21460af | |
| 0900 | 1000 | | UK, BBC World Service | 6190af | 6195as |
| | | | 9605as | 11940af | 12095eu |
| | | | 15360as | 15400af | 15190ca |
| | | | 17640eu | 17760as | 15485eu |
| | | | 17885af | 21470af | 17790as |
| | | | | | 21660as |
| 0900 | 1000 | s | UK, BBC World Service | 11760me | 15575me |
| 0900 | 1000 | | USA, AFRTS | 4319usb | 5446usb |
| | | | 6350usb | 7507usb | 10320usb |
| | | | 13362usb | | 12133usb |
| 0900 | 1000 | | USA, KAIJ Dallas TX | 5755va | |
| 0900 | 1000 | | USA, KTNB Salt Lake City UT | 7505na | |
| 0900 | 1000 | | USA, KWHR Naalehu HI | 11565as | 17780as |
| 0900 | 1000 | | USA, WBCQ Kennebunk ME | 5105na | 7415na |
| 0900 | 1000 | | USA, WBOH Newport NC | 5920am | |
| 0900 | 1000 | | USA, WEWN Birmingham AL | 5825na | 7425na |
| | | | 11875na | | |
| 0900 | 1000 | | USA, WHRA Greenbush ME | 11730na | |
| 0900 | 1000 | | USA, WHRI Noblesville IN | 7315am | 7535am |
| 0900 | 1000 | | USA, WJIE Louisville KY | 7490am | 13595am |
| 0900 | 1000 | | USA, WRMI Miami FL | 6870na | |
| 0900 | 1000 | | USA, WTJC Newport NC | 9370na | |
| 0900 | 1000 | | USA, WWCR Nashville TN | 3210na | 5070na |
| | | | 5770na | 5935na | |
| 0900 | 1000 | | USA, WYFR Okeechobee FL | 5950na | 6855va |
| | | | 7455va | | |
| 0900 | 1000 | vi | Vanuatu, Radio | 4960do | 7260do |
| 0900 | 1000 | | Zambia, Radio Christian Voice | 9865af | |
| 0910 | 0930 | s | Armenia, Voice of | 4810eu | 15270as |
| 0930 | 1000 | | Georgia, Radio Georgia | 11910me | |
| 0930 | 1000 | smwhfa | Greece, Voice of | 9420eu | 15630eu |
| | | | | | 15650af |

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

| | | | | | |
|------|------|----|---------------------------------|---------|---------|
| 1000 | 1029 | | Czech Rep, Radio Prague Intl | 21745va | |
| 1000 | 1030 | | Guam, AWR/KSDA | 11560as | 11930as |
| 1000 | 1030 | vi | Libya, Voice of Africa | 21695af | |
| 1000 | 1030 | | Mongolia, Voice of | 12085as | |
| 1000 | 1030 | | UK, BBC World Service | 6195as | 7320eu |
| | | | 9605as | 9740as | 12095eu |
| | | | 15485eu | 15565eu | 15310as |
| | | | 17790as | 21660as | 17640eu |
| 1000 | 1045 | | USA, WYFR Okeechobee FL | 7455va | |
| 1000 | 1057 | | Netherlands, Radio | 7315as | 12065as |
| | | | 13820au | | |
| 1000 | 1059 | | New Zealand, Radio NZ Intl | 9885pa | |
| 1000 | 1100 | | Anguilla, Caribbean Beacon | 11775am | |
| 1000 | 1100 | | Australia, ABC NT Alice Springs | 2310do | 4835irr |

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| | | | | | | | |
|------|------|--------|----------------------------------|---------|----------|----------|---------|
| 1000 | 1100 | | Australia, ABC NT Katherine | 2485do | | | |
| 1000 | 1100 | | Australia, ABC NT Tennant Creek | 2325do | | | |
| 1000 | 1100 | | Australia, HCJB | 11750ou | | | |
| 1000 | 1100 | | Australia, Radio | 5995pa | 6020pa | 6035va | |
| | | | 9475as9560as | 9580va | 9590as | 11880va | |
| | | | 12080as | 13630pa | | | |
| 1000 | 1100 | | Australia, Voice Intl | 11955as | 13685as | | |
| 1000 | 1100 | | Canada, CFRX Toronto ON | 6070do | | | |
| 1000 | 1100 | | Canada, CFVP Calgary AB | 6030do | | | |
| 1000 | 1100 | | Canada, CKZN St John's NF | 6160do | | | |
| 1000 | 1100 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 1000 | 1100 | | China, China Radio Intl | 6040na | 17490va | | |
| | | | 17690va | | | | |
| 1000 | 1100 | | Costa Rica, University Network | 5030am | 6150am | | |
| | | | 7375am | 9725sa | 11870am | 13750na | |
| 1000 | 1100 | | Eat Guinea, Radio Africa | 15184af | | | |
| 1000 | 1100 | | Guyana, Voice of | 3290do | 5950do | | |
| 1000 | 1100 | | India, All India Radio | 13695as | 15020as | 15260as | |
| | | | 15410as | 17510au | 17800as | 17895as | |
| 1000 | 1100 | vl/as | Italy, IRRS13840va | | | | |
| 1000 | 1100 | | Japan, Radio | 6120ca | 9695as | 11730as | |
| | | | 17585eu | 17720va | 21755va | | |
| 1000 | 1100 | | Malaysia, RTM | 7295as | 15295as | | |
| 1000 | 1100 | DRM | Netherlands, Radio | 9815eu | | | |
| 1000 | 1100 | | Nigeria, Voice of | 7255af | 15120af | | |
| 1000 | 1100 | | North Korea, Voice of | | 3560as | 11710am | |
| | | | 11735na | 13650as | 15180as | | |
| 1000 | 1100 | | Papua New Guinea, Catholic Radio | | | 4960va | |
| 1000 | 1100 | | Papua New Guinea, NBC | 4890do | | | |
| 1000 | 1100 | | Singapore, Mediacorp Radio | 6150do | | | |
| 1000 | 1100 | vl | Solomon Islands, SIBC | 5020do | 9545do | | |
| 1000 | 1100 | | South Africa, Channel Africa | 11825af | | | |
| 1000 | 1100 | as | UK, BBC World Service | 15400af | 17830af | 17885af | 21470af |
| | | | 15400af | 17830af | 17885af | 21470af | |
| 1000 | 1100 | s | UK, BBC World Service | | 15575as | | |
| 1000 | 1100 | DRM/ m | UK, Christian Voice | 9760eu | | | |
| 1000 | 1100 | | USA, AFRTS | 4319usb | 5446usb | 5765usb | |
| | | | 6350usb | 7507usb | 10320usb | 12133usb | |
| | | | 13362usb | | | | |
| 1000 | 1100 | | USA, KAIJ Dallas TX | 5755va | | | |
| 1000 | 1100 | | USA, KTBN Salt Lake City UT | 7505na | | | |
| 1000 | 1100 | | USA, KWHR Naalehu HI | 9930as | 11565as | | |
| 1000 | 1100 | | USA, WBCQ Kennebunk ME | 5105na | | | |
| 1000 | 1100 | | USA, WBOH Newport NC | 5920am | | | |
| 1000 | 1100 | | USA, WEWN Birmingham AL | 11875na | 7425na | 7520na | |
| 1000 | 1100 | | USA, WHRI Noblesville IN | 7315am | 7535am | | |
| 1000 | 1100 | | USA, WINB Red Lion PA | 9320am | | | |
| 1000 | 1100 | | USA, WJIE Louisville KY | 7490am | 13595am | | |
| 1000 | 1100 | | USA, WRMI Miami FL | 9955am | | | |
| 1000 | 1100 | | USA, WTJC Newport NC | 9370na | | | |
| 1000 | 1100 | | USA, WWCR Nashville TN | 5935na | 5070na | | |
| | | | 5770na | 9985na | | | |
| 1000 | 1100 | | USA, WYFR Okeechobee FL | 6890na | 5950na | 6855va | |
| 1000 | 1100 | vl | Vanuatu, Radio | 4960do | 7260do | | |
| 1000 | 1100 | | Zambia, Radio Christian Voice | 9865af | | | |
| 1030 | 1045 | mtwhf | Ethiopia, Radio | 5990do | 7110do | 9704do | |
| 1030 | 1045 | | Israel, Kol Israel | 15640va | 17535va | | |
| 1030 | 1100 | mt hfa | Guam, AWR/KSDA | 11900as | | | |
| 1030 | 1100 | | Iran, Voice of the Islamic Rep | 15600as | 17660as | | |
| 1030 | 1100 | | UAE, Radio Dubai | 13675va | 15370va | 15395va | |
| | | | 21605eu | | | | |
| 1030 | 1100 | f | UAE, Radio UNMEE | 21550af | 6195as | 9605as | |
| 1030 | 1100 | | UK, BBC World Service | 9740as | 11945as | 15285as | 17760as |
| | | | 17790as | 21660as | | | |
| 1030 | 1100 | | Vatican City, Vatican Radio | | 5890eu | | |

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

| | | | | | | | |
|------|------|------------|---------------------------------|---------|---------|---------|---------|
| 1100 | 1104 | vl | Pakistan, Radio | 15100eu | 17835eu | | |
| 1100 | 1115 | mtwhfa/ vl | Vanuatu, Radio | 4960do | 7260do | | |
| 1100 | 1127 | | Iran, Voice of the Islamic Rep | 15600as | 17660as | | |
| 1100 | 1128 | | Vietnam, Voice of | 7285as | | | |
| 1100 | 1130 | vl | Libya, Voice of Africa | 17695af | 21675af | 21695af | |
| 1100 | 1130 | | Tibet, Xizang PBS | 4920as | 6110as | 9490as | |
| 1100 | 1130 | f | UAE, Radio UNMEE | 21550af | | | |
| 1100 | 1130 | | UK, BBC World Service | 11940af | 15190ca | 15400af | 17790ca |
| | | | 17885af | 21470af | | | |
| 1100 | 1145 | | USA, WYFR Okeechobee FL | 5950eu | | | |
| 1100 | 1157 | | Czech Rep, Radio Prague Intl | 11640eu | 21745va | | |
| 1100 | 1200 | | Anguilla, Caribbean Beacon | 11775am | | | |
| 1100 | 1200 | | Australia, ABC NT Alice Springs | 2310do | 4835irr | | |
| 1100 | 1200 | | Australia, ABC NT Katherine | 2485do | | | |
| 1100 | 1200 | | Australia, ABC NT Tennant Creek | 2325do | | | |
| 1100 | 1200 | | Australia, HCJB | 15425au | | | |
| 1100 | 1200 | | Australia, Radio | 5995pa | 6020pa | 6035va | |
| | | | 9475as9560as | 9580vo | 9590as | 11880va | |
| | | | 12080as | | | | |

| | | | | | | | |
|------|------|-------|----------------------------------|---------|----------|----------|---------|
| 1100 | 1200 | | Australia, Voice Intl | 13685as | | | |
| 1100 | 1200 | | Canada, CFRX Toronto ON | 6070do | | | |
| 1100 | 1200 | | Canada, CFVP Calgary AB | 6030do | | | |
| 1100 | 1200 | | Canada, CKZN St John's NF | 6160do | | | |
| 1100 | 1200 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 1100 | 1200 | | China, China Radio Intl | 6040am | 11750ca | | |
| | | | 17490am | 17650am | | | |
| 1100 | 1200 | | Costa Rica, University Network | 7375am | 9725sa | 5030am | 6150am |
| | | | | | 11870am | 13750na | |
| 1100 | 1200 | | Ecuador, HCJB | 12005am | 21455am | | |
| 1100 | 1200 | vl/as | Italy, IRRS13840va | | | | |
| 1100 | 1200 | f | Italy, IRRS15665af | | | | |
| 1100 | 1200 | | Japan, Radio | 6120na | 9695as | 11730as | |
| | | | 17585eu | | | | |
| 1100 | 1200 | | Malaysia, RTM | 7295as | 15295as | | |
| 1100 | 1200 | | New Zealand, Radio NZ Intl | 15530pa | | | |
| 1100 | 1200 | | Nigeria, Voice of | 15120eu | | | |
| 1100 | 1200 | | Papua New Guinea, Catholic Radio | | | 4960va | |
| 1100 | 1200 | | Papua New Guinea, NBC | 4890do | | | |
| 1100 | 1200 | | Singapore, Radio Singapore Intl | 6080as | 6150as | | |
| 1100 | 1200 | | South Africa, Channel Africa | 11825af | | | |
| 1100 | 1200 | | Taiwan, Radio Taiwan Intl | 7445as | | | |
| 1100 | 1200 | s | UK, BBC World Service | 15575as | | | |
| 1100 | 1200 | | UK, BBC World Service | 9740as | 12095eu | 15310as | 15485eu |
| | | | 17640eu | 17790as | | | |
| 1100 | 1200 | mtwff | UK, BBC World Service | | 17830af | | |
| 1100 | 1200 | | USA, AFRTS | 4319usb | 5446usb | 5765usb | |
| | | | 6350usb | 7507usb | 10320usb | 12133usb | |
| | | | 13362usb | | | | |
| 1100 | 1200 | | USA, KAIJ Dallas TX | 5755va | | | |
| 1100 | 1200 | | USA, KTBN Salt Lake City UT | 7505na | | | |
| 1100 | 1200 | | USA, KWHR Naalehu HI | 9930as | 11565as | | |
| 1100 | 1200 | | USA, WBCQ Kennebunk ME | 5105na | | | |
| 1100 | 1200 | | USA, WBOH Newport NC | 5920am | | | |
| 1100 | 1200 | | USA, WEWN Birmingham AL | 11875na | 7425na | 7520na | |
| 1100 | 1200 | | USA, WHRI Noblesville IN | 7315am | 7535am | | |
| 1100 | 1200 | | USA, WINB Red Lion PA | 9320am | | | |
| 1100 | 1200 | | USA, WJIE Louisville KY | 7490am | 13595am | | |
| 1100 | 1200 | | USA, WRMI Miami FL | 9955am | | | |
| 1100 | 1200 | | USA, WTJC Newport NC | 9370na | | | |
| 1100 | 1200 | | USA, WWCR Nashville TN | 5935na | 5070na | | |
| | | | 5770na | 9985na | | | |
| 1100 | 1200 | a | USA, WYFR Okeechobee FL | 6890na | 5950na | 6855va | |
| 1100 | 1200 | f | Vatican City, Vatican Radio | | 15595va | 17515va | |
| 1145 | 1155 | | Rwanda, Radio | 6055do | | | |

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

| | | | | | | | |
|------|------|----|---------------------------------|---------|---------|---------|---------|
| 1200 | 1215 | vl | Cambodia, National Radio | 11940as | | | |
| 1200 | 1230 | | Australia, HCJB | 15425au | | | |
| 1200 | 1230 | | France, Radio France Intl | 17815af | 25820af | | |
| 1200 | 1230 | vl | Libya, Voice of Africa | 17695af | 21675af | 21695af | |
| 1200 | 1230 | | Malaysia, RTM | 7295as | 15295as | | |
| 1200 | 1230 | | UAE, AWR Africa | 15135as | | | |
| 1200 | 1230 | | Uzbekistan, Radio Tashkent Intl | 7285as | 9715as | | |
| | | | 15295as | 17775as | | | |
| 1200 | 1257 | | Netherlands, Radio | 11675na | | | |
| 1200 | 1259 | | Canada, Radio Canada Intl | 13655am | 15190as | 9660am | 15190as |
| | | | | | 17800am | | |
| 1200 | 1259 | | New Zealand, Radio NZ Intl | 15530pa | | | |
| 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 | 6035va | |
| | | | 9475as9560as | 9580as | 9590as | 11880as | |
| 1200 | 1300 | | Australia, Voice Intl | 13685as | | | |
| 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 | | China, China Radio Intl | 6040am | 11750ca | | |
| | | | 11760pa | 11980pa | 15415as | 17490va | |
| | | | 17650va | | | | |
| 1200 | 1300 | | Costa Rica, University Network | 7375am | 9725sa | 5030am | 6150am |
| | | | | | 11870am | 13750na | |
| 1200 | 1300 | | Ecuador, HCJB | 12005am | 21455am | | |
| 1200 | 1300 | | Greece, Voice of | 9420eu | 15630eu | 15650af | |
| 1200 | 1300 | | Nigeria, Voice of | 15120eu | | | |

Shortwave Guide



| | | | | | |
|------|------|-------|----------------------------------|---------|-------------------|
| 1200 | 1300 | | Papua New Guinea, Catholic Radio | 4960va | |
| 1200 | 1300 | | Papua New Guinea, NBC | 4890do | |
| 1200 | 1300 | | Singapore, Radio Singapore Intl | 6080as | 6150as |
| 1200 | 1300 | | South Korea, Radio Korea Intl | 9650ca | |
| 1200 | 1300 | | Taiwan, Radio Taiwan Intl | 7130as | |
| 1200 | 1300 | | UK, BBC World Service | 6190af | 6195ca |
| | | | 7320eu | 9740os | 11760me 11940of |
| | | | 12095eu | 15190ca | 15310os 15485eu |
| | | | 15565eu | 15575as | 17640eu 17760os |
| | | | 17885of | 17790os | 21470af |
| 1200 | 1300 | mtwhf | UK, BBC World Service | 17830af | |
| 1200 | 1300 | | Ukraine, Radio Ukraine Intl | 15620eu | |
| 1200 | 1300 | | USA, AFRTS | 4319usb | 5765usb |
| | | | 6350usb | 7507usb | 10320usb 12133usb |
| | | | 13362usb | | |
| 1200 | 1300 | | USA, KAIJ Dallas TX | 13815va | |
| 1200 | 1300 | | USA, KTNB Salt Lake City UT | 7505na | |
| 1200 | 1300 | | USA, KWHR Naalehu HI | 9930as | 11565as |
| 1200 | 1300 | | USA, Voice of America | 6160va | 9645va |
| | | | 9760va 15240va | | |
| 1200 | 1300 | | USA, WBCQ Kennebunk ME | 9330na | 17495na |
| 1200 | 1300 | | USA, WBOH Newport NC | 5920am | |
| 1200 | 1300 | | USA, WEWN Birmingham AL | 7425na | 7520na |
| | | | 9355na | 13615na | |
| 1200 | 1300 | | USA, WHRI Noblesville IN | 7315am | 11670am |
| 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, WTJC Newport NC | 9370na | |
| 1200 | 1300 | | USA, WWCN Nashville TN | 5070na | 5770na |
| | | | 5935na | 15825na | |
| 1200 | 1300 | | USA, WWRB Manchester TN | 3185na | 5050na |
| 1200 | 1300 | | USA, WYFR Okeechobee FL | 11530va | 11970nc |
| 1200 | 1300 | | Zambia, Radio Christian Voice | 9865af | |
| 1205 | 1230 | mtwhf | Austria, Radio Austria Intl | 6155eu | 13730eu |
| | | | 17715va | | |
| 1215 | 1300 | | Egypt, Radio Cairo | 17670as | |
| 1230 | 1245 | | UK, BBC World Service | 15425eu | |
| 1230 | 1245 | | UK, BBC World Service | 17780af | 21640af |
| 1230 | 1258 | | Vietnam, Voice of | 9840va | 12020va |
| 1230 | 1300 | | Australia, HCJB | 15405va | |
| 1230 | 1300 | | Bangladesh, Bangla Betar | 7185as | 9550as |
| 1230 | 1300 | vi | Libya, Voice of Africa | 21675af | 21695af |
| 1230 | 1300 | | Sri Lanka, SLBC | 6005os | 11930os |
| 1230 | 1300 | | Thailand, Radio | 9855va | |
| 1235 | 1245 | as | Austria, Radio Austria Intl | 6155eu | 13730eu |
| | | | 17715va | | |
| 1245 | 1300 | | Austria, Radio Austria Intl | 6155eu | 13730eu |
| | | | 17715as | | |

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

| | | | | | |
|------|------|-----|----------------------------------|---------|-----------------|
| 1300 | 1305 | | Nigeria, Voice of | 15120eu | |
| 1300 | 1330 | DRM | Canada, Radio Canada Intl | 9815eu | |
| 1300 | 1330 | | Ecuador, HCJB | 12005am | 21455am |
| 1300 | 1330 | | Egypt, Radio Cairo | 17670as | |
| 1300 | 1330 | vi | Libya, Voice of Africa | 21675af | 21695af |
| 1300 | 1345 | | USA, WYFR Okeechobee FL | 7355va | 11970na |
| 1300 | 1356 | | Romania, Radio Romania Intl | 11830eu | 15105eu |
| 1300 | 1400 | | Anguilla, Caribbean Beacon | 11775am | |
| 1300 | 1400 | | Australia, Radio | 5995pa | 6020pa 9475as |
| | | | 9560as 9580va | 11660as | |
| 1300 | 1400 | | Australia, Voice Intl | 13685as | |
| 1300 | 1400 | | Canada, CBC Northern Service | 9625do | |
| 1300 | 1400 | | Canada, CFRX Toronto ON | 6070do | |
| 1300 | 1400 | | Canada, CFVP Calgary AB | 6030do | |
| 1300 | 1400 | | Canada, CKZN St John's NF | 6160do | |
| 1300 | 1400 | | Canada, CKZU Vancouver BC | 6160do | |
| 1300 | 1400 | | Canada, Radio Canada Intl | 9515am | 13655am |
| | | | 17800sa | | |
| 1300 | 1400 | | China, China Radio Intl | 7405am | 9570am |
| | | | 9795va 11760pa | 11980as | 15180as 17490va |
| | | | 17650va | | |
| 1300 | 1400 | DRM | China, China Radio Intl | 7250va | 11810va |
| 1300 | 1400 | | Costa Rica, University Network | 9725am | 11870am |
| | | | 13750am | | |
| 1300 | 1400 | | Germany, Deutsche Welle | 6140eu | |
| 1300 | 1400 | | Germany, Overcomer Ministries | 6110eu | 13810eu |
| 1300 | 1400 | | Jordan, Radio | 11690eu | |
| 1300 | 1400 | | Malaysia, RTM | 7295os | |
| 1300 | 1400 | | New Zealand, Radio NZ Intl | 9870pa | |
| 1300 | 1400 | | North Korea, Voice of | 4405as | 9335eu |
| | | | 11710na | 13760eu | 15245am |
| 1300 | 1400 | | Papua New Guinea, Catholic Radio | 4960va | |
| 1300 | 1400 | | Papua New Guinea, NBC | 4890do | |
| 1300 | 1400 | | Singapore, Radio Singapore Intl | 6080as | 6150as |
| 1300 | 1400 | | South Korea, Radio Korea Intl | 9570as | 9700as |
| 1300 | 1400 | | Sri Lanka, SLBC | 6005as | 11930as |
| 1300 | 1400 | | UK, BBC World Service | 6190af | 6195ca |
| | | | 7320eu | 11760me | 11940af 12095eu |
| | | | 15190ca | 15420af | 15485eu 15565eu |

| | | | | | |
|------|------|--------|---------------------------------|---------|-------------------|
| 1300 | 1400 | | 17640eu | 17885af | 21470af |
| 1300 | 1400 | mtwhf | UK, BBC World Service | | 17830af |
| | | | USA, AFRTS | 4319usb | 5765usb |
| | | | 6350usb | 7507usb | 10320usb 12133usb |
| | | | 13362usb | | |
| 1300 | 1400 | | USA, KJES Vado NM | 11715na | |
| 1300 | 1400 | | USA, KNLS Anchor Point AK | | 9690as |
| 1300 | 1400 | | USA, KTNB Salt Lake City UT | | 7505na |
| 1300 | 1400 | | USA, KWHR Naalehu HI | | 9930as 11565as |
| 1300 | 1400 | | USA, Voice of America | | 9645va 9760va |
| 1300 | 1400 | | USA, WBCQ Kennebunk ME | | 9330na 17495na |
| 1300 | 1400 | | USA, WBOH Newport NC | | 5920am |
| 1300 | 1400 | | USA, WEWN Birmingham AL | | 7425na 7520na |
| | | | 9355na | 13615na | |
| 1300 | 1400 | | USA, WHRA Greenbush ME | | 17560na |
| 1300 | 1400 | | USA, WHRI Noblesville IN | | 11670am 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, WTJC Newport NC | | 9370na |
| 1300 | 1400 | | USA, WWCN Nashville TN | | 5935na 7465na |
| | | | 9985na | 15825na | |
| 1300 | 1400 | | USA, WWRB Manchester TN | | 3185na 5050na |
| 1300 | 1400 | | USA, WYFR Okeechobee FL | | 11830va 11855na |
| 1300 | 1400 | | Zambia, Radio Christian Voice | | 9865af |
| 1315 | 1330 | a | Russia, TWR | 7535eu | |
| 1330 | 1400 | s | Australia, HCJB | 15405va | |
| 1330 | 1400 | s | Guam, AWR/KSDA | 11980as | |
| 1330 | 1400 | mtwhfa | Guam, AWR/KSDA | 15275as | |
| 1330 | 1400 | | India, All India Radio | 9690as | 11620as 13710as |
| 1330 | 1400 | | Laos, National Radio | 7145as | |
| 1330 | 1400 | | Sweden, Radio | 7420va | 11550va |
| 1330 | 1400 | DRM | Sweden, Radio | 7240va | |
| 1330 | 1400 | | Turkey, Voice of | 15155va | 15195eu |
| 1330 | 1400 | | UK, BBC World Service | | 15105af 17810af |
| 1330 | 1400 | | Uzbekistan, Radio Tashkent Intl | | 7285as 9715as |
| | | | 15295as | 17775as | |

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

| | | | | | |
|------|------|-------|--------------------------------|---------|-------------------|
| 1400 | 1415 | | Russia, FEBA | 9445va | |
| 1400 | 1415 | mtw | UK, BBC World Service | | 15420af 21490eu |
| 1400 | 1420 | | Turkey, Voice of | 15155va | 15195eu |
| 1400 | 1429 | | Czech Rep, Radio Prague Intl | | 21745va |
| 1400 | 1430 | mtwhf | Germany, Deutsche Welle | | 15725na |
| 1400 | 1430 | vi | Libya, Voice of Africa | 21675af | |
| 1400 | 1430 | | Sweden, Radio | 7420va | 11550va |
| 1400 | 1430 | | Thailand, Radio | 9830as | |
| 1400 | 1459 | as | Canada, Radio Canada Intl | | 9515as |
| 1400 | 1500 | | Anguilla, Co-ibbean Beacon | | 11775am |
| 1400 | 1500 | | Australia, Radio | 5995pa | 6080pa 7260as |
| | | | 9475as 9590as | 11660as | 11750as |
| 1400 | 1500 | | Australia, Voice Intl | 13685as | |
| 1400 | 1500 | | Canada, CBC Northern Service | | 9625do |
| 1400 | 1500 | | Canada, CFRX Toronto ON | | 6070do |
| 1400 | 1500 | | Canada, CFVP Calgary AB | | 6030do |
| 1400 | 1500 | | Canada, CKZN St John's NF | | 6160do |
| 1400 | 1500 | | Canada, CKZU Vancouver BC | | 6160do |
| 1400 | 1500 | | China, China Radio Intl | | 7405am 9610va |
| | | | 9795va 11675as | 11765af | 13685am 13680af |
| | | | 15125am | 17490am | 17650am |
| 1400 | 1500 | | Costa Rica, University Network | | 9725am 11870am |
| | | | 13750am | | |
| 1400 | 1500 | | France, Radio France Intl | | 7175as 9580as |
| | | | 11610os | 17515as | 17620as |
| 1400 | 1500 | | Germany, Deutsche Welle | | 6140eu |
| 1400 | 1500 | | Germany, Overcomer Ministries | | 6110eu 13810eu |
| 1400 | 1500 | | India, All India Radio | 9690as | 11620as 13710as |
| 1400 | 1500 | | Japan, Radio | 7200as | 11730as 11840pa |
| 1400 | 1500 | | Jordan, Radio | 11690eu | |
| 1400 | 1500 | | Malaysia, RTM | 7295os | |
| 1400 | 1500 | | Netherlands Radio | 9345as | 12080as 15595as |
| 1400 | 1500 | | New Zealand, Radio NZ Intl | | 9870pa |
| 1400 | 1500 | | Nigeria, Voice of | 15120af | |
| 1400 | 1500 | | Oman, Radio | 15140eu | |
| 1400 | 1500 | DRM | Russia, Voice of | 15780va | |
| 1400 | 1500 | | Russia, Voice of | 7390eu | 9745eu 12055as |
| | | | 15605as | 17645as | |
| 1400 | 1500 | | Singapore, Mediacorp Radio | | 6150do |
| 1400 | 1500 | | South Africa, Channel Africa | | 11825af |
| 1400 | 1500 | | Sri Lanka, SLBC | 6005as | 11930as 15745as |
| 1400 | 1500 | | Taiwan, Radio Taiwan Intl | | 15265as |
| 1400 | 1500 | | UK, BBC World Service | | 6190af 6195as |
| | | | 7320eu | 9740as | 11940af 12095eu |
| | | | 15190ca | 15310as | 15485eu 15575as |
| | | | 15575eu | 17640eu | 17790as 21470af |
| | | | 21660af | | |
| 1400 | 1500 | mtwhf | UK, BBC World Service | | 17830af |
| 1400 | 1500 | | USA, AFRTS | 4319usb | 5446usb 5765usb |
| | | | 6350usb | 7507usb | 10320usb 12133usb |
| | | | 13362usb | | |

Shortwave Guide



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|------|------|-------------------------------|---------|---------|--|
| 1400 | 1500 | USA, KJES Vado NM | 11715na | | |
| 1400 | 1500 | USA, KTBN Salt Lake City UT | 7505na | 15590na | |
| 1400 | 1500 | USA, KWHR Naalehu HI | 9930as | 11565as | |
| 1400 | 1500 | USA, Voice of America | 6160va | 7125va | |
| | | 9760va | 15160va | 15425va | |
| 1400 | 1500 | USA, WBCQ Kennebunk ME | 7415na | 9330na | |
| | | 17495na | | | |
| 1400 | 1500 | USA, WBOH Newport NC | 5920am | | |
| 1400 | 1500 | USA, WEWN Birmingham AL | 7425na | 7520na | |
| | | 9355na | 9955na | | |
| 1400 | 1500 | USA, WHRA Greenbush ME | 17560na | | |
| 1400 | 1500 | USA, WHRI Noblesville IN | 11670am | 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 | 7465na | 9985na | |
| | | 13845na | 15825na | | |
| 1400 | 1500 | USA, WWRB Manchester TN | 3185na | 5050na | |
| 1400 | 1500 | USA, WYFR Okeechobee FL | 11615na | 11855na | |
| | | 13695na | 17760na | | |
| 1400 | 1500 | Zambia, Radio Christian Voice | 9865af | | |
| 1415 | 1430 | Nepal, Radio | 3230as | 6100as | |
| | | 7165as | | | |
| 1430 | 1500 | Australia, HCJB | 15390va | | |
| 1430 | 1500 | Germany, Pan American BC | 15650eu | | |
| 1430 | 1500 | Myanmar, Radio | 5040do | 5985do | |
| 1430 | 1500 | Sweden, Radio | 11550va | | |
| 1445 | 1500 | UK, BBC World Service | 6140as | 7205as | |
| | | 15245as | | | |

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

| | | | | | |
|------|------|--------------------------------|---------|----------|----------|
| 1500 | 1515 | Germany, Pan American BC | 15650me | | |
| 1500 | 1528 | Vietnam, Voice of | 7285va | 9840va | 12020va |
| 1500 | 1530 | Mongolia, Voice of | 12085eu | | |
| 1500 | 1530 | Sri Lanka, SLBC | 6005as | 11930as | 15745as |
| 1500 | 1530 | Turkmenistan, Turkmen Radio | 5030as | | |
| 1500 | 1530 | UK, BBC World Service | 6190af | 11860af | |
| | | 11940af | 15400af | 15420af | 21470af |
| | | 21490af | 21660af | | |
| 1500 | 1545 | USA, WYFR Okeechobee FL | 15210ca | | |
| 1500 | 1557 | Canada, Radio Canada Intl | 15455as | 17720as | |
| 1500 | 1557 | Netherlands, Radio | 9345as | 12080as | 15595as |
| 1500 | 1559 | Canada, Radio Canada Intl | 9515am | 13655am | |
| | | 17800am | | | |
| 1500 | 1600 | Anguilla, Caribbean Beacon | 11775am | | |
| 1500 | 1600 | Australia, HCJB | 15390va | | |
| 1500 | 1600 | Australia, Radio | 5995pa | 6080pa | 7260as |
| | | 9475as | 9590as | 9805as | 11750as |
| 1500 | 1600 | Australia, Voice Intl | 13685as | 15150as | |
| 1500 | 1600 | Canada, CBC Northern Service | 9625do | | |
| 1500 | 1600 | Canada, CFRX Toronto ON | 6070do | | |
| 1500 | 1600 | Canada, CFVP Calgary AB | 6030do | | |
| 1500 | 1600 | Canada, CKZN St John's NF | 6160do | | |
| 1500 | 1600 | Canada, CKZU Vancouver BC | 6160do | | |
| 1500 | 1600 | China, China Radio Intl | 7160as | 9610va | |
| | | 9785as | 11940af | 13685am | 15125af |
| | | 17490va | 17650va | | |
| 1500 | 1600 | Costa Rica, University Network | 9725am | 11870am | |
| | | 13750am | | | |
| 1500 | 1600 | Germany, Deutsche Welle | 6140eu | | |
| 1500 | 1600 | Guam, TWR/KTWR | 12105as | | |
| 1500 | 1600 | Japan, Radio | 6190as | 7200am | 9505as |
| | | 11730va | | | |
| 1500 | 1600 | Jordan, Radio | 11690na | | |
| 1500 | 1600 | Malaysia, RTM | 7295as | | |
| 1500 | 1600 | Myanmar, Radio | 5040do | 5985do | |
| 1500 | 1600 | New Zealand, Radio NZ Intl | 9870pa | | |
| 1500 | 1600 | North Korea, Voice of | 4405eu | 9335eu | |
| | | 11535me | 13760eu | 15245am | |
| 1500 | 1600 | Russia, FEBA | 7340as | | |
| 1500 | 1600 | Russia, Voice of | 4940me | 4975me | 7325me |
| | | 7390me | 11500as | 11985as | |
| 1500 | 1600 | Singapore, MediCorp Radio | 6150do | | |
| 1500 | 1600 | South Africa, Channel Africa | 11825af | 17770af | |
| 1500 | 1600 | UK, BBC World Service | 5975as | 6195as | |
| | | 7160as | 9740as | 12095eu | 15310as |
| | | 15485eu | 15565eu | 17790as | |
| 1500 | 1600 | UK, BBC World Service | 17830af | | |
| 1500 | 1600 | UK, Sudan Radio Service | 15530va | | |
| 1500 | 1600 | USA, AFRTS | 4319usb | 5765usb | |
| | | 6350usb | 7507usb | 10320usb | 12133usb |
| | | 13362usb | | | |
| 1500 | 1600 | USA, KJES Vado NM | 11715na | | |
| 1500 | 1600 | USA, KTBN Salt Lake City UT | 15590na | | |
| 1500 | 1600 | USA, KWHR Naalehu HI | 9930as | 11565as | |
| 1500 | 1600 | USA, Voice of America | 6160va | 7125va | |
| | | 9590af | 9760af | 9845af | 12040af |
| 1500 | 1600 | USA, WBCQ Kennebunk ME | 7415na | 9330na | |
| | | 17495na | | | |

| | | | | | |
|------|------|-----------------------------------|---------|---------|--|
| 1500 | 1600 | USA, WBOH Newport NC | 5920am | | |
| 1500 | 1600 | USA, WEWN Birmingham AL | 9955na | 11530na | |
| 1500 | 1600 | USA, WHRA Greenbush ME | 17650na | | |
| 1500 | 1600 | USA, WHRI Noblesville IN | 13760am | 15105am | |
| 1500 | 1600 | USA, WINB Red Lion PA | 13570am | | |
| 1500 | 1600 | USA, WJIE Louisville KY | 7490am | 13595am | |
| 1500 | 1600 | USA, WRMI Miami FL | 15725na | | |
| 1500 | 1600 | USA, WTJC Newport NC | 9370na | | |
| 1500 | 1600 | USA, WWCR Nashville TN | 7465na | 9985na | |
| | | 13845na | 15825na | | |
| 1500 | 1600 | USA, WWRB Manchester TN | 3185na | 5050na | |
| 1500 | 1600 | USA, WYFR Okeechobee FL | 11615na | 11855na | |
| | | 17760na | | | |
| 1500 | 1600 | Zambia, Radio Christian Voice | 9865af | | |
| 1505 | 1630 | Austria, Radio Austria Intl | 13755ca | | |
| 1515 | 1550 | Vatican City, Vatican Radio | 12065va | 13765va | |
| | | 15235va | | | |
| 1530 | 1545 | India, All India Radio 9910as | | | |
| 1530 | 1545 | UK, BBC World Service | 9600as | 11685as | |
| 1530 | 1600 | Iran, Voice of the Islamic Rep | 9635as | 11650as | |
| 1530 | 1600 | UAE, AWR Africa | 15225as | | |
| 1530 | 1600 | UK, BBC World Service | 6190af | 11940af | |
| | | 15400af | 21470af | 21660af | |
| 1540 | 1555 | Austria, Radio Austria Intl | 13775ca | | |
| 1545 | 1600 | Germany, Bible Voice Broadcasting | | 15680me | |
| 1545 | 1600 | Germany, Pan American BC | 15650me | | |
| 1555 | 1600 | Austria, Radio Austria Intl | 13775ca | | |

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

| | | | | | |
|------|------|-----------------------------------|---------|----------|----------|
| 1600 | 1615 | Pakistan, Radio | 11570va | 11850va | 15070va |
| | | 15725va | | | |
| 1600 | 1627 | Iran, Voice of the Islamic Rep | 9635as | 11650as | |
| 1600 | 1628 | Hungary, Radio Budapest | 6025eu | 9580eu | |
| 1600 | 1628 | Vietnam, Voice of | 7220as | 9550as | 11630va |
| | | 13740va | | | |
| 1600 | 1630 | Guam, AWR/KSDA | 15235as | | |
| 1600 | 1630 | Guam, TWR/KTWR | 12105as | | |
| 1600 | 1630 | Jordan, Radio | 11690na | | |
| 1600 | 1630 | Libya, Voice of Africa | 15220af | 17840af | |
| 1600 | 1645 | USA, WYFR Okeechobee FL | 11615na | 11830va | |
| | | 17760na | | | |
| 1600 | 1649 | New Zealand, Radio NZ Intl | 9870pa | | |
| 1600 | 1659 | Germany, Deutsche Welle | 6170as | 7225as | |
| | | 11695as | | | |
| 1600 | 1700 | Anguilla, Caribbean Beacon | 11775am | | |
| 1600 | 1700 | Australia, HCJB | 15390va | | |
| 1600 | 1700 | Australia, Radio | 5995pa | 6080pa | 7220as |
| | | 7260as | 9475as | 11660as | |
| 1600 | 1700 | Australia, Voice Intl | 13685as | 15150as | |
| 1600 | 1700 | Canada, CBC Northern Service | 9625do | | |
| 1600 | 1700 | Canada, CFRX Toronto ON | 6070do | | |
| 1600 | 1700 | Canada, CFVP Calgary AB | 6030do | | |
| 1600 | 1700 | Canada, CKZN St John's NF | 6160do | | |
| 1600 | 1700 | Canada, CKZU Vancouver BC | 6160do | | |
| 1600 | 1700 | China, China Radio Intl | 17510vo | | |
| 1600 | 1700 | China, China Radio Intl | 9440af | 9570af | |
| | | 9795af | 11900af | 11940af | 13640va |
| | | 17490va | 17650va | | |
| 1600 | 1700 | Costa Rica, University Network | 11870am | 13750am | |
| 1600 | 1700 | Ethiopia, Radio | 5990af | 7110af | 7165af |
| | | 9560af | 9704af | 11800af | |
| 1600 | 1700 | France, Radio France Intl | 6010af | 6170af | |
| | | 9730af | 11615af | 15160af | 15605af |
| 1600 | 1700 | Germany, Bible Voice Broadcasting | | 15680me | |
| 1600 | 1700 | Greece, Voice of | 7475eu | 9420eu | 15630eu |
| | | 17705na | | | |
| 1600 | 1700 | Malaysia, RTM | 7295as | | |
| 1600 | 1700 | North Korea, Voice of | 11535me | 3560me | 9975af |
| 1600 | 1700 | Russia, Voice of | 5945me | 9405as | 11985af |
| | | 12055vo | | | |
| 1600 | 1700 | South Korea, Radio Korea Intl | 5975va | 9870vo | |
| 1600 | 1700 | Taiwan, Radio Taiwan Intl | 11550as | | |
| 1600 | 1700 | UK, BBC World Service | 3915as | 5975as | |
| | | 6195as | 7160as | 9410eu | 11750as |
| | | 15310as | 15485eu | 15565eu | 17790as |
| | | 17820eu | | | |
| 1600 | 1700 | UK, BBC World Service | 17830af | | |
| 1600 | 1700 | UK, Sudan Radio Service | 15530va | | |
| 1600 | 1700 | USA, AFRTS | 4319usb | 5446usb | 5765usb |
| | | 6350usb | 7507usb | 10320usb | 12133usb |
| | | 13362usb | | | |
| 1600 | 1700 | USA, KTBN Salt Lake City UT | 15590na | | |
| 1600 | 1700 | USA, KWHR Naalehu HI | 9930as | | |
| 1600 | 1700 | USA, Voice of America | 6160va | 7125va | |
| | | 9700va | 9760va | 9850af | 12080af |
| | | 15205af | 15225af | 15525va | 15410af |
| | | 15580af | 17895af | | |
| 1600 | 1700 | USA, WBCQ Kennebunk ME | 9330na | 17495na | |
| 1600 | 1700 | USA, WBOH Newport NC | 5920am | | |

Shortwave Guide



| | | | | |
|------|------|-------------------------------|---------|---------|
| 1600 | 1700 | USA, WEWN Birmingham AL | 11530va | 13615va |
| | | 15745va | | |
| 1600 | 1700 | USA, WHRA Greenbush ME | 17650na | |
| 1600 | 1700 | USA, WHRI Noblesville IN | 13760am | 15105am |
| 1600 | 1700 | USA, WINB Red Lion PA | 13570am | |
| 1600 | 1700 | USA, WJIE Louisville KY | 7490am | 13595am |
| 1600 | 1700 | USA, WMLK Bethel PA | 9465eu | |
| 1600 | 1700 | USA, WRMI Miami FL | 15725na | |
| 1600 | 1700 | USA, WTJC Newport NC | 9370na | |
| 1600 | 1700 | USA, WWCR Nashville TN | 9985na | 12160na |
| | | 13845na | 15825nc | |
| 1600 | 1700 | USA, WWRB Manchester TN | 3185na | 5050na |
| 1600 | 1700 | USA, WYFR Okeechobee FL | 6085na | 13695na |
| | | 17690va | 18980eu | |
| 1600 | 1700 | Zambia, Radio Christian Voice | 9865af | |
| 1615 | 1630 | Vatican City, Vatican Radio | 15595va | |
| 1615 | 1700 | UK, BBC World Service | 11860af | 15420af |
| | | 21490af | | |
| 1630 | 1630 | Swaziland, TWR | 6070af | |
| 1630 | 1645 | Turkmenistan, Turkmen Radio | 4930as | |
| 1630 | 1700 | Egypt, Radio Cairo | 9855af | |
| 1630 | 1700 | Guam, AWR/KSDA | 11975as | 15235as |
| 1630 | 1700 | UK, BBC World Service | 6190af | 11940af |
| | | 15400af | 15420af | 21470af |
| 1645 | 1700 | Tajikistan, Radio | 7245irr | |
| 1651 | 1700 | New Zealand, Radio NZ Intl | 9870pa | |

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

| | | | | |
|------|------|-----------------------------------|---------|----------|
| 1700 | 1727 | Czech Rep, Radio Prague Intl | 5930eu | 15710af |
| 1700 | 1728 | Vietnam, Voice of | 9725au | |
| 1700 | 1730 | Azerbaijan, Voice of | 6110me | |
| 1700 | 1730 | France, Radio France Intl | 15605af | 17605af |
| 1700 | 1730 | Libya, Voice of Africa | 15220af | 15615af |
| 1700 | 1730 | UK, BBC World Service | 6195eu | 9410eu |
| | | 12095eu | 15565eu | 17820eu |
| 1700 | 1745 | UK, BBC World Service | 3255af | 6005cf |
| | | 6190af | 9630af | 15420af |
| | | 15400af | | 21470af |
| 1700 | 1750 | New Zealand, Radio NZ Intl | 9870pa | |
| 1700 | 1755 | South Africa, Channel Africa | 15285af | |
| 1700 | 1759 | Poland, Radio Polonia | 7265eu | 7285eu |
| 1700 | 1800 | Anguilla, Caribbean Beacon | 11775am | |
| 1700 | 1800 | Australia, HCJB | 15390va | |
| 1700 | 1800 | Australia, Radio | 5995pa | 6080pa |
| | | 7260as | 9475as | 11880as |
| 1700 | 1800 | Australia, Voice Intl | 13685as | 15150as |
| 1700 | 1800 | Canada, CBC Northern Service | 9625do | |
| 1700 | 1800 | Canada, CFRX Toronto ON | 6070do | |
| 1700 | 1800 | Canada, CFYP Calgary AB | 6030do | |
| 1700 | 1800 | Canada, CKZN St John's NF | 6160do | |
| 1700 | 1800 | Canada, CKZU Vancouver BC | 6160do | |
| 1700 | 1800 | China, China Radio Intl | 9570af | 11670va |
| | | 11900af | 11940af | 13640af |
| | | 15150af | | 13830af |
| 1700 | 1800 | China, China Radio Intl | 17510va | |
| 1700 | 1800 | Costa Rica, University Network | 11870am | 13750am |
| 1700 | 1800 | Egypt, Radio Cairo | 9855af | |
| 1700 | 1800 | Eat Guinea, Radio Africa | 7189af | 15184af |
| 1700 | 1800 | Germany, Bible Voice Broadcasting | | 15680me |
| 1700 | 1800 | Germany, Overcomer Ministries | 17550na | |
| 1700 | 1800 | Japan, Radio | 9535am | 11970eu |
| 1700 | 1800 | Malaysia, RTM | 7295as | 15355af |
| 1700 | 1800 | Nigeria, Voice of | 7255af | 15120af |
| 1700 | 1800 | Russia, Voice of | 7350as | 9405eu |
| 1700 | 1800 | 11510af | 11985af | 9890af |
| 1700 | 1800 | Russia, Voice of | 11675as | |
| 1700 | 1800 | Swaziland, TWR | 3200af | |
| 1700 | 1800 | Taiwan, Radio Taiwan Intl | 11550as | |
| 1700 | 1800 | UK, BBC World Service | 17830af | |
| 1700 | 1800 | UK, Sudan Radio Service | 11715va | |
| 1700 | 1800 | USA, AFRTS | 4319usb | 5765usb |
| | | 6350usb | 7507usb | 10320usb |
| | | 13362usb | | |
| 1700 | 1800 | USA, KTNB Salt Lake City UT | 15590na | |
| 1700 | 1800 | USA, KWHR Naalehu HI | 9930as | |
| 1700 | 1800 | USA, Voice of America | 6020va | 6160va |
| | | 7125va | 9640va | 9760va |
| | | 15255va | 15410af | 15880af |
| 1700 | 1800 | USA, WBCQ Kennebunk ME | 9330na | 17495na |
| 1700 | 1800 | USA, WBOH Newport NC | 5920am | |
| 1700 | 1800 | USA, WEWN Birmingham AL | 11530va | 13615va |
| | | 15685va | 15745vc | |
| 1700 | 1800 | USA, WHRA Greenbush ME | 17650na | |
| 1700 | 1800 | USA, WHRI Noblesville IN | 13670am | 15665am |
| 1700 | 1800 | USA, WINB Red Lion PA | 13570am | |
| 1700 | 1800 | USA, WJIE Louisville KY | 7490am | 13595am |
| 1700 | 1800 | USA, WMLK Bethel PA | 9465eu | |
| 1700 | 1800 | USA, WRMI Miami FL | 15725na | |
| 1700 | 1800 | USA, WTJC Newport NC | 9370na | |
| 1700 | 1800 | USA, WWCR Nashville TN | 9985na | 12160na |
| | | 13845na | 15825na | |

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|------|------|-------------------------------|---------|---------|
| 1700 | 1800 | USA, WWRB Manchester TN | 3185na | 5050na |
| 1700 | 1800 | USA, WYFR Okeechobee FL | 13695na | 17510va |
| | | 18980eu | 21455na | |
| 1700 | 1800 | Zambia, Radio Christian Voice | 4965af | |
| 1715 | 1730 | Vatican City, Vatican Radio | 4005va | 5890va |
| | | 7250va | 9645va | 15595va |
| 1730 | 1745 | UK, BBC World Service | 3390af | 7230af |
| | | 9685af | | |
| 1730 | 1745 | UK, United Nations Radio | 7170af | 9565me |
| | | 17810af | | |
| 1730 | 1800 | Bulgaria, Radio | 9500eu | 11500eu |
| 1730 | 1800 | Guam, AWR, KSDA | 9385me | |
| 1730 | 1800 | Liberia, ELWA | 4760da | |
| 1730 | 1800 | Philippines, Radio Pilipinas | 11720me | 15190me |
| | | 17720me | | |
| 1730 | 1800 | Slovakia, Slovak Radio | 5915eu | 6055eu |
| 1730 | 1800 | Swaziland, TWR | 9500af | |
| 1730 | 1800 | UK, BBC World Service | 5875eu | 6015eu |
| | | 6195eu | 7190eu | 9410eu |
| | | 15565eu | 17820eu | |
| 1730 | 1800 | USA, Voice of America | 11975af | 17895af |
| 1730 | 1800 | Vatican City, Vatican Radio | 13765af | 15570af |
| | | 17515af | | |
| 1735 | 1745 | Paraguay, Radio Nacional | 9739sa | |
| 1745 | 1800 | Bangladesh, Bangla Betar | 7185me | 9550me |
| 1745 | 1800 | India, All India Radio | 7410eu | 9445af |
| | | 11620eu | 11935af | 9950eu |
| | | 15155af | 17670af | 13605af |
| 1745 | 1800 | UK, BBC World Service | 3255af | 6190af |
| | | 15400af | 15420af | 21470af |
| 1751 | 1800 | New Zealand, Radio NZ Intl | 11980pa | |

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

| | | | | |
|------|------|-----------------------------------|---------|----------|
| 1800 | 1810 | Zanzibar, Voice of Tanzania | 11734da | |
| 1800 | 1827 | Czech Rep, Radio Prague Intl | 5930eu | 9415va |
| 1800 | 1828 | Vietnam, Voice of | 11630va | 13740vc |
| 1800 | 1830 | Egypt, Radio Cairo | 9855af | |
| 1800 | 1830 | Germany, Bible Voice Broadcasting | | 15680me |
| 1800 | 1830 | Germany, Universal Life | 15675af | |
| 1800 | 1830 | Libya, Voice of Africa | 9485af | 11635af |
| 1800 | 1830 | South Africa, AWR Africa | 3215af | 3345af |
| | | 12130af | | |
| 1800 | 1830 | UK, BBC World Service | 3255af | 5975as |
| | | 6190af | 11750as | 15420af |
| | | 21470af | | |
| 1800 | 1850 | New Zealand, Radio NZ Intl | 11980pa | |
| 1800 | 1856 | Romania, Radio Romania Intl | 11940eu | 15380eu |
| 1800 | 1857 | Netherlands, Radio | 6020af | 9895af |
| 1800 | 1859 | Canada, Radio Canada Intl | 9530af | 11770af |
| | | 13730af | 15255as | |
| 1800 | 1900 | Anguilla, Caribbean Beacon | 11775am | |
| 1800 | 1900 | Argentina, RAE | 9690eu | 15345eu |
| 1800 | 1900 | Australia, Radio | 6080pa | 7220as |
| | | 7260as | 9475as | 11880as |
| 1800 | 1900 | Australia, Voice Intl | 11685as | |
| 1800 | 1900 | Canada, CBC Northern Service | 9625do | |
| 1800 | 1900 | Canada, CFRX Toronto ON | 6070do | |
| 1800 | 1900 | Canada, CFYP Calgary AB | 6030do | |
| 1800 | 1900 | Canada, CKZN St John's NF | 6160do | |
| 1800 | 1900 | Canada, CKZU Vancouver BC | 6160do | |
| 1800 | 1900 | China, China Radio Intl | 11670vc | 11940va |
| | | 13640va | 13760va | 15150af |
| 1800 | 1900 | China, China Radio Intl | 17510vc | |
| 1800 | 1900 | Costa Rica, University Network | 11870am | 13750am |
| 1800 | 1900 | Eat Guinea, Radio Africa | 7189af | 15184af |
| 1800 | 1900 | Germany, Overcomer Ministries | 17550na | |
| 1800 | 1900 | Greece, Voice of | 7475eu | 9420eu |
| | | 17705eu | | |
| 1800 | 1900 | India, All India Radio | 7410eu | 9445af |
| | | 11620eu | 11935af | 13605af |
| | | 15155af | 17670af | 15075af |
| 1800 | 1900 | Liberia, ELWA | 4760do | |
| 1800 | 1900 | Malaysia, RTM | 7295as | |
| 1800 | 1900 | Nigeria, Voice of | 7255af | 15120af |
| 1800 | 1900 | Philippines, Radio Pilipinas | 11720me | 15190me |
| | | 17720me | | |
| 1800 | 1900 | Russia, Voice of | 9480af | 9745eu |
| | | 9890eu | 11510af | 9820eu |
| 1800 | 1900 | Sierra Leone, Radio UNAMSIL | 6137af | |
| 1800 | 1900 | Swaziland, TWR | 3200af | 9500af |
| 1800 | 1900 | Taiwan, Radio Taiwan Intl | 3965eu | |
| 1800 | 1900 | UK, BBC World Service | 17830af | |
| 1800 | 1900 | UK, BBC World Service | 6195eu | 9410eu |
| | | 12095eu | 13700eu | |
| 1800 | 1900 | USA, AFRTS | 4319usb | 5446usb |
| | | 6350usb | 7507usb | 5765usb |
| | | 10320usb | | 12133usb |
| | | 13362usb | | |
| 1800 | 1900 | USA, KJES Vado NM | 15385na | |
| 1800 | 1900 | USA, KTNB Salt Lake City UT | 15590na | |
| 1800 | 1900 | USA, Voice of America | 6040va | 9760va |
| | | 9770va | 9850af | 11975af |
| | | 15410af | | 15580af |

Shortwave Guide

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|------|------|---------------------------------|---------|-----------------|
| 1800 | 1900 | 17895af | | |
| 1800 | 1900 | USA, WBCQ Kennebunk ME | 9320na | 17495na |
| 1800 | 1900 | USA, WBOH Newport NC | 5920am | |
| 1800 | 1900 | USA, WEWN Birmingham AL | 11530va | 13615va |
| | | 15685va | 15745va | |
| 1800 | 1900 | USA, WHRA Greenbush ME | 17650na | |
| 1800 | 1900 | USA, WHRI Noblesville IN | 13760am | 15665am |
| 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, WTJC Newport NC | 9370na | |
| 1800 | 1900 | USA, WWCR Nashville TN | 9985na | 12160na |
| | | 13845na | 15825na | |
| 1800 | 1900 | USA, WWRB Manchester TN | 3185na | 5050na |
| 1800 | 1900 | USA, WYFR Okeechobee FL | 13695na | 15115na |
| | | 18980eu | | |
| 1800 | 1900 | Yemen, Rep of Yemen Radio | 9780me | |
| 1800 | 1900 | Zambia, Radio Christian Voice | 4965af | |
| 1815 | 1900 | Bangladesh, Bangla Betar | 7185eu | 9550eu |
| | | 15520eu | | |
| 1830 | 1845 | Israel, Kol Israel | 11605na | 17535va |
| 1830 | 1845 | UK, BBC World Service | 6050eu | 6130eu |
| | | 7105eu | | |
| 1830 | 1900 | Belgium, Radio Vlaanderen Intl | 7490eu | 5910eu |
| 1830 | 1900 | Serbia & Montenegro, Intl Radio | 6100eu | |
| 1830 | 1900 | South Africa, AWR Africa | 12130af | |
| 1830 | 1900 | Sweden, Radio | 6065va | |
| 1830 | 1900 | UK, BBC World Service | 3255af | 5975as |
| | | 6005af 6190af | 9630af | 15400af 15420af |
| | | 21470af | | |
| 1845 | 1900 | Congo, RTV Congolaise | 4765af | 5985af |
| 1851 | 1900 | New Zealand, Radio NZ Intl | 15265pa | |

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

| | | | | |
|------|------|----------------------------------|---------|-----------------|
| 1900 | 1915 | Congo, RTV Congolaise | 4765af | 5985af |
| 1900 | 1925 | Israel, Kol Israel | 11605eu | 15615af |
| 1900 | 1928 | Vietnam, Voice of | 11630va | 13740va |
| 1900 | 1930 | Germany, Universal Life | 13820me | |
| 1900 | 1930 | Libya, Voice of Africa | 11635af | 11715af |
| 1900 | 1930 | Philippines, Radio Pilipinas | 11720me | 15190me |
| | | 17720me | | |
| 1900 | 1945 | India, All India Radio | 7410eu | 9445af 9950eu |
| | | 11620eu | 11935af | 13605af 13620af |
| | | 15075af | 15115af | 17670af |
| 1900 | 1945 | USA, WYFR Okeechobee FL | 6085af | 13695na |
| | | 15565va | 18980eu | |
| 1900 | 1959 | Germany, Deutsche Welle | 6180af | 11865af |
| | | 13780af | 17800af | |
| 1900 | 2000 | Anguilla, Caribbean Beacon | 11775am | |
| 1900 | 2000 | Australia, Radio | 6080pa | 7220as |
| | | 9500as 11650as | 11880as | |
| 1900 | 2000 | Australia, Voice Intl | 11685as | |
| 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 | Canada, Radio Canada Intl | 17765am | |
| 1900 | 2000 | China, China Radio Intl | 7145af | 9430af |
| | | 9585af 11940af | 13760va | |
| 1900 | 2000 | China, China Radio Intl | 12080va | |
| 1900 | 2000 | Costa Rica, University Network | 11870am | 13750am |
| 1900 | 2000 | Eq Guinea, Radio Africa | 7189af | 15184af |
| 1900 | 2000 | Ghana, Ghana BC Corp | 3366do | 4915do |
| 1900 | 2000 | Italy, IRRS5755va | | |
| 1900 | 2000 | Liberia, ELWA | 4760do | |
| 1900 | 2000 | Malaysia, RTM | 7295as | |
| 1900 | 2000 | Namibia, Namibian BC Corp | 3270af | 3290af |
| | | 6060af | | |
| 1900 | 2000 | Netherlands, Radio | 7120af | 9895af 11655af |
| | | 17810af | | |
| 1900 | 2000 | Netherlands, Radio | 15315na | 17725na 17875na |
| 1900 | 2000 | New Zealand, Radio NZ Intl | 15265pa | |
| 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 | 15120af |
| 1900 | 2000 | North Korea, Voice of | 4405eu | 11535me |
| | | 13760eu | 15245eu | |
| 1900 | 2000 | Papua New Guinea, Catholic Radio | | 4960va |
| 1900 | 2000 | Russia, Voice of | 7310eu | 9890eu |
| 1900 | 2000 | Sierra Leone, Radio UNAMSIL | 6137af | |
| 1900 | 2000 | Sierra Leone, SLBS | 3316do | |
| 1900 | 2000 | Solomon Islands, SIBC | 5020do | 9545do |
| 1900 | 2000 | South Africa, Channel Africa | 3345af | |
| 1900 | 2000 | South Korea, Radio Korea Intl | 5975va | 7275eu |
| 1900 | 2000 | Sri Lanka, SLBC | 6010eu | |

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|------|------|--------------------------------|---------|-----------------|
| 1900 | 2000 | Swaziland, TWR | 3200af | |
| 1900 | 2000 | Thailand, Radio | 7155eu | |
| 1900 | 2000 | Uganda, Radio | 4976da | 5026do 7196do |
| 1900 | 2000 | UK, BBC World Service | | 17830af |
| 1900 | 2000 | UK, BBC World Service | | 3255af 5975as |
| | | 6005af 6190af | 6195eu | 9410eu 9630af |
| | | 12095af | 13700eu | 15400af |
| 1900 | 2000 | USA, AFRTS | 4319usb | 5446usb 5765usb |
| | | 6350usb | 7507usb | 10320usb |
| | | 13362usb | | |
| 1900 | 2000 | USA, KAIJ Dallas TX | 13815va | |
| 1900 | 2000 | USA, KTBN Salt Lake City UT | | 15590na |
| 1900 | 2000 | USA, Voice of America | | 4950af 6040va |
| | | 9760va 9770af | 9850af | 11975af 13670af |
| | | 15410va | 15445af | 15580af 17895af |
| 1900 | 2000 | USA, Voice of America | | 5965va 9840va |
| | | 11720va | 11970va | 13725va 15205va |
| 1900 | 2000 | USA, WBCQ Kennebunk ME | | 7415na 9330na |
| | | 17495na | | |
| 1900 | 2000 | USA, WBOH Newport NC | | 5920am |
| 1900 | 2000 | USA, WEWN Birmingham AL | | 11530va 13615va |
| | | 15685va | 15745va | |
| 1900 | 2000 | USA, WHRA Greenbush ME | | 17650na |
| 1900 | 2000 | USA, WHRI Noblesville IN | | 13760am 15665am |
| 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, WTJC Newport NC | | 9370na |
| 1900 | 2000 | USA, WWCR Nashville TN | | 9985na 12160na |
| | | 13845na | 15825na | |
| 1900 | 2000 | USA, WYFR Okeechobee FL | | 15115na 17510va |
| | | 17535na | | |
| 1900 | 2000 | Vanuatu, Radio | 4960do | 7260do |
| 1900 | 2000 | Zambia, Radio Christian Voice | | 4965af 4965af |
| 1900 | 2000 | Zimbabwe, ZBC Corp | | 5975do |
| 1915 | 1925 | Rwanda, Radio | 6005do | |
| 1915 | 1930 | UK, BBC World Service | | 15105af 17885af |
| 1930 | 2000 | Germany, AWR | 15175eu | |
| 1930 | 2000 | Iran, Voice of the Islamic Rep | | 9800af 11750eu |
| 1930 | 2000 | Papua New Guinea, NBC | | 4890do |
| 1930 | 2000 | Slovakia, Slovak Radio | | 5915eu 7345eu |
| 1930 | 2000 | Turkey, Voice of | 6055eu | |
| 1930 | 2000 | USA, Voice of America | | 7260me 9680me |
| | | 13635me | | |
| 1935 | 1955 | Italy, RAI Intl | 6035eu | 9760eu |
| 1945 | 2000 | Albania, Radio Tirana | | 6115eu 7210eu |
| 1945 | 2000 | Armenia, Voice of | 4810eu | 9960eu |

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

| | | | | |
|------|------|----------------------------------|---------|-----------------|
| 2000 | 2020 | Turkey, Voice of | 6055eu | |
| 2000 | 2027 | Iran, Voice of the Islamic Rep | | 9800af 11750eu |
| 2000 | 2028 | Hungary, Radio Budapest | | 3975eu 6025eu |
| 2000 | 2030 | Germany, Universal Life | | 5775va |
| 2000 | 2030 | Italy, IRRS | 5775va | |
| 2000 | 2030 | Libya, Voice of Africa | 11635af | 11715af |
| 2000 | 2030 | Mongolia, Voice of | 12015eu | |
| 2000 | 2030 | Papua New Guinea, Catholic Radio | | 4960va |
| 2000 | 2030 | Swaziland, TWR | 3200af | |
| 2000 | 2030 | USA, Voice of America | | 4950af 6040va |
| | | 6095va | 9760va | 9750af 9850af |
| | | 11855af | 11975af | 13670af 15410af |
| | | 15445af | 17745af | |
| 2000 | 2030 | Vatican City, Vatican Radio | | 9660eu 11625eu |
| | | 13765eu | | |
| 2000 | 2030 | Vietnam, Voice of | 7220as | 9550as |
| 2000 | 2057 | Netherlands, Radio | 7120af | 9895af 11655af |
| | | 17810af | | |
| 2000 | 2059 | Canada, Radio Canada Intl | | 5850eu 7235eu |
| | | 11690af | 13700eu | 17870eu |
| 2000 | 2059 | Germany, Deutsche Welle | | 12025af 13780af |
| | | 15205af | 15410af | |
| 2000 | 2059 | Spain, Radio Exterior Espana | | 9570va 15290va |
| 2000 | 2100 | Anguilla, Caribbean Beacon | | 11775am |
| 2000 | 2100 | Australia, ABC NT Alice Springs | | 2310do 4835irr |
| 2000 | 2100 | Australia, ABC NT Katherine | | 2485do |
| 2000 | 2100 | Australia, ABC NT Tennant Creek | | 2325do |
| 2000 | 2100 | Australia, Radio | 6080pa | 7220os 9500as |
| | | 11650as | 11880as | |
| 2000 | 2100 | Australia, Voice Intl | 11685as | |
| 2000 | 2100 | Canada, CBC Northern Service | | 9625do |
| 2000 | 2100 | Canada, CFRX Toronto ON | | 6070do |
| 2000 | 2100 | Canada, CFVP Calgary AB | | 6030do |
| 2000 | 2100 | Canada, CKZN St John's NF | | 6160do |
| 2000 | 2100 | Canada, CKZU Vancouver BC | | 6160do |
| 2000 | 2100 | Canada, Radio Canada Intl | | 17765am |
| 2000 | 2100 | China, China Radio Intl | | 7145eu 9440eu |
| | | 9600eu | 11640vo | 11940af 13630af |
| | | 13760af | | |

Shortwave Guide



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|------|------|--------|---------------------------------|----------|----------|------|------|---------------------------------|---------------|----------|
| 2000 | 2100 | DRM | China, China Radio Intl | 12080va | | 2100 | 2145 | USA, WYFR Okeechobee FL | 17510va | 17535na |
| 2000 | 2100 | | Costa Rica, University Network | 13750am | | 2100 | 2157 | Czech Rep, Radio Prague Intl | 5930eu | 9430va |
| 2000 | 2100 | | Eat Guinea, Radio Africa | 7189af | 15184af | 2100 | 2157 | Netherlands, Radio 15150eu | | |
| 2000 | 2100 | vl | Ghana, Ghana BC Corp | 3366da | 4915do | 2100 | 2159 | Canada, Radio Canada Intl | 9800na | |
| 2000 | 2100 | | Indonesia, Voice of 9525as | 11785as | 15150al | 2100 | 2159 | Germany, Deutsche Welle | 9615af | 13780af |
| 2000 | 2100 | | Liberia, ELWA 4760do | | | | | 15410af | | |
| 2000 | 2100 | | Malaysia, RTM 7295as | | | 2100 | 2159 | Spain, Radio Exterior Espana | 9570eu | 9640eu |
| 2000 | 2100 | | Namibia, Namibian BC Corp | 3270af | 3290af | 2100 | 2200 | Anguilla, Caribbean Beacon | 11775am | |
| | | | 6060af | | | 2100 | 2200 | Australia, ABC NT Alice Springs | 2310da | 4835irr |
| 2000 | 2100 | | New Zealand, Radio NZ Intl | 15265pa | | 2100 | 2200 | Austria, AWR Eurape | 15130af | |
| 2000 | 2100 | | Nigeria, Radio/Enugu | 6025do | | 2100 | 2200 | Bulgaria, Radio 5800eu | 7500eu | |
| 2000 | 2100 | | Nigeria, Radio/Ibadan | 6050do | | 2100 | 2200 | Canada, CBC Northern Service | 9625da | |
| 2000 | 2100 | | Nigeria, Radio/Kaduna | 4770do | 6090do | 2100 | 2200 | Canada, CIBX Toronto ON | 6070do | |
| 2000 | 2100 | | Nigeria, Radio/Lagos | 3326do | 4990da | 2100 | 2200 | Canada, CFPV Calgary AB | 6030da | |
| 2000 | 2100 | | Nigeria, Voice of 7255af | 15120al | | 2100 | 2200 | Canada, CKZN St John's NF | 6160da | |
| 2000 | 2100 | | Papua New Guinea, NBC | 4890do | | 2100 | 2200 | Canada, CKZU Vancouver BC | 6160da | |
| 2000 | 2100 | | Russia, Voice of 7310eu | 11980eu | | 2100 | 2200 | Costa Rica, University Network | 13750am | |
| 2000 | 2100 | | Sierra Leone, Radio UNAMSIL | 6137af | | 2100 | 2200 | Egypt, Radio Cairo 15375af | | |
| 2000 | 2100 | vl | Sierra Leone, SLBS 3316do | | | 2100 | 2200 | Eat Guinea, Radio Africa | 7189af | 15184af |
| 2000 | 2100 | vl | Solomon Islands, SIBC | 5020do | 9545do | 2100 | 2200 | Ghana, Ghana BC Corp | 3366do | 4915do |
| 2000 | 2100 | | South Africa, AWR Africa | 7170af | | 2100 | 2200 | Guyana, Voice of 3290do | 5950do | |
| 2000 | 2100 | vl | Uganda, Radio 4976do | 5026do | 7196do | 2100 | 2200 | India, All India Radio 7410eu | 9445eu | 9910au |
| 2000 | 2100 | mtwhf | UK, BBC World Service | 17830af | | 2100 | 2200 | India, All India Radio 7410eu | 9950au | 11620eu |
| 2000 | 2100 | | UK, BBC World Service | 3255af | 6005af | 2100 | 2200 | Japan, Radio 6035pa | 6055eu | 6180eu |
| | | | 6190af 6195eu 9410eu | 9630af | 12095af | | | 11855af 17825pa | 21670pa | |
| | | | 15400af | | | 2100 | 2200 | Liberia, ELWA 4760do | | |
| 2000 | 2100 | | USA, AFRTS 4319usb | 5446usb | 5765usb | 2100 | 2200 | Malaysia, RTM 7295as | | |
| | | | 6350usb 7507usb | 10320usb | 12133usb | 2100 | 2200 | Namibia, Namibian BC Corp | 3270af | 3290af |
| | | | 13362usb | | | | | 6060af | | |
| 2000 | 2100 | | USA, KAIJ Dallas TX 13815va | | | 2100 | 2200 | New Zealand, Radio NZ Intl | 15265pa | |
| 2000 | 2100 | | USA, KTBN Salt Lake City UT | 15590na | | 2100 | 2200 | Nigeria, Radio/Enugu | 6025do | |
| 2000 | 2100 | | USA, KWHR Naalehu HI | 11565as | | 2100 | 2200 | Nigeria, Radio/Ibadan | 6050do | |
| 2000 | 2100 | | USA, WBCQ Kennebunk ME | 7415na | 9330na | 2100 | 2200 | Nigeria, Radio/Kaduna | 4770do | 6090do |
| | | | 17495na | | | 2100 | 2200 | Nigeria, Radio/Lagos | 3326do | 4990do |
| 2000 | 2100 | | USA, WBOH Newport NC | 5920am | | 2100 | 2200 | North Korea, Voice of | 4405eu | 13760eu |
| 2000 | 2100 | | USA, WEWN Birmingham AL | 11530va | 13615va | | | 15245eu | | |
| | | | 15745va 17595va | | | 2100 | 2200 | Papua New Guinea, NBC | 4890do | |
| 2000 | 2100 | | USA, WHRA Greenbush ME | 17650na | | 2100 | 2200 | Sierra Leone, Radio UNAMSIL | 6137af | |
| 2000 | 2100 | | USA, WHRI Nablesville IN | 13760am | 15665am | 2100 | 2200 | Sierra Leone, SLBS 3316do | | |
| 2000 | 2100 | | USA, WINB Red Lion PA | 13570am | | 2100 | 2200 | South Africa, Channel Africa | 3345af | |
| 2000 | 2100 | | USA, WJIE Louisville KY | 7490am | 13595am | 2100 | 2200 | Syria, Radio Damascus | 12085eu | 13610eu |
| 2000 | 2100 | | USA, WMLK Bethel PA | 9465eu | | 2100 | 2200 | UK, BBC World Service | 3255af | 3915as |
| 2000 | 2100 | | USA, WRMI Miami FL | 15725na | | 2100 | 2200 | UK, BBC World Service | 5965as 5975ca | 6005af |
| 2000 | 2100 | | USA, WTJC Newport NC | 9370na | | | | 6195va 9410eu | 6110as | 6190af |
| 2000 | 2100 | | USA, WWCN Nashville TN | 9985na | 12160na | | | 15400af | 9605af | 12095ca |
| | | | 13845na 15825na | | | 2100 | 2200 | USA, AFRTS 4319usb | 5446usb | 5765usb |
| 2000 | 2100 | | USA, WWRB Manchester TN | 3185na | 505cna | | | 6350usb 7507usb | 10320usb | 12133usb |
| 2000 | 2100 | | USA, WYFR Okeechobee FL | 7580na | 15115na | | | 13362usb | | |
| | | | 17535na 17535va | | | 2100 | 2200 | USA, KAIJ Dallas TX 13815va | | |
| 2000 | 2100 | vl | Vanuatu, Radio 4960dc | 7260do | | 2100 | 2200 | USA, KTBN Salt Lake City UT | 15590na | |
| 2000 | 2100 | | Zambia, Radio Christian Voice | 4965af | | 2100 | 2200 | USA, KWHR Naalehu HI | 11565as | |
| 2000 | 2100 | vl | Zimbabwe, ZBC Corp | 5975do | | 2100 | 2200 | USA, Voice of America | 11835af | 11975af |
| 2004 | 2100 | | USA, WYFR Okeechobee FL | 5820na | | | | 13670af 15410af | 15445af | |
| 2005 | 2100 | | Syria, Radio Damascus | 12085eu | 13610eu | 2100 | 2200 | USA, WBCQ Kennebunk ME | 5105na | 7415na |
| 2025 | 2045 | | Italy, RAI Intl 6040af | 11880af | | | | 9330na 17495na | | |
| 2030 | 2045 | | Thailand, Radio 9680eu | | | 2100 | 2200 | USA, WBOH Newport NC | 5920am | |
| 2030 | 2058 | | Vietnam, Voice of 9725va | 11630va | 11775va | 2100 | 2200 | USA, WEWN Birmingham AL | 11530va | 13615va |
| | | | 13740va | | | | | 15745va 17595va | | |
| 2030 | 2100 | | Belgium, Radio Vlaanderen Intl | 7490eu | | 2100 | 2200 | USA, WHRA Greenbush ME | 17650na | |
| 2030 | 2100 | | Cuba, Radio Havana | 9505ca | 11760na | 2100 | 2200 | USA, WHRI Nablesville IN | 13770am | 15665am |
| 2030 | 2100 | | Egypt, Radio Cairo 15375af | | | 2100 | 2200 | USA, WINB Red Lion PA | 13570am | |
| 2030 | 2100 | vl | Libya, Voice of Africa 11635af | | | 2100 | 2200 | USA, WJIE Louisville KY | 7490am | 13595am |
| 2030 | 2100 | | Sweden, Radio 6065va | 7240va | | 2100 | 2200 | USA, WMLK Bethel PA | 9465eu | |
| 2030 | 2100 | as | USA, Voice of America | 4950af | 9850af | 2100 | 2200 | USA, WRMI Miami FL | 15725na | |
| | | | 11975af 13670af | 15410af | 15445af | 2100 | 2200 | USA, WTJC Newport NC | 9370na | |
| | | | 17745af | | | 2100 | 2200 | USA, WWCN Nashville TN | 9985na | 12160na |
| 2030 | 2100 | | USA, Voice of America | 11835as | | | | 13845na | | |
| 2030 | 2100 | | Uzbekistan, Radio Tashkent Intl | 5025eu | 9545eu | 2100 | 2200 | USA, WWRB Manchester TN | 3185na | 5050na |
| | | | 11905eu | | | 2100 | 2200 | USA, WYFR Okeechobee FL | 5820na | 7580na |
| 2040 | 2100 | mtwhfa | Armenia, Voice of 4810eu | 9960eu | | | | 17575va | | |
| 2040 | 2100 | | Vatican City, Vatican Radio | 6185eu | | 2100 | 2200 | Vanuatu, Radio 4960do | 7260do | |
| 2045 | 2100 | | India, All India Radio 7410eu | 9445eu | 9910au | 2100 | 2200 | Zambia, Radio Christian Voice | 4965af | |
| | | | 9950au 11620eu | 11715au | | 2100 | 2200 | Zimbabwe, ZBC Corp | 5975do | |
| 2050 | 2100 | | Vatican City, Vatican Radio | 4005eu | 5890eu | 2104 | 2200 | USA, WYFR Okeechobee FL | 15565va | |
| | | | 7250eu | | | 2115 | 2130 | UK, BBC World Service | 11675ca | 15390ca |
| 2055 | 2100 | DRM | Vatican City, Vatican Radio | 9800eu | | 2115 | 2200 | Egypt, Radio Cairo 9990eu | | |
| | | | | | | 2130 | 2145 | UK, BBC World Service | 11680ca | |
| | | | | | | 2130 | 2156 | Romania, Radio Romania Intl | 7285eu | 9725eu |
| | | | | | | | | 11750eu 15285eu | | |
| | | | | | | 2130 | 2200 | Australia, ABC NT Katherine | 5025do | |
| | | | | | | 2130 | 2200 | Australia, ABC NT Tennant Creek | 4910do | |
| | | | | | | 2130 | 2200 | Australia, Radio 9660pa | 11650as | 11880va |
| | | | | | | | | 12080va 17715pa | 17585pa | 21740as |
| | | | | | | 2130 | 2200 | Guam, AWR/KSDA 11850as | 11980as | |
| | | | | | | 2130 | 2200 | Turkey, Voice of 9525as | | |
| | | | | | | 2130 | 2200 | f UK, Wales Radio Intl 3955eu | 7110eu | |
| | | | | | | 2130 | 2200 | Uzbekistan, Radio Tashkent Intl | 5025eu | 9545eu |
| | | | | | | | | 11905eu | | |

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

| | | | | | | | | | | |
|------|------|-----|---------------------------------|---------|---------|------|------|---------------------------------|---------|---------|
| 2100 | 2115 | DRM | China, China Radio Intl | 12080va | | 2130 | 2200 | Australia, ABC NT Katherine | 5025do | |
| 2100 | 2130 | | Australia, ABC NT Katherine | 2485do | | 2130 | 2200 | Australia, ABC NT Tennant Creek | 4910do | |
| 2100 | 2130 | | Australia, ABC NT Tennant Creek | 2325do | | 2130 | 2200 | Australia, Radio 9660pa | 11650as | 11880va |
| 2100 | 2130 | | Australia, Radio 7220as | 9500as | 9660pa | | | 12080va 17715pa | 17585pa | 21740as |
| | | | 11650as 11880as | 17715pa | 21740as | 2130 | 2200 | Guam, AWR/KSDA 11850as | 11980as | |
| 2100 | 2130 | | China, China Radio Intl | 11640af | 13630af | 2130 | 2200 | Turkey, Voice of 9525as | | |
| 2100 | 2130 | | Cuba, Radio Havana | 9505ca | 11760na | 2130 | 2200 | f UK, Wales Radio Intl 3955eu | 7110eu | |
| 2100 | 2130 | vl | Libya, Voice of Africa 11635af | | | 2130 | 2200 | Uzbekistan, Radio Tashkent Intl | 5025eu | 9545eu |
| 2100 | 2130 | | Serbia & Montenegro, Intl Radio | 6100eu | | | | | | |
| 2100 | 2130 | | South Korea, Radio Korea Intl | 3955eu | | | | | | |
| 2100 | 2130 | DRM | Vatican City, Vatican Radio | 9800eu | | | | | | |

Shortwave Guide

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

| | | | | | | |
|------|------|--------|--|---------|---------|----------|
| 2200 | 2205 | | Syria, Radio Damascus | 12085eu | 13610eu | |
| 2200 | 2220 | | Turkey, Voice of 9525as | | | |
| 2200 | 2228 | | Hungary, Radio Budapest | 6025eu | 12010af | |
| 2200 | 2229 | | Canada, Radio Canada Intl 15170am | 5960am | 13785am | |
| 2200 | 2230 | mt hfa | Belarus, Radio 7105eu | 7210eu | | |
| 2200 | 2230 | | Belgium, Radio Vlaanderen Intl | 11730na | | |
| 2200 | 2230 | | India, All India Radio 7410eu 9950au | 9445eu | 9910au | |
| 2200 | 2230 | | Liberia, ELWA 4760do | | | |
| 2200 | 2230 | smtwhf | Serbia & Montenegro, Intl Radio | 7230pa | | |
| 2200 | 2230 | | USA, Voice of America | 11835af | | |
| 2200 | 2239 | | New Zealand, Radio NZ Intl | 15265pa | | |
| 2200 | 2245 | | Egypt, Radio Cairo 9990eu | | | |
| 2200 | 2245 | | USA, WYFR Okeechobee FL | 21525na | | |
| 2200 | 2257 | DRM | Netherlands, Radio 15525na | | | |
| 2200 | 2259 | | Germany, Deutsche Welle | 6180as | 6225as | |
| 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 11880va 17715pa | 13620pa | 15320pa | |
| 2200 | 2300 | | Canada, CBC Northern Service | 9625do | | |
| 2200 | 2300 | | Canada, CFRX Toronto ON | 6070do | | |
| 2200 | 2300 | | Canada, CFVP Calgary AB | 6030do | | |
| 2200 | 2300 | | Canada, CKZN St John's NF | 6160do | | |
| 2200 | 2300 | | Canada, CKZU Vancouver BC | 6160do | | |
| 2200 | 2300 | | China, China Radio Intl | 9880eu | | |
| 2200 | 2300 | | Costa Rica, University Network | 13750am | | |
| 2200 | 2300 | | Eq Guinea, Radio Africa | 7189af | 15184af | |
| 2200 | 2300 | | Germany, Bible Voice Broadcasting | | 5925me | |
| 2200 | 2300 | vi | Ghana, Ghana BC Corp | 3366do | 4915do | |
| 2200 | 2300 | | Guyana, Voice of 3290do | | | |
| 2200 | 2300 | | Malaysia, RTM 7295as | | | |
| 2200 | 2300 | | Namibia, Namibian BC Corp 6060af | 3270af | 3290af | |
| 2200 | 2300 | | Nigeria, Radio/Enugu | 6025do | | |
| 2200 | 2300 | | Nigeria, Radio/Ibadan | 6050do | | |
| 2200 | 2300 | | Nigeria, Radio/Kaduna | 4770do | 6090do | |
| 2200 | 2300 | | Nigeria, Radio/Lagos3326do | 4990do | | |
| 2200 | 2300 | | Papua New Guinea, NBC | 4890do | | |
| 2200 | 2300 | vi | Sierra Leone, Radio UNAMSIL | 6137af | | |
| 2200 | 2300 | vi | Sierra Leone, SLBS 3316do | | | |
| 2200 | 2300 | | Solomon Islands, SIBC | 5020do | 9545do | |
| 2200 | 2300 | | Taiwan, Radio Taiwan Intl | 15600eu | | |
| 2200 | 2300 | | UK, BBC World Service 7105as9605af 9740as | 5965as | 6195va | 12095ca |
| 2200 | 2300 | | Ukraine, Radio Ukraine Intl | 5840eu | | |
| 2200 | 2300 | | USA, AFRTS 4319usb 6350usb 7507usb | 5446usb | 5765usb | 12133usb |
| 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 15290va 15305va | 7215va | 15185va | 17820va |
| 2200 | 2300 | | USA, WBCQ Kennebunk ME 9330na 17495na | 5105na | 7415na | |
| 2200 | 2300 | | USA, WBOH Newport NC | 5920am | | |
| 2200 | 2300 | | USA, WEWN Birmingham AL 13615na 15745na | 9355na | 9975af | |
| 2200 | 2300 | | USA, WHRA Greenbush ME | 17650na | | |
| 2200 | 2300 | | USA, WHRI Noblesville IN | 9495am | 13770am | |
| 2200 | 2300 | | USA, WINB Red Lion PA | 13570am | | |
| 2200 | 2300 | | USA, WJIE Louisville KY | 7490am | 13595am | |
| 2200 | 2300 | | USA, WMLK Bethel PA | 15265eu | | |
| 2200 | 2300 | mtwhf | USA, WRMI Miami FL | 6870na | 15725na | |
| 2200 | 2300 | as | USA, WRMI Miami FL | 9955am | | |
| 2200 | 2300 | | USA, WTJC Newport NC | 9370na | | |
| 2200 | 2300 | | USA, WWCR Nashville TN 9985na 13845na | 5070na | 7465na | |
| 2200 | 2300 | | USA, WWRB Manchester TN 6890na | 3185na | 5050na | |
| 2200 | 2300 | | USA, WYFR Okeechobee FL | 9690na | 11740va | |
| 2200 | 2300 | vi | Vanuatu, Radio 4960do | 7260do | | |
| 2200 | 2300 | | Zambia, Radio Christian Voice | 4965af | | |
| 2205 | 2230 | | Italy, RAI Intl 11895as | | | |
| 2229 | 2259 | | Canada, Radio Canada Intl 12035as | 9525as | 11810as | |
| 2230 | 2257 | mtwhfo | Czech Rep, Radio Prague Intl | 5930na | 7345af | |
| 2230 | 2300 | | Albania, Radio Tirana | 7130eu | | |
| 2230 | 2300 | | Australia, HCJB 15525va | | | |
| 2230 | 2300 | | Sweden, Radio 6065va | | | |
| 2230 | 2300 | | USA, Voice of America | 11935as | | |
| 2240 | 2300 | | New Zealand, Radio NZ Intl | 17675pa | | |
| 2245 | 2300 | | India, All India Radio 9705as 11645as 13605as | 9950as | 11620as | |

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

| | | | | | | |
|------|------|-----|--|---------|---------|----------|
| 2300 | 0000 | | Anguilla, Caribbean Beacon | 6090am | | |
| 2300 | 0000 | | Australia, ABC NT Alice Springs | 2310do | 4835irr | |
| 2300 | 0000 | | Australia, ABC NT Katherine | 5025do | | |
| 2300 | 0000 | | Australia, ABC NT Tennant Creek | 4910do | | |
| 2300 | 0000 | as | Australia, HCJB 15525va | | | |
| 2300 | 0000 | | Australia, Radio 9660pa 15320as 17585pa | 12080va | 13620as | 17715pa |
| 2300 | 0000 | | 17795as 21740as | | | |
| 2300 | 0000 | | Bulgaria, Radio 9700na | 11700na | | |
| 2300 | 0000 | | Canada, CBC Northern Service | 9625do | | |
| 2300 | 0000 | | Canada, CFRX Toronto ON | 6070do | | |
| 2300 | 0000 | | Canada, CFVP Calgary AB | 6030do | | |
| 2300 | 0000 | | Canada, CKZN St John's NF | 6160do | | |
| 2300 | 0000 | | Canada, CKZU Vancouver BC | 6160do | | |
| 2300 | 0000 | | China, China Radio Intl 13680ca | 5990na | 6145am | |
| 2300 | 0000 | | Costa Rica, University Network | 13750am | | |
| 2300 | 0000 | | Egypt, Radio Cairo 11725na | | | |
| 2300 | 0000 | | Germany, Bible Voice Broadcasting | | 5925me | |
| 2300 | 0000 | vi | Ghana, Ghana BC Corp | 3366do | 4915do | |
| 2300 | 0000 | | Guyana, Voice of 3290do | | | |
| 2300 | 0000 | | India, All India Radio 9705as 11645as 13605as | 9950as | 11620as | |
| 2300 | 0000 | | Malaysia, RTM 7295as | | | |
| 2300 | 0000 | | Namibia, Namibian BC Corp 6060af | 3270af | 3290af | |
| 2300 | 0000 | | New Zealand, Radio NZ Intl | 17675pa | | |
| 2300 | 0000 | | Papua New Guinea, NBC | 4890do | | |
| 2300 | 0000 | | Sierra Leone, Radio UNAMSIL | 6137af | | |
| 2300 | 0000 | vi | Sierra Leone, SLBS 3316do | | | |
| 2300 | 0000 | | Singapore, MediCorp Radio | 6150do | | |
| 2300 | 0000 | vi | Solomon Islands, SIBC | 5020do | 9545do | |
| 2300 | 0000 | | UK, BBC World Service 12095ca | 5975ca | 6195eu | |
| 2300 | 0000 | | USA, AFRTS 4319usb 6350usb 7507usb | 5446usb | 5765usb | 12133usb |
| 2300 | 0000 | | 13362usb | | | |
| 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 | 9725as | 11965as | |
| 2300 | 0000 | | 12055as 13755as | 15145as | | |
| 2300 | 0000 | | USA, WBCQ Kennebunk ME 9330na | 5105na | 7415na | |
| 2300 | 0000 | | USA, WBOH Newport NC | 5920am | | |
| 2300 | 0000 | | USA, WEWN Birmingham AL 13615na 15745na | 9355na | 9975af | |
| 2300 | 0000 | | USA, WHRA Greenbush ME | 7580va | | |
| 2300 | 0000 | | USA, WHRI Noblesville IN | 9495am | 13770am | |
| 2300 | 0000 | | USA, WINB Red Lion PA | 9320am | | |
| 2300 | 0000 | | USA, WJIE Louisville KY | 7490am | 13595am | |
| 2300 | 0000 | | USA, WTJC Newport NC | 9370na | | |
| 2300 | 0000 | | USA, WWCR Nashville TN 7465na 13815na | 3210na | 5070na | |
| 2300 | 0000 | | USA, WWRB Manchester TN 6890na | 3185na | 5050na | |
| 2300 | 0000 | | USA, WYFR Okeechobee FL 15170va 15400va | 5985na | 11855na | |
| 2300 | 0000 | vi | Vanuatu, Radio 4960do | 7260do | | |
| 2300 | 0000 | | Zambia, Radio Christian Voice | 4965af | | |
| 2300 | 2306 | | Nigeria, Radio/Lagos3326do | | | |
| 2300 | 2315 | | Cuba, Radio Havana 9550ca | | | |
| 2300 | 2330 | vi | Croatia, Croatian Radio | 7285sa | | |
| 2300 | 2330 | | Germany, Deutsche Welle | 9800na | | |
| 2300 | 2330 | | UK, BBC World Service | 3915as | 5965as | |
| 2300 | 2330 | | 6195as9740as 11945as | 11955as | 15280as | |
| 2300 | 2330 | | USA, Voice of America | 11935as | | |
| 2300 | 2345 | | USA, WYFR Okeechobee FL | 11740va | | |
| 2300 | 2350 | | Turkey, Voice of 7275va | | | |
| 2300 | 2356 | | Romania, Radio Romania Intl 9645au 11940au | 7280au | 9590au | |
| 2300 | 2359 | | Canada, Radio Canada Intl | 5960am | 13785am | |
| 2300 | 2359 | | Germany, Deutsche Welle 12035as | 7250as | 9815as | |
| 2305 | 2330 | | Austria, Radio Austria Intl | 9870sa | | |
| 2330 | 0000 | | Lithuania, Radio Vilnius | 9875na | | |
| 2330 | 0000 | | UK, BBC World Service | 3915as | 5965as | |
| 2330 | 0000 | | 6170as6195as 9740as | 11945as | 11955as | |
| 2330 | 0000 | | 15280as | | | |
| 2330 | 0000 | | USA, Voice of America | 7225as | 7260as | |
| 2330 | 0000 | | 11805as 11965as | 11995as | 12055as | |
| 2330 | 0000 | | 13725as 15145as | 15205as | | |
| 2330 | 2357 | | Czech Rep, Radio Prague Intl | 5930na | 7345na | |
| 2330 | 2358 | | Vietnam, Voice of 9840as | | | |
| 2330 | 2359 | DRM | Sweden, Radio 9800va | | | |
| 2335 | 0000 | cs | Austria, Radio Austria Intl | 9870sa | | |

Headnotes:

1. Reception of **Deutsche Welle's** 0400, 0500, 0600, 1600, 1900, 2000 and 2100 broadcasts have proven generally reliable for at least some North American listeners, so we list the programs available at these times. Consult the frequency section of the SWG for channels to try. An enhanced antenna suitable to your receiver will help in some cases.
2. **Listings for US-based independent shortwave broadcasters are limited to general interest programming** that departs from their largely primary formats of religious and political fare.
3. **BBCWS stream abbreviations:** (am)=Americas; (eas)=East Asia; (eaf)=East Africa; (me)=Middle East; (waf)=West Africa. During the hours when the (am) stream is unavailable, we've identified the streams and frequencies that may provide acceptable reception for some North American listeners. As with reception of **DW**, an enhanced antenna will often help.
4. It was still unclear in late October as to what specific changes **Radio Sweden** was to make to its program line-up. Its printed schedule arriving just prior to the fall/winter season promises "new segments that explore history, geography, sci-tech, sport, personalities and the intricacies of Swedish cooking."
5. While every effort is made to ensure maximum accuracy, please note that all times are approximate and all schedules and programs are subject to change.

0000 UTC / 7pm E / 4pm P - Page 45 Freqs**BBC WORLD SERVICE (am)**

0000 D News; **0006** S Pick of the World (BBC's best), M Documentary, T-A Outlook (magazine); **0032** M Quiz or panel game; **0045** S Write On (letters), T-A Off the Shelf (book readings).

RADIO AUSTRALIA

0000 D News; **0005** S Keys to Music (enjoying the classics), A Inside Out (Pacific views); **0010** M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); **0045** A Ockham's Razor (science opinion).

RADIO AUSTRIA INTERNATIONAL

0005 S/M Week in Review; **0010** T-A Report from Austria; **0025** S/M Listener Letters; **0035** S/M Week in Review; **0040** T-A Report from Austria; **0055** S/M Listener Letters.

RADIO BULGARIA

0000 D News; **0010** S/M Views Behind the News, T-A Events and Developments; **0020** S Keyword Bulgaria (Bulgaria and things Bulgarian), M Folk Studio (Bulgarian folk music), T Sports, W Magazine Economy, H The Way We Live, F History Club; **0030** S Answering Your Letters, M-F Keyword Bulgaria, A Radio Bulgaria Calling (for radio hobbyists); **0040** M Walks and Talks (interesting places), T-F Timeout for Music; **0045** S/A Timeout for Music.

RADIO CANADA INTERNATIONAL

0000 D CBC News; **0005** S Quirks & Quarks (science), M Global Village (world music), T-A As It Happens (interviews with newsmakers) [began at 2330]; **0030** H Dispatches (world events in Canadian perspective).

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; **0017** T-A Spain Day-by-Day (feature magazine); **0035** S Radio Waves, M Radio Club

(letters), W Entremeses (food & tourism), F American Chronicles, A Food in Spain; **0040** W History Notes, F Culture Notes, A Africa Today; **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 Japanology, T-A Songs for Everyone; **0015** T-A 44 Minutes (magazine); **0054** M Japan Music Scene.

RADIO NETHERLANDS

0000 S Wide Angle (in-depth), M Europe Unzipped; T-A Newline; **0022** S The Week Ahead (on RN), M Insight (commentary); **0030** S Amsterdam Forum (conversations), M Vox Humana (culture, T Research File (science), W EuroQuest (Europe in context), H Documentary, F Dutch Horizons, A A Good Life (development).

RADIO NEW ZEALAND INTERNATIONAL

0000 S/A RNZ News, M-F Pacific Regional News; **0006** S At the Movies, M-F Wayne's Music (favorites), A Your Money; **0030** S Bookmarks, A Saturday Comedy Zone.

WBCQ, Maine

5105 kHz.: **0000** D Radio Six International (independent/small label music).

7415 kHz.: **0000** , S The Real Amateur Radio Show, M Le Show (satire/entertainment), H Off the Hook (public telecommunications issues), F Goddess Irene I Music Show; **0030** , S Fred Flintstone Music Show, W Duhh News, F Steppin' Out of Babylon (progressive views).

9330 kHz.: **0000** M The Voice of Reason.

WHRA, Maine

7580 kHz. **0030** T-A Radio Weather.

WHRI, Indiana

9495 kHz.: **0030** S DXing with Cumbre.
13770 kHz.: **0030** S Radio Weather.

WWCR, Tennessee

9475 kHz.: **0045** S Ask WWCR.

0100 UTC / 8pm E / 5pm P - Page 45 Freqs**BBC WORLD SERVICE (am)**

0100 D News; **0106** S Top of the Pops (British music charts), M Everywoman, T/H Documentaries, W Masterpiece (artistic ideas), F Assignment, A Sports International; **0132** M Westway Omnibus, T Music Feature, W White Label (new music), H Charlie Gillett (world music), F Music Biz, A John Peel (eclectic).

CHINA RADIO INTERNATIONAL

0100 D News & Reports; **0110** S Report on Developing Countries; **0115** A Cutting Edge (sci/tech); **0120** S CRI Roundup; **0130** S In the Spotlight (cultural magazine), 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 In Conversation (about science), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A The Chat Room (interviews).

RADIO CANADA INTERNATIONAL

0100 S/M The World This Weekend (news magazine), T-A The World at Six (domestic main evening newscast); **0130** S Madly Off in All Directions (comedy/satire), M Maple Leaf Mailbag (w/CIDX report bimonthly), T-A As It Happens (interviews w/newsmakers).

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 JAPAN - NHK WORLD

0100 D News; **0110** S Pop Joins the World, M-F Songs for Everyone, A Hello from Tokyo (listener contact); 0115 M-F 44 Minutes (magazine).

RADIO NETHERLANDS

0100 S Wide Angle (in-depth), M Europe Unzipped, T-A Newline; **0122** S The Week Ahead (on RN), M Insight (commentary); **0130** S Amsterdam Forum (conversations), M Vox Humana (culture), T Research File (science), W EuroQuest (Europe in context), H Documentary, F Dutch Horizons, A A Good Life (development).

RADIO NEW ZEALAND INTERNATIONAL

0100 D RNZ News; **0105** S Feature, M-F In Touch with New Zealand (music, interviews, variety), A Eureka! (science); **0130** A Health Matters [or] Environment Matters.

[*may be preempted by live sport]

RADIO PRAGUE

0100 D News; **0105** S Magazine, M Mailbox, T-A Current Affairs; **0110** S Letter from Prague, M ABC of Czech (the language), W Czech Science, A The Arts; **0115** S/W One on One (interview), M Encore [or] Magic Carpet (both monthly) [or] Czech Books (biweekly), T Talking Point (Czech issues), H Czechs in History [or] Czechs Today (both monthly) [or] Spotlight (travelogue), F Business Report, A Stepping Out (Prague nightlife).

RADIO ROMANIA INTERNATIONAL

0100 D Radio Newsreel; **0110** S The Week, M Focus, T-A Commentary; **0115** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate), A Challenge for the Future; **0120** S RRI Encyclopedia, T Political Flash, W European Horizons, A Business Update; **0125** S Roots (culture/traditions), T Business Update, W Visual Arts, F Listeners' Letterbox, A Practical Guide; **0130** S Radio Pictures, M Romanian Itineraries, H Visit Romania, A Cultural Survey; **0135** S Romanian Itineraries, M Listeners' Letterbox, T Pages of Romanian Literature, W Talking Points or Living Romania (programs alternate), H Partners in a Changing World, F Guest at the Microphone, A Over Coffee (with artists); **0140** S Romanian by Radio M/F The Skylark (folk music), H Stage and Screen, A Off Bucharest; **0145** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Folk Music Box; **0150** 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 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.

RADIO UKRAINE INTERNATIONAL

0100 D News; **0110** S Ukrainian Diary (weekly review), M Music from Ukraine, T-A Ukraine Today (magazine); **0118** S The Whole World on the Radio Dial (DX program); **0135** S Hello From Kiev (listener letters/music), M Roots (culture & education); **0145** T-A Closeup (current issues).

Shortwave Guide



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.

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.

WBCQ, Maine

5105 kHz.: **0100** S Jean Shepherd (stories/humor), M Firesign Theatre Hour (classic satire), A Allan Weiner Worldwide.

7415 kHz.: **0100** S The Peacock Project (1st A: Old Time Radio, 2nd: Voice of Savage Henry, 3rd: Tim Gaynor from Australia, 4th: A Different Kind of Oldies Show, 5th: The Hollow-State Hound), M Radio New York International, F Odin Lives (Norse legends), A Allan Weiner Worldwide.

9330 kHz.: **0100** M The Voice of Reason.

WHRA, Maine

7580 kHz.: **0105** S Turn Your Radio On (southern gospel music).

WHRI, Indiana

7315 kHz.: **0130** S DXing with Cumbre.

0200 UTC / 9pm E / 6pm P - Page 46 Freqs

BBC WORLD SERVICE (am)

0200 D News; **0206** S Play of the Week (radio theatre), M The Ticket (global arts survey), T Health Matters, W Go Digital, H Discovery (science), F One Planet (ecology), A Science in Action; **0232** T Quiz or panel game, W Music Review, H/A Westway, F The Word (writing & writers) [exc. last F, World Book Club (discussion)]; **0245** H Heart & Soul (beliefs & values), A What's the Problem (advice).

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** T-F Stock Market Report, A Reporter's Notebook.

[Special service: **0205** S/A Grandstand (live sports action) on 9660, 12080, 15240, 17750 kHz. only.]

RADIO AUSTRIA INTERNATIONAL

0205 S/M Week in Review; **0210** T-A Report from Austria; **0225** S/M Listener Letters; **0235** S/M Week in Review; **0240** T-A Report from Austria; **0255** S/M Listener Letters.

RADIO BUDAPEST

0200 D News; **0205** S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-F Hungary Today (current events magazine), A The Week; **0220** A DX Corner.

RADIO CANADA INTERNATIONAL

0200 S Global Village (world music), M Writers & Co. (books), T-A As It Happens (cont'd); **0230** H Dispatches (world events from Canadian perspective).

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 S/A* RNZ News, M-F In Touch with New Zealand (cont'd); **0205** S RPM (documentaries)*, A Home Grown (NZ music)*; **0230** A Musical Chairs (artist spotlight)*.

[*may be preempted by live sport]

RADIO PRAGUE

0200 D News; **0205** S Magazine, M Mailbox*, T-A Current Affairs; **0210** S Letter from Prague, M ABC of Czech (the language), W Czech Science, A The Arts; **0215** S/W One on One (interview), M Encore [or] Magic Carpet (both monthly) [or] Czech Books (biweekly), T Talking Point (Czech issues), H Czechs in History [or] Czechs Today (both monthly) [or] Spotlight (travelogue), F Business Report, A Stepping Out (Prague nightlife).

RADIO TAIWAN INTERNATIONAL

0200 D News; **0210** S News Talk, M Taiwan Economic Journal, T Kaleidoscope (society), W On the Job, H Trends, F Politics Today, A Bookworm; **0220** S Taipei Magazine, M Discover Taiwan, T Mailbag Time, W Jade Bells & Bamboo Pipes (traditional music), H People, F Culture Express, A Stage, Screen & Studio; **0230** M Asia Pacific (from R. Australia), A Groove Zone; **0235** S Sound Postcard, H Wisdom.com, F New Music Lounge; **0240** S Hakka World (indigenous culture), T Sound Postcard; **0245** T Let's Learn Chinese, W Life Unusual (the offbeat), H Instant Noodles (the weird).

[This schedule also airs at **0700** for western North America.]

VOICE OF RUSSIA

0200 D News; **0211** S/M Moscow Mailbag, T-A Commonwealth Update; **0230** D News in Brief; **0232** S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits, F Moscow Calling, A Christian Message from Moscow; **0246** F Music At Your Request; **0254** H Russia: People & Events.

RADIO SWEDEN

0230 S Network Europe (Europe magazine-1s-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), F Nordic Lights (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th). A Review of the Newsweek.

WBCQ, Maine

5105 kHz.: **0200** S Firesign Theatre Hour (classic satire), A Tasha Takes Control.

7415 kHz.: **0200** S Marion's Attic (vintage recordings), M Radio New York International (cont'd), T The Secular Bible Study, A Tasha Takes Control.

9330 kHz.: **0200** M World of Radio.

WHRA, Maine

7580 kHz.: **0230** M DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **0245** S Ask WWCR.

VOICE OF VIETNAM

0230 D News; **0235** D Current Affairs; **0240** S 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 Viet-

nam Economy, A Rural Vietnam; **0250** S Music, A Literature and Arts.

0300 UTC / 10pm E / 7pm P - Page 46 Freqs

BBC WORLD SERVICE (am)

0300 S/A News, M-F The World Today; **0332** S The Interview (trends), M World Business Review, T-A World Business Report; **0345** M Instant Guide (background), T/W/F/A Analysis, H From Our Own Correspondent.

CHINA RADIO INTERNATIONAL

0300 D News & Reports; **0310** S Report on Developing Countries; **0315** A Cutting Edge (sci/tech); **0320** S CRI Roundup; **0330** S In the Spotlight (cultural magazine), 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 Australian Express (magazine), A Rural Reporter; **0310** M-F Regional Sports Report; **0320** M-F Life Matters (social issues); **0330** S Music Deli (diverse), A Australian Country Style; **0354** Heywire (young rural Australian opinion).

[Special service: **0305** S/A Grandstand (live sports action) on 9660, 12080, 15240, 17750 kHz. only.]

RADIO BULGARIA

0300 D News; **0310** S/M Views Behind the News, T-A Events and Developments; **0320** S Keyword Bulgaria (Bulgaria and things Bulgarian), M Folk Studio (Bulgarian folk music), T Sports, W Magazine Economy, H The Way We Live, F History Club; **0330** S Answering Your Letters, M-F Keyword Bulgaria, A Radio Bulgaria Calling (for radio hobbyists); **0340** M Walks and Talks (interesting places), T-F Timeout for Music; **0345** S/A Timeout for Music.

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 Sunday Drama* (radio plays); **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 Home Grown* (cont'd).

[*may be preempted by live sport]

RADIO TAIWAN INTERNATIONAL

0300 D News; **0310** S News Talk, M Taiwan Economic Journal, T Kaleidoscope (society), W On the Job, H Trends, F Politics Today, A Bookworm; **0320** S Taipei Magazine, M Discover Taiwan, T Mailbag Time, W Jade Bells & Bamboo Pipes (traditional music), H People, F Culture Express, A Stage, Screen & Studio; **0330** M Asia Pacific (from R. Australia), A Groove Zone; **0335** S Sound Postcard, H Wisdom.com, F New Music Lounge; **0340** S Hakka World (indigenous culture), T Sound Postcard; **0345** T Let's Learn Chinese, W Life Unusual (the offbeat), H Instant Noodles (the weird).

[This schedule also airs at **0700** for western North America.]

VOICE OF AMERICA, Africa Service

0300 M-F Daybreak Africa (morning newsmagazine); **0330** M-F News Headlines; **0333** M-F

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Business Report; **0345** M-F Dateline (documentary); **0355** M-F Opinion Roundup.

VOICE OF RUSSIA

0300 D News; **0211** M Sunday Panorama, T-S News & Views; **0330** D News in Brief; **0332** S Songs from Russia, M/F Russian by Radio, T Kaleidoscope (Russian events), W Musical Portraits, H Moscow Yesterday & Today, A Audio Book Club (Russian lit.); **0346** S You Write to Moscow; **0354** S/W Russia: People & Events.

WBCQ, Maine

5105 kHz.: **0300** S Tesla's Ear, A Lost Discs Radio Show (obscure singles).
7415 kHz.: **0300** S Pan Global Wireless, M Radio New York International (cont'd), A Lost Discs Radio Show (obscure singles).

WRMI, Florida

6870/7385 kHz: **0330** S Voice of the NASB (US sw broadcasters consortium), M World of Radio.

WWCR, Tennessee

5070 kHz.: **0300** S DX Partyline; **0330** S World of Radio.

RADIO BUDAPEST

0330 D News; **0335** S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-F Hungary Today (current events magazine), A The Week; **0350** A DX Corner.

RADIO SWEDEN

0330 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); **0345** T Sports Scan, W Close Up (profiles of Swedes-1st), 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

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: Lana & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0350** S Music, A Literature & Arts.

0400 UTC / 11pm E / 8pm P - Page 47 Freqs

BBC WORLD SERVICE (am)

0400 S World Briefing, M-A News; **0406** M Talking Point (phone-in)(taped S 1406), T-F Outlook (magazine), A Pick of the World (BBC's best); **0432** S Global Business; **0445** M-F Off the Shelf (book readings), A Write On (letters).

CHINA RADIO INTERNATIONAL

0400 D News & Reports; **0410** S Report on Developing Countries; **0415** A Cutting Edge (sci/tech); **0420** S CRI Roundup; **0430** S In the Spotlight (cultural magazine), 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 Newslink Africa; **0430** T Insight (international issues), W World in Progress (development), H Money Talks (business), F Living Planet (environment), A Spectrum (sci-tech); **0445** T Business German.

RADIO AUSTRALIA

0400 D News; **0405** S The Europeans, A Books & Writing; **0410** M-F Bush Telegraph (rural life);

0430 S The Chat Room (interviews); **0435** A Book Talk; **0455** M-F Perspective (commentary).
[Special service: **0405** S/A Grandstand (live sports action) on 9660, 12080, 15240, 17750 kHz. only.]

RADIO HABANA CUBA

0400 D International News; **0410** M From Habana (Cuban musicians), T-S National 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

0400 S Wide Angle (in-depth), M Europe Unzipped, T-A Newslite; **0422** S The Week Ahead (on RN), M Insight (commentary); **0430** S Amsterdam Forum (conversations), M Vox Humano (culture), T Research File (science), W EuroQuest (Europe in context), H Documentary, F Dutch Horizons, A A Good Life (development).

RADIO NEW ZEALAND INTERNATIONAL

0400 S/A RNZ News; M-F Checkpoint; **0410** S Religion feature or series, A Tagata O Te Moana (Pacific magazine); **0440** S Jazz Spotlight.

RADIO PRAGUE

0400 D News; **0405** S Magazine, M Mailbox, T-A Current Affairs; **0410** S Letter from Prague, M ABC of Czech (the language), W Czech Science, A The Arts; **0415** S/W One on One (interview), M Encore [or] Magic Carpet (both monthly) [or] Czech Books (biweekly), T Talking Point (Czech issues), H Czechs in History [or] Czechs Today (both monthly) [or] Spotlight (travelogue), F Business Report, A Stepping Out (Prague nightlife).

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), A Challenge for the Future; **0420** S RRI Encyclopedia, T Political Flash, W European Horizons, A Business Update; **0425** S Roots (culture/traditions), T Business Update, W Visual Arts, F Listeners' Letterbox, A Practical Guide; **0430** S Radio Pictures, M Romanian Itineraries, H Visit Romania, A Cultural Survey; **0435** S Romanian Itineraries, M Listeners' Letterbox, T Pages of Romanian Literature, W Talking Points or Living Romania [programs alternate], H Partners in a Changing World, F Guest at the Microphone, A Over Coffee (with artists); **0440** S Romanian by Radio, M/F The Skylark (folk music), H Stage and Screen, A Off Bucharest; **0445** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Folk Music Box; **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.

RADIO UKRAINE INTERNATIONAL

0400 D News; **0410** S Ukrainian Diary (weekly review), M Music from Ukraine, T-A Ukraine Today (magazine); **0415** S The Whole World on the Radio Dial (DX program); **0430** S Hello From Kiev (listener letters/music), M Roots (culture & education); **0445** T-A Closeup (current issues).

RVi, Belgium

0400 S Music from Flanders, M Radio World, T-A News; **0404** T-A Flanders Today (incl. press review, reports & CD of the Week); **0408** M Tourism in Flanders; **0414** M Brussels 1043 (letters).

VOICE OF AMERICA, Africa Service

0400 M-F News & Reports; **0415** M-F Focus (a topic in-depth); **0423** M-F Sports; **0430** M-F Daybreak Africa (morning newsmagazine).

VOICE OF RUSSIA

0400 D News; **0411** S Music & Musicians, M This is Russia, T Musical Portraits, W/A Moscow Mailbag,

H Science Plus, F Newmarket; **0430** D News in Brief; **0432** M Moscow Calling, T/H/A The River of Time, W Guest Speaker, F Russian history/culture; **0447** W Ladies of Character

VOICE OF TURKEY

0400 D News; **0410** D Press Review; **0415** 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; **0420** S The Stream of Love or DX Corner, T Hues & Colors of Anatolia, H Letterbox; **0425** M/A Music, F In the Wake of a Contest; **0430** S/T Music; **0435** 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.

WBCQ, Maine

5105 kHz.: **0400** A Squad 51 (musical menagerie).
7415 kHz.: **0400** S Michael Ketter Show (satire/free form), M Radio New York International (cont'd).
9330 kHz.: **0400** S World of Radio; **0430** S The RMF Show (extreme lyrics).

WHRI, Indiana

7315 kHz.: **0402** S 20 The Countdown Magazine (Christian rock charts); **0430** M DXing with Cumbre.
7535 kHz.: **0400** S Powersource Top 20 (Christian rock music)

WRMI, Florida

6870/7385 kHz.: **0400** S DX Partyline (from HCJB), M Wavescan (for DXers from AWR); **0430** S/M World Radio Network.

WWCR, Tennessee

5070 kHz.: **0400** S Radio Weather; **0430** S DX Radio School.

0500 UTC / 12am E / 9pm P - Page 47 Freqs

BBC WORLD SERVICE (am)

0500 D World Briefing; **0520** D Sports Roundup; **0532** S Reporting Religion, M-F The World Today, A People & Politics.

CHANNEL AFRICA, South Africa

0500 D News; **0515** S Inner Voice (African spirituality), M Nepad Focus, T-F Africa Rise & Shine (current affairs), A 37 Degrees (health & medicine); **0540** M UN Chronicle.

CHINA RADIO INTERNATIONAL

0500 D News & Reports; **0510** S Report on Developing Countries; **0515** A Cutting Edge (sci/tech); **0520** S CRI Roundup; **0530** S In the Spotlight (cultural magazine), 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

0500 News; **0505** S Religion & Society, M Hard to Beat (sport), T-A Newslink Africa; **0515** S German by Radio, M Inspired Minds; **0530** S Africa This Week, M Hits in Germany [or] Melody Time, T A World of Music, W Arts on the Air, H Living in Germany, F Cool (youth culture), A Focus on Folk; **0545** H Europe in Capitals.

RADIO AUSTRALIA

0500 D News; **0505** S All in the Mind (the brain), A Australian Express (magazine); **0510** M-F Pacific Beat (Pacific islands magazine w/sports @ 0530); **0530** S The Ark (religious history), A All in the Mind; **0535** M-F On the Mat (regional issues); **0549** S The Pulse (Aussie music row).
[Special service: **0505** S/A Grandstand (live sports action) on 9660, 12080, 15240, 17750

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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/H/F Caribbean Outlook, A Weekly Review; **0550** M Breakthrough (science report).

RADIO JAPAN - NHK WORLD

0500 D News; **0510** S Pop Joins the World, A Hello from Tokyo (listener contact); **0515** M-F 44 Minutes (magazine).

RADIO NEW ZEALAND INTERNATIONAL

0500 D RNZ News; **0507** S Mana Korero (Maori magazine), M-F Worldwatch & Pacific Report, A The Mix ('live' music acts); **0530** M Letter (from a global correspondent); **0545** M-F Storytime.

VOICE OF AMERICA, Africa Service

0500 M-F News & Reports; **0523** M-F Sports Report; **0530** M-F News Headlines; **0533** M-F Business Report; **0545** M-F Dateline (documentary); **0555** M-F Opinion Roundup.

VOICE OF RUSSIA

0500 D News; **0511** S/M Musical Portraits, T/F Moscow Mailbag, W/A Science Plus, H New-market (business); **0530** D News in Brief; **0532** S Kaleidoscope, M Audio Book Club, T Music Around Us, W Moscow Yesterday & Today, H Folk Box, F Audio Book Club (Russian lit.), A Timelines; **0547** T Music At Your Request.

WBCQ, Maine

7415 kHz.: **0500** S Tom & Darryl (electronic media), M-A Amos 'n Andy; **0515** T Odin Lives (old Norse myths/music); **0530** M World of Radio.

WHRI, Indiana

7315 kHz.: **0500** S 20 The Countdown Magazine (cont'd).

WRMI, Florida

6870/7385 kHz.: **0500** D World Radio Network.

WWCR, Tennessee

3210 kHz.: **0500** M Worldwide Country Radio. 5070 kHz.: **0500** S Cyberline (digital communications).

0600 UTC / 1am E / 10pm P - Page 48 Freqs

CHANNEL AFRICA, South Africa

0600 D News; **0615** S Our Heritage, M UN Chronicle, T-F Africa Rise & Shine (current affairs), A Tam Tam Express (governance in Africa).

DEUTSCHE WELLE

0600 D News; **0605** S Inside Europe, M Mailbag, T-A Newlink Africa; **0630** T Insight (international issues), W World in Progress (development), H Money Talks (business), F Living Planet (environment), A Spectrum (sci-tech); **0645** T Business German.

RADIO AUSTRALIA

0600 D News; **0605** S The Buzz (sci-tech), A Verbatim (oral histories); **0610** M-F Regional Sports Report; **0620** M Ockham's Razor (science opinion), T In Conversation (about science), W Lingua Franca (about language), H The Ark (religious history), F Inside Out (Pacific views); **0630** S Hit Mix (pop/rock), A Jazz Notes; **0635** M Hit Mix, T Music Deli (diverse world/folk), W Jazz Notes, H Australian Country Style.

[Special service: **0605** S/A Grandstand (live sports action) on 9660, 12080, 15240, 17750 kHz. only. (continues to 0800)]

RADIO HABANA CUBA

0600 D International News; **0610** M From Habana

(Cuban musicians), T-S National News; **0615** T-S 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 Japanology (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 Musicscape, T Basic Japanese for You, W Japan Music Travelogue, H Brush Up Your Japanese, F Music Beat; **0654** S Japan Music Scene.

RADIO NEW ZEALAND INTERNATIONAL

0600 D News; **0605** S One in Five (disability issues), M-F Checkpoint (repeat of 0405), A Saturday Night (variety); **0630** S The Week in Parliament.

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/A Main Street (life in America).

WBCQ, Maine

7415 kHz.: **0600** S Juliet's Wild Kingdom.

WHRI, Indiana

7315/7355 kHz.: **0600** A DXing with Cumbre.

WRMI, Florida

6870/7385 kHz.: **0600** D World Radio Network.

WWCR, Tennessee

5070 kHz.: **0600** S Ken's Country Classics; **0630** S Country Crossroads, M-F Natural Health Clinic.

1100 UTC / 6am E / 3am P - Page 50 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-F World Business Report, A World Football; **1145** S-H Sports Roundup, F Football Extra.

BBC WORLD SERVICE (eas)

1100 S Play of the Week (cont'd from 1032), M-A News; **1106** M-F Outlook (magazine), A The Ticket (global arts survey); **1132** S Reporting Religion; **1145** M-F Off the Shelf (book readings).

CHINA RADIO INTERNATIONAL

1100 D Real Time Beijing (world/national/city news, business, sports, press, sci-tech, culture, show-biz, music, features); **1115** S China Beat (popular music), A China Roots (traditional music).

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 Sunday Profile (current events), M-A Asia Pacific (regional current affairs); **1130** S Speaking Out (Aboriginal affairs), M Innovations (new products), T Earthbeat (environment), W Rural Reporter, H Smart Societies (social challenges), F The Chat Room (interviews), A All in the Mind (the brain).

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 Musicscape, T Basic Japanese for You, W Japan Music Travelogue, H Brush Up Your Japanese, F Music Beat.

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.

WWCR, Tennessee

15825 kHz.: **1100** M-F Worldwide Country Radio; **1115** S Ask WWCR. 5070 kHz.: **1115** S A View from Europe; **1130** A World of Radio

1200 UTC / 7am E / 4am P - Page 50 Freqs

BBC WORLD SERVICE (am)

1200 D Newshour; **1205** M-F Caribbean Business; **1210** M-F Caribbean Morning Report 2nd Edition; **1220** M-F Caribbean Magazine; **1230** M-F Newshour (cont'd.).

BBC WORLD SERVICE (eas)

1200 D Newshour.

HCJB ECUADOR

1200 S Moody Presents, M-F Morning in the Mountains, 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 & interviews), F Sound Quality (innovative music), A The Music Show; **1255** S The Pulse (Aussie music now).

RADIO KOREA INTERNATIONAL

1200 D News; **1210** S Korean Pop Interactive (requests), M-F News Commentary, A Worldwide Friendship (letters, DX news); **1215** M-F Seoul Calling (magazine); **1230** S Korean Pop Interactive (cont'd), M-F Seoul Calling (cont'd), A Worldwide Friendship (cont'd); **1245** M Korea Today & Tomorrow (peninsula issues), T Korean Kaleidoscope (Korean society), W Wonderful Korea (tourism), H Seoul Report (interviews).

RADIO NETHERLANDS

1100 S Wide Angle, A Europe Unzipped; M-F Newsline; **1122** S The Week Ahead, A Insight (comment); **1130** S Vox Humana (culture), M Research File (science) T EuroQuest (Europe in context), W Weekly Documentary, H Dutch Horizons, F The Good Life (development issues), A Amsterdam Forum (conversations).

RADIO NEW ZEALAND INTERNATIONAL

1200 S-F RNZ News, A Forces Programme (cont'd.); **1205** S Sportsworld (recap magazine), M-F Late Edition.

WWCR, Tennessee

15825 kHz.: **1210** A A View from Europe.

1300 UTC / 8am E / 5am P - Page 51 Freqs

BBC WORLD SERVICE (am)

1300 D News; **1306** S From Our Own Correspondent (background), M-F Outlook (magazine), A Pick of the World (BBC's best); **1332** S In Praise of God; **1345** M-F Off the Shelf (book readings), A Write On (letters).

BBC WORLD SERVICE (eas)

1300 D News; **1301** A In Concert (performances); **1306** S From Our Own Correspondent, M Age of Empire (America in the modern world), T Masterpiece (arts ideas), W Passport Please (national identity-1/21, 28; 2/4) Documentaries (2/11, 18, 25), H Assignment, F Sports International; **1332**

Shortwave Guide



M-F British News; **1345** S Reporting Religion, M-H Sports Roundup, F Football Extra.

CHINA RADIO INTERNATIONAL

1300 D News & Reports; **1310** S Report on Developing Countries; **1315** A Cutting Edge (sci/tech); **1320** S CRI Roundup; **1330** S In the Spotlight (cultural magazine), 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

1300 D News; **1305** S Encounter (religion in Australia), M-F The Planet (diverse music from around the world), A The Music Show (cont'd); **1355** S Perspective (commentary).

RADIO CANADA INTERNATIONAL

1300 M-F News; **1305** M-F The Current (current affairs-joined in progress).

RADIO NEW ZEALAND INTERNATIONAL

1300 S/A RNZ News, M-F Pacific Regional News; **1305** S Tagata o te Maana, A New Music Releases; **1308** M-F Dateline Pacific; **1330** M Mailbox (letters & DX news) or RNZI Talk (station info), T Tradewinds (Pacific commerce), W The World in Sport, H Pacific Correspondent, F Sports Story.

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), 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

9495 kHz.: **1300** A Radio Weather; **1330** A DXing with Cumbre.

WRMI, Florida

15725 kHz.: **1300** S Viva Miami (magazine), M-A World Radio Network; **1330** S Voice of the NASB (US private sw consortium).

1400 UTC / 9am E / 6am P - Page 51 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 White Label (new music), W Charlie Gillett (world music), H Music Biz, F John Peel (eclectic).

BBC WORLD SERVICE (eas)

1400 S/A News, M-F World Briefing; **1406** S Talking Point (live phone-in), A Sportsworld (live action); **1420** M-F World Business Report; **1432** M-F British News; **1445** M-F Sports Roundup.

CHINA RADIO INTERNATIONAL

1400 D News & Reports; **1410** S Report on Developing Countries; **1415** A Cutting Edge (sci/tech); **1420** S CRI Roundup; **1430** S In the Spotlight (cultural magazine), 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

1400 D News; **1405** S The Science Show, M-F PM (domestic early evening newscast), A Background Briefing (documentaries); **1455** S Business Weekend, M-F Perspective (informed opinion), A Correspondent's Notebook.

RADIO CANADA INTERNATIONAL

1400 D News; **1405** S The Sunday Edition, M-F Sounds Like Canada (Canadian magazine); A The House (Canadian politics).

RADIO NEW ZEALAND INTERNATIONAL

1400 D RNZ News; **1405** D Book Reading (in installments); **1430** M Bookmarks (NZ books/writers), T What's the Word? (NPR quiz), H For a Smile (BBC comedy), F Auckland Issues; **1440** S The Week in Parliament, W Diversions, A Nga Taonga Korero (Maori program).

RADIO SWEDEN

1430 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); **1445** M Sports Scan, T Close Up (profiles of Swedes-1st), 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.: **1400** M-A World Radio Network; **1430** S World Radio Network.

WWCR Tennessee

15825 kHz.: **1400** M-F Worldwide Country Radio.

1500 UTC / 10am E / 7am P - Page 52 Freqs

BBC WORLD SERVICE (am)(eas)

1500 D News; **1506** S Documentary, 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 In Praise of God (worship service), M Quiz (or) panel game, T Music Review, W/F Westway (drama serial), H The Word (writers & writing) [exc. last Fri., 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 CRI Roundup; **1530** S In the Spotlight (cultural magazine), 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

1500 D News; **1505** S The National Interest, M-F Asia Pacific (regional current affairs), A Smart Societies (social challenges); **1530** M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor; **1555** S Perspective (informed opinion), A Business Weekend.

RADIO CANADA INTERNATIONAL

1500 D News; **1505** S The Sunday Edition (cont'd.), M-F Sounds Like Canada (cont'd.), including **1530** F C'est La Vie (life in French Canada), **1545** T-F Out Front (first person views of life), A Vinyl Cafe (humor/music).

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 MusicScope, T Basic Japanese for You, W Japan Music Travelogue, H Brush Up Your Japanese, F Music Beat.

RADIO NEW ZEALAND INTERNATIONAL

1500 S/A RNZ News, M-F Pacific Regional News; **1505** S/A Forces Radio; **1508** M-F Dateline 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.

WRMI, Florida

15725 kHz.: **1500** D World Radio Network.

1600 UTC / 11am E / 8am P - Page 52 Freqs

BBC WORLD SERVICE (am)

1600 S-F World Briefing, A News; **1606** A Sportsworld (live action from 1406); **1620** S-F British News; **1632** S World Business Review, M-F World Business Report; **1640** S The Instant Guide (background), M-F Sports Roundup; **1645** M/T/H/F Analysis, W From Our Own Correspondent.

DEUTSCHE WELLE

1600 D News; **1605** S Mailbag, M-F Newslink Asia, A Hard to Beat (sport); **1615** A German by Radio; **1630** M Insight (international issues), T World in Progress (development), W Money Talks (business), H Living Planet (environment), F As a This Week, A Cool! (youth culture); **1645** M Europe in Capitals (city profile).

RADIO AUSTRALIA

1600 D News; **1605** S Books & Writing, M-F Margaret Throsby (interview/music), A Hindsight (social history); **1635** S Book Talk.

RADIO AUSTRIA INTERNATIONAL

1605 S/A Week in Review; **1610** M-F Report from Austria; **1625** S/A Listener Letters; **1635** S/A Week in Review; **1640** M-F Report from Austria; **1655** S/A Listener Letters.

RADIO CANADA INTERNATIONAL

1600 D News; **1605** S The Sunday Edition (cont'd.), A Quirks & Quarks (science).

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.

WHRI, Indiana

15105 kHz.: **1630** S DXing with Cumbre.

13760 kHz.: **1600** A DXing with Cumbre.

WRMI, Florida

15725 kHz.: **1600** D World Radio Network.

WWCR, Tennessee

12160 kHz.: **1600** A Golden Age of Radio.

1700 UTC / 12pm E / 9am P - Page 53 Freqs

BBC World Service (eaf) - 21470

1700 D News; **1706** D Focus on Africa; **1745** S-H Sports Roundup, F Football Extra.

BBC World Service (me) - 12095, 15565

1700 D World Briefing; **1720** D British News; **1732** S Instant Guide (background), M-F World Business Report, A The Interview (trends); **1745** S-H Sports Roundup, F Football Extra.

CHANNEL AFRICA, South Africa

1700 D News; **1715** S/A Africa This Week, M-F Dateline Africa (current affairs).

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).

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).

Shortwave Guide

MT

VOICE OF AMERICA, Africa Service

1700 S Reporters' Roundtable, M-A News; 1706 M-F Talk to America (global phone-in), A News & Reports; 1720 A Sports; 1730 S Music Time in Africa; 1733 A Press Conference USA.

VOICE OF GREECE

1700 A Hellenes Around the World (Greek popular & traditional music, letters).

ALL INDIA RADIO

1745 M Light Music, T Karnatak Instrumental Music, W Folk Songs, H-S Devotional Music.

WHRA, Maine

13760 kHz.: 1730 A Radio Weather

WRMI, Florida

15725 kHz.: 1700 S/A World Radio Network.

WWCR, Tennessee

15825 kHz.: 1700 S Latin Catholic Mass, M-F Worldwide Country Radio.

1800 UTC / 1pm E / 9am P - Page 53 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.

BBC WORLD SERVICE (eaf) - 21470

1800 S/A News, M-F World Briefing; 1806 S From Our Own Correspondent, A The Ticket (global arts revue); 1820 M-F British News; 1832 S Global Business (trends), M/F Fast Track (African sport), T Postmark Africa (answers), W Africa Live (phone-in), H Artbeat.

BBC WORLD SERVICE (me) - 12095

1800 D News; 1806 S Pick of the World (BBC's best), M/W Documentaries, T Masterpiece (cultural ideas), H Assignment (one topic), F Sports International (magazine); 1832 M Music Feature, T White Label (new music releases), W Charlie Gillett (world music), H The Music Biz, F John Peel (electic music); 1845 S Write On (letters).

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); 1835 M-F On the Mat (regional issues).

VOICE OF AMERICA, Africa Service

1800 S/A News & Reports, M-F Africa World Tonight; 1805 S On the Line (US foreign policy), A Our World (science magazine); 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 Editorial.

WRMI, Florida

15725 kHz.: 1800 S/A World Radio Network.

WWCR, Tennessee

15825 kHz.: 1815 H Ask WWCR; 1830 T Old Record Shop (vintage recordings).

1900 UTC / 2pm E / 9am P - Page 54 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.

BBC WORLD SERVICE (eaf) - 12095

1900 D News; 1901 A In Concert; 1906 S Top of the Pops (British music charts), M-F Focus on Africa; 1932 M-F World Business Report; 1945 MTHF Analysis, W From Our Own Correspondent.

BBC WORLD SERVICE (waf) - 15400, 17830

1900 S/A World Briefing, M-F News; 1906 M-F Focus on Africa; 1920 S/A Sports Roundup; 1932 S The Interview (trends), M-F World Business Report, A Voices from the Market (drama series); 1945 MTHF Analysis, W From Our Own Correspondent.

DEUTSCHE WELLE

1900 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 [ar] Melody Time, M A World of Music, T Arts on the Air, W Living in Germany, H Cool (youth culture), F Focus on Folk, A Africa This Week; 1945 W Europe in Capitals.

RADIO AUSTRALIA

1900 D News; 1905 F Rural Reporter, A Earthbeat (environment); 1910 S-H Pacific Beat (regional magazine w/Sport @ 1929); 1930 F Australian Country Style (music), A The Makers (artists & performers); 1935 M-F The Best of 'Bush Telegraph' (rural life); 1945 A Health Bits.

RADIO NETHERLANDS

1900 S Documentary, A Vox Humana (culture); 1930 S/A News; 1935 S Wide Angle (in-depth), A Europe Unzipped; 1955 S The Week Ahead (on RN), A Insight (commentary).

VOICE OF AMERICA, Africa Service

1900 S News & Reports, M-F News, A Hip Hop Connections (music); 1906 M-F Border Crossings (music--exc. T Housecall (medical info)); 1923 S Sports; 1930 S Music Time in Africa (part 2), M-F World of Music, A News Headlines; 1933 A Press Conference USA.

WBQC, Maine

7415 kHz.: 1945 M-F Planet World News
9330 kHz.: 1945 M-F Planet World News
17495 kHz.: 1900 M-F Old Time Radio Theatre;
1945 M Planet World News

WHRI, Indiana

15665 kHz.: 1905 S Pat Boone (variety).

WRMI, Florida

15725 kHz.: 1900 S/A World Radio Network.

WWCR, Tennessee

12160 kHz.: 1900 M-F Natural Health Clinic; 1930 M-F Stairway to Health.

2000 UTC / 3pm E / 9am P - Page 54 Freqs

BBC WORLD SERVICE (eaf)(waf) - 12095,
15400, 17830
2000 D Newshour.

DEUTSCHE WELLE

2000 D News; 2005 S Mailbag, M-F Newslink

Africa, A Inside Europe; 2030 M Insight (international issues), T World in Progress (development), W Money Talks (business), H Living Planet (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 CANADA INTERNATIONAL

2000 D CBC News; 2005 S Tapestry (spiritual matters), M-F Richardson's Roundup (variety), A Definitely Not the Opera (popular culture).

RADIO NETHERLANDS

2000 S Vox Humana (culture), A Amsterdam Forum (conversations); 2030 S/A News; 2035 S Wide Angle (in-depth), A Europe Unzipped; 2055 S The Week Ahead (on RN), A Insight (commentary).

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.

WHRI, Indiana

15665 kHz.: 2030 A DXing with Cumbre.

WRMI, Florida

15725 kHz.: 2000 S/A World Radio Network.

WWCR, Tennessee

15825 kHz.: 2000 A U.S. Presidential Radio Address/Democratic Response; 2030 W Ask WWCR.

2100 UTC / 4pm E / 1pm P - Page 55 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 Newshour*.
[*Special service to the Caribbean on 5975, 11675, 15390 kHz.: 2115 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 [ar] Melody Time, M A World of Music, T Arts on the Air, W Living in Germany, H Cool (youth culture), F Focus on Folk, A Africa This Week; 2145 W Europe in Capitals.

RADIO AUSTRALIA

2100 D News; 2105 F Verbatim (oral history), A Australia All Over; 2110 S-H AM (morning news magazine); 2130 S Country Breakfast (rural life), M-F RNZI Pacific Dateline; 2145 A Asia Sunday.

RADIO CANADA INTERNATIONAL

2100 D CBC News; 2105 S Cross Country Checkup

Shortwave Guide



(national phone-in), M-F Richardson's Roundup (cont'd), A Definitely Not the Opera (cont'd).

RADIO JAPAN - NHK WORLD

2100 D News; **2110** S Pap 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 Musicscape, T Basic Japanese for You, W Japan Music Travelogue, H Brush Up Your Japanese, F Music Beat; **2154** A Japan Music Scene.

RADIO ROMANIA INTERNATIONAL

2130 D Radio Newsreel; **2140** S The Week, M Focus, T-A Commentary; **2145** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate), A Challenge for the Future; **2150** S RRI Encyclopedia, T Political Flash, W European Horizons, A Business Update.

VOICE OF AMERICA, Africa Service

2100 M-F News; **2106** M American Gold, T Roots and Branches, W Classic Rock, H Top 20, F Country Hits.

WBCQ, Maine

5105 kHz.: **2100** M-F The Voice of Reason
7415 kHz.: **2100** T The Last Roundup (classic radio).
9330 kHz.: **2100** S/A Radio Weather; **2130** S Northern Lights
17495 kHz.: **2100** M-F Radio Caroline; **2130** A World of Radio.

WHRA, Maine

17650 kHz.: **2100** F DXing with Cumbre.

WHRI, Tennessee

13760 kHz.: **2130** S DXing with Cumbre.

WRMI, Florida

15725 kHz.: **2100** A World Radio Network.

WWCR, Tennessee

15825 kHz.: **2100** M DX Radio School, H DX Partyline, F Real Radio; **2130** H World of Radio, F Ask WWCR.
12160 kHz.: **2100** S Worldwide Country Radio; **2130** A World of Radio.

2200 UTC / 5pm E / 2pm P - Page 56 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 News; **2201** A Play of the Week; **2206** S Everywoman (magazine), M Health Matters, T Go Digital, W Discovery, H One Planet, F Science in Action; **2232** S Westway Omnibus, M Quiz or panel game, T Music Review, W/F Westway (drama serial), H The Word (writers & writings) [exc. last H, World Book Club (discussion)]; **2245** W Heart & Soul (beliefs & values), F What's the Problem? (advice).

RADIO AUSTRALIA

2200 D News; **2205** F Asia Pacific (regional current affairs), A Correspondents' Report; **2210** S-H AM (morning news magazine); **2230** F Saturday AM (morning news magazine), A Music Deli (international); **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 Maple Leaf Mailbag (w/CIDX Report fortnightly), M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy/satire).

RVI, Belgium

2200 S Radio World, M-F News, A Music from Flanders; **2204** M-F Flanders Today (incl. press review, reports & 'CD of the Week'); **2208** S Tourism in Flanders; **2214** S Brussels 1043 (letters).

WBCQ, Maine

5105 kHz.: **2200** M-F Radio Caroline.
7415 kHz.: **2200** S CW Junction (country music concerts), M Jean Shepherd (stories/humor), T The Last Roundup (classic radio), F Frankie V Radio Show; **2230** H The Last Roundup, F Pab Sungenis Project.
9330 kHz.: **2230** S Science Rocks.

WHRI, Indiana

9495 kHz.: **2230** A DXing with Cumbre.

WRMI, Florida

15725 kHz.: **2200** A World Radio Network; **2230** S Voice of the NASB (consortium of US private sw broadcasters).

2300 UTC / 6pm E / 3pm P - Page 56 Freqs

BBC WORLD SERVICE (am)

2300 D The World Today; **2332** F People & Politics, A The Interview (trends).

CHINA RADIC INTERNATIONAL

2300 D News & Reports; **2310** A Report on Developing Countries; **2315** F Cutting Edge (sci/tech); **2320** A CRI Roundup; **2330** S People in the Know (China's leading personalities), M Biz China, T China Horizons (China outside Beijing), W Voices from Other Lands, H Life in China, F Listeners' Garden, A 'n the Spotlight (cultural magazine).

RADIO AUSTRALIA

2300 D News; **2305** F Country Breakfast (rural life), A The Europeans; **2310** S-H Asia Pacific (regional current affairs); **2330** S Verbatim (oral history), M The Europeans, T Rural Reporter, W The Arts on RA, H The Buzz (technology issues), F Hit Mix (pop/rock), A Innovations (new products).

RADIO CANADA INTERNATIONAL

2300 S/A The World This Weekend, M-F The World at 6; **2330** S Maple Leaf Mailbag (w/CIDX Report fortnightly), M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy/satire).

RADIO NEW ZEALAND INTERNATIONAL

2300 F/A News, S-H Midday Report; **2312** F Focus on Politics, A The Week in Parliament; **2333** F The Sampler (latest CDs), A Spectrum (life in NZ).

RADIO PRAGUE

2330 D News, **2335** S Mailbox, M-F Current Affairs, A Insight Central Europe (regional magazine); **2340** S ABC of Czech (the language), T Czech Science, F The Arts; **2345** S Encore [or] Magic Carpet (both monthly) [or] Czech Books (biweekly), M Talking Point (Czech issues), T One on One (interview), W Czechs in History [or] Czechs Today (both monthly) [or] Spotlight (travelogue), H Business Report, F Stepping Out (Prague nightlife).

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), F Challenge for the Future, A World of Culture; **2320** M Political Flash, T European Horizons, F Business

Update, A RRI Encyclopedia; **2325** M Business Update, T Visual Arts, H Listeners' Letterbox, F Practical Guide, A Roots (culture/traditions); **2330** S Romanian Itineraries, W Visit Romania, F Cultural Survey, A Radio Pictures; **2335** S Listeners' Letterbox, M Pages of Romanian Literature, T Talking Points or Living Romania [programs alternate], W Partners in a Changing World, H Guest at the Microphone, F Over Coffee (with artists), A Romanian Itineraries; **2340** S/H The Skylark (folk music), W Stage and Screen, F Off Bucharest, A Romanian by Radio; **2345** M Romanian Hits, W Romanian Musicians, F Folk Music Box, 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.

VOICE OF TURKEY

2300 D News; **2310** D Press Review; **2315** 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; **2320** M Hues & Colors of Anatolia, W Letterbox, A The Stream of Love or DX Corner; **2325** S/F Music, H In the Wake of a Contest; **2330** M/A Music; **2335** 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.: **2300** S Allan Weiner Worldwide.
7415 kHz.: **2300** M Radio Weather, W World of Radio, H Planet World News Roundup, F Pab Sungenis Project (cont'd), A Radio Timtron Worldwide; **2330** W The Music Download Scene, H Uncle Ed's Musical Memories, F Wanton Display of Control & Disruption (audio animation).
9330 kHz.: **2300** S Allan Weiner Worldwide, A The Country Music Hour.
17495 kHz.: **2300** W World of Radio.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; *BCL News*; James Burnett, *TWR*; *Cumbre DX*; Glenn Hauser, Enid, *OK/DX Listening Digest*; Alokesh Gupta, New Delhi, India; Thorsten Hallman, Munster, Germany; Jeff LeCureux, KTWR; Anker Petersen, Denmark; R. Geoffrey, Montreal, Canada; Adrian Sainsbury/Radio NZ Intl; *DX Window*; *Observer*, Bulgaria; ODXA/DX Ontario; Media Network/Radio Netherlands; Prime Time SW, Larry Van Horn N5FPW, MT Asst. Editor; Loyd Van Horn W4LVH/WWNC, Asheville, NC; Alexander Yegorov, Kiev, Ukraine; *Hard Core DX*; *NASWA Journal*; *WWDX*.



The New Year's Eve Deadline is Near!

We will be doing more than celebrating the first half of the first decade of the new century this year on December 31, 2004.

If you read this column on a regular basis you know that as of January 1, 2005, all radio systems in the 162-174 MHz range have to be narrowband and spacing in this band is now a standard 12.5 kHz instead of the old "all-over-the map" spacing under the old bandplan.

I invite all our *Milcom* readers to check this VHF government band, especially if you live near any military installation. The goal here is to see if the base is still using any of their older assignments that might have to be abandoned because the equipment might not meet the new NTIA standards.

Also watch for new APCO-25 digital signals popping up in this band as well as the digital signals from trunk control channels. You can hear samples of what these signals sound like by visiting Lindsay Blanton's *RadioReference.com* website at the URL below: <http://www.radioreference.com/modules.php?name=Content&pa=showpage&pid=3>

❖ New England Base Made the Changeover

One example of the sort of changeover mentioned above was recently observed by one of our regular *MT Milcom* reporters, "The Researcher."

Monitoring from his listening post in the New England area he observed first hand the major changeover the base made to their new APCO-25 digital conventional frequencies at the Joint Air Reserve Base in Westover, Massachusetts. Here are the new frequencies that have been observed so far:

| | |
|----------|---|
| 138.0750 | Base Law Enforcement/Security repeater output (input 148.4625) |
| 138.3250 | Aircraft Maintenance Net #1 repeater output (input 150.2875) |
| 138.9625 | Base Fire Department repeater output (input 150.5125) |
| 139.2375 | Base Civil Engineering simplex |
| 139.9875 | Aircraft Maintenance Net #2 repeater output (input unknown) |
| 140.7875 | Aircraft Maintenance Net repeater output (input 150.7875) |
| 142.1750 | Aerial Port, Fleet and Passenger Service repeater output (input 148.8625) |
| 142.4500 | Communications Squadron Repair repeater output (input unknown) |
| 143.6500 | Aircraft Maintenance Net, Base Operations and Transit Alert simplex |
| 148.4625 | Base Law Enforcement/Security repeater input (output 138.075) |

| | |
|----------|--|
| 148.8625 | Aerial Port, Fleet and Passenger Service repeater input (output 142.175) |
| 149.0375 | Base Operations and Tower Ground Control simplex |
| 150.2875 | Aircraft Maintenance Net #1 repeater input (output 138.325) |
| 150.5125 | Base Fire Department repeater input (output 138.9625) |
| 150.7875 | Aircraft Maintenance Net repeater input (output 140.7875) |

Now the challenge for our New England reporter is to find the tactical and fireground simplex frequencies used by base security, the fire department and others. He has also noted that some of the old analog nets still have limited activity. These include:

| | |
|----------|------------------------------------|
| 165.1375 | Transit Alert/Aircraft Maintenance |
| 163.5875 | Aircraft Maintenance |
| 173.5625 | Medical Net |

Many thanks to the Researcher for his on scene report.

❖ National Capitol Region P25IP Trunk Systems

Shortly before we went to press last month I was informed that a second 380-399.9 MHz trunk system in the nation is being tested in and around the nation's capitol. Since this only came from one source and I had no way to verify what was actually happening on the ground, I held off reporting it in the *Milcom* column until this month.

I have now received several field reports and some additional background information on this new system (repeater output/input).

| | |
|-------------------|-------------------|
| 386.1825/396.1825 | 386.9875/396.9875 |
| 387.0625/397.0625 | 388.1125/398.1125 |
| 388.1375/398.1375 | 388.1625/398.1625 |
| 388.1875/398.1875 | 388.2125/398.2125 |
| 388.2625/398.2625 | 388.3125/398.3125 |
| 388.3375/398.3375 | |

According to one source, the frequencies above are associated with one of the two wide area, multi-site, P25 (APCO-25) systems in the Washington, DC, area that are in the process of being built out in this band. We have the following information from the system contractor M/A-COM on this new National Capitol Region P25IP trunk system.

"The National Capitol Region [is] to be the home of the first DoD P25 trunked IP communication system, providing secure base

communications and network first interoperability with first responders to deploy and link critical communications to more than 5,000 Army base personnel in and around the National Capital Region (NCR). Deployed by the Army's DOIM (Director Of Information Management) for Department of Defense (DoD) users, M/A-COM's P25IP Trunked IP Communications System, in combination with its Network First Interoperability System, will be the first deployment of its kind in the Nation's armed forces.

"The contract is a 'turnkey,' completely integrated, Land Mobile Radio system that will link 10 Army installations in the NCR region and will include site preparation, equipment, implementation, testing and maintenance of the system. The system also will include several sites located outside the National Capital Region in Maryland and Virginia. General Dynamics Wireless Services, a unit of GD Network Systems, is M/A-COM's subcontractor for site preparation work, site management, equipment installation, and life cycle maintenance.

"This IP-based network solution will facilitate interoperable communications, via its NetworkFirst system with approximately 60 civilian public safety agencies located in both the National Capital Region and in suburban Maryland and Virginia. These agencies are currently communicating on different frequencies and have disparate radio systems throughout the NCR.

"The new system, called P25IP, combines the P25 air link standard with the power of IP packet technology in a trunked voice and data communications system. The M/A-COM system will dramatically improve the existing communications capabilities, providing a more secure and highly reliable and interoperable digital communication system.

"The digital system supports P25 trunking standard features and DES encryption for secure communications. This system will operate using DoD UHF spectrum in the 380-399.9 MHz frequency range. Additionally, the system meets the NTIA Narrowband mandate and the guidelines set forth in the Deputy Secretary of Defense's *Policy Letter for LMR Systems* and the *Army Plan for Narrowband Systems Operating in the Land Mobile Radio Spectrum*. M/A-COM's system employs fault-tolerant P25IP technology that supports current operational requirements, in addition to addressing future growth, scalability, and interoperability."

In addition to the system above, another trunk system control channel on 385.7125/395.7125 and two of its associated digital voice channels have been discovered by Eric Cottrell. We are not sure at this time if this system is part of the NCR P251P system we discussed above, but one source indicates it is not. APCO-25 digital voice communications have been heard in association with this system on: 386.2125/396.2125 386.5625/396.5625 386.8125/396.8125 MHz

Eric says that this system's repeater site appears to be in northeast Washington, DC, or Maryland. One of the users of the system was identified as Walter Reed Medical Center.

With the Presidential Inauguration Ceremony scheduled for next month (if we get all the votes counted and lawsuits out of the way), these trunk systems could provide some interesting listening. I want to thank Al Dudley, Eric Cottrell, Alan Henney and several other members of the SCAN-DC newsgroup who supplied observations above and hope we can get additional information on these multiple DC trunk systems soon.

I am also looking for monitor information on the new Eglin AFB, Florida, 380-399.9 MHz LMR trunk system and I encourage all our *Milcom* monitoring family to continue to watch this new land mobile band for possible activity in your area.

❖ Fort Gordon UHF Trunk System

A long time supporter to this column, Mark Shelton down in Mitchell, Georgia, has been monitoring the new base trunk system at Fort Gordon near Augusta, Georgia. Here is Mark's report on that Motorola exclusive digital system.

Fort Gordon
System Type: Motorola 9600 baud ASTRO Project 25 Standard, IMBE Exclusive
System ID: 01C

Base Frequency: 406.100, Spacing: 12.5 kHz, Offset: 8192 (Pro-96)/380 (Uniden)
There are five towers for the system, but Tower 101 is the most active at this time.

Frequencies:
Tower 101 409.7000 406.1125 406.5000
406.7625 407.0750 407.5000
407.7625 407.8875 408.0500
408.3625

Tower 102 406.1625 407.9625 408.1250
Tower 103 407.8125 410.5500 410.7625
Tower 104 410.5625
Tower 105 408.0875 409.3625 410.9000

Talkgroups.

2 Military Police
11 Ft. Gordon Fire Department
15 Fireground 3
27 Range control (firearms range, Preston Drop Zone)
53 Ft. Gordon EMS
152 Unknown user/usage (encrypted)

❖ More Frequency Changes/ Spectrum Holes Found

Jack NeSmith checks in with the following frequency changes courtesy of the military NOTAM system.

227.125 MCAS Yuma, AZ Ground Controlled Approach (GCA), ex-254.0
241.175 Laguna AAF, AZ (Yuma Proving Ground) Air-Ground Facility, ex-241.0
251.075 FAA Kansas City International, MO Approach Control

266.400 FACSAC Pearl Harbor, HI Primary [Hula Dancer]
269.325 FAA Gainesville Regional, FL usage unknown, ex-257.75
279.525 MCAS Yuma, AZ GCA, ex-301.2
289.400 Ellsworth AFB, SD Approach Control
294.700 FAA Kansas City International, MO Approach Control
305.700 MCAS Cherry Point, NC Base Operations
307.225 FAA Savannah, GA Remote Transmitter/Receiver (RTR)
317.725 FAA Birmingham International, AL RTR, ex-377.150
322.350 NAS Fallon, NV Desert Control
336.800 FACSAC Pearl Harbor, HI Secondary [Hula Dancer]
353.675 NAS Jacksonville, FL Clearance Delivery
396.000 Ellsworth AFB, SD Approach Control

And the Southcom Key West, Florida, Flight Monitoring Facility, callsign "Smasher," uses the following HF frequencies (USB): 8120 11410 15025 kHz. Thanks, Jack, for the updates.

❖ National Guard HF ALE Addresses Change

Thanks to a tip from Jack Metcalfe, Maryland's Ron Perron has been collecting the new ALE identifiers being used by the National Guard.

The fact that they appear to be structured in line with the 10 FEMA regions, leads Ron to believe that they are used by regional National Guard Headquarters when communicating with the National Guard elements assigned to each state's Emergency Operations Center (EOC). Some of the new style identifiers are being used by Weapons of Mass Destruction Civil Support Teams (WMD-CST), although I don't believe that all of these new identifiers are WMD-CST units.

Here's the information he has collected so far:

Frequencies (USB/ALE): 4924.5 5847.0 6809.0 8047.0 10816.5 14653.0 16338.5 20906.0 kHz. These are frequencies allocated to State National Guard headquarters.

ALE Addresses:
HQ701N Probably NG HQs (Arlington VA)
HQ703N Probably NG Readiness Center (Arlington VA)
Unknown user
WD1 West Virginia
WV3

FEMA Region 1
C010TN Connecticut
R010IN Rhode Island
M010EN Maine
M010AN Massachusetts
V010TN Vermont
N010HN New Hampshire

FEMA Region 2
N020YN New York
N020JN New Jersey
P020RN Puerto Rico
V020IN Virgin Islands

FEMA Region 3
W030VN West Virginia
M030DN Maryland
D030EN Delaware
P030AN Pennsylvania
V030AN Virginia
D030CN Washington DC

FEMA Region 4
G040AN Georgia
K040YN Kentucky
F040LN Florida
T040NN Tennessee
M040SN Mississippi
N040CN North Carolina
S040CN South Carolina
A040LN Alabama

FEMA Region 5
O050HN Ohio
M050IN Michigan
I050NN Indiana
M050NN Minnesota
MN55CSTNGB 55th WMD CST Unit, Minnesota

FEMA Region 6
T060XN Texas
TXC06NG 6th WMD CST Unit, Texas
N060MN New Mexico
L060AN Louisiana
O060KN Oklahoma
OKC63NG 63rd WMD CST Unit, Oklahoma
A060RN Arkansas
ARC61NG 61st WMD CST Unit, Arkansas

FEMA Region 7
I070AN Iowa
K070SN Kansas
N070EN Nebraska
M070ON Missouri

FEMA Region 8
C080ON Colorado
I080AN Iowa
M080TN Montana
U080TN Utah
W080YN Wyoming
S080DN South Dakota
N080DN North Dakota

FEMA Region 9
A090ZN Arizona
H090IN Hawaii
C090AN California
G090UN Guam

FEMA Region 10
W010AN Washington State
I010DN Idaho
O010RN Oregon
A100KN Alaska

Ron has also seen an ALE address PMTRCS/PMTRCSHFON. He believes the letters stand for Program Manager for Tactical Radio Communications Systems and has seen this address communicating with several of the new identifiers. Perhaps they are evaluating or checking on the deployment of their radio systems to these units.

❖ 'Tis the Season!

For the 50th year in a row, the men and women of NORAD will be following the track of a certain jolly old fellow on December 24-25, 2004. They will star their annual coverage of this event after November 25 at <http://www.noradsanta.org/>.

And on behalf of the entire staff here at *MT* headquarters and my family I want to wish each of you a safe and happy holiday season. 73 and good hunting.



Railscanning

Welcome to another column on scanning the railroads both for fun and for learning how today's corporate railroads function in their daily operations. We will cover various classes of railroad, including some industrial lines and a government railroad.

Several readers have sent the rail radio frequencies used in their locales to share with our readers. We will print these frequencies for use in your scanners and to illustrate the variations within the railroad radio frequency spectrum.

❖ Rail radio from NE Ohio

Dale from Ohio sends his favorite RR radio frequencies from eastern Ohio. Dale listens to the Wheeling and Lake Erie, and the Ohio Central. The W&LE is considered a regional railroad and the Ohio Central is a short line.

The W&LE uses 161.025 MHz for its main operating channel and sometimes uses 161.250 MHz for switching and other operations.

System-wide, the Ohio Central uses radio channel 160.215 MHz and has a repeater channel on 160.845 MHz, which is used north of Coshoc-ton, Ohio.

Dale also mentioned that many of the VHF railroad antennas mounted atop locomotives look like beer cans. These are called, not "beer cans," but "Firecrackers" and are used by a number of railroads. They have unity gain and are rugged in their design.

He mentioned another antenna that appears bent and parallel to the roofline of the locomotive. This antenna is folded for clearance issues and may be either a Sinclair or Excalibur type antenna. A number of railroads, like the CSX, merely use a whip for their radios atop the locomotive cab. An Excalibur style antenna may also be used for the UHF communications from the rear-end detector.

❖ Other Frequencies from Readers

Let's explore some RR radio frequencies from around the country.

Kansas

Blue Angel Eric from Emporia, Kansas, sends along Burlington Northern Santa Fe (BNSF) radio frequencies for this area of America's farmland. Please note the following:

- 160.650 MHz Road channel: Emporia Subdivision
- 161.145 MHz Road channel: Topeka Subdivision

- 160.935 MHz Road channel: LaJunta Subdivision
- 161.370 MHz Emporia Yard
- 161.010 MHz Maintenance of Way
- 160.425 MHz PBX output west of Emporia
- 160.335 MHz PBX output east of Emporia
- 452.900 MHz Dispatcher link: Olivet to Emporia Tower (both sides of conversation)
- 457.900 MHz Dispatcher output to Olivet
- 457.900 MHz DPU (Distributed Power Units) for grain trains

We wish to thank Eric for his list, which shows both VHF and UHF channels being used for railroad communications and some new uses for rail radio.

Wisconsin

Tom Heiderer is from the Milwaukee, Wisconsin, area. We have been corresponding for weeks on what channels he listens to in the state of Wisconsin. Tom noted that he has ridden a train on the tourist railroad, Wisconsin Great Northern in Spooner. Their website is <http://www.spoonerrtrainride.com>.

The Wisconsin Great Northern has Channel 1 (160.575 MHz) as an alternate channel and Channel 2 (161.265 MHz) for their General Operations. Tom monitored Channel 2 while riding the train.

Tom also sent information about the Tomahawk Railroad in its namesake city in Wisconsin. Here are the channels that are in use:

- 160.290 MHz Channel #1: General Operations
- 160.740 MHz Channel #2: Administrative

Locally in Milwaukee, Tom listens to both the Union Pacific and the CP Rail (Canadian Pacific). Here are the Union Pacific channels in the Milwaukee area, including Butler Yard:

- 160.485 MHz Road: Milwaukee Subdivision
- 160.890 MHz Road: Adams Subdivision
- 161.040 MHz Road: Kenosha & Shoreline Subdivisions
- 160.455 MHz Maintenance of Way (M of W) and Butler Yard channel
- 161.175 MHz Jones Island and Butler Yard channels

The CP Rail has the following radio frequencies in use for Milwaukee:

- 160.770 MHz Road: Chicago to Milwaukee
- 161.520 MHz Road: West of Milwaukee
- 160.725 MHz Glendale Yard
- 161.085 MHz Yard and M of W
- 161.370 MHz Burnham Bridge Yard
- 161.430 MHz General Yardmaster

We wish to thank Dale, Eric, and Tom for their contributions to *MT* and invite others to share their railroad radio frequencies with us.

Portland, Oregon

The Oregon Pacific Railroad Company owns the Molalla Western and Portland Traction in the Portland area. The following radio channels are used (provided by the railroad):

- 161.190 MHz General Operations
- 161.190/160.575 MHz Portland Traction Repeater
- 161.445 MHz General Operations
- 161.190/160.575 MHz Molalla Western Repeater
- 161.340 MHz Switching
- 161.550 MHz Union Pacific Road
- 161.310 MHz Union Pacific Brooklyn Yard
- 160.320 MHz Union Pacific Brooklyn Yard
- 160.575/160.335 MHz Special Repeater
- 452.900/457.900 MHz Repeater link
- 452.950/457.950 MHz Locomotive remote control



Norfolk Southern train 15E with Union Pacific run-through power at NE Junction.

Proctor, Minnesota

The Canadian National (CN) has purchased the Duluth, Missabe, and Iron Range Railroad Company (DMIR) in Proctor, Minnesota. Prior to the purchase, the DM&IR radio engineer had sent me an extensive listing of their radio channels. Since the American Association of Railroads (AAR) frequency coordinator had their radio channels already in place, probably little has changed since the acquisition. I will list the channel usage below. Please send any corrections to my attention for publication.

| | |
|-------------|--|
| 160.230 MHz | Yard Operations |
| 160.290 MHz | Duluth Ore Docks Operations and Maintenance |
| 160.320 MHz | M of W Repeater Service |
| 160.350 MHz | South Subdivision dispatcher |
| 160.680 MHz | M of W |
| 160.800 MHz | North Subdivision dispatcher |
| 160.890 MHz | Union Pacific Joint Operations with DMIR Dispatcher |
| 161.055 MHz | Two Harbors Ore Docks Data |
| 161.100 MHz | BNSF Joint Operations with DMIR Dispatcher |
| 161.175 MHz | Union Pacific Joint Operations with DMIR Dispatcher |
| 161.205 MHz | Canadian National (CN) Joint Operations with DMIR Dispatcher |
| 161.235 MHz | Two Harbors Ore Docks Data |
| 161.280 MHz | Two Harbors Ore Docks Operations and Maintenance |
| 161.340 MHz | M of W Repeater Service |
| 161.385 MHz | BNSF Joint Operations with DMIR Dispatcher |
| 161.415 MHz | CN Joint Operations with DMIR Dispatcher |
| 161.520 MHz | CP Rail Joint Operations with DMIR Dispatcher. |

Akron, Ohio

Paul Fafrak from the Akron, Ohio, area has also snail mailed in a list of radio channels he listens to in his area. He also listens to the Wheeling and Lake Erie Railroad in the Brewster area.

| | |
|---------------|------------------|
| CSX Railroad: | |
| 160.230 MHz | Road |
| 160.320 MHz | "AT" Dispatcher |
| 160.530 MHz | Akron Yardmaster |
| 160.785 MHz | M of W |

| | |
|-------------------------|---|
| Wheeling and Lake Erie: | |
| 161.025 MHz | Road and dispatcher channel |
| 161.250 MHz | Akron Brittain Yardmaster and switching |
| 160.440 MHz | Yard |

| | |
|------------------------------------|--------------------|
| Akron, Barberton Cluster Railroad: | |
| 160.650 MHz | General Operations |

| | |
|---------------------------------|------------------------------|
| Cuyahoga Valley Scenic Railway: | |
| 160.965 MHz | Tourist/excursion operations |
| 161.325 MHz | Alternate channel |

| | |
|-----------------------|--------------------|
| R.J. Cormar Railroad: | |
| 160.455 MHz | General Operations |

| | |
|----------------------------|-----------------------|
| Norfolk Southern Railroad: | |
| 161.070 MHz | Road - Cleveland Line |
| 161.055 MHz | M of W |
| 161.130 MHz | M of W |

Thanks, Paul! We appreciate your frequencies and hope others will contribute their railroad radio frequency lists.

Snowflake, Arizona

Here are a few radio frequencies from my

own files. The Apache Railway in Snowflake, Arizona, uses all ultra-high frequencies (UHF) for their operations. Note the frequencies used with some having repeater pairs:

| | |
|---------------------|---------------------|
| 452.900/457.900 MHz | Road and dispatcher |
| 453.7375 MHz | Yard |
| 452.825/457.825 MHz | Holbrook Yard |

❖ RailAmerica's New Regional Railroad

RailAmerica's Chicago, Fort Wayne and Eastern Railroad (CFWE) began operations August 1, 2004, on ex-CSX, ex-Conrail, ex-Penn Central, ex-Pennsylvania Railroad Chicago mainline from Crestline, Ohio, through Lima, Fort Wayne and into Chicago. The CFWE is leasing the trackage from the CSX.

Trains originate on the west-end in the Indiana Harbor Belt (IHB) Riverdale Yard and use the IHB 160.485 MHz frequency to Tolleston Junction. The Norfolk Southern channel 160.440 MHz is used for a short distance until the trains switch to the NS 161.490 MHz while traveling to Mike Tower at Fort Wayne. The CFWE uses NS terminal channel 160.380 MHz at Mike and then switches to the old CSX road channel of 161.070 MHz to Crestline. I have also heard the crews switching on 160.545 MHz at SDI Steel west of Fort Wayne. The crews have mentioned that they have one more switching channel they use, but no verification of which one.

Neither RailAmerica nor the CFWE has any outstanding requests for new radio channels with the AAR Frequency Allocation Planner or the Federal Communication Commission as of September 2004. Please continue to monitor this railroad for future radio traffic.

❖ Industrial Yards

The BRC, Chicago, Illinois

The Belt Railway of Chicago is a terminal railway with two humps (see August column) in operation. The BRC classifies many trains for its owner railroads. The radio channels the Belt uses are:

| | |
|-------------|--------------------------|
| 160.500 MHz | Road and dispatcher |
| 160.380 MHz | West Yard |
| 161.445 MHz | East Yard |
| 160.965 MHz | Clearing Yard hump |
| 161.295 MHz | Car shop and diesel shop |
| 160.695 MHz | M of W |
| 161.205 MHz | Police |

BS in Alabama

The Birmingham Southern operates around the Fairfield, Alabama, area. The Birmingham Southern is a steel mill road and has nine switching channels for each of its crews. Its railroad radio frequencies follow:

| | |
|-------------|----------------------------|
| 160.290 MHz | Road and dispatcher |
| 160.335 MHz | Koppers Coke Mill switcher |
| 160.425 MHz | Switching |
| 160.560 MHz | Switching |
| 160.575 MHz | Switching |
| 160.755 MHz | Switching |
| 160.815 MHz | Switching |
| 161.325 MHz | Switching |
| 161.385 MHz | Switching |
| 161.445 MHz | Switching |
| 161.535 MHz | Switching |

| | |
|-------------|------------------------------------|
| 161.025 MHz | 34th Street Yard - Ensley switcher |
| 160.890 MHz | M of W and dispatcher |

Cincinnati's Queensgate Yard

CSX Transportation operates Queensgate Yard in Cincinnati, Ohio. This sprawling yard has numerous radio frequencies coordinating its activities in Queensgate. The radio channels are:

| | |
|---------------------|-------------------------------|
| 160.530 MHz | Yard |
| 161.160 MHz | Yard and industrial switching |
| 160.290 MHz | Pulldown |
| 160.410/161.340 MHz | Car Dept. repeater |
| 160.785 MHz | M of W and Signal Dept. |
| 160.875 MHz | Police - Ch. 1 |
| 160.605 MHz | Hump |
| 160.425 MHz | Pulldown 1 |
| 160.635 MHz | Pulldown 3 |
| 160.455 MHz | Car Dept. |
| 161.295 MHz | Police - Ch. 2 (Portables) |
| 452.950/457.950 MHz | Hump speed control |

A Northern Texas Switching Road

The Panhandle & Northern Railroad in Bolger, Texas, switches local petroleum and chemical plants in this northern Texas town. The following are the channels that the railroad uses for its operations.

| | |
|-------------|--|
| 161.085 MHz | Ch 1 Switching at Hoechst-Celanese, at Pampa |
| 160.650 MHz | Ch 2 BNSF interchange at Panhandle |
| 160.995 MHz | Ch 3 Switching at Phillips Petroleum, at Borger |
| 160.965 MHz | Ch 4 Borger local switcher and Borger-Panhandle local |
| 160.815 MHz | Ch 5 Borger local switcher and local carbon black plants |

❖ And More...

Railroads to Space!

NASA's Kennedy Space Center at Cape Canaveral, Florida, even has a radio frequency for the operation of their rail system for moving their rockets and space shuttles on the base. NASA uses 413.125 MHz for these railroad operations.

FRED at the end of the train

Don't forget to monitor the normal FRED (flashing rear-end detector) channels while listening into the rail chatter. The Norfolk Southern uses a VHF FRED on 161.115 MHz that has a very strong signal!

Las Vegas Monorail Company

The Las Vegas Monorail System is opening a monorail system for passengers to get around on the Strip. They have applied with the FCC for the following railroad radio frequencies: 160.260, 160.335, 160.410, 160.455, 160.485, 160.980, 161.055, 161.130, 161.205, and 161.415 MHz. They also have applied for a license on 911.5 MHz and 918.5 MHz, so be listening to see what the uses are for each frequency.

❖ Until next time

Be sure to send in your lists of favorite radio frequencies to be printed in this column. Your contributions will help make this column a success. All contributions of correct railroad radio frequencies are welcome.

KFAR and Radio Santa Cruz Busted by FCC

At about 10:00 am on September 15, personnel from the Federal Communications Commission and federal marshals shut down FM pirate KFAR, Knoxville First Amendment Radio in Knoxville, TN. The photo that we see here was taken by the station staff at the time of the bust. Thus, the station's former broadcasts on 90.9 MHz are no longer heard on the Tennessee airwaves.

The station's web site at <http://kfar.org/> on the internet remains active, so additional news on the station's future will continue to be available there. The station reports that much of their equipment was confiscated. The FCC has not yet levied other penalties and fines in this case, but those are probably pending. Some, including the Associated Press, have reported that station DJ's are remaining anonymous, in hopes of avoiding personal fines in this incident.



In a public statement, KFAR complained that the government had devoted considerable effort and taxpayers' money to busting a station that used only 100 watts, "about the power of the average light bulb."

In a different bust, FCC personnel and federal marshals also raided FM pirate Free Radio Santa Cruz in California on September 29. This station on 101.1 MHz had some political support from the local city council, but its equipment was nevertheless seized by federal authorities. The *Santa Cruz Sentinel* reported that federal authorities complained that local Santa Cruz police failed to respond to a federal request for backup help during this bust. The station still maintains a web site presence at <http://www.freakradio.org> if you want to hear their programming. The *Santa Cruz Sentinel* also reported that the station has future plans to return to the FM broadcasting band despite the bust.

Readers of *Monitoring Times* are aware that although much broadcasting material by unlicensed stations is entertaining and an interesting DX challenge, the stations remain illegal under federal law, since they lack broadcasting licenses. Occasionally

the FCC continues to exercise its authority to shut down some of the unlicensed stations.

One other local FM pirate that has been under FCC threat for quite some time now, **Radio Free Brattleboro** on 107.9 MHz in Brattleboro, VT, remains on the air via an unlicensed FM transmitter, and can also be heard over the internet. You can hear them even outside New England at their <http://www.rfb.fm/> internet web site.

An interesting internet resource for FM pirate broadcasting is the Minneapolis-based **Radio Revolt** advocacy site at <http://projects.walkerart.org/radio/> on the internet. This grass roots group held numerous "how-to" workshops on low power broadcasting in Minneapolis and St. Paul during the fall.

❖ Schoech's QSL Information Page

Martin Schoech, the longtime director of the wonderful *Clandestine Radio Watch* newsletter, reports that he has once again updated his very interesting QSL information pages. They can be reached at <http://www.schoechi.de/qip.html> on the internet. Since the political clandestine scene is constantly changing, this one would be a good one to put in your internet browser.

❖ Europirate Season

Now that winter DX conditions are returning, the number of European pirate stations that can be heard in North America is on the increase. Most of these stations make excellent DX catches, particularly for those of us who do not live right near the Atlantic Ocean. But, we had several reports this month on **Jolly Roger Radio**, a pirate on 6240 kHz, which has been responding to reception reports sent to either PO Box 39, Waterford, Ireland, or their JR_Radio@hotmail.com e-mail address.

Most European pirates that can be heard in North America operate in the frequency range just above the 49 meter band that Jolly Roger Radio has been using. But, their frequency use can be erratic, and it pays to tune around the band near 6210-6310 kHz on weekend evenings, particularly near your local sunset, as you try to find these interesting targets.

❖ What We Are Hearing

Monitoring Times readers heard over 20 different North American shortwave pirate broadcasters this month. Pirate radio stations use sporadic schedules, but shortwave pirate broadcasting increases noticeably on weekends and during major holiday periods. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but the primary North American pirate

frequency of 6925 kHz, plus or minus 30 or 40 kHz remains the best place to scan for the pirates. More than 90% of all North American shortwave pirate broadcasts are heard on or near 6925 kHz.

Dead Cat Radio- Only station identifications so far. (None)

Dorm Radio- Newcomer to the pirate bands, specializing in Cheech and Chong comedy routines. Unknown if they actually broadcast from a college residence hall. (None)

Hang Ten Radio- Another new pirate, oldies rock format dominated by surfing tunes. (None, but asks for reports to the Free Radio Network)

Hippie Radio- Dr. Who is the announcer on this new one featuring rock music. (Uses theedrwho@yahoo.com e-mail)

James Bond- Although widely heard by our readers with plenty of identifications, little information known so far about this new rock music station. (None)

KIPM- Alan Maxwell's elaborate existential dramas, most starring himself, generate praise and puzzlement. (Elkhorn)

NAM- New pirate operation, so far programming rock music. (None)

Partial India Radio- Parody of **All India Radio**. Sometimes relays other stations. (Stoneham)

Radio First Termer- Dave Rabbit's documentary about psychedelic radio stations active in Viet Nam during the war, via an unknown relay. (None)

Radio Three- Sal Amoniac has returned to the air after a long absence. One of the first pirates to simply number his station. (Belfast)

Random Radio- Another new one; a mix of rock and country music. (None yet)

The Crystal Ship- Somebody named "The Poet" has been airing a reactivation of this classic pirate station from the 1970s. Characters such as Saddam Hussein who mix with their rock music suggest that these are new shows. (Belfast)

Undercover Radio- Dr. Benway is almost a prototype North American pirate, with his format of rock music and humor about pirate radio. (Merlin)

Voice of the Pink Puma- This new one has been spicing its rock music with movie sound effects. (None)

Voice of Sector Zulu- This new jazz pirate has been heard by our readers, but details on its operation remain sparse. (None)

WAZU- This fall featured rock and comedy, spiced by an unexpected appearance of the hilarious Fearless Fred of **Radio Garbanzo**. (Belfast)

WBNY- Commander Bunny of the Rodent Revolution no longer waits for Easter to transmit his shows. (None)

WBMR- Rock music shows from Mike O'Farad at Black Mountain Radio. (Uses wmbrradio@hotmail.com e-mail)

WHYP- James Brownyard and his comedy sidekicks in North East, PA, may be the most prominent pirate station on the shortwave bands today. (Providence)

WMPR- The "dance party" techno rock format of this pirate is familiar to almost all pirate DXers. Normally heard at least a couple of times a month on 6925 kHz. (None)

Y-108- A relay of a Hamilton, Ontario, FM station on 6925 kHz. Relays like this have been occasional features of the pirate band for decades. (None)

continued on next page

Emergency Radio

Suppose when you think of radio in emergencies, you think first of the public-safety services. The Hurricane Watch Net on 14.325; storm-chasing aircraft on HF; local police and fire officials on VHF/UHF all play an important part in keeping us safe. Despite frequent criticism of large group broadcasters, they too play an important part. Broadcast radio provided valuable information in the recent hurricanes in Florida and the Gulf and Atlantic coasts.

People tend to prefer television as a source of information in emergencies. But few people have battery-powered TV sets. When the power goes out, TV ceases to be a useful information source. (For that matter, even if the power is still on, if the local cable TV service goes down many TV sets cease to be useful.) This is when radio takes over.

Peter Vieth forwarded an item from the *Washington Post* about WCVU-104.9 in Florida. Hurricane Charley blew the roof off the WCVU studios, but spared enough equipment to allow the station to return to the air, on generator power, four hours after the storm. WCVU and its sister stations promptly dropped their normal music programming and switched to continuous storm-relief information. Who's got ice for sale? Where can you find drinking water? When will garbage pickup start again? All the mundane questions that are critically important to those whose normal lives have been blown apart by a storm – radio had the answers.



Two large AM stations in particular are well-known for providing valuable information during hurricane emergencies. WWL-870 in New Orleans and WOKV-690 in Jacksonville both air continuous emergency information. The WWL identification announcement may take awhile during emergencies – as the station is relayed by a long list of other Southern Louisiana outlets... And while the hurricane season is long over, other emergencies can happen. These are two of the first frequencies to check when they do.

Yes, there's a DX link here! FCC regulation 73.1250 specifically authorizes AM stations to operate with daytime facilities at night when necessary during an emergency. In almost all cases, AM stations' daytime facilities are more powerful than their night facilities. Stations broadcasting emergency information will be much easier to DX. If you become aware of an emergency occurring in a distant part of the country, look up a few of that area's AM stations and check out their frequencies. You might log some rare DX.

❖ K, W... and X

Reader Henry Bartholomew wrote from the Bay Area with a question. Henry was commenting on some shuffling in baseball play-by-play broadcasts in Southern California; the San Diego Padres have moved from KOGO-600 to XPRS-1090, while the Anaheim Angels are no longer on XPRS. Henry asks, "...don't all U.S. AM stations have to use K or W as their beginning letter? Did a law change this rule?"

No, the rule is still in effect: the call letters

few pirates will occasionally QSL a report left on the FRN.

❖ 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: Dave Balint, Wooster, OH; Jerry Berg, Lexington, MA; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Harold Frodge, Midland, MI; Harry Helms, Wimberly, TX; Chris Lobdell, Stoneham, MA; Larry Magne, Penn's Park, PA; Greg Majewski, Oakdale, CT; Pancho Villa, Upstate NY; Lee Reynolds, Lempster, NH; Martin Schoech, Eisenach, Germany; Jerry Strawman, Des Moines, IA; John Sedlacek, Omaha, NE; Robert E. Thomas, Bridgeport, CT; Niel Wolfsh, Toronto, Ontario; and Robert Zeller, Knoxville, TN.

assigned to U.S. broadcasting stations (whether AM, FM, or TV) must begin with either K or W. These two letters are assigned to the United States by international treaty. (So are N and A if the A is immediately followed by a letter between A and L. However, it's FCC policy to not use N or A for broadcast stations.) You might notice that these letters are also used in other radio services – all U.S. ham calls start with K, W, N, or A; if you copy the Morse Code ID of your local police department base station, it will start with K or W as well.

So how does XPRS get away with a callsign beginning with X? It's not a U.S. station. XPRS's transmitter is located in Mexico, between Ensenada and Tijuana. Programs are beamed across the border from San Diego for transmission. The letter X (if immediately followed by a letter between A and H) is assigned by international treaty to Mexico. Actually, the call letters of this station are XEPRS; Mexican government policy is to use XE as the first two letters of all AM callsigns. XH is used for FM and TV stations in most cases. I know XETRA-FM used to identify in Spanish at least twice an hour, and the Spanish ID contained the full callsign.

There are other stations transmitting in English from northwestern Mexico for a U.S. audience in San Diego. "Extra Sports" 690 XETRA is a Mexico-based station; so are "91-X" (XETRA-FM 91.1) and XETV (the Fox affiliate for San Diego, which transmits on channel 6). An FM station in Juarez broadcasts in English for the El Paso, Texas, market.

❖ More IBOC

While we're south of the border... Mexico has its first In Band On Channel station. XEN-690 in Mexico City is experimenting with digital radio. This part of the dial is unusually crowded in the capital; there are full-powered stations on 660, 690, and 710. If XEN can make IBOC work with a 100-kilowatt station 20kHz away, it'll work anywhere<grin>!

The National Radio Club's *DX News* reports KFI-640 Los Angeles has begun using IBOC during the day. I've not heard of any other new AM IBOC operations recently. A number of FM stations in Boston and Philadelphia began IBOC operation in early October.

❖ 'Til next month

Nobody's lost (or "un-lost") a license this month! Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

Outer Limits continued from previous page

❖ 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 14895; PO Box 69, Elkhorn, NE 68022; PO Box 146, Stoneham, MA 02180; PO Box 28413, Providence, RI 02908; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins 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@jccan.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, and a

SATELLITE SERVICES

MT TRANSPONDER GUIDE www.monitoringtimes.com/mtssg.html

All Frequencies MHz

Robert Smathers

robertsmathers@monitoringtim

Telesat Canada Anik F2

| Ku-band | - 111.1 degrees West longitude |
|---------|--|
| T1(V) | 11714 Data Transmissions / Saskatchewan CommunicaNetwork (SCN) (digital) |
| T2(M) | 11744 Data Transmissions |
| T3(V) | 11775 Data Transmissions |
| T4(V) | 11807 Data Transmissions / Private Business Networks (digital) |
| T5(V) | 11836 Data Transmissions / Private Business Networks (digital) |
| T6(V) | 11867 Data Transmissions |
| T7(M) | 11897 Data Transmissions |
| T8(V) | 11928 Data Transmissions |
| T9(V) | 11960 Occasional video |
| T10(V) | 11990 Occasional video |
| T11(V) | 12020 Star Choice DBS (digital) |
| T12(V) | 12051 Star Choice DBS (digital) |
| T13(V) | 12081 Occasional video |
| T14(V) | 12113 Star Choice DBS (digital) |
| T15(V) | 12140 Star Choice DBS (digital) |
| T16(V) | 12172 Data Transmissions |
| T17(H) | 11725 Data Transmissions |
| T18(H) | 11756 Data Transmissions |
| T19(H) | 11786 Data Transmissions |
| T20(H) | 11817 Data Transmissions |
| T21(H) | 11850 Data Transmissions |
| T22(H) | 11880 Star Choice DBS (digital) |
| T23(H) | 11910 Data Transmissions |
| T24(H) | 11940 Star Choice DBS (digital) |
| T25(H) | 11971 Star Choice DBS (digital) |
| T26(H) | 12002 Star Choice DBS (digital) |
| T27(H) | 12033 Star Choice DBS (digital) |
| T28(H) | 12063 Star Choice DBS (digital) |
| T29(H) | 12094 Star Choice DBS (digital) |
| T30(H) | 12124 Star Choice DBS (digital) |
| T31(H) | 12155 Occasional video |
| T32(H) | 12180 Star Choice DBS (digital) |

Satelites Mexicanos Solidaridad 2

| C-Band | - 113 degrees West longitude |
|---------|--|
| 1N(V) | 3720 Television Par Cable (digital) |
| 1W/L(H) | 3740 Data Transmissions |
| 2N(V) | 3760 Data Transmissions / TVSat (digital) |
| 1W/U(H) | 3780 Data Transmissions / TV and Radio Michoacan (digital) |
| 3N(V) | 3800 Edusat (digital) |
| 2W/L(H) | 3820 Data Transmissions / Occasional video |
| 4N(V) | 3840 Data Transmissions / TV Mas (digital) / Television Tabasquena (TVT) (digital) |
| 2W/U(H) | 3860 Data Transmissions |
| 5N(V) | 3880 Occasional video |
| 3W/L(H) | 3900 Data Transmissions / Central TV (digital) |
| 6N(V) | 3920 Television Munda Maya (digital) |
| 3W/U(H) | 3940 Data Transmissions |
| 7N(H) | 3960 Occasional video |
| 4W/L(H) | 3980 Data Transmissions |
| 8N(V) | 4000 Occasional video |
| 4W/U(H) | 4020 Data Transmissions |
| 9N(V) | 4040 Occasional video |
| 5W/L(H) | 4060 Tele-Yucatan (digital) |
| 10N(V) | 4080 Data Transmissions |
| 5W/U(H) | 4100 Data Transmissions / RCG (digital) |
| 11N(V) | 4120 Occasional video |
| 6W/L(U) | 4140 Occasional video |
| 12N(V) | 4160 Data Transmissions |
| 6W/U(H) | 4180 Data Transmissions / TV and Radio Hidalgo (digital) / TV Nueva Leon (digital) / Sistema Jalisciense (digital) |

Satelites Mexicanos Solidaridad 2

| Ku-band | - 113 degrees West longitude |
|---------|------------------------------|
| T01(H) | 11730 Data Transmissions |
| T02(H) | 11791 Data Transmissions |
| T03(H) | 11852 Data Transmissions |
| T04(H) | 11913 Data Transmissions |
| T05(H) | 11974 Data Transmissions |
| T06(H) | 12035 Occasional video |
| T07(H) | 12096 Data Transmissions |

| | |
|--------|--------------------------|
| T08(H) | 12157 Data Transmissions |
| T09(V) | 11743 Data Transmissions |
| T10(M) | 11804 Data Transmissions |
| T11(V) | 11865 Data Transmissions |
| T12(V) | 11926 Data Transmissions |
| T13(V) | 11987 Data Transmissions |
| T14(M) | 12048 Data Transmissions |
| T15(V) | 12109 Occasional video |
| T16(V) | 12170 Data Transmissions |

Satelites Mexicanos SATMEX-5

| C-band | - 116.8 degrees West longitude |
|--------|--|
| 1(V) | 3720 Data Transmissions |
| 2(H) | 3740 Occasional video |
| 3(V) | 3760 Data Transmissions / Universal Circus (digital) |
| 4(H) | 3780 Data Transmissions |
| 5(V) | 3800 Television Par Cable (digital) |
| 6(H) | 3820 Data Transmissions |
| 7(V) | 3840 Television Par Cable (digital) |
| 8(H) | 3860 Data Transmissions / CB Television (digital) |
| 9(V) | 3880 Data Transmissions |
| 10(H) | 3900 Data Transmissions |
| 11(V) | 3920 Data Transmissions / Hippodrama Presidente Remon (digital) / NDTV (digital) / Canal 11 Satel (digital) |
| 12(H) | 3940 Data Transmissions |
| 13(V) | 3960 TV Azteca / Azteca America (digital) |
| 14(H) | 3980 Data Transmissions |
| 15(V) | 4000 Latinoamerica Television (digital) / Ecuavisa (digital) / RGT (digital) / Once TV International (digital) / XEIMT-TV Canal 22 (digital) / XHAW-TV Monterrey (digital) / Teleritma (digital) |
| 16(H) | 4020 Data Transmissions |
| 17(V) | 4040 Data Transmissions / Television Mexiquense (digital) / Videarala (digital) |
| 18(H) | 4060 Mexican Government services (digital) |
| 19(V) | 4080 Data Transmissions |
| 20(H) | 4100 Data Transmissions / Guatevisan (digital) |
| 21(V) | 4120 Occasional video |
| 22(H) | 4140 Data Transmissions / Canal 9 Oaxaca (digital) |
| 23(V) | 4160 Television Par Cable (digital) |
| 24(H) | 4180 Edusat (digital) |

Satelites Mexicanos SATMEX-5

| Ku-Band | - 116.8 degrees West longitude |
|---------|--|
| 1(H) | 11720 Data Transmissions |
| 2(V) | 11740 Data Transmissions |
| 3(H) | 11760 Data Transmissions |
| 4(V) | 11780 Data Transmissions |
| 5(H) | 11800 Data Transmissions |
| 6(V) | 11820 Data Transmissions |
| 7(H) | 11840 Data Transmissions |
| 8(V) | 11860 Data Transmissions |
| 9(H) | 11880 Data Transmissions |
| 10(V) | 11900 Data Transmissions |
| 11(H) | 11920 Data Transmissions |
| 12(V) | 11940 Data Transmissions |
| 13(H) | 11960 Data Transmissions |
| 14(V) | 11980 Data Transmissions |
| 15(H) | 12000 Data Transmissions |
| 16(V) | 12020 Data Transmissions |
| 17(H) | 12040 Data Transmissions / El Sembrador Nueva Evangelizacion (digital) / Alma-vision (digital) |
| 18(V) | 12060 Data Transmissions |
| 19(H) | 12080 Atlanta DTH (digital) |
| 20(V) | 12100 Power TV, TV Polonia, Tzu Chi, CCTV-4, MAC TV, ATV, Hwazan, ERA News, Asia Plus, Guang Dang TV, Palskie Radio 1, Palskie Radio 2 |
| 21(H) | 12120 Data Transmissions |
| 22(V) | 12140 Data Transmissions / Occasional video |
| 23(H) | 12160 Data Transmissions / Latter Day Saints (LDS) Television (digital) / Occasional video |

| | |
|-------|---|
| 24(V) | 12180 Occasional video / Data Transmissions / Sistema Tecnological de Monterrey (digital) / Universidad Virtual Empresarial (digital) |
|-------|---|

Telesat Canada Anik E2

| C-Band | - 118.7 degrees West longitude |
|--------|--------------------------------|
| 1A(H) | 3720 Inactive Transponder |
| 1B(V) | 3740 Occasional video |
| 2A(H) | 3760 Occasional video |
| 2B(V) | 3780 Occasional video |
| 3A(H) | 3800 Occasional video |
| 3B(V) | 3820 Occasional video |
| 4A(H) | 3840 Occasional video |
| 4B(V) | 3860 Occasional video |
| 5A(H) | 3880 Occasional video |
| 5B(V) | 3900 Occasional video |
| 6A(H) | 3920 Occasional video |
| 6B(V) | 3940 Occasional video |
| 7A(H) | 3960 Inactive Transponder |
| 7B(V) | 3980 Occasional video |
| 8A(H) | 4000 Occasional video |
| 8B(V) | 4020 Occasional video |
| 9A(H) | 4040 Occasional video |
| 9B(V) | 4060 Inactive Transponder |
| 10A(H) | 4080 Occasional video |
| 10B(V) | 4100 Occasional video |
| 11A(H) | 4120 Occasional video |
| 11B(V) | 4140 Occasional video |
| 12A(H) | 4160 Occasional video |
| 12B(V) | 4180 Inactive Transponder |

Telesat Canada Anik E2

| Ku-Band | - 118.7 degrees West longitude |
|---------|--------------------------------|
| T01(V) | 11717 Occasional video |
| T02(M) | 11743 Occasional video |
| T03(V) | 11778 Occasional video |
| T04(V) | 11804 Occasional video |
| T05(V) | 11839 Occasional video |
| T06(V) | 11865 Occasional video |
| T07(M) | 11900 Occasional video |
| T08(V) | 11926 Occasional video |
| T09(V) | 11961 Occasional video |
| T10(V) | 11987 Occasional video |
| T11(V) | 12022 Occasional video |
| T12(V) | 12048 Occasional video |
| T13(V) | 12083 Occasional video |
| T14(V) | 12109 Occasional video |
| T15(V) | 12144 Inactive Transponder |
| T16(V) | 12170 Inactive Transponder |
| T17(H) | 11730 Occasional video |
| T18(H) | 11756 Occasional video |
| T19(H) | 11791 Occasional video |
| T20(H) | 11817 Occasional video |
| T21(H) | 11852 Occasional video |
| T22(H) | 11878 Occasional video |
| T23(H) | 11913 Occasional video |
| T24(H) | 11939 Occasional video |
| T25(H) | 11974 Occasional video |
| T26(H) | 12000 Occasional video |
| T27(H) | 12035 Occasional video |
| T28(H) | 12061 Occasional video |
| T29(H) | 12096 Occasional video |
| T30(H) | 12122 Occasional video |
| T31(H) | 12157 Inactive Transponder |
| T32(H) | 12183 Inactive Transponder |

Before I dismantle the satellite uplink...

This is my last column after around a decade of writing for *Satellite Times* and then *Monitoring Times* magazine. I would like to thank Bob and Judy Grove and my editors Larry Van Horn (ST) and Rachel Baughn (MT) for allowing me to share my efforts with you. Until I give the satellite chart on my webpage (<http://www.nmia.com/~roberts>) a long-overdue update, there is a Satellite Services Guide chart on the *Monitoring Times* website that can be referenced. Please feel free to visit either site and leave me comments or questions at roberts@nmia.com.

An Invitation

Welcome to the December issue of *Below 500 kHz*. There is no better time to get started in longwave listening than in the winter. Natural static is at its lowest level, and most of us have a bit more time to spend in the radio room as compared to the warmer months. This month, we'll discuss ways to get started on the LF band and derive the most from your efforts.

What can you hear on longwave? Well, how about military signals, time standards, broadcast stations "lower" experimenters, aviation beacons, and weather broadcasts? I can't think of any other 500 kHz slice of spectrum offering such a wide variety of signals.

❖ Gearing Up

To begin, you'll need a receiver that covers the longwave frequencies of interest. Many newer rigs cover down to at least 150 kHz, and some tabletop models dip down to 30 kHz or lower, though the sensitivity at these low ranges may not be quite as "hot" as the upper end of the dial. If you have an older receiver lacking longwave coverage, you can still explore this part of the spectrum using an LF converter. A converter "shifts" the 0 to 500 kHz spectrum to a range that the receiver is able to tune, such as 4 to 4.5 MHz.

With a converter, all of the features of an existing receiver (notch filter, S-meter, frequency readout, etc.) can be applied to longwave signals. This gives you a no-compromise approach to tuning the band. In fact, many converters give better sensitivity to LF signals than standalone receivers. Installation of a converter is simple. You merely connect it inline between the antenna and receiver. No modifications are required at the receiver whatsoever.

Just as important as the receiver is the station antenna. A good antenna will make the difference between just hearing a few local beacons and true DX performance. A common mistake made by many newcomers is to judge the band using the same antenna they use for shortwave. The typical "longwire" antenna performs poorly at LF. A much better choice would be an active antenna, outside loop, or tabletop ferrite loop. These antennas avoid the "noise collector" syndrome suffered by longwire types. You'll notice the difference.

❖ What Can You Hear?

What can you expect to hear on longwave? As mentioned earlier, a wide variety of signals will be waiting for you. Table 1 gives an over-

view of the band by frequency range. An excellent place to begin is the 190-530 kHz beacon band. Here, you'll hear slow speed Morse Code stations sending 2 or 3-letter IDs repetitively. These beacons are used by aviators for positioning and homing, and are typically designed to cover a limited range such as 100 miles. When conditions are good, you can hear beacons at 10 times their normal range, and that's where the thrill comes in.

Many beacons can be identified using an online resource, such as <http://www.airnav.com>. For a more complete listing, consider obtaining a printed directory, such as the *BeaconFinder*, advertised elsewhere in this issue. It contains listings for the two-letter beacons, which are omitted from some other sources, and many other longwave utilities from 0 to 530 kHz.

After you've explored beacons, you may want to try your skill at pulling in more exotic signals, such as those below 150 kHz, or the experimental stations operating at 160-190 kHz. If digital modes are your thing, the NAVTEX signals at 518 kHz should prove interesting. All you need is a PC and a decoder capable of AMTOR Mode B (Broadcast) reception. With NAVTEX, you'll hear (or rather "see") bulletins for overdue vessels, navigation alerts, and iceberg warnings.

Table 1. Longwave Frequency Usage

| Frequency Range | Service |
|-----------------|---|
| 0-10 kHz | Natural radio phenomena |
| 10-15 kHz | Hyperbolic navigation systems |
| 15-150 kHz | Military data signals (encrypted) |
| 60 kHz | WWVB time station |
| 136 kHz | Ham and experimental operations |
| 150-280 | LW Broadcasters (Europe) |
| 160-190 kHz | 1-watt license-free experimenters |
| 190-530 kHz | Aviation beacons and automated weather stations |
| 518 kHz | International NAVTEX teleprinting system |

❖ Logging Your Catch

Chances are, after you get started on longwave, you'll want to keep some sort of log to record what you hear. This can be done electronically with a simple word processing program, spreadsheet, or dedicated logging program. An old-fashioned paper log will work, too. You can adapt a ham or SWL log quite easily for longwave use.

Some listeners actually record rare or DX signals with a tape recorder. This allows you to review a noisy or weak signal over and over

again to verify an ID. It also saves your catch for posterity and might even impress your friends at the next SWL meet!

Speaking of sound, another thing many serious listeners do is write down the number of *complete* IDs heard from a beacon in one minute. This serves as a "fingerprint" for the station, and might be important if you want to get into the QSL game. It provides proof positive that you heard the beacon in question.

The recent *MT* survey confirmed something I already suspected – you want to see lots and lots of frequencies! I will be putting even more emphasis on loggings in the coming year, so feel free to send in your favorites using the e-mail address in the masthead. This month, I'm presenting the DX loggings of Jacques d'Avignon (ON) from his DXpedition to Miscou Island, New Brunswick. All loggings were made between November 2nd and November 5th. Those of you living near the East Coast, how many of these stations you can hear?

That's it for this month. Merry Christmas to all, and I'll see you in '05.

Table 2. DXpedition Logs from Miscou, NB

| Freq | Call | St/ITU | Location | Time (UTC) |
|-------|-------|--------|-------------------------|------------|
| 20.9 | HWU | F | Leblanc | 17:30 |
| 24.0 | NAA | ME | Cutler | 17:25 |
| 25.2 | NAL4 | ND | Lamouré | 17:23 |
| 37.5 | NRK | ISL | Grindavik | 17:22 |
| 40.8 | NAU | PTR | Aguada | 17:21 |
| 45.9 | NSY | I | Nisceni | 17:18 |
| 51.95 | GNY1 | G | Thurso | 17:17 |
| 57.4 | NRK | ISL | Grindavik | 17:16 |
| 60.0 | WWVB | CO | Fort Collins | 17:14 |
| 60.0 | MSF | G | Rugby | 17:14 |
| 77.5 | DCF77 | D | Mainflingen | 17:13 |
| 153 | BDCST | ALG | Radio Alger | 21:21 |
| 162 | BDCST | F | France Inter | 21:23 |
| 171 | BDCST | MRC | Radio Méditerranée | 21:24 |
| 177 | BDCST | D | Deutschlandradio Berlin | 21:25 |
| 183 | BDCST | LUX | Europe 1 | 21:26 |
| 189 | BDCST | ISL | Ríkissutvarpid Ras | 21:26 |
| 198 | BDCST | G | BBC Radio 4 | 21:27 |
| 216 | BDCST | F | Radio Monte Carlo | 21:28 |
| 234 | BDCST | LUX | RTL | 22:22 |
| 270 | FLO | AZR | Flores | 23:01 |
| 252 | BDCST | IRL | RTE Radio 1 | 21:32 |
| 292.5 | BA | E | Estac De Bares | 22:35 |
| 329 | POR | POR | Porto | 1:39 |
| 338 | PST | MDR | Porto Santo | 1:12 |
| 341 | GP | AZR | Lajes | 0:20 |
| 371 | MGL | AZR | Ponta Delgada | 0:55 |
| 380 | FIL | AZR | Horta | 0:57 |
| 382 | SF | GRL | Sondstrom | 2:35 |
| 382 | LAR | POR | Arruda | 0:59 |
| 410 | C | E | La Coruna | 0:34 |

ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI

tjarey@monitoringtimes.com

The Ham Holiday Wish List

It is once again the Holiday Season. Even though it is early in the game, I am still driving my XYL and harmonics crazy by repeated viewings of *The Christmas Story*, written by that world renowned ham Jean Shepherd K2ROS.

Certain things always signal the more or less formal beginning of the season for folks. When I was a lad it was the Macy's Thanksgiving Day Parade. That was always a sign that, the following day, my Dad would head up into the attic and bring down the distinctive orange and blue boxes containing the Lionel Trains. For other folks it may be hearing the first couple of carols on the local broadcast radio outlet. Or perhaps it is the displays in the stores (although it seems these go up right after Halloween in our consumer oriented culture).

These days, the first sign of the holiday season seems to come when folks approach my XYL and ask her: "What can I get Skip for Christmas?" Being Bohemian by nature and more or less free of the boundaries of "modern" taste, it makes it a bit hard for well meaning friends to come up with meaningful gifts for Old Uncle Skip. But I am blessed with a spouse who not only tolerates my quirks, but is also a licensed amateur radio operator in her own right. As such she can drop a few hints to help the process along.

This month's column will include a number of ideas that you might share with people on your behalf. You may even want to leave this issue of *MT* laying around opened to this page for wandering eye to glance at. Not all that unlike the behavior of young Ralphie in Shep's aforementioned classic Christmas tale.

The 2005 ARRL Handbook (82nd Edition)
Hardcover—\$54.95 ARRL Order No. 9299
(ISBN 0-87259-929-9)
Softcover—\$39.95 ARRL Order No. 9280 (ISBN
0-87259-928-0)
The American Radio Relay League
225 Main St
Newington, CT 06111
1-888-277-5289
<http://www.arrl.org/catalog/>

No ham should be without a current copy of *The Handbook*. In addition to having the most up to date information on the amateur radio art, you have the added opportunity to pass along your previous edition to someone interested in or new to ham radio. It's a great opportunity to be an Elmer to someone.



But beyond the above reason, the 2005 edition is billed as one of the most complete updates to the handbook in a decade. A lot has happened in ham radio in the last 10 years. And, while Ohm's Law has not been repealed, new theories and practices have come at a very rapid rate. For

this reason, entire sections of the *2005 Handbook* have been completely reworked to provide state-of-the-art information in a useful format for every ham.

Up to date information is provided on a number of subjects including analog and digital signals and components; working with surface-mount components; High-Speed Multimedia (HSMM); antennas and baluns; satellites (including the new Phase 3E) and EME; oscillators, DSP and software radio design. There is also an excellent new chapter of Internet tips for hams, Wi-Fi, and other wireless and PC technology. I remember *Handbooks* that didn't even mention personal computing. Now I cannot imagine one not including this information.

The new 2005 edition of the *Handbook* includes thorough coverage of theory, references and practical projects. I can't begin to count the number of fun projects I have built through the years using the schematics and information from the *Handbook*. You would be hard pressed to find a better source for building receivers, transceivers, power supplies, RF amplifiers, station accessories and antenna construction projects. This 82nd edition includes many new antenna projects and even a new 10-W, 60-meter SSB transceiver. I may never come out of my basement workshop this winter!

The *Handbook* now includes a CD-ROM. For the first time, this edition is bundled with *The ARRL Handbook CD* (version 9.0) – the fully searchable and complete book on CD-ROM (including many color images). This used to be a separate item and, as such, was well worth the price. Kudos to the League for adding it to the mix.

So anyone who is stumped for a gift for you could certainly put a *Handbook* under your tree. And you know something? If you get more than one you don't even have to return it. Just pass the additional edition on to those future hams you know. Even better than passing on last year's edition.

The ARRL Repeater Directory – 2004/2005 (32nd Edition)
\$9.95 ARRL Order No. #9191 (ISBN 0-87259-919-1)

The American Radio Relay League
225 Main St
Newington, CT 06111
1-888-277-5289

<http://www.arrl.org/catalog/>

Need a less expensive gift? Maybe something for the Office Pollyanna? How about this?

Any ham who travels out of range of their local repeater system, or, for that matter, many hams in or near large metropolitan areas, would enjoy finding this little book stuffed in their stocking. To me, while the *Repeater Directory* was always

a useful tool, it really came into its own with the advent of multi-memory, computer programmable UHF/VHF transceivers. Now, before I go trekking out of my local repeater area, a short session with the *Directory* lets me drop any number of repeater systems into my handheld. It sure makes making contact with the local ham community a lot easier when you're already up on the area machines.



The new edition includes updated listings for thousands of repeaters across the United States and Canada on all bands. These listings include frequencies as well as CTCSS and DCS information. The *Directory* now includes IRLP (Internet linked) nodes as well as traditional systems. Most importantly, you find out which machines are set up as open, public places. A common new user gaffe is to get on a "closed" repeater without prior permission from the group or individual running the system.

In addition to this useful information, the *Directory* provides a number of useful guides that are especially helpful to new or infrequent repeater system users. This includes operating tips for newly licensed amateurs. I wish I had this information when I was starting out. I would have sounded a lot smarter from the get go.

The 2004/2005 *ARRL Repeater Directory* would also be something worth seeing under the tree, or, for that matter, any time of year.

ARRL's RF Amplifier Classics
\$19.95 ARRL Order No. #9310 (ISBN: 0-87259-931-0)

The American Radio Relay League
225 Main St
Newington, CT 06111
1-888-277-5289

<http://www.arrl.org/catalog/>

Okay, this next suggestion may get a few of my friends in the QRP community angry with me, but there is a new book out worthy of note. And for those who think I am breaking faith with the under 5 watt crowd, let me remind everyone that even a QRP rig has a stage of amplification deep down in its schematic somewhere.

Even a dyed in the wool, low power fanatic such as Old Uncle Skip can appreciate the elegance of a well designed RF amplifier built to any power level. Getting a radio signal to thrive and behave while increasing its power can be a tricky business. And the higher you go in frequency, the trickier things can become. So when a ham comes up with a design to make watts work, I have no small amount of



respect for that individual. Many excellent designs have appeared in both *QST* and the ARRL's technical journal *QEX*. *RF Amplifier Classics* takes the best of the best published in these magazines between 1980 and 2003 and compiles them in a single useful and instructive volume.

The book includes amplifiers for HF, MF, VHF and even microwave applications. They are authored by respected hams such as Gary Breed, K9AY; Jerry Pittenger, K8RA; Bill Sabin, W0IYH; Al Ward, W5LUA; Dave Meacham, W6EMD and others.

In this book you will find practical designs and construction details for classic tube and solid-state amplifiers at power levels from 5 W to 1.5 kW. You will also learn techniques that will help you build safe and reliable amplifiers that produce loud and clean signals.

Even if you are not a homebrewer, you will learn a great deal about how the amplification stage of your transceiver does its job. You will also see how dedicated hams can apply design techniques to find all sorts of new ways to skin the old RF cat.

And, of course, said tome of RF wisdom might be just the kind of book you might want to curl up with in front of the old Yule Log.

N1MM Free Contest Logger
(Like the man says: It's Free!)
<http://www.n1mm.com/>

Okay, now let's shift gears a bit. How about a gift you can give yourself and other ham friends? Even better, how about a great ham radio gift that is essentially free?

Every ham can use a good logging program. A really excellent one is a *freeware* product created by Tom Wagner N1MM, along with the help of Thomas Tinge PA1M and Eric Ellison N2AMG



I've always said that one of the things I use to sell folks on the idea of ham radio is our great shared tradition of helping each other out. Tom N1MM and friends have made a great contribution to the wider amateur radio community by way of their efforts to develop a great logging program for basic contesting use. The N1MM program may not have all the bells and whistles of some of the larger commercial products, but it has more than many hams will ever need or make use of, and it continues to evolve as Tom and others contribute their time and effort to bring the program along.

The number of excellent features would take up a full column and more. I suggest you take a look at Tom's Web site mentioned above for more information. But I would like to point out things I appreciate about the software that make me a dedicated user.

All major HF Contests are supported including General DX logging. The program performs automatic beam heading and sunrise/sunset calculations. It has packet and telnet support as well as packet spot filtering. It exports files in the standard Cabrillo format. The program generates fine statistical reports. And, for me, one of the neatest features is the ability to generate CW by way of the keyboard without needing to exit the program!

The program supports many Kenwood, Yaesu, Elecraft, TenTec and Icom radios. It can support two radios at the same time. Sending of CW, RTTY, PSK31 and sound card wav files are also supported. The program runs under Microsoft Windows 98, ME, NT, 2000, XP Home, and XP Pro

Support is via a Yahoo Group at: <http://groups.yahoo.com/group/N1MMLogger>

After you download a copy of this program for yourself, why not burn off a few extra copies to hand out to friends at your ham club's holiday dinner? A nice ham oriented gift for the mere cost of the data media of your choice.

Well, now we turn the page on another year. All is well at N2EI. I hope the same will be true for you and yours in the coming year. Peace, Prosperity and Propagation to all! I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CORNER

QRP ARCI Topband Sprint (160 Meters)

Dec 2, 0000 UTC - 0600 UTC

ARRL 160-Meter Contest

Dec 3, 2200 UTC - Dec 5, 1600 UTC

QRP ARCI Holiday Homebrew Sprint

Dec 5, 2000 UTC - 2400 UTC

ARS Spartan Sprint

Dec 7, 0200 UTC - 0400 UTC

ARRL 10-Meter Contest

Dec 11, 0000 UTC - Dec 12, 2400 UTC

Fall NA Meteor Scatter Rally

Dec 11, 0000 UTC - Dec 15, 0700 UTC

Russian 160 Meter Contest

Dec 17, 2100 UTC - 2300 UTC

Stew Perry Topband Challenge (160 Meters)

Dec 18, 1500 UTC - Dec 19, 1500 UTC

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Fading and Antenna Systems

When a signal to which we are listening drops in strength within a short period of time, we say that the signal has "faded." Sometimes signals fade in strength only to return to useful levels a short time later. At other times signals may fade completely away for long periods of time. In any case fading can reduce or destroy the usefulness of signals we want to receive.

❖ Some Common Types of Fading

Ionospheric Fading:

Ionospheric, or sky-wave fading is a common nuisance on HF. It is caused by relatively rapid changes in the heights or surface texture of layers of the ionosphere. This type of fading can cause the point of arrival of a signal to change and move out of the capture area of an antenna which had formerly been receiving that signal.

Selective Fading:

Ionospheric fading can occur differently at different frequencies. At times frequencies as close together as the two sidebands of an AM signal, or as the mark and space frequencies of radio teletype (RTTY) will fade differentially. One sideband may be received at good strength while the other fades, or they may be affected such that they are out of phase with each other which results in loss of signal strength.

Multi-Path Fading:

Multi-path fading is due to different rays from the same signal traveling paths of differing lengths, and therefore arriving at the receiving antenna with various phase differences between them. When signals are in phase they add in strength, and produce more signal strength than either by itself would produce. But when they are out of phase they cause fading because their

combination produces less strength than one ray by itself would produce.

Multi-path fading can also be caused by interference between ionospheric-rays (sky waves), and ground-wave rays from the same signal (fig. 1). This is often a problem in the evening when receiving beyond-local MF signals.

At VHF and higher frequencies, multi-path fading is often a problem for communication with mobile units. As the mobile unit moves, its signal paths encounter terrain variations. This changing terrain includes obstacles such as hills and tall buildings which are located between the mobile unit and its base station. Thus, as the mobile unit moves, the paths available to the different rays propagating from the base station to the mobile receiver change, and multi-path fading results.

❖ Reducing the Effects of Fading

Automatic Gain Control:

The automatic gain control (AGC) circuitry found in most radio receivers automatically adjusts the receiver's RF gain to compensate for signal-strength variations. However, AGC is of no value when received-signal strength fades below the minimum required for reception.

Anti-Fade Antennas:

A 5/8 wavelength vertical antenna is often employed at AM broadcast stations to reduce the amount of sky wave radiated. This reduces ground-wave-sky-wave interference fading.

Antennas with circular or elliptical polarization respond well to signals with any type of linear (vertical, horizontal, and angles in between) polarization. Deep fades can result when using linear polarization if the polarity of the incoming signal and the receiving antenna

are very different. However, circularly polarized antennas lose relatively-little signal strength when responding to linearly polarized signals.

Diversity Systems:

Diversity reception gets its name from the fact that diversity systems utilize diverse (more than one) sources for receiving the desired signal. The diverse sources are usually multiple antennas. Received-signal strength from each source is monitored, and the source providing the strongest signal is automatically selected.

Diversity can be used to combat fading on long-distance MF and HF communication circuits. It is also quite useful in VHF-UHF-microwave relay work, wireless computer network systems, and with wireless microphones and wireless musical-instrument pickups.

Space Diversity:

Moment to moment changes in the ionosphere cause some wandering in the point of arrival of signals reflected from the ionosphere. Space diversity uses receiving antennas sited at somewhat different locations: spacing a full-wavelength apart is often suggested. It is quite possible that when the signal is faded at one antenna, it will be of usable strength at another. Separate receiving circuits monitor each antenna's output, and the one with the strongest signal is automatically selected by logic circuitry. This signal is then routed to the receiving circuits.

Polarity Diversity:

Signals propagating through the ionosphere often undergo changes in their polarity. Polarity diversity utilizes receiving antennas with similar monitoring and processing as described above for space diversity.

Frequency Diversity:

Moment to moment changes in the ionosphere affect signals of different frequencies differently. For one kind of frequency diversity a station transmits its programming on multiple frequencies. A single antenna, or multiple antennas may be used for transmitting, or for receiving. Signal strength of the different frequencies is monitored, and automatic selection of the strongest signal is utilized as described above.

In radioteletype (RTTY) work, signals for either the mark frequency alone or the space frequency alone will allow perfect reception. This is because if the receiver doesn't receive a mark it produces a space, and vice versa. When selective fading occurs, either the mark or the space frequency may fade out, but if the other

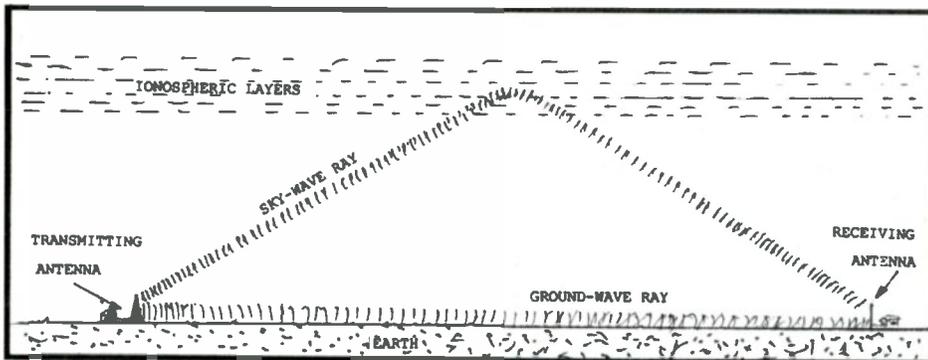


Fig. 1. Fading can be caused when sky-wave rays and ground-wave rays from the same signal travel paths of different lengths and arrive at the receiving antenna out of phase with one another.

A review of diversity reception: <http://www.lectrosanics.com/wg/wgdiv.pdf>
A smart antenna tutorial: http://www.iec.org/online/tutorials/smart_ant/

remains strong this frequency diversity aspect of RTTY can still give perfect copy.

Time Diversity:

Reception conditions vary with time, especially on the HF band. When a station transmits the same program at different times, one repetition of the program may have severe fading, and yet the other repetition may be received with little or no fading. Repeating shortwave broadcast programs at different times of day provides one form of time diversity.

Another time diversity is the radio operator's Q-code phrase "QSM" which means "please repeat the last message."

A more sophisticated form of time diversity is found in the automatic, error-correcting modes used in digital communications. If a burst of digital data fails the error check at the receiving end of a communication circuit, then an automatic request for a repetition of that burst is sent as a reply. In response the burst is repeated. This automatic request-repeat goes on until a burst passes the error check successfully, and perfect copy is usually the result.

Smart-Antenna Systems:

It wouldn't be stretching the point too far to say that diversity antenna systems are a kind of "smart antenna" system. Smart antennas offer diverse means of maximizing reception of a desired signal. The old-time, multiple-unit, steerable array (MUSA) is perhaps the earliest ancestor of what we now call "smart antennas." An MUSA consists of an array of rhombic antennas in which the array's vertical reception pattern can be steered by mechanically raising or lowering portions of the antennas' elements. Automatic signal-tracking devices control the array's vertical reception pattern. The pattern is maintained at the appropriate angle to maximize reception of incoming signals as their vertical angle of arrival changes.

Today there are various designs of smart antennas, but basically they all have computer-automated control systems which monitor signal performance on the frequencies available to the system. The control system then selects a frequency favorable to reliable communications, and adapts the antenna system accordingly. In addition to selecting an appropriate antenna and maximizing its pattern for reception of a desired signal, some smart antenna systems can simultaneously adapt the antenna's pattern to also reject interference.

Smart antenna systems are utilized for services such as cell-phone systems and military communications.

❖ Home-Brew Diversity

It is possible to attach two separate receivers to two separate antennas in an attempt at a "poor-man's diversity" approach. When signals from one antenna fade there may be a decent signal from the other antenna. However, when

both signals are strong, the combination of the outputs of the two receivers may produce a garbled sound. This happens because the signals are somewhat out of phase. This can be cured by locking the local oscillators of both receivers together. The following web site gives one method for this:

<http://www.qsl.net/ab4oj/icom/ic7800/7800div.html>

For a simpler and easier home-brew approach, try this next site. This approach connects one earphone from an earphone pair to each receiver:

<http://users.crosspaths.net/~wallio/PO-LAR.html>

RADIO RIDDLES

Last Month:

I discussed how moment-to-moment changes in the ionosphere may cause a signal to wander out of a receiving antenna's aperture or capture area. I then continued: "What can be done to reduce this fading? Yes, we could use designs that would result in wider beam widths for the transmitting and/or receiving antenna. What other solutions are available?"

Well, space diversity as discussed above should help if the signal has wandered from its original compass-direction just a bit. Or, if the wandering is in its vertical angle rather than horizontally, then an MUSA might help. And,

an appropriately-designed smart-antenna system should be able to adapt to reduce either sort of fading.

This Month:

Let's say that you are listening on HF, and you receive a very short transmission, perhaps just one dit of Morse Code. Then after only a fraction of a second, say .13 second, you receive that identical transmission again. Is it possible that the short transmission wasn't re-transmitted a second time, but somehow, instead of traveling off into space, it returned to your antenna a second time? Could it even do this a third or fourth time? Radio waves travel in straight lines, don't they? Sound spooky? Or could that really happen?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, 73 and Happy Holidays!

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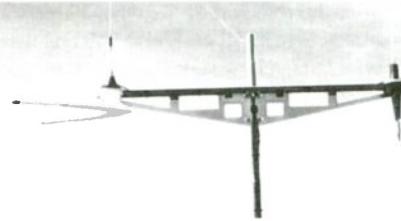
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Four Foot Steel with four different antennas *pictured above*. Other uses include a versatile Meteorological sensor platform, surveillance cameras and supports for Photographic and studio lighting. Stacked arrays have multiple Military applications: amphibious operation voice and code communications plus RDF.

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5. Two Meter Al (78-3/4") Grey (large thick 5" pads) 9.8# \$369.00
6. Two Meter Stainless Steel (small thick 4" pads) 20.3# \$599.00

The advantage of flush pads is they can accommodate larger base amounts without blocking ground plane mounting holes. Flush bases are more desirable when two extra pounds are not critical. 12- and 24-foot designs available direct from factory. Special Stainless or Rubber coated U-bolts available at additional charge.

Shipping and handling in the USA is a flat \$15.00 for the first unit and \$10.00 for each additional unit for four-foot units. Two meter units are \$20.00 for the first unit and \$15.00 for each additional unit via standard ground or USPS. Payment may be made by Visa, Mastercard, check or money order to Talon Creative Inc.

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www.antennacrossarmmount.com

U.S. Patent # 6,348,899 B1

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Back on Task with the NC-57

Sorry for last month's interruption to the NC-57 restoration – though I hope you all enjoyed the story of the Antique Wireless Association Annual Conference. If I've tempted any of you into attending next year, let me know and we'll arrange to meet there and get acquainted.

❖ Tubes and Performance

Perhaps the best way to get into the NC-57 story again is to mention that I was successful in shopping the Conference flea market for the three tubes I needed (a 6SB7Y and two 6SG7s) to return this radio's tube complement to its original configuration. After getting back home, I tested them and found them to be fine. In fact, two were NOS (new old stock) in their original unopened boxes.

I've done a little reading about the somewhat exotic 6SB7Y pentagrid converter tube. Most sets, including the Hallcrafters S-40 we recently restored, use the much more common 6SA7 for this function. But when I discovered that the 6SB7Y was introduced for use in FM radios, something clicked in my mind.

Readers who followed the S-40 story may remember that the 6SA7 originally installed in that radio wouldn't oscillate on the highest frequency band (15.5-44 MHz). I had to substitute another 6SA7 from my junkbox to restore operation on this band. But the NC-57 tunes to 55 MHz, covering the entire 6-meter amateur band – quite a challenge for the oscillator section of a 6SA7.

But it wouldn't be much of a challenge for the 6SBY7Y – intended, as it was, for FM band (88 - 108 MHz) use. The "Y" in the type number, incidentally, means that the tube is equipped with a low-loss (Micanol) base, another refinement that helps make this tube a "hot" performer at higher frequencies. I was very happy to get my hands on a 6SB7Y to replace the 6SA7 that the NC-57's previous owner had substituted for it.

While we're talking about tubes, the NC-57 has a VR-150 voltage regulator tube (lacking in the S-40) to stabilize the oscillator and is equipped with 6SG7s at the r.f. and both i.f. amplifier stages. During this era, the higher-performing 6SG7 had begun to replace the earlier 6SK7. The S-40 had a 6SG7 r.f. amplifier, but 6SK7s were used for the two i.f. amplifier stages.

Yet, even though both radios were in the same price class and being marketed at about the same time, the S-40 seems to have been much

more popular. As I think I probably observed earlier, this was probably due to the latter's much snazzier appearance – which was created by noted industrial designer Raymond Loewy.

❖ First Steps in Restoration

By the end of the last work session (October issue), the NC-57 chassis had been completely removed from its wraparound cabinet, paving the way for cleaning, capacitor replacement and other maintenance procedures. Noted at the time was the thick layer of gummy dust covering the top of the chassis. We began this month's work by removing that.

The deposit wiped off easily from most surfaces with a rag dampened in mineral spirits. Difficult crevices, such as the top of the tuning capacitor and around the bases of transformers and chokes were cleaned with dampened Q-tips. Luckily none of the gunk had gotten between the plates of the capacitor. Otherwise it would have been necessary to remove it for deep cleaning – a tough job because of its multiple ground connections.

I can't say that the chassis top looked mint after the removal of the dust. There was minor pitting here and there and the plating was mottled with faint yellow stains in several places. But the overall appearance was quite decent, without any sign of the heavy corrosion that had made me decide to paint the chassis of the S-40.

The underside of the chassis looked a lot closer to mint. It had suffered no pitting and little dust infiltration.

Before doing any serious work on this radio, I needed to acquire a good service manual. Often these can be found as free downloads from the internet, but this time I couldn't find a good copy. However, over the years I've managed to put together a complete set of Rider's manuals. John Rider seemed to have had a wonderful relationship with communications receiver manufacturers – at least with Hallcrafters and National.

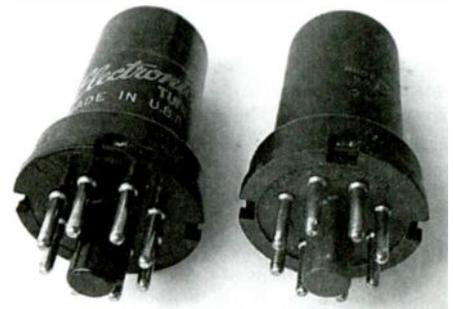
Readers who followed the S-40 project will remember how exhaustive and helpful the Rider's data was. There was really more there than in the official printed service manual. The NC-57 data was in the same class. There were 16 pages of it, containing everything I'd need to know.

So the first thing I did was to remove the pages, temporarily, from their loose-leaf binder so that I could scan them and print them out to

make myself a manual. Next, as always, I made a map of the UNDERSIDE of the chassis, showing the location of all tube sockets, labeled with the tube types and their functions in the circuit. Printed data usually identify the sockets as seen on the TOP of the chassis, and – using that information – it is very easy to misidentify them on the bottom, particularly when preoccupied with troubleshooting. Now I was ready to begin the serious restoration.

❖ Capacitor Replacement

At first glance, there didn't seem to be very many capacitors to replace. There were only a few of those ugly and invariably leaky wax-covered tubular units. Most of the others were Bakelite cased units that looked like mica



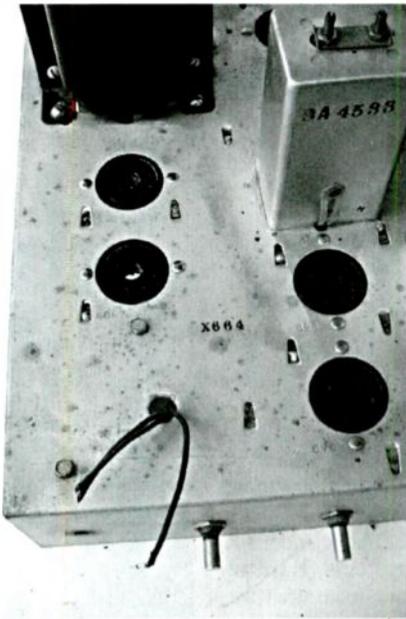
12SA7 (left) and 12SB7Y pentagrid converter tubes. Note the lighter color of the 12SBY7Y's special Micanol base.

capacitors – which hardly ever need replacing. But, the first impression was wrong.

Looking closer and checking the schematic, I could see that these apparent micas were used for purposes, such as bypass and coupling, for which paper capacitors were normally employed. And, sure enough, each such capacitor that I investigated was identified on the parts list as "paper."

However, since these Bakelite-cased capacitors looked to be better sealed than those unreliable wax covered tubulars, I thought they might have been more resistant to the entrance of water vapor. Perhaps their insulation resistance would be high enough that they didn't need to be replaced. But I was wrong again.

Removing several of the units and evaluating them on my Sprague capacitor checker, I found that they all read well below the minimum allowable insulation resistance for their

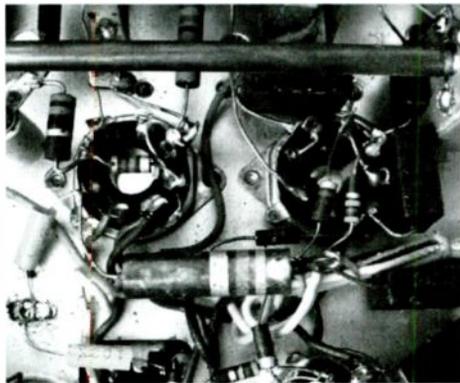


With its coating of gummy dust removed, the top of the NC-57's chassis reveals some pits and stains, but looks quite decent indeed.

capacities. Yet, even at that, they outperformed the wax tubulars, which didn't even have enough resistance for an on-scale reading. So it looked like I was going to have to remove and replace all of the twenty-odd paper capacitors.

I did more than half of the job during this work session. But, since I didn't have all the sizes I would need anyway, I took a break after about a dozen swaps and phoned in an order for the caps I would need to finish the job next time. The four electrolytic caps would also be swapped out later.

I did notice a surprising feature of the original factory wiring that was quite helpful to me in making the capacitor changes. In most radios I have worked on (with the exception of the little RCA a.c.-d.c. set that was our last restoration project), the resistor and capacitor leads had been tightly wrapped around their attachment points before soldering. That made it very difficult to remove them without applying excessive, damaging heat and possibly causing mechanical trauma.



The Bakelite-cased capacitors just above, below and to the right of the tube socket at right look like micas, but are actually leaky paper units. The smaller Bakelite-cased unit at far upper right is an actual mica capacitor.

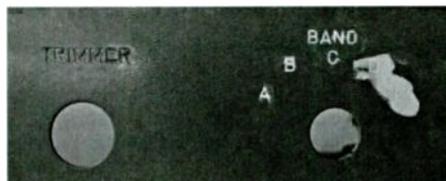
And so, as demonstrated several times in this column, I would quite often snip out the component, leaving its leads still connected, and solder-splice its replacement to those leads using butt connectors. Radio shack 64-3036A connectors are very handy for this. Even though designed for crimped connections, they take solder very well.

In discussions of soldering techniques, most radio texts stress the importance of making a firm mechanical connection before applying solder. And I always try to apply this principal when doing new work. Yet I can't say that I really believe in its importance. Most joints, even fairly loose ones, are quite convincingly firm and tight after proper application of solder.

Apparently the engineers at National, a company famous for its very high quality standards, agreed with me. In case after case, particularly on terminal lugs carrying many connections, I found that component leads were either not wrapped at all (merely slipped into their holes) or secured with a single 180-degree turn. The easy removal really facilitated my restoration work.

❖ Cabinet Cosmetics

With the recapping project on temporary hold, I turned my attention to the cabinet. As mentioned earlier, it was quite sad looking – dirty, paint badly scarred in many places, panel markings faded. In fact, the estate from which I had purchased my very nice National HRO-60 threw in the NC-57 just to get rid of it. Apparently the previous owner had treated this set with extreme disrespect once he had upgraded to the HRO-60.



Labels for bandswitch (right) have been filled with white lacquer and cleanoff of excess in process. Antenna trimmer label is still unrestored.

Repainting would most definitely be called for. Yet a back-yard, spray-can repainting, careful as it might be, would never be mistaken for the original factory finish. Now, I'm quite a pragmatic soul when it comes to radio restorations. I do strive for electronic perfection, but realize that I'm never going to make the neglected radios I usually work with look mint again. I'm happy if I can restore a decent, clean appearance.

The top, sides, and bottom of the cabinet definitely needed a repaint, but I thought I could save the finish on the front panel, which bore only a relatively few scars. In any case, if I had painted the panel, the engraved control markings would have filled in with the new paint, making it virtually impossible to restore their white color.

Going over the panel with a mildly abrasive auto finish restorer (Turtle Wax Polishing Compound and Scratch remover), I was very pleasantly surprised. Many of the defects that had looked permanent polished right out, and the paint took on a nice, new-looking, gleam. There were only a few bad scratches – which could be touched up with the paint I would later choose for the refinishing of the rest of the cabinet.

I also experimented with methods for refilling the engraved control markings with new white material. First I tried rubbing the markings with a white "Blend Stick" made by DAP. This product is made to fill small holes or gouges in woodwork with matching color. It didn't work because the material I worked into the markings came right out when the excess material around them was rubbed off.

What now seems to be working very well for me is treatment with white lacquer purchased in a tiny bottle from a hobby shop. First the lacquer is painted in and around the panel markings to be restored, then allowed to dry thoroughly. Lacquer is removed very easily with lacquer thinner – even when dry. Carefully going over the dry lacquer with Q-tips dampened in thinner, the excess lacquer can now be cleaned off without removing the material inside the markings.

Readers who remember my near-disastrous experience using mineral spirits on the finish of the S-40 are assured that this time I tested the lacquer thinner on an inconspicuous part of the cabinet to make sure it wouldn't attack the paint!

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A New Era in Scanning - First Look at the Uniden BC-246T

By Larry Van Horn, N5FPW, Grove Technical Department



When I sat down to test the new Uniden BC-246T handheld scanner, I was also keeping one eye on the television watching my favorite college football team play their arch rivals. While my team marched the ball down the field, I was unpacking this new scanner, attaching accessories, loading the batteries and prepping the radio for operation. So far, so good, both on the football field and with the 246T.

As my team approached the goal line for their first score, I was also making progress in sifting through the manual preparing to enter my first frequency in the scanner. That all came to a sudden stop. My football team fumbled the ball and I fumbled the entry of my first frequency into the scanner.

Like the football that my team had lost on the field, I found out that I had lost a key feature that scanner hobbyists have grown used to since the advent of the first programmable scanner - frequency banks.

With this new scanner, banks are out and systems, groups, and channels (both frequency and talk groups within trunk systems) are in. How high tech are we? No channel numbers or systems are used: This scanner has a memory management display that shows you instead how much memory you have used and how much you have left. Bet you don't have one of those on your present scanner!

But my team did manage to recover the old pigskin and I managed to enter my first system, group and frequency in the scanner, thanks to sticking with the manual and taking the learning process one step at a time.

The more time I spent with the manual and the radio in hand, the more these new concepts became actually easy to understand. Programming became easier (albeit still laborious), and the features that make the BC-246T unique are ones that users will come to truly appreciate.

❖ What's New?

The BC-246T handheld is the latest in a string of innovative new scanners from Uniden, starting with the introduction of their first trunk tracking scanner (BC-235) in 1997. This radio introduces two more revolutionary innovations - the aforementioned dynamically allocated memory system and Uniden's exclusive Close Call™ RF Capture Technology.

The BC246T dynamically allocated memory system allows the user to program its 2500 channels into any configuration. While traditional scanners have been limited to 10 to

20 banks, the BC246T groups channels (frequencies) into systems (trunk or conventional), allowing for up to 200 systems to be programmed and scanned. Systems can be quickly enabled or disabled using the 0-9 keys, and each system can contain up to 20 groups composed of an unlimited number of conventional frequencies or talk groups within the system. Both systems and groups can easily be selected or deselected.

❖ How Does Dynamic Memory Work?

The dynamically allocated memory system gives the scanner hobbyist a flexibility long sought, but never realized until now. To better illustrate how this works, Table 1 is how I decided to configure our test version; each numbered quick key is a system, and each letter represents a group within the system.

Of course, within each group I had the frequencies for that group. And I had a choice to display the frequency I had programmed in each of the memory channels or to put an alphanumeric tag instead of the frequency, although this uses another memory channel.

One of the real benefits of this scanner's dy-

namically allocated memory system is its flexibility in programming trunk systems, especially EDACS and LTR systems. Here in our local area we have a little three-channel EDACS trunk system I like to monitor. Using an older bank type scanner such as the Uniden BC-245, 250D, or 296D, etc., I would put those three frequencies into a bank, but because an EDACS or LTR system has to be in Logic Channel Number (LCN) order, only those frequencies associated with the trunk system could be programmed into that bank. Unlike a Motorola trunk system, you can't program additional conventional frequencies in an EDACS or LTR trunk bank. Thus, you would always waste a lot of memory channels in the bank when you programmed an EDACS or LTR trunk system.

But, since the 246T has no banks, if your EDACS or LTR trunk system consists of only

MT Rating: ★★★★★

Table 1

Systems (numbers)/Groups (letters)

| | | |
|---|--|-----------------------------|
| 1. North Carolina Public Safety Conventional | | |
| A. Cherokee County | B. Clay County | C. Graham County |
| D. Macon County | F. Swain County | G. Jackson County |
| 2. Georgia Public Safety Conventional | | |
| A. Towns County | B. Union County | C. Fannin County |
| D. Gilmer County | E. Hall County | F. Rabun County |
| G. Murray County | H. White County | |
| 3. Tennessee Public Safety Conventional | | |
| A. Polk County | B. Bradley County | C. Hamilton County |
| 4. Federal/Military Conventional | | |
| A. Interagency | B. Forestry | C. Federal Law Enforcement |
| D. TVA | E. Department of the Interior | F. Department of Defense |
| G. Miscellaneous Agencies | H. Unidentified Frequencies | |
| 5. State Agencies Conventional | | |
| A. North Carolina | B. Georgia | C. Tennessee |
| D. Alabama | F. Highway Departments | G. Unidentified Frequencies |
| 6. Business Conventional | | |
| A. FRS/GMRS | B. Business Confirmed | C. Fast Food Kiosk |
| D. Itinerants | E. Unidentified Frequencies | |
| 7. Utility Companies Conventional | | |
| A. Power Companies | B. Water Companies | C. Telephone Companies |
| D. Gov Public Works | | |
| 8. Trunk Systems | | |
| | Note: Each trunk system programmed into the 246T counts as one system up to 200 trunk or conventional systems. | |
| 9. Aircraft/Railroad/Marine Conventional | | |
| A. Confirmed Aircraft | B. Confirmed Railroad | C. Marine |
| D. Aircraft Holes | E. Railroad Holes | |
| 10. Unknowns and Holes Conventional | | |
| A. Unknowns (not included in other systems above) | | |
| B. Frequency Holes | | |

three frequencies, that is all this revolutionary new memory management system will use. The days of losing whole banks of memory locations with an EDACS or LTR trunk system are history with the Uniden's dynamically allocated memory system.

❖ **Close Call™**

The second major new feature is Uniden's Close Call™ RF Capture Technology. Think of Close Call as a frequency counter with a speaker. Actually, it is much more than that. Close Call zeroes in on nearby transmissions without the need for programming, even when the BC246T is in other modes, or is scanning, searching or holding on a frequency. For example, if someone transmits within a few hundred feet (range depends on transmit power and other radio traffic in the area), the scanner immediately detects and tunes to the transmission – ideal for use at events where the frequency being used is unknown.

Unlike most of the frequency counters in the marketplace today, Close Call puts the received signals it intercepts through a series of tests to ensure that the signal is a valid transmission and the frequency being displayed is accurate. In addition, you can program the scanner to detect and display CTCSS/DCS tones in use, and enable an automatic "repeater output find" function when monitoring the input to a repeater system.

Another nice feature of Close Call is a setting in which the scanner alerts you when it detects a valid signal; it can even be set to work in a particular band(s) to look for signals. Like some of the more expensive frequency counters, Close Call can automatically store frequencies it finds for later recall in up to 256 memory channels.

The 246T also takes care of the pager problems that frequency counters and other scanners encounter in the search modes. You can activate a menu option that will screen out paging transmissions found on common pager frequencies in the VHF/UHF ranges.

We field tested the Close Call and were very pleased with the following results, using a 130 mW ERP Family Radio Service radio in a variety of environments, including urban, rural, and near wilderness:

Average Detection Range: 130 feet
Minimum/Maximum range: 50/300 feet
98% Confidence Interval: 85-174 feet
(i.e. 98% of the time, using a 130 mW radio will achieve a detection range of 85-174 feet)

This range in itself isn't impressive, until you consider that most commercial handhelds are at least 2 watts, mobile transceivers are typically 25 Watt, etc. So, like its frequency counter brethren, you will have to be fairly close to the source of low powered transmitters when using the stock antenna. We noticed a definite range increase when we went mobile using our Grove Stealth Antenna on the car. More powerful, nearby transmitters such as pagers and repeater output frequencies could be received at greater distances.

❖ **Other Great Features**

The BC-246T scanner is also preprogrammed with over 400 channels, covering police, fire, and ambulance operations in the 25 most populated counties in the US. This is designed to save the user a considerable amount of time in startup operation, especially when traveling. Our chief concern here is that the information is only as good as it was on the day it was preprogrammed. Changes to systems can and do occur on trunk systems.

Another first for Uniden with this scanner is the elimination of the proprietary battery pack. Finally, after years of constant complaints, Uniden has done away with those expensive Nicad battery packs. The BC246T comes complete with two NiMH AA batteries and an internal recharging system, or, with a flip of a switch in the battery compartment, you can use regular AA batteries. I will caution all users of the 246T to take *great care* to flip the switch when using non-rechargeable batteries – regular batteries can overheat or even burst, ruining your radio.

Battery life with this scanner was excellent and audio quality was among the best I have heard. Other key features include:

- 25-54, 108-174, 216-225, 400-512, 806-956, 1240-1300 MHz frequency coverage
- Selectable frequency step lets you select a step (5, 6.25, 7.5, 10, 12.5, 15, 20, 25, 50 or 100 kHz) for manual mode and chain search mode. Auto step lets the scanner automatically choose the correct step.
- Selectable and preprogrammed mode: AM, NFM, FM
- TrunkTracker III technology (Tracks Motorola, EDACS, EDACS SCAT and LTR analog trunk systems)
- Comprehensive analog trunk capability including I-calls, emergency alert, trunk Search and ID scans and blockouts
- System, channel group and channel alpha tagging (both frequencies and talkgroups)
- Ten programmable search ranges that can be chained in any combination for searching
- Ten preprogrammed service searches: Public safety, news, amateur radio, marine, railroad, air, CB radio, FRS/GMRS, racing, and special (kiosk and wireless mike frequencies)
- CTCSS/DCS rapid decode
- SAME weather alert including FIPS encoding
- Repeater reverse sets the scanner to switch to the input frequency on a conventional repeater system
- Backlit display and compact housing (4-1/2" x 2-3/4" x 1-1/4")

❖ **What's in the Box?**

In addition to the BC-246T scanner, you will get a wrist strap, computer connection cable to scanner (user must still supply a serial cable or serial to USB port cable for computer operation), AC adapter for recharging batteries or for AC operation with alkaline or ro batteries installed, two AA rechargeable batteries, standard 6-1/4 inch rubber duck antenna using BNC connectors, belt clip and screws, printed owners manual, Bearcat frequency guide, and a *National Public Safety Trunk System* frequency guide.

Unfortunately, the two printed frequency guides are out-of-date; for some systems you will need to use an online source such as Radio-Reference.com or a current *Police Call* book.

❖ **Overall Rating and Final Thoughts**

Finally, I have only four complaints with the BC-246T and they are: no military air coverage (which makes the radio useless for most air show monitoring), no APCO-25 digital capability, lack of fully functional computer software bundled with the unit to assist in programming, and the owners manual. It is a bit vague on some key programming points, suffers a bit on overall organization, and is poorly bound.

However, like the outcome of the football I watched when I tested the 246T, Uniden really has a winner here. They have done a good job in bringing an innovative project to market. And once you break through the initial complexity, I think you will find this radio a winner in your radio shack, too. The BC246T has a MSRP of \$299.95.

MT First Look Rating (0-10 scale)

| | |
|------------------------------|-----|
| Audio Quality..... | 9 |
| Audio Levels..... | 9 |
| Backlight/Display | 7 |
| Ease of Use | 6 |
| Feature Set | 8.5 |
| Keyboard/Button Layout | 8 |
| Overall Reception..... | 8 |
| Sensitivity..... | 7 |
| Selectivity..... | 6 |

The Uniden BC246T is now available as SCN46 from Grove Enterprises (1-800-438-8155; <http://www.grove-ent.com>) for \$229.95 plus shipping.

NOT CE It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology

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AirNav Live Flight Tracker 3 now 6

Last month we looked at AirNav Systems Live Flight Tracker 3, a potentially super program from a company that has a history of producing the best. But we encountered an operational issue. That's where we ended, asking the question, "Is it a hardware, software or internet issue?"

Well, AirNav Systems, other beta testers and myself have been burning up the email lines over the past few weeks making this program fly straight and level. And we succeeded! Why did this program warrant our efforts? Let's see.

❖ A Quick Review

Live Flight Tracker 3 provides the user with a radar screen-like presentation of the map positions of all the USA and Canadian commercial and private aircraft in the air. See Figure 1. This is not a simple static display. Instead it is updated frequently approximating real-time. It's like having your own air traffic control center. It is rich in many other features. See last month's column for details.

The AirNav Systems website <http://www.airnavsystems.com> claims that it works with "any version" of Windows and gives no minimum PC system. We put it to the test on a Pentium II 366 MHz PC running Windows 98SE and a Pentium III 500 MHz PC running Win XP SP2.

Although the program has phenomenal features and graphics, we had two operational problems. While running "Live" there were a number of times, on both PCs, when it went

into a constant "busy" state with a perpetual "busy" hourglass displayed. This usually, if not always, occurred after a menu choice and during a "Processing flight data, please wait" period. The condition required the program to be closed using the "X" at the top right of the display.

The Win98 PC had an additional problem. The program would not close no matter what was clicked. Only the three-fingered salute, Ctrl-Alt-Del closed it.

Clearly we had our work cut out for us; first to determine where the problem was and then to fix it.

❖ A Fix, or Was It?

As soon as I emailed them with the problems the people at AirNav got right on it. I sent a number of emails with attached screen captures of the error messages and other information. After a few days AirNav responded with a program patch to try.

After three patches and a concerted effort characteristic of their professionalism, AirNav cured the constant busy problem on both PCs! I enjoyed hours of tracking flights all over the world. With the polar map projection I was even able to track two flights in the South Pacific. AirNav had found and fixed the software problem. We had the answer to our question. It was software.

When it came time to have some dinner I tried to shut down the program on the Win98 PC using the "X" at the top right. Ugh! No luck; it kept running. I tried the Exit command under the File menu. Still no luck! Unfortunately, it was the three-fingered-salute to the rescue again. I could just hear the groans at AirNav when they received my email. But to their credit they didn't quit. More patches followed but the shut problem on the Win98 PC remained.

❖ A Machine Problem, Too?

After a sleepless night I concluded that this shutdown problem must be machine related. So starting at 5am I began digging into my Win98

| Flight Number | Origin | Destination | Arrival Time | Departure Time |
|---------------|--------|-------------|--------------|----------------|
| AA100 | AA100 | AA100 | AA100 | AA100 |
| AA101 | AA101 | AA101 | AA101 | AA101 |
| AA102 | AA102 | AA102 | AA102 | AA102 |
| AA103 | AA103 | AA103 | AA103 | AA103 |
| AA104 | AA104 | AA104 | AA104 | AA104 |
| AA105 | AA105 | AA105 | AA105 | AA105 |
| AA106 | AA106 | AA106 | AA106 | AA106 |
| AA107 | AA107 | AA107 | AA107 | AA107 |
| AA108 | AA108 | AA108 | AA108 | AA108 |
| AA109 | AA109 | AA109 | AA109 | AA109 |
| AA110 | AA110 | AA110 | AA110 | AA110 |

Figure 2 Not just a flight tracker! Detailed arrival and departure info

PC. Stopping the program using the three-fingered salute displayed all applications that were running. I decide to remove one running application at a time. I then loaded, and tried to shut down "Live".

Two hours and about ten application-removals later, I hit pay dirt. "Live" ran great and closed as expected! I then reloaded all the applications I had removed except the last called "InstantAccess" and tried "Live Flight Tracker 3". Again, it worked well and behaved on shut down. By now, after all the work, AirNav had renamed the program Live Flight Tracker 6.

I owed AirNav an immediate email, which I happily sent. Then running "msconfig" from the Start menu and the choosing the "Startup" tab, the offending application was found. It was associated with TextBridge Pro, a program we looked at a few years ago which converts images to text.

Un-checking the box next to InstantAccess in the "Startup," the PC was re-started and "Live" ran and shut down without a problem.

❖ Comparing PCs

Now that both the Pentium III and Pentium II machines are running the program, I can see a big difference in performance. The PII, at times, gets well behind the operational tasks curve. The result is that it sits there apparently doing nothing for long periods, even if you click a button. But then the display jumps to life and updates itself and the program runs almost in real time. The PIII has an almost constant operational feel with delays only occurring during data download periods.

In any case, make sure all programs running in the background are kept to the bare

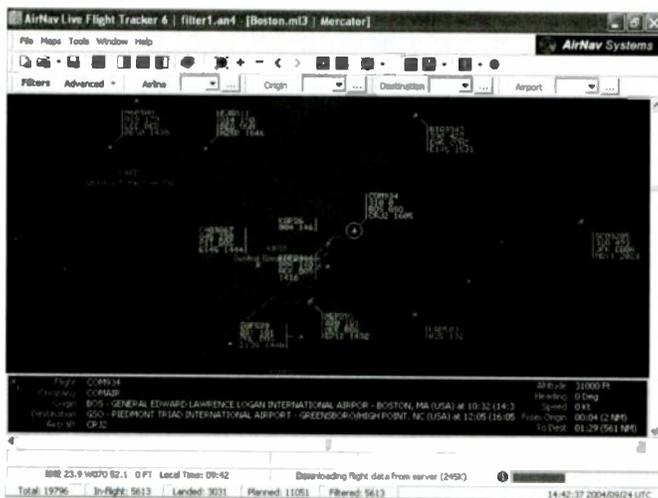


Figure 1 Live Flight Tracker 6 showing a morning at Boston Logan Airport

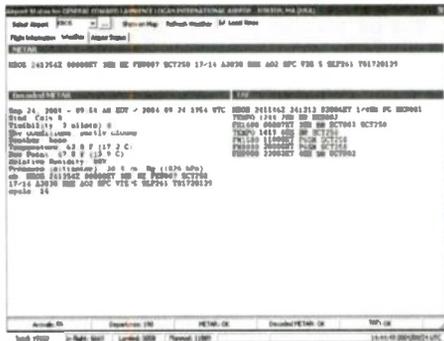


Figure 3 Airport Weather. A nice morning at Logan

minimum. "Live" is still a bit "particular" about running with other memory hungry programs such as Paint Shop Pro still causing some shutdown anomalies possibly associated with virtual memory usage.

Now that the wrinkles have been worked out, let's take a look at useful program functions which we did not cover in detail last month.

❖ An ATC of Your Own

Every time I use "Live" I discover more useful features and functions. Figure 1 shows the impressive namesake of the program: flight tracking which makes you feel as if you are in an Air Traffic Control center. Here we are viewing all the commercial and general aviation aircraft in flight in the vicinity of Boston Logan airport.

Entering the identifier of an airport in the "Airport" box at the top right of Figure 1 then displays only aircraft whose destination or origin is that airport, for example, Boston. The other boxes or filters to the left of the Airport box function in a similar manner. For example, entering DAL, the abbreviation for Delta Airlines, in the "Airline" filter, results in only Delta flights being displayed.

But Live Flight Tracking also puts a wealth of real time airport information at our fingertips.

❖ "Live" Airport

There are many ways of accessing airport information. If you know the specific airport of interest, press the F6 key, which brings up airport info. Another convenient method is to use the cursor and hover over an aircraft coming or going to the airport of



Figure 4 Airport information a'plenty! Logan gate and traffic delays

interest. Right clicking brings up a menu that includes "Airport Information." The destination or origin airport is then chosen and Figure 2, "Flight Information," a list of arrival and departure aircraft at the chosen airport, is displayed. This list can be scrolled down to show expected and completed departures and landings.

The bottom of the list has some very interesting up-to-the-minute data, specific to the chosen airport. This includes the number of arrivals/departures and the total of flights that are in-flight, landed or planned.

Selecting the "Weather" tab at the top left of Figure 2 displays the weather status for Boston Logan in three different formats as shown in Figure 3. The Decoded METAR, on the left, is the closest to plain language. Looks like a nice morning in Boston.

Clicking the "Airport Status" tab at the top right of the screen displays the official Federal Aircraft Administration (FAA) air traffic control synopsis of the air traffic and gate conditions at the airport. A fifteen-minute delay is nothing. Right now is a good time to get in or out of Boston. These are some of the features that make Flight Tracker a great Airport Tracker.

❖ The ACARS Connection

Over the years we have looked at many ACARS (Aircraft, Communications and Reporting System) programs in this column. One of them was AirNav's ACARS Decoder. "Live" provides a data connection for direct use with their ACARS Decoder. In other words, "Live" will provide the data feed to the ACARS program. AirNav's ACARS Decoder 2.1 costs \$69.95 or \$55.95 when purchased with Live Flight Tracker. It is a 4.8 MEG program available for downloading as a demo or full version for from their website <http://www.airnavsystems.com>

❖ Counting the Cost

Live Flight Tracker 6 has proven itself to truly be a quantum leap in flight tracking programming. The program has many more slick flight tracking functions that must be used to be appreciated. For the pilots, aircraft aficionados and airband monitors, Live Flight Tracker 6 brings aircraft to life. The one-time cost of the program is \$79.95. This includes six months of server use with up to 60 hours of use per month.

Unfortunately, even for non-commercial users, there is an on-going server cost of \$79.95 every six months after the initial 6-month period. Upgrading from version 3 to 6 is free. Upgrading from version 2 to 6 is \$59.95. Download the free Demo version and give it a try.

❖ Next Time

Our feet may be planted back on the ground, or we just might be 12,000 miles above the earth! You'll see next time. Please allow me to extend my season's greetings to everyone and a sincere wish, not just for peace, but also for justice on Earth for all of humanity.

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WiNRADiO AX-71C Discone Antenna

By Bob Grove W8JHD

Meeting the requirements of the newer wideband receivers, transceivers and scanners, WiNRADiO has introduced their AX-71C wideband discone antenna.

Intended for VHF/UHF receiving and transmitting applications, the AX-71C has a VSWR measurement of under 2:1 (50 ohms characteristic impedance) continuously from 85 MHz to well above 3000 MHz (3 GHz). Throughout this range, the antenna has performance roughly equivalent to a resonant ground-plane antenna at any frequency.

The sturdy, stainless-steel elements and rugged center insulator/connector accept power of at least 300 watts. Overall height of the antenna is 62 inches, with a maximum skirt diameter of 33 inches.

A two-foot-long, 1-inch diameter, black-anodized, aluminum mounting tube is provided to attach the antenna to the user-provided support mast. The tube is drilled, with screws provided, for rigid attachment to the base insulator. A low-loss, polyethylene-insulated, SO-239 receptacle accepts the standard PL-259 connector on the user's coax.

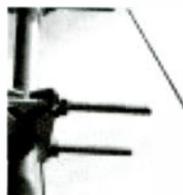
Mounting clamps are not provided, but are available as an accessory kit; alternatively (and more economically), the user may simply purchase a pair of U-bolts and nuts or a pair of hose clamps at a hardware outlet to affix the antenna tube to a convenient mast.

❖ Assembly

Eight pairs of upper and lower stainless-steel elements are threaded for easy assembly into the center insulator; nuts are provided to lock the elements solidly into place. The assembly will take about ten minutes.

When the assembled antenna is ready to be mounted, the coax is inserted through the aluminum mounting tube and screwed into the center insulator connector. Three stainless-steel screws are then inserted to firmly attach the tube to the base.

Since this is a wideband, omni-directional antenna, no alignment or adjustments are needed. As with all antennas, the discone should be mounted as high as practical, away from reflective or signal-absorbing obstructions. Low-loss coax (RG-8 foam, RG-6/U, LR-400, etc.) is mandatory for UHF/microwave applications.



❖ Let's Try it Out

Since the Grove Scantenna is such a hot performer, we thought it would be a good baseline against which to test the reception of the AX-71C. A six-foot test stand held each antenna alternately; the same coax was used for both antennas.

Comparative reception tests were performed at 10, 15, 120, 27, 54, 75, 81, 88, 110, 152, 158, 162, 172, 407, 417, 860, 871, 879, 940, 947 and 1090 MHz. Taking into consideration predictable variables like fade and flutter, both antennas received identically.

❖ The Bottom Line

Choose the WiNRADiO AX-71C if:

- (1) You are planning to transmit, especially on widely-separated VHF/UHF frequencies;

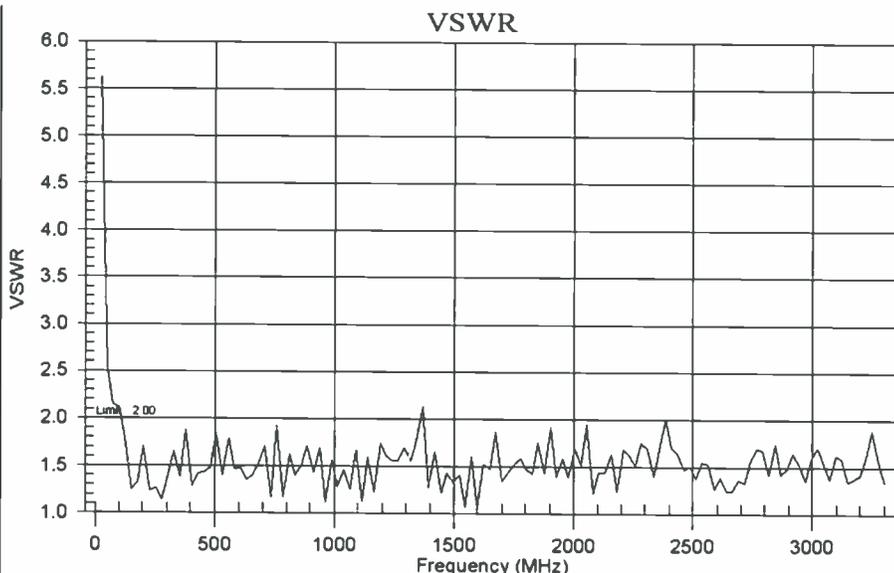
- (2) Consistent impedance match is important throughout the VHF/UHF spectrum;

- (3) Durability under high winds, ice loading, or corrosive climate must be considered;

- (4) If long-term use is planned, especially at a difficult-to-access mounting location.



The AX-71C is \$89.95 from Grove Enterprises (7540 Hwy 64, Brasstown, NC 28904; 800-438-8155; <http://www.grove-ent.com/order>)



ICOM SP-23 Noise-Reducing Speaker

While it's always best to reduce noise interference with the receiver, it's not always possible. Several accessories are sold as add-ons to process the audio from the receiver, and noise-reducing speakers are popular.

One of the newest, and certainly one of the nicest, is the SP-23 from ICOM,

prominent manufacturer of communications receivers and transceivers.

The SP-23 utilizes passive circuitry (no transistors or ICs) to limit the bandwidth of the internal speaker element; no power source is required.

Measuring 5-3/4"W x 4-1/4"H x 11"D and weighing 3.6 pounds, the SP-23's black-

finished steel cabinet makes a professional statement alongside any radio accessory.

Without filter activation, the speaker accessory is rated at a flat 200 Hz - 10 kHz. Upper- and lower-frequency cutoffs are selected by front-panel pushbuttons, nominally set at 250 and 500 Hz for the low end, and 1 and 3 kHz for the high end.

Additional pushbuttons permit selection of either of two 1/8" mini-jack inputs from the attendant radio, and speaker on/off as well.

A front-panel 1/4-inch headphone jack is also provided. Four husky rubber feet prevent scratching the surface of the listening position while cushioning the speaker cabinet.

The internal, 3-inch speaker element accepts up to 4 watts of audio at a nominal 8 ohms impedance. A 1/8-inch mono interconnect cable is supplied with the speaker unit.



❖ Let's try it out

Connecting the SP-23 to our ICOM R-8500 test receiver, we immediately saw improvement in voice intelligibility when hiss was present, or if too much "boominess" accompanied the communications.

The SP-23 does not attenuate sharp-rise-time pulses like spark interference, although the taming of the spark's high-frequency components makes it slightly more tolerable.

Passive circuitry doesn't offer the sharp rolloff characteristics of active circuitry, but its ability to compress the desired audio passband by reducing unwanted highs and lows works quite well, and it doesn't require any power source.

The SP-23 is available from Grove Enterprises for \$169.95 (7540 Hwy 64, Brasstown, NC 28904; 800-438-8155; <http://www.grove-ent.com/order>) and other leading ICOM dealers.

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Running PowerSDR for the SDR-1000 Software Definable Radio

By John Catalano

Last month we explored exactly what a Software Definable Radio (SDR) is. We then got our hands on the first commercially available SDR from FlexRadio Systems, the SDR-1000.

This month we take a peek into the inside of the SDR-1000 transceiver. Then we will connect it to a PC and try out FlexRadio's receiver software, PowerSDR. After all, a software definable radio is only as good as its software.

What's Inside?

The blank front panel of the SDR-1000 belies the complexity of the circuitry within. However, given the vast strides in on-chip circuit integration, the SDR-1000 electronics hardware is quite compact. Figure 1 shows the sandwich of printed circuit cards that make up the SDR-1000's hardware. This photo shows the size of the printed circuit board stack relative to a US twenty-five cent piece. The stack only occupies about half of the case, with the remaining half predestined for add-ons, such as a 100 watt amplifier for the now 1 watt transmitter. See Part One for a block diagram of the SDR-1000.

Our first task is to connect the SDR-1000

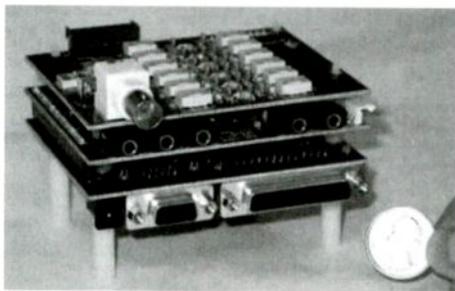


Figure 1- The Printed Circuit Board Sandwich Inside the SDR-1000

to a well-regulated 13.8 volt DC supply. For receive-only a steady 0.6 amp supply will do fine. However, if the transmitter section is to be used, 1.1 amp supply is suggested. In any case, make sure that it is a well-regulated supply. I used a Lambda supply, model LXD-C-152-R, that I found at a radio flea market.

When I heard about the SDR1000, I envisioned it using either a serial or USB port for control. I was very surprised to find that the SDR-1000 utilizes the computer's parallel/printer port. Therefore, you will need a full 25 pin parallel cable (male-male) which is not supplied with the SDR-1000. These are a bit rare these days, but my well-stocked cable box provided one.

The signal output of the SDR-1000 requires a shielded miniature stereo cable (male-male) to connect between the "To Line" connector on the back of the SDR-1000 and the "Line In" of the PC's sound card. See Part One to refresh your memory on the "supported" sound cards. With the addition of an antenna connection, we are ready to go.

PowerSDR and the SDR-1000

I tried PowerSDR on two Windows 98SE PCs with little to no success. Once I moved to an XP machine with the latest SP2 patch, things worked as expected. Experience with the various sound cards and Win98 indicated that these are two critical areas that cannot be worked around. I strongly suggest you use XP and try your existing sound card. However, be prepared to install one of FlexRadio's support sound cards if you have problems. Don't waste time, just do it, if you want to use the SDR-1000.

As the FlexRadio website says, "The SDR-Console provides all DSP and control functions for the SDR-1000 transceiver. Source code is available with purchase of the SDR-1000 to encourage amateur SDR research and experimentation."

First, let me say, that the software provided by FlexRadio is in constant flux due to improvements and additions. Remember that this is part of the excitement, with the SDR in its early stages of development. During my time with the SDR-1000 there were four versions of PowerSDR issued. Each one added new features as well as curing teething software issues. Check out their website <http://www.flex-radio.com> for new versions.

We will use PowerSDR version Beta 0.1.6 for this article. This program comes as a 700M zipfile and installs without problems with three mouse clicks. PowerSDR's main screen has a lot going on, as you can see in Figure 2. Clicking on the "Power" button at the top left connects the program to the hardware.

In Figure 2 we are tuned to WWV's time signal on 15 MHz in the SAM (synchronous AM) mode. The large display at the top left of

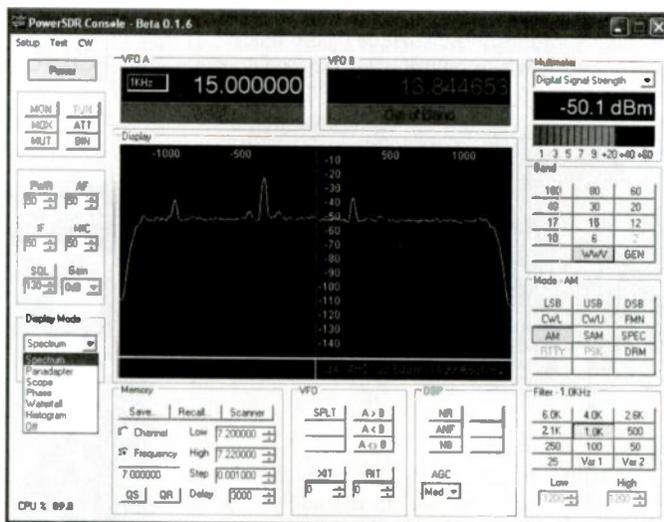


Figure 2- The Main Display of the SDR-1000 Where It's All Happening

the display shows we are tuned to 15.000000 MHz. The out-of-the-box tuning was accurate to a few hundred cycles ... pretty good! But the SDR-1000 is capable of better. More on this subject later.

Gain Control Panel

The area on the center left side of Figure 2 has six different gain settings. The default values worked fine for all except "Gain". For my location/antenna the gain setting had to be set to 0dB (from the default value of 26dB) in order to eliminate overloading and all the problems it brings. This change made a world of difference to the performance of the SDR-1000.

The "IF" gain adjusts the Record Line In level and effects the dynamic range of the receiver. It seemed to work best in a range from 36 to 60. But this value is a function of the sound card being used. Volume "AF" and squelch "SQL" are other often used settings found in this panel.

Tuning the SDR

There are many methods of tuning the SDR-1000. These include using: the mouse wheel, the numeric keypad, Shift/arrow keys, the "Band" buttons and spectrum display, to name a few. I found the easiest method was a two-step approach. First, the approximate frequency is keyed in via the number keys or the "Band" buttons on the right of the screen. These buttons store the last four frequency, mode, and band pass selections. Pressing the Band button multiple times, scrolls through the stored selections. For SWLers, a five memory General Coverage

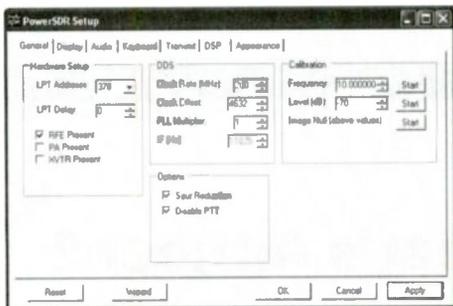


Figure 3- SDR-1000's Setup Menu with Seven Tabbed Sub-menus

Band button is provided.

Then, for fine-tuning, the spectrum display can be used. Here a right mouse click brings up crosshairs. They are placed over a signal of interest, and then a click of the left mouse button will accurately tune to the signal. The mouse/trackball wheel tuning also works very conveniently. Under the "Keyboard" tab in the "Setup" menu, the user can customize keystrokes for tuning functions.

Two VFO (a throwback to the old days of Variable Frequency Oscillators) memories are provided. The "A" and "B" frequency memories can be easily manipulated and swapped using the VFO box shown at the lower center of Figure 2. Tuning to a resolution of 1 Hz is possible, especially after careful calibration, as we shall see.

Filters Are Us

Operating in the digital domain allows for IF filtering that can only be dreamed about in the analog world. PowerSDR has ten fixed filters and two user defined filters which allow setting the high and low frequency filter parameters from 1 Hz to 9999 Hz.

These filters range from 6 kHz down to 25 Hz in 1 Hz steps (not a typo!). These filters, shown on the lower right of Figure 2, have a shape factor of <1.05:1 at 500Hz bandwidth. Not too shabby. In addition, three selectable noise filters are available at the lower right of the screen.

Multi-Tabbed Displays

Another great feature of an all digital receiver is the flexibility of its displays. Coupled with the SDR's hardware flexibility, just about

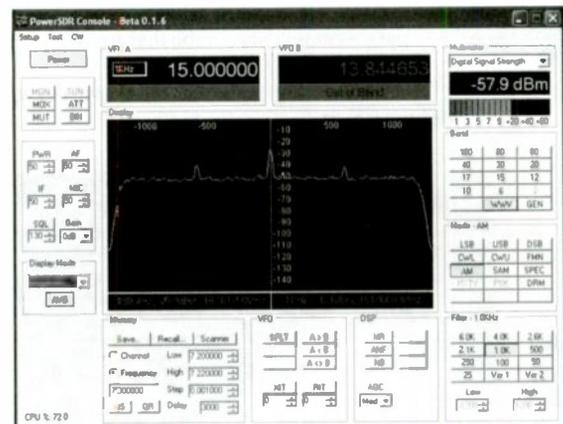


Figure 4- A Calibrated SDR-1000. Compare It To the Un-Calibrated in Figure 2.

anything can be displayed. In Figure 2 we have purposely left the pull down menu on the lower left side expanded to show all signal display modes. What is being displayed in Figure 2 is the Spectrum in the averaging mode. Similarly, the signal strength meter, labeled "Multimeter" at the top right, can be configured in one of ten ways.

The spectrum display takes lots of computer horsepower to run and taxed the outdated Pentium III to the limit. In fact, you can see at the bottom left that the CPU is working at 89% of its capacity, at times reaching 100%. When the Display Mode is shut off, this drops to around 50%, which is indicative of what it takes to actually run the signal manipulation algorithms.

We could shut down the spectrum display to ease the work of the CPU. Alternatively, we could reduce its refresh rate. This is found in the Setup menu under the "Display" tab. A Main Display FPS (frame per second) value of 8 is a nice compromise for a PC running at less than 1 GHz. With this FPS value and the spectrum display running, the CPU utilization drops to around 70%. This reduces the lag between initiating a command and seeing the result on the display.

Calibration

Three important parameters – oscillator adjustment, image rejection and spectrum analyzer/S-meter – can be adjusted to each user's system. I did not do any when I first operated the SDR-1000. I suggest that a frequency calibration is performed. This does not require any test equipment and can be done in a minute.

Why do it? It is clear from the spectrum display in Figure 2 that the signal for WWV peak (the major peak) is not tuned to the center of the spectrum. However, the digital display reads 15.000000 MHz. Now look at the number at the lower right of the spectrum display. The first number automatically gives the frequency offset between the major signal peak and the tuned frequency. Here we read 347.4 Hz, not bad for most receivers. But, as we said, the SDR-1000 can do much better.

First we need to click on the "Setup" at the top left of the Figure 2. This brings up a screen with seven tabbed menus, see Figure 3. Here we have chosen the "General" menu tab. To calibrate the SDR's tuning we must change the setting of Clock Offset under the DDS box. But what number should we use? A simple formula provides the answer.

$$\text{Frequency Offset X [200MHz / Actual Frequency]} = \text{Clock Offset}$$

$$\text{For our case: } 347.4 \text{ X [200/15]} = 4632$$

By entering 4632 into the Clock Offset as seen in Figure 3, and then clicking "Apply" we have calibrated the SDR-1000 to within a few hertz! This can be seen in the numbers below the display in Figure 4 and the fact that the peak has now moved under the center vertical axis.

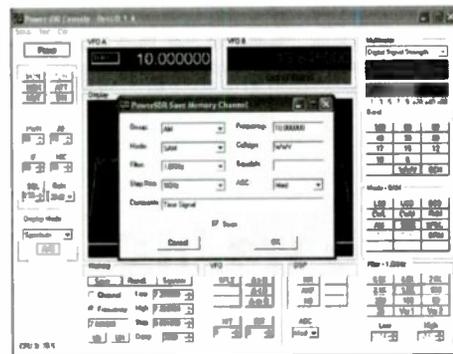


Figure 5- "Save Memory Channel" Screen Showing the Stored Fields.

Also note at the bottom left, that the CPU usage has dropped to 72% as a result of reducing the Main Display FPS value. I used the SDR-1000 without further adjustments, since test equipment is required to set the image rejection and calibrate the spectrum analyzer/S-meter.

Scan/Storing/Search

The section labeled "Memory" on the bottom left of Figure 4 provides scanning, searching and on-disk storage functions. Scan between two pre-set frequencies, entered in the High and Low boxes. Or scan the stored channel list using the "Scan" button.

Selecting "Save" brings up the Save Memory Channel screen seen in Figure 5. The frequency, mode, band-pass filter, squelch value, memory scan lock settings, call sign (or broadcast station ID) and comments of the current tuned station can all be stored. Each memory can be linked with groups for memory scanning. The number of stored memories is essentially only limited by hard drive space. Saved frequencies are retrieved by using the "Recall" button which displays a listed of stored channels. Select the channel you wish to recall by clicking on the arrowhead on the left of the screen.

Temporary storage of the current radio settings is possible using the Quick Memory buttons; QS (Quick Storage) and QR (Quick Recall). But remember, when the program is shut down this information is lost.

The first time the list of stored channels was displayed and any item selected by a click, a Windows error message appeared and the application needed to be closed. However, the second time the list was recalled, an arrowhead appeared on the left and the problem disappeared. I'm sure this will be corrected in future versions of PowerSDR.

Next Time

The SDR-1000 does it all! Using the MK I Ear standard, this receiver sounds pretty good in the shortwave bands hooked up to a tuned multi-band dipole. It pulls in weak ham stations and does a great job on strong broadcast powerhouses.

Next time, we will do A-B-C listening tests using the SDR-1000, a PCR1000 and an FRG-100, all switched to the same antenna. Stay tuned: We will see if the SDR technology can live up to being called "the most important development in radio for the past 75 years."

Are we high enough yet? High Gear's Altitech2

Drumroll please – I am delighted to announce the very first *Monitoring Times* High Altitude Get-Your-Name-and-Picture in the Gadget Guy Column Contest. That's right: you can bask in the adulation of an adoring public, thanks to your name and picture prominently displayed in this column. To do that, you only have to meet one requirement, so how hard could it be?

We'll get to how hard it might be in just a minute, but first some background. A couple of days ago the Fedex guy dropped off a package. In it was a nifty gadget called the Altitech2 from High Gear. It's a palm-sized electronic instrument that clips to a belt loop, climbing harness or jacket zipper with a carabiner-style gated clip and delivers a wealth of information that might be useful to a hiker, hunter, climber or first-responder.

The Altitech2 includes:

- Digital altimeter with working range from -2296 ft. to 29,500 ft. (feet or meter option)
- Accumulated and maximum altitude, stores 20 altimeter readings
- Digital barometer with working range from 300mbar to 1100 mbar
- Barometer pressure updated every minute and graph shows relative changes for the last 24 hours
- Digital compass with adjustable declination, leveling bubble and 1 degree resolution with 16 directional pointers
- Digital thermometer with 0.1 degree resolution (Celsius or Fahrenheit option) with a working range of -4F to 158F (-20 to 70C)
- Dual time zones with hour, minute, second, month, date, and weekday
- Dual daily alarms and hourly chime signal
- Chronograph with lap/split time measurement and 100-lap memory capacity in a maximum of 30 runs, 1/100 resolution, 24-hour working range
- Countdown timer with stop, repeat, and up function
- Electro luminescent back-light display
- Water-resistance to 100 ft.

The whole unit measures only 4 inches long (including the clip) by 2-1/4 inch wide by 3/4 inch thick. Most of the front is dominated by a large digital display with large, easy to read main digits. The carabiner/clip flips back to prop the Altitech2 up at an easy viewing angle on your desk. There are four buttons on the outside of the case that are used to activate various functions, a rotating compass bezel surrounding the display, and a temperature sensor and a small bubble level just below the display. The unit is powered by a single user-replaceable CR2032 battery.

❖ Putting it to the Test

Everything works as it should on the Altitech2. It takes about 10 minutes with the owner's manual to get familiar with most of the functions, and everything is pretty straightforward from then on.

I particularly liked being able to track barometric pressure over time, which is a very useful indicator if you are out in the wild and can't hear a weather radio station. (The short

version of weather forecasting is: if the pressure is dropping rapidly, it's time to get out of Dodge.)

The digital compass is easily among the best I have used. Unlike many others I've owned or played with, it didn't require re-calibrating on a frequent basis. In fact, it didn't require recalibrating at all; it simply worked. Just hold the Altitech2 horizontal (you can check it easily, thanks to the built in level), press the button, and – voila! – read your bearing. Combine this with the altimeter and a topographic map, and knowing your heading as well as your altitude would make overland navigation easier, even under dicey conditions.

❖ The MT Challenge

But what really sparked my imagination was the working range of the altimeter: -2296 ft. to 29,500 ft. I checked on the Internet and discovered that Mt. Everest has "grown" over the years. In 1852, the height was estimated at 29,002 by the Great Trigonometrical Survey of India. In 1955, the height was adjusted, based on better data, to 29,028 ft. But in 1999, the mountain grew another 7 ft – to 29,035 ft – based on some data taken on the mountain in 1998.

So, here's how to win the *Monitoring Times* High Altitude Get-Your-Name-and-Picture in the Gadget Guy Column Contest: climb Mt. Everest and (using a stepladder or riding on someone's shoulders) take a picture of your Altitech2 reading more than 29,035 ft. (In case of tie, winners will be picked from a hat.)

Even if you're not planning to climb any mountains, the Altitech2 gets my recommendation: it's a well-made, conversation-provoking watch/compass/weather data combo that could prove very handy. MSRP is \$150.

For more information, visit <http://www.highgear.com>.



The Altitech2 packs a lot of useful goodies in one easy to carry unit.



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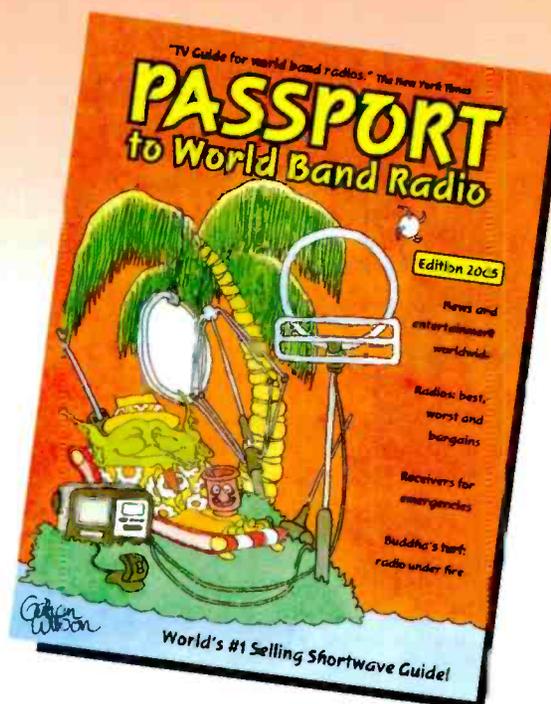
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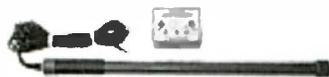
What's NEW

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Active SW Antenna

LF Engineering has upgraded their H-800 Skymatch active antenna with the H-900 Gain Probe antenna, now covering increased spectrum to include low band, the entire shortwave spectrum, and a portion of the mediumwave broadcast band, 10 to 60 kHz! Additional gain improves weak signal reception, and increased dynamic range withstands strong-signal overload and avoids desensitization from nearby transmitting antennas.

The Gain Probe antenna is 25



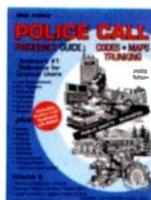
inches long and 1 inch in diameter. The entire antenna is sealed against the weather for outdoor use. The LF Engineering H-900 Gain Probe Antenna includes the integrated active antenna, 50 feet of RG174U w/ RCA coax lead-in, control box, and AC adaptor.

The H-900 is available for \$189.00 exclusively from Grove Enterprises (1-800-438-8155; <http://www.grove-ent.com>; 7540 Hwy 64 West, Brasstown, NC 28902). Check out the Grove website for additional specifications, and watch for *MT*'s review coming up soon.

Police Call Frequency Guide, 2005 edition

This is the 42nd edition of the nation's favorite scanner directory, loaded with information for scanner radio enthusiasts. Each edition (Volumes 1-9) covers VHF/UHF land, sea and air frequencies in the frequency range from 30-869 MHz for the specific states, except for Hawaii and Alaska.

Each volume includes frequencies for public safety, railroads, forestry, aircraft, highways, transportation services, schools, news media, movie/TV production crews, security companies, rescue services, hotels, sporting events, public utilities,



amusement parks and much more.

Listings are alphabetized by location, and include frequency, call sign, base or mobile class, and service. A by-frequency cross-reference allows the listener to look up the most likely source of an unrecognized transmission.

Each volume also includes a *Police Call* Version 6 CD-ROM that has the entire United States directory set (all the material from each of the regional volumes). On the CD are public safety listings by frequency, selected trunk systems data; business listings by state; Grove's Top 1000 Shortwave frequency list (all direct from databases on the CD); and maps of various public safety jurisdictions.

There is additional material on the CD that uses the Adobe portable document files (PDF) format which will require the user to install an Acrobat reader. These additional listings includes a sampling of U.S. government frequencies (not indicated as a PDF on the main menu); a railroad and aircraft frequency list; the consolidated frequency list (CFL); code and signals; glossary of terms and slang; auto racing frequency data; and listings of various FCC radio services.

The CD is easy to use, and most of the operational problems experienced in earlier versions appear to have been worked out. It should be noted that from the browse portion of the CD, data from the main frequency databases cannot be printed out.

While the most important sections of this year's edition have been brought up to date, some of the generic lists are getting real long in the tooth, as we have mentioned in our reviews over the last two years. The FCC's reforming of the spectrum is mentioned and some of the information has been updated. In the aircraft listings many of the frequencies are not identified as to usage and some of the material is out-of-date. The military/government listings still need to be completely scrapped and started all over, but it does look like Mark Meece, a noted federal/military writer, will now be editing that section.

In addition to inaccurate information, there are still listings for bases that have been closed by the Department of Defense, as we have pointed out in reviews over the last two years.

But, in spite of the above lapses, this year's blue cover *Police Call Frequency Guide* remains the leading

source of scanner frequency listings on the market, and with good reason. Its overall accuracy remains high, especially considering the rapidly-changing VHF/UHF spectrum assignments.

A *Police Call* directory for your region is available for \$19.95 plus shipping from Grove Enterprises (7540 Hwy 64 West, Brasstown, NC 28902; 800-438-8155; <http://www.grove-ent.com>).

— Review by Larry Van Horn, N5FPW

Big Things in Small Packages

While radio hobbyists have an insatiable appetite for new radios and other expensive gizmos, you don't always have to break the bank to make him or her happy. Check out these accessories and catalogs for some ideas on last-minute shopping.

Hang it on the Tree

This tree-tapper is no woodpecker — it's a gold-plated, miniature Morse Code Key that really works. The 2004 Christmas Key is a miniaturized replica of a 19th century camelback key with all the usual adjustments for tension and spacing.

According to Marshall Emm (N1FN) at Morse Express, the Christmas Key is "one of the smallest practical keys we've ever seen, so it will be very handy for QRP portable operations." The key measures 2-9/16 inches by 1-5/16 inches at the base and weighs 8 ounces. This is a limited edition of 250 keys, and each bears an engraved serial number on the base.

The 2004 Christmas Key is \$69.96 plus s/h, available only from Morse Express; call (800) 238-8205 to order by phone or visit <http://www.MorseX.com> to order on line.



MFJ Enterprises

MFJ has lots of nifty accessories like 12 pairs of Anderson PowerPole connectors for \$10.49 (yes, the kind "Bright Ideas" keeps touting) and the Anderson PowerPole crimping tool for \$9.95, 100 feet of 14 Gauge Copper Strand Antenna Wire for \$11.95, and new ceramic bone-insulators (as low as \$1.95 each).

To order, get a free catalog, or for your nearest dealer, call 1-800-647-1800; or write to: MFJ, 300 Industrial Park Road, Starkville, MS 39759; or go online: <http://www.mfjenterprises.com>; or fax to: 1-662-323-6551.

Ramsey Electronics

Ramsey Electronics' little bug kit is fun to build, and when you're done, you have a little "bug" that scoots around using two subminiature vibrator motors. Using two optical "tentacle" sensors on the front, it will automatically move out of the way of obstructions and will run away from a flashlight beam! Runs on two "N" batteries (not included). Get two and have your own Bug Wars at \$29.95 each!



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By the way, did you know you can now order single issues of the pdf version of *MT*? Just \$3 — much less than the newsstand price! Just email the address above with credit card and the month you want or call 1-800-438-8155.

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Endings

Summer 2004 will probably be remembered as the summer (and autumn) of hurricanes. It seemed to start with information about sea temperatures posted on a NOAA web site in late spring – the fact that temperatures were two degrees warmer than usual was interpreted as being likely to produce more storms and hurricanes than average. How right they were!

Hurricanes form when suitable conditions, such as an existing weather disturbance, warm tropical oceans, plenty of moist air, and relatively light winds are present. The persistence of these conditions can combine to produce violent winds, torrential rain, and floods associated with storms. Tropical storms develop over the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico; fortunately, most of these remain over the ocean and never impact the U.S. coastline. An average of six of these storms become hurricanes each year, and roughly five hurricanes strike the U.S. coastline during an average 3-year period.



❖ End of WEFAX scheduled

NOAA has formally stated that WEFAX transmissions from both GOES-East and GOES-West will cease on 31 December 2005. GOES-East has been providing time-shared WEFAX and LRIT – the latter being the new international standard (Low Rate Information Transmission) for transmissions of low resolution imagery that replaces WEFAX. From October 1, GOES-West started time shared WEFAX/LRIT transmissions.

Reception of LRIT – Low Rate Information Transmission – requires new hardware and software. The image stream is completely different from WEFAX, and unfortunately means that both dish and receiver have to be replaced in order to receive the new data. It is not clear to

me how many manufacturers will be providing LRIT or HRIT hardware. A search of current WEFAX systems providers shows that some LRIT systems are either available already or are likely to become available, but being a new state-of-the-art transmission format, prices are well above WEFAX system prices.

Information about the implementation of LRIT on GOES WXSATs is available on the web site <http://noaasis.noaa.gov/LRIT/>

❖ LRIT-HRIT the cheap way

European WXSAT users were originally expecting to have to buy new and expensive systems for LRIT, with HRIT being an impossibility due to zoning laws generally not permitting the installation of large dishes. This did not happen. The new all-digital Meteosat Second Generation (MSG-1) now called Meteosat-8 suffered a significant component failure on its downlink side. This caused a re-think about data delivery to users, so the decision was taken to re-broadcast image (and other) data via a commercial satellite – HotBird-6.

The result for European enthusiasts has been an incredibly economical satellite television broadcast system using off-the-shelf products, supplemented by proprietary software from EUMETSAT, and data management software from various sources to decode and manage the data stream.

The question of whether NOAA could adopt a policy of providing LRIT/HRIT data via a commercial satellite television transponder in a similar manner to EumetCast has been discussed in the WXSAT forums. The consensus was that NOAA does not have the money or authority to pay for such a service. Eumetsat already had a transponder on HotBird providing data to users.

The World Meteorological Organization has expressed its approval of Eumetsat's expanded transmission system – so perhaps at some future date NOAA might also be funded for this most effective and economical addition. The EumetCast system was expanded to include not only LRIT and HRIT data (the latter being otherwise virtually unavailable to amateurs) but is also including other meteorological data, making it an incredible resource.

Regardless of this possible, longer term development, LRIT data is expected to become widely disseminated during the next several years, currently the Russian GOMS, the Japanese MTSAT and the Chinese satellite will all provide this. Consequently, my expectation is that LRIT systems will become available at lower cost, more comparable to WEFAX systems within a few years.

❖ NOAA Polar WXSATs

Little has changed in recent months. NOAA-12, NOAA-15, NOAA-16 and NOAA-17 have continued to provide good quality HRPT (high resolution imagery) and – except for NOAA-16 – all provide APT as well. At regular intervals, the VHF footprints of NOAA-12 and NOAA-15 coincide, so one transponder is always switched off to avoid APT users suffering joint reception on the same frequency. Some users commented that NOAA-12 imagery was superior to NOAA-15 imagery, so during the September 19 to October 20 conflict NOAA-15's APT transmitter was switched off.

NOAA-16 has previously suffered from some image degradation, but during recent months this had disappeared. My resumption of HRPT monitoring last month (following the repair of my dish tracking motor) revealed that NOAA-16's HRPT was suffering from some "wavy" features, as first seen some months ago. Other than this minor defect, the data appears to remain of high quality.

NOAA-17 is being closely monitored. The payload scan motor is showing a "non-favorable trend," as the engineers describe it. Temperature and current graphs have shown worrying trends, but fortunately this has not yet impacted data quality.

If you have HRPT receiving equipment then you can also monitor the Chinese satellite Fengyun 1D, also providing reliable imagery.

❖ Farewell

Despite the tremendous changes now underway in the weather satellite world, this is the last edition of *View from Above*. I wish to thank those many readers over the years that have contributed pictures and information. I shall continue to lurk in the WXSAT forums, and in *Shortwave Magazine*, so I hope to see you there.

lawrence@astronomerplus.com

Frequencies APT

NOAA-12 and 15 transmit APT on 137.50 MHz
NOAA-17 transmits APT on 137.62 MHz
Frequencies HRPT
NOAA-12 and NOAA-16 transmit HRPT on 1698.0 MHz
NOAA-14 transmits on 1707 MHz (no valid image data)
NOAA-15 transmits on 1702.5 MHz
NOAA-17 transmits on 1707 MHz
Fengyun 1C (unsynchronized) and FY-1D (good) transmit on 1700.5 MHz
GOES-10 (west) and GOES-12 (east) use 1691 MHz for time shared WEFAX and LRIT

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