

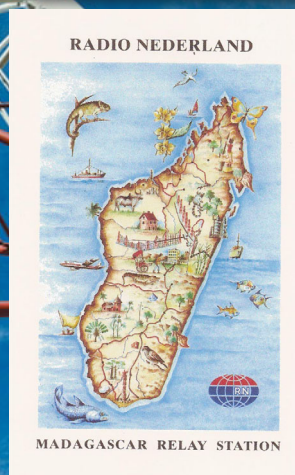
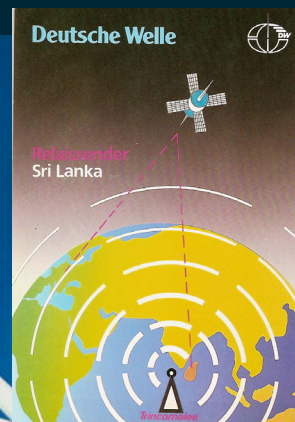
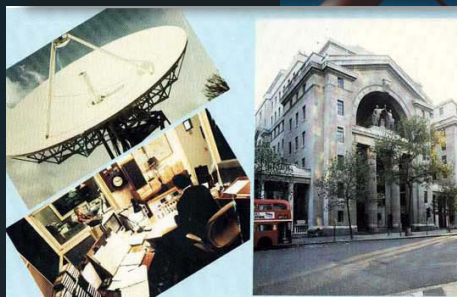
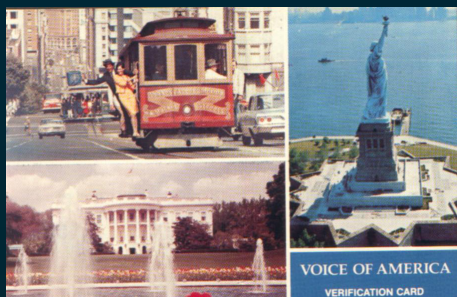
Scanning - Shortwave - Ham Radio - Equipment
Internet Streaming - Computers - Antique Radio

Monitoring Times

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QSLing Brokered Broadcasts

Also in this issue:

- Turkish Delight
- Old Buzzards Balanced Doublet
- USCG Communications Merger?



Want to SEE who is watching you?

*The **AR-STV** handheld receiver captures hidden video signals!*

Now, with the AR-STV handheld wireless camera receiver from AOR, you can see who is watching you on wireless video surveillance cameras. It's a valuable addition to any security operation. This easy to operate receiver features a large 2.5 inch color LCD display, still picture recorder and sensor that captures video signals in real-time. The USB connector makes it easy to download stored images into a computer. And the AR-STV comes complete with an internal clock that allows captured images to be time-stamped. With an optional 4 GB SD memory card, the AR-STV can be used to store up to nearly 2000 images.

Add to the power of your security force with this pocket-sized video receiver from AOR!

- Receives and displays analog video signals on L-band (1.2 GHz) or S-band (2.4 GHz)
- 2.5 inch color LCD display
- Still picture recorder
- Can be set for continuous search between 900 ~ 2800 MHz
- Detects NTSC or PAL analog video signals in real-time
- Built-in clock allows captured images to be time-stamped
- USB connector makes it easy to download stored images into a computer
- Easy to operate
- Powered by four AA size batteries or external DC power
- NiMH batteries, belt clip and battery charger included
- Rubber duck antenna with SMA connector
- Optional 4 GB SD memory card can store nearly 2000 images

Available from your favorite AOR dealer!

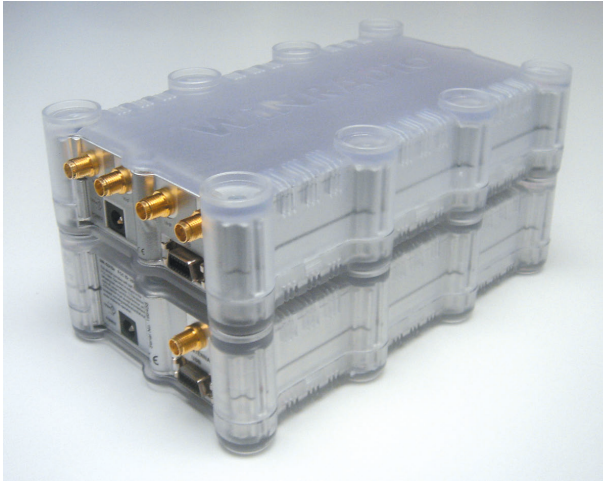


Authority on Radio
Communications

AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
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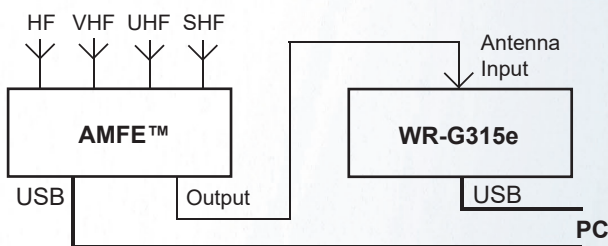
Extend your receiver's range beyond 8 GHz!



WiNRADiO WR-G315e receiver enhanced with WR-AMFE-3500



The WR-AMFE™ adds additional antenna inputs - and more.



Our latest WiNRADiO accessory redefines the definition of "DC to daylight", yet again. And while it is perfect for the WiNRADiO WR-G315 series of receivers, it can be used to extend the frequency range of almost any VHF/UHF receiver.

The frequency range of the WR-G315 receiver can now be extended up to 8.599 GHz using the "AMFE" option (Antenna Multiplexer and Frequency Extender). This is the first time a receiver of such affordable price range can go that high in frequency.

And you also get an antenna multiplexer thrown in, making it possible to connect four antennas for different frequency bands directly to your receiver: No more hassles with antenna switching!

- ❑ Input frequency range up to 8599 MHz
- ❑ Output frequency range 96 to 1800 MHz
- ❑ High temperature stability
- ❑ High input isolation
- ❑ High dynamic range
- ❑ Low noise figure
- ❑ Simple installation
- ❑ Integrates with WR-G315e and WR-G315i receivers
- ❑ Suitable for any third-party receivers (AMFE-8600 only)
- ❑ Low-noise linear power supply included
- ❑ Application software included
- ❑ Programmers' API included to support third-party development

The AMFE™ unit interfaces neatly with the WiNRADiO WR-G315e or WR-G315i receiver. The receiver's application software is able to recognize the AMFE™ unit and expand the ranges of the frequency input and display automatically. Switching between the antennas and tuning the local oscillator for the downconversion is accomplished automatically and fully transparently to the user. The AMFE™ enclosure is similar to that of the WR-G315e receiver and stacks neatly on top or under it.

Two models are available: WR-AMFE-3500 (DC to 3500 MHz) and WR-AMFE-8600 (DC to 8599 MHz). The AMFE™ units are USB controlled, supplied with application software and a linear AC/DC power adapter. The WR-AMFE-8600 model can be also used with third-party receivers, and can be optionally fitted with an OCXO for enhanced stability of 0.01 ppm, to suit the most demanding monitoring and surveillance applications.



QSLing Brokered Broadcasts

By Gayle Van Horn

In these days when budget cuts force shortwave broadcasters to drastically reduce office staff and broadcast hours, it is more difficult than ever to pick up those treasured verification cards (QSLs). Listeners must become as creative as the broadcasters in finding ways to reduce expenses and entice the broadcaster to verify.

One potential solution is to make use of brokered broadcasts. Sometimes the listener can save postage by submitting reports of multiple broadcasters to the broker who is providing the air time. In other cases, the brokered broadcast enables the listener to hear a station which would otherwise be inaudible, even though they must still report directly to whoever originated the programming.

This article provides information about the four biggest brokers, including detailed information from the largest of these: Germany's Media Broadcast. The story starts on page 10.

On Our Cover:

This relay station in Thailand is operated and maintained by VT Communications (photo courtesy VTC). In addition to relaying BBC World Service broadcasts, such sites around the world are leased by anyone with a message. (QSLs courtesy Gayle Van Horn.)

C O N T E N T S

Turkish Delight 15 Eric Bryan

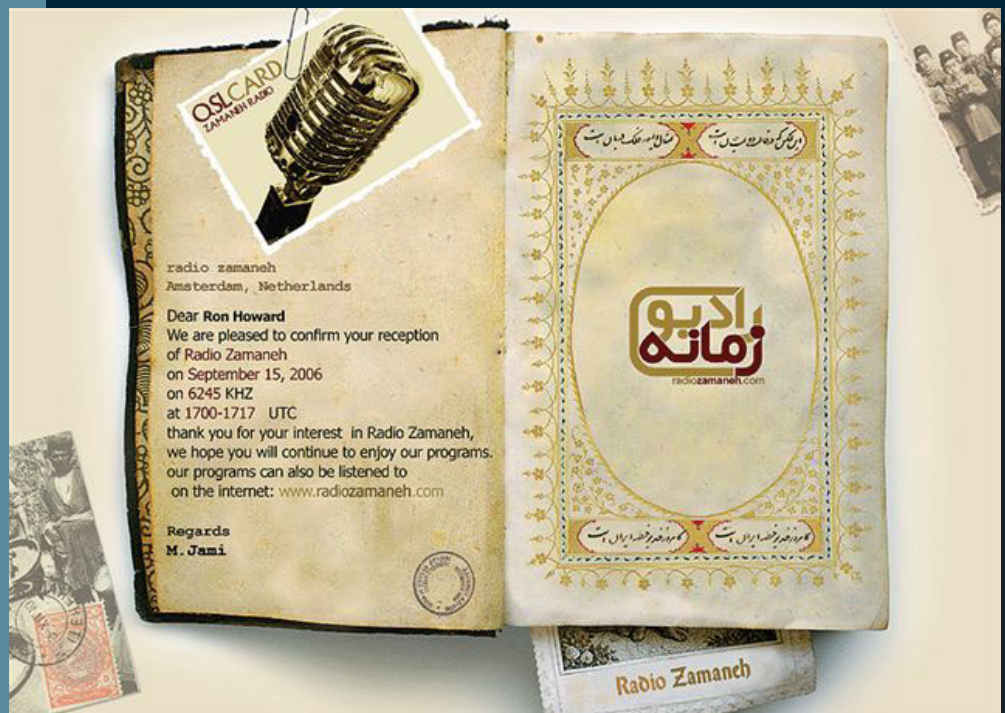
Turkey has recently made a big splash in the shortwave broadcast world – in a good way. The station's often unreliable signal got a big boost when it began leasing time on Canada's Sackville relay station for its English language broadcasting.

At the same time, the Turkish Radio Television completely revamped its website. Now, whatever broadcasts you may miss on air can generally be found either live or on-demand via the website. Here is a tour of the kind of things you can expect to find on the site.

The "OBBD" Antenna..... 18 By R.W. Parker

"I've been DXing with the OBBD (or 'Old Buzzard Balanced Doublet') antenna for over a year now, and the results have been awesome," says RW Parker. The secret is in the air insulated feedline – two wires separated by a bunch of homemade wooden spacers.

Initially intending to use it for the 75 meter ham band, the author adds, "I never expected that it would turn out to be the hottest antenna I've ever used for SWBC DXing."



Reviews

AOR has always produced a quality radio and the AR-Mini B is no exception. This tiny wideband receiver is particularly suited for travel, and is useful as a back-up radio for shortwave and conventional scanning. FM reception is particularly impressive. See *MT's First Look* column. *Computers & Radio* strives to resolve

two incompatible goals: simplifying the maze of necessary passwords while also strengthening the security of our passwords. For a fleeting moment, John Catalano thought he'd found the solution in biometrics, specifically, Microsoft's fingerprint reader. But apparently, in biometrics you get what you pay for..



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Address: 7540 Highway 64 West,
Brasstown, NC 28902-0098
Telephone: (828) 837-9200
Fax: (828) 837-2216 (24 hours)
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Subscription Questions?
belinda@grove-ent.com

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
larryvanhorn@monitoringtimes.com

Art Director

Bill Grove

Advertising Svcs.

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

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EDITORIAL STAFF Email firstlast@monitoringtimes.com

TJ "Skip" Arey.....	On the Ham Bands	Hugh Stegman.....	Utility World
Rachel Baughn.....	Letters to the Editor	Ernest Robl.....	Trains
Kevin Carey.....	Below 500 kHz	Gayle Van Horn.....	Frequency Manager
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**Available in a professional and consumer version,
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From aircraft and public safety, to broadcast and shortwave, no wonder so many Federal and State law enforcement, military units, surveillance agencies, government users, hospitals, RF labs, news media and monitoring professionals rely on the AR5000A+3 for accuracy, sensitivity and speed!

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

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

- All analog mode reception AM, FM, USB, LSB & CW (APCO 25 accessory optional)
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Add to the capabilities of the AR5000A+3 with options:

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- DS3000A external antenna



AOR U.S.A., Inc.
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The Serious Choice in Advanced Technology Receivers

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*Cellular blocked. Unblocked version available for qualified users.
Documentation required.

Universal Radio — Quality equipment since 1942.

YAESU VR-5000



The **Yaesu VR-5000** provides sophisticated wideband reception. Coverage is from 100 kHz to 2600 MHz (2.6 GHz) less cellular, in AM, FM-N, FM-W, LSB, USB and CW. This radio features a real-time bandscope and you get 2000 alphanumeric memories grouped into 100 banks. Optional aids such as a DSP unit, voice synthesizer and digital voice recorder are available. Jacks on the back panel include: Mute, 13.8 VDC input, External Speaker, 10.7 MHz IF Output, Antenna Input A (SO-239 50 ohm) & B (Hi Z 450 ohm), CAT Interface Jack (4800/9600/57600 bps). The VR-5000 comes with the PA28B 117 VAC adapter and a DC power cord. This radio is only 7.1 x 2.75 x 8 inches 4.2 Lbs. Please visit our website for full specifications, color photos and current price.

ACCESSORIES

- #3545 **DSP-1** DSP Notch/NR/Bandp. \$119.95
- #0560 **DVS-4** Digital Voice Recorder 49.95

YAESU

VR-120D PKG



The **VR-120D** is a compact wideband receiver covering 100 kHz to 1299.995 MHz (less cellular and image gaps), in AM, FM-N and FM-W with 640 alphanumeric memories. Scan features include: Full Mem. Scan, Mem. Bank Scan, Selected Mem. Channel Scan, Band-Limit Mem. Scan, Smart Search, Priority Channel Watch and Dual Watch. Manual tuning is via the tuning knob. A built-in AM ferrite loop insures good AM performance. A Channel Counter feature measures the frequency of a strong nearby signal. With BNC antenna, wrist strap and belt clip. This new **VR-120D "PKG"** configuration now **includes** the FNB79 NiCad battery, CA34 sleeve, NC82 stand and PA30B 120 VAC adapter. Size: 2.3 x 3.8 x 1 inches 8 oz.

Order #4120 **\$139.98**

ACCESSORIES

- #0384 **CA34** Charging sleeve \$3.95
- #4332 **CSC76** Carry Case 19.95
- #3646 **EDC15** Cigarette lighter cord 36.95
- #0353 **FNB79** Ni-Cad 2.4V 700 mA 9.95

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VR-500 PKG



The **Yaesu VR-500** is the first to provide wideband coverage plus single sideband capability in such a small and capable package. Coverage is solid from 100 kHz to 1300 MHz (1.3 GHz) less cellular, in AM, FM-N, FM-W, LSB, USB and CW. You get 1000 regular memories (10x100) plus tuning steps from 50 Hz to 100 kHz. Other features include: backlit keypad, priority, power-off timers, adjustable battery saver, 60 channel bandscope, attenuator, dual watch, alphanumeric recall, bank scanning Smart Search™. The VR-500 operates from two AA cells. Includes BNC antenna, hand strap and belt clip. This new **Yaesu VR-500 "PKG"** configuration also **includes** the NiCd battery and wall charger. Only 2.3 x 3.7 x 1" 8 oz. Please call or visit our website for more information and current price.

ACCESSORIES

- #4037 **ADMS3** Win Software & PC cable \$37.95
- #4035 **CSC72** Carry Case 19.95
- #1693 **EDC5B** DC Cable +Cigar Plug 23.95
- #3116 **EDC6** DC Cable 6.95
- #0353 **FNB79** NiCad Batt 2.4V 9.95
- #0594 **NC60B** AC Adapter 13.95

YAESU

FT-857D



FREE Yaesu orange mug with FT-857D/897D.



The **Yaesu FT-857D** is the world's smallest HF/VHF/UHF multimode amateur transceiver covering 160 m to 70 cm with 100 watts on HF. Now with 60 meters and DSP2 built-in.

FT-897D



The **Yaesu FT-897D** is a multi-mode high-power base/mobile transceiver covering 160 m to 70 cm including 60 meters. Now with TCXO.

FT-817ND



FREE Yaesu orange urban case with FT-817ND.

The **Yaesu FT-817ND** is an improved, deluxe version of the hugely popular FT-817. It includes 60 meter coverage plus the new high capacity FNB-85 battery. This radio has an excellent shortwave receiver built-in and is a fully self-contained, battery-powered, low power amateur MF/HF/VHF/UHF QRP transceiver.



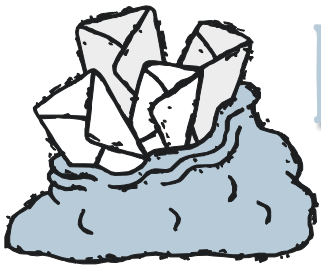
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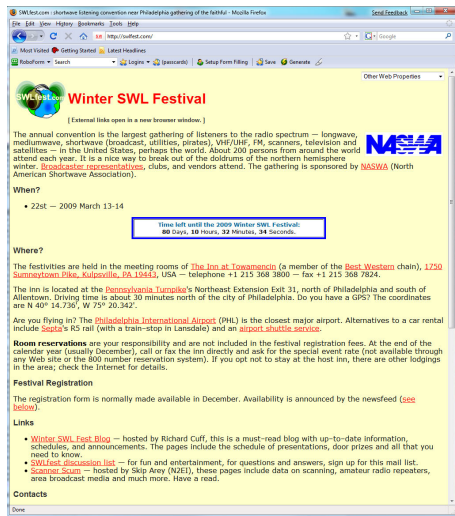


LETTERS TO THE EDITOR

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

Note to Self:

For a good time, go to <http://swlfest.com> and register for the 22nd SWL Winterfest — 2009 March 13-14 in Kulpsville, PA. There's no better way to beat the winter doldrums than to cozy up with a bunch of like-minded hobbyists (and they are full-spectrum, by the way: scanner buffs are welcome, too). You'll come home ready to hit the radios with some new tricks to try.



```
CO DE WCC =
=====
IMPORTANT NOTICE TO MARINERS:
PLS NOTE: EFFECTIVE 30JUN97, THE CALL LETTERS AND FREQUENCIES OF
STATIONS KPH AND WCC WILL BE ASSIGNED TO THE FACILITIES OF
GLOBE WIRELESS. AFTER MANY YEARS OF CONTINUOUS SERVICE FROM OUR
QTH AT BOLINAS, MARSHALL POINT REYES, AND CHATHAM, THE EMPLOYEES
OF KPH AND WCC WISH YOU FAIR WINDS AND BON VOYAGE.
=====

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P3JW4 P3JW4/TOR P3KT6 P3KT6 P3QF6 P3QF6 SNRX SNRX/TOR TCSP TCSP/TOR

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*Tech in-Charge
WCC
Wally Tappan KIWT
6/18/97*

Busted for Being Cheap

“Just read the article in your [December] Communications column about interference to tower communications from a TV. I am sure I know what the device was that caused the problem – the same thing happened to me a few years ago.

“I live about a quarter mile from Wright Patterson AFB here in Ohio. The planes make their final approach over my house. One day I saw a cable TV man walking through my yard with a small radio receiver of some type. I walked out to see what he was doing. He said

they had received complaints from Wright Pat about TV interference when they fly over my house. They were picking up cable news on their VHF radio system in the aircraft.

“When he walked over to my tower with VHF/UHF ham antennas, the meter went off the scale on his receiver. He asked me if I was using an amplifier on my cable hookup in the house. I said yes. I was using a cheap amp with cheap cable from a department store through my house.

“I then found out that the VHF aircraft freqs are used in some cable TV channels. By using cheap cable and amp, it was radiating through the air through the cable. When I disconnected the TV amp, the signal went away. All was now well.

“A few days later when I thought the coast was clear, I hooked it back up again! Two days later I found a note on my door that said unhook the device or all cable service would stop in this area! I did as they said and never used an amplifier again on my cable TV.”

Larry Didier KB8GVI

tenna that I ‘reengineered’ from the old VHF/UHF antenna that I was using. Took off all the VHF elements, added a few feet to the boom, added UHF elements, and now have about 48 elements, turned by a Radio Shack rotor, and amplified by a Winegard PS-1503. Boom length is 8 feet. My converter box is a Digital Stream, purchased from Radio Shack using a gov’t coupon. I get NY, some NJ, most Philly channels and one from Allentown, PA.

“Anyway, the system I have works great, as long as you have patience and turn the beam constantly. BTW, I live in Ringoes, NJ, definitely a fringe area, and equidistant from Philadelphia and NYC TV stations. Maybe 35 - 40 miles as the crow flies.

“But the real reason I am writing is that over the weekend I disconnected the current antenna and attached a Radio Shack discone (25 - 1000 MHz) antenna that is mounted on my chimney just to see how it would work receiving digital TV. Well, it brought in most if not all the Philadelphia channels (3, 6, 10, 17, 29, 35, 65) with no problems, and PBS from Trenton (channel 52). New York channels were unable to be received. Only reason I did this experiment is to see what a scanner antenna would do when used for digital TV, and I was pleasantly surprised.

“So, if any readers out there have a dis-



Alternative DTV Antenna

“As a subscriber to Monitoring Times, I just wanted to let you know how helpful your magazine is for making the transition from analog to digital. Currently I use an attic an-

cone and want to check out digital TV prior to purchasing an antenna, maybe they can try what I have done.”

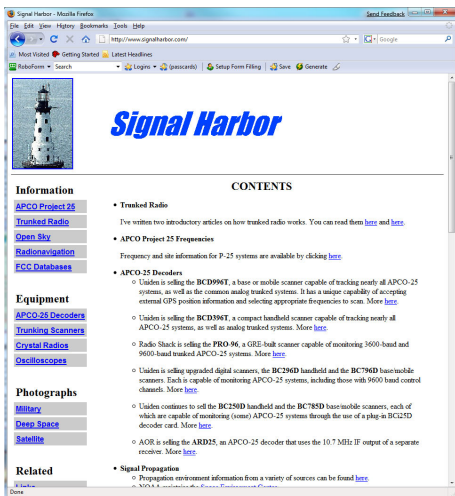
Mario Filippi, N2HUN, KAF5755

MT a Great Resource

Every so often we get notes or phone calls like the one below that remind us our audience is not strictly hobby listeners:

“Dan, Love your site (www.signalharbor.com). Learned more reading there than all the years I worked in commercial radio stations. I am writing about the new 800 frequencies law enforcement and other emergency personnel have started using.”

Gwen Break, editor, *The Walton Sun*



Remembering WCC

“Recently I purchased a new receiver from Grove and decided to renew a subscription to *Monitoring Times*. (My sub had lapsed years ago.) I must tell you how pleasant it was to receive the November issue. The article about WCC on Cape Cod was excellent! (I live only a few miles from the site.) It’s no mystery why Marconi chose this area – conditions to this day are superb for transmitting and receiving.

“As for *Monitoring Times* – it’s better than ever! (However, I still miss Havana Moon.)”

Richard Johnson, K1YZY, Harwich, MA

“The attached SITOR copy (graphic on the left) of the shut down notice from WCC was received in Hyannis at my receiving sta-

tion, Cape Cod, MA. I took it to the transmitter site on Forest Beach Road and found an operator finishing his walk of the antenna site ‘array’ that was done every day. I asked him if he would sign the copy, which he did.

“The cost of labor and electricity was the deciding factor in the shut down. All he did was to shut off the electricity, lock the door, and leave!”

“In the town of Orleans, Cape Cod, Mass., there is an original working site of the French Cable Company. They do have a web site: www.frenchcablestationmuseum.org”

Roger Parmenter, Hyannis, MA



Multi-Reader Help Needed

Jack Dully owns the MFJ-462B Multi-Reader for decoding Morse code, but says that though he has read the manual over and over and has spoken with MFJ, he cannot seem to operate it properly. He’s not sure if it’s his lack of understanding, or if it’s defective, but he’s pretty sure it’s the former. Jack is hoping that someone who owns the same model might be willing to contact him by phone or mail and help walk him through it.

Jack does not have a computer or email. If you have an MFJ Multi-mode decoder and are willing to help, you can write Jack at 240 McLean Ave Apt 1C, Yonkers, NY 10705, or call him at 914-476-2438. If you leave your number on his answering machine, he will call you back on his dime. Thanks for helping!



Express for Success

If any of you took advantage of our offer of three free issues of *MT Express*, your free “subscription” is about up. I hope you have enjoyed your digital issues. Have you made use of the clickable email and internet links to follow up on additional information immediately as you’re reading the articles? Or clicked on audio links to listen to music as you read about it?

Obviously, we are encouraging you to lengthen your subscription to *MT Express* for a reason – primarily cost. *MT Express* not only costs us less to produce and ship, but those savings are also passed along to you. If you find yourself in a financial bind, perhaps you’ll find you can afford to keep your *MT* subscription going by switching to *MT Express*. We hope never to abandon those who have no alternative but to buy the paper magazine, but it will be the digital subscribers who will keep us going, as manufacturers and commercial enterprises continue to drop their investment in magazine advertising.

We also believe that *MT Express* is leading in the right direction to incorporate new content delivery methods without abandoning our radio roots. It allows us to experience the best of both worlds – you can still print out select pages for use when you’re not at the computer. You may want to staple or punch them to put in a binder to customize your own “magazine.”

One feature of the pdf file that many hobbyists appreciate is the ability to search for any word or frequency. All of us are busy, so let Adobe Acrobat flip through the pages for you to find needed information or something you remember reading.

Personally, I simply appreciate seeing the pictures in color throughout the magazine. I am also deeply appreciative of getting the magazine near the 20th of the month, instead of watching the mailbox for uncertain delivery. My December hard copy arrived more than a week after I started expecting it.

Some of you have had problems with delivery of *MT Express*, especially with receiving the monthly email notification and password. This is part of the problem in sending out mass emailings, and many of your internet providers reject these bulk notices. If you’ve had trouble in the past, put the address we plan to use in 2009 on your “white” or “safe sender” list: mt@bobgrove.com

Hopefully none of you had trouble in the actual downloading, but if there is anything we can do to improve the process, please let us know. We hope you will “opt in” to this less expensive tool for keeping the radio hobby alive and well. As always, feel free to send us your news, suggestions, and opinions.

Here are a couple of comments recently received from *MT Express* users whose problems were quickly dealt with:

WOW... as usual your FAST service is one of the reasons I keep dealing with you guys ... you guys are the best... Dave Buda

Holy cow - on Sunday no less! You guys and your service are exactly why I have been subscribing to *Monitoring Times* and now *MT Express*! Tom Olver



COMMUNICATIONS

by Ken Reitz

“Communications” is compiled by Ken Reitz KS4ZR (kenreitz@monitoringtimes.com) from news clippings and links supplied by our readers. Many thanks to this month’s fine reporters: Anonymous, Rachel Baughn, Larry Van Horn)

SHORTWAVE/AMATEUR RADIO

40 Meters: All Amateur All the Time

March 29 is the day high-powered international broadcasters must vacate the portion of 40 meters used by amateur radio operators worldwide. The plan was originally approved at the 2003 World Radiocommunications Conference (WRC) and ends a battle for 40 meters that has raged for 70 years. Look for many DXpeditions to operate 40 meters this year and fill in a lot of missing countries for that band.

The conference made changes to the Region 1 (Europe, Africa and Mideast) band plan. Unfortunately for hams in Region 2 (which includes the U.S.), there won’t be any change in the band plan that went into effect January, 2008, leaving Regions 1 and 2 out of sync in what modes are allowed where.

Very little in the way of band changes are anticipated in the next WRC meeting slated for 2011. There is a chance that a small amount of spectrum will be granted hams in the 600 meter MW band around 500 kHz where experiments in various digital modes have been taking place for nearly a year.

FCC Grants HF Renewals

In a public notice released November 10, the FCC granted license renewals for WRNO (Good News World Outreach), New Orleans, Louisiana; KJES (Our Lady’s Youth Center) Vado, New Mexico and WJIE (Word Broadcasting Network, Inc.) Millerstown, Kentucky.

FCC OKs Experimental Stations

Every now and then the FCC grants experimental licenses for individuals, companies and organizations for a variety of applications. They are typically valid for two years, but terms up to five years may be granted. Renewals may be filed to extend an existing authorization even further.

All of these applicants receive call signs that have a WE prefix, the number 2 call district and an X as the first letter in the suffix of the call. Here’s a rundown on a few of the experimental licenses granted last September and released in November:

WE2XTU: Testing efficiency of various mobile omni-directional antenna designs for 130 kHz to 450 MHz. issued to James Whedbee, Gladstone, MO. Whedbee also received WE2XUR for operations between 27.245-27.255 MHz “for teaching students propagation testing in radiocommunications as part of an educational curriculum in Kansas City, Missouri.”

WE2XTT: Part of the 500 kHz propagation study for future amateur application. Issued to Philip Galasso, Huntington Township, PA.

GM Onstar, Cessna Aircraft Co., Raytheon,

Northrup Grumman, Lockheed Martin and E.F. Johnson Co. all received licenses to test antennas ranging in use from LAN equipment to Warfighter Information Network –Tactical command posts. Stanford University received WE2XUO for testing and demonstrating WiMAX radio technology in the 2.4 -2.6 GHz range.



Northrup Grumman’s DSP 23 missile-tracking satellite gets launched in November, 2007. (Courtesy: Northrup Grumman)

PUBLICSERVICE

Scanner Listener Saves Child’s Life

A report in the Galena (IL) *Gazette* last November detailed the rescue of a one year-old child, who had fallen into a swimming pool, by a neighbor who heard events unfolding in his backyard on his scanner. An ambulance had been called but would be minutes more in arriving. When the neighbor realized the nature of the emergency he rushed over and applied CPR, for which he had been trained, and resuscitated the child. First responders arriving at the scene credited the scanner listener with having saved the child’s life.

Ohio Multi-Agency System Crashed

According to a report on the Ohio News Network (ONN) in mid-November, a nine year-old power supply in the computer center of a statewide communication system caught fire and caused the entire state-wide system to go down for two hours. What officials found out during that period was that each system could still function at the local level. The incident should give all budget-strapped agencies nationwide something to think about: replacing older, inexpensive equipment is a good idea, particularly if that piece of gear is a vital link in a major system.

AM Info Channel Debuts in Skokie

An article in the Chicago *Tribune* detailed the introduction of a new AM Information transmitter to cover Skokie, Illinois, a Chicago suburb. While such stations are not new, the article pointed out that the transmitter will be able to reach many more people locally than other emergency communications systems the city had considered.

For example, emergency information sent via a popular electronic newsletter would only reach the 1,500 of Skokie’s 70,000 inhabitants, and a 911 telephone reverse message system only contacts home numbers, meaning that

people at work would not hear the emergency message.

According to the article, the station, operating at 10 watts on 1660 AM, cost the city \$35,000 and is licensed by the FCC for 10 years.

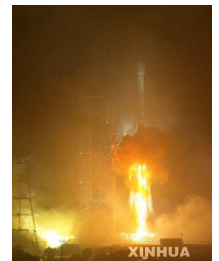
IBM to Sink Millions into BPL

While many locations around the U.S. are dumping their Broadband over Power Line (BPL) internet systems, as was the case in Dallas, Texas, or wondering what to do with the expensive system with few subscribers, as was the case in Manassas, Virginia, IBM announced in mid-November that it was planning to sink \$9.6 million into a scheme for rural BPL systems. IBM will team up with International Broadband Electric Communications, Inc. (IBEC) a Huntsville, Alabama company specializing in BPL, and other power line management systems. IBM and IBEC will try to convince the 900 rural electric cooperatives around the country to use BPL to provide their customers with high-speed internet service.

SATELLITE

U.S. MilSat Goes on the Blink

A report from Reuters news agency from late November said a Northrup Grumman-built military satellite, designed to track intercontinental missiles and designated as DSP-23, had apparently stopped transmitting in mid-September 2008. The report mentioned that several amateur astronomers noted that the satellite had malfunctioned. The \$400 million DSP-23 was launched in November 2007 and was the 23rd and final satellite in the constellation of similar satellites which began service in 1970. According to the report, the constellation is beginning to fall apart, but the fact that the last one launched has malfunctioned has troubled defense officials.



Nigerian Broadcast Satellite Defunct

Numerous space-related news sources reported that a Chinese-built, Nigerian communications satellite, designated as NIGCOM-SAT-1, lost power in November 2008. The satellite was launched in May 2007, and by April 2008 it had lost power

Nig Com Sat-1 is launched from China’s Xichang Launch Center aboard a Long March 3-B launch vehicle. Eighteen months later it was declared a total loss. (Courtesy: China Great Wall Industry Corp.)

from one solar panel. Seven months later the other panel had quit functioning, and the satellite was declared a total loss.

The bird had on board 4 C-band, 14 Ku-band, 8 Ka-band and 2 L-band transponders and was intended to be used to provide increased cell-phone and internet service to Nigeria. It was the first foreign-purchased Chinese satellite/launch vehicle package.

Venezuela bought a similar satellite/launch package which was launched in September 2008. Venezuelan authorities may want to monitor that satellite's systems very closely.

FCC ENFORCEMENT

\$14,000 for No Fence

Every month FCC field office personnel visit broadcast radio stations all over the U.S., finding various infractions of some fairly arcane but still serious rules. The biggest problem for radio stations seems to be keeping a complete public file handy for inspection by any citizen who wishes to view it.

Matters of life and death and the public safety with regard to radio stations are taken particularly seriously by field agents. So, if you fail to properly fence off your antenna tower that carries huge voltage potential, you'll get the FCC's attention. If you let a year lapse between having such an infraction pointed out and still haven't bothered to do anything about it, you might as well get out the pen and start writing the check. That's how DWQMA-AM, operating on 1520 kHz from Marks, Mississippi, incurred a \$14,000 fine and why the FCC wouldn't even consider reducing it.

ECONOMY VS. ELECTRONICS

Broadcast Radio's Worst Year Since 1954

A number of radio trade journals reported the findings of Jim Boyle, stock analyst for C.L. King & Associates, in his "Radio Observer" report from late November of last year. Boyle showed 2008 to be the worst year for ad revenue falloff since 1954. The data was backed up by the October radio revenue report from the Radio Advertising Bureau, an industry trade group which keeps track of radio advertising spending. It saw a year-to-year revenue drop of 10% among all markets during October.

Worst hit was local revenue in all markets (6,000 stations in the U.S.) which saw a loss of 15%. And, believe it or not, that's the good news! The report period included figures for the unprecedented, lavish spending by political campaigns at all levels and in all markets, all of which will be missing in 2009.

Internet Radio Changes

The internet's two most listened to radio services last year, AOL Radio and Yahoo's Launchcast Internet Radio, were swallowed up by CBS Radio in an effort to stay alive against mounting royalty fees and a disintegrating economy. CBS's online radio, www.last.fm.com, which it trumpets as "The Social Music Revolution," will switch Launchcast listeners to its own player and axe Launchcast premium service,

Launchcast Plus, which featured commercial-free "high-def" audio and cost \$2/month for subscribers. The high-def stream will continue, but will be commercially supported.

Tweeter Leads Circuit City to Oblivion

National retail electronics chain Tweeter, with 94 stores nationwide, had filed for Chapter 11 bankruptcy protection, which allows a company to reorganize its finances, over a year ago, but couldn't compete with other bigger retail chains such as Circuit City. Last November the chain liquidated its assets in a Chapter 7 filing and disappeared.

Meanwhile, Circuit City appears to be one step behind Tweeter, having filed for Chapter 11 protection the same week Tweeter went into liquidation. According to an article in the *Washington Post*, Circuit City closed 155 of its 712 "superstores" and laid off 17 percent of its work force. A week later the company laid off 1,300 more workers. The company's stock had fallen over 96 percent in the previous 12 months and was suspended from trade on the New York Stock Exchange. Analysts fear that Circuit City will also end up filing Chapter 7.

Broadcast Related Businesses Plummet

The last six months have seen an incomparable drop in revenue, stock prices, value and subscriptions in virtually every form of electronic broadcasting. The ripple effects could end up being more like tsunami effects. As of this writing, here's how much of the industry has fared.

Sony saw shares plummet from \$57.19/share to \$18.14/share in one year. Motorola dropped from \$16.70/share to \$3.00/share.

DISH Network has lost customers for several consecutive months for the first time since it began over 10 years ago; its stock has gone from \$43.70/share to \$8.34/share in one year.

Sirius/XM, with more than \$3 billion dollars in debts, 1.1 billion of which is due this year and \$300 million due this month, is clinging to its 19 million subscribers, but that number is set to plummet as auto sales dry up. Their stock went from \$3.94/share to 14 cents/share in one year.

News Corp., the FOX news/entertainment global empire, has collapsed from \$22.14/share to \$5.83/share in one year. Major media/newspaper conglomerate Gannett has gone from \$39.50/share to \$5.00/share in one year.

Vaunted new-age stocks such as Apple have imploded from \$202.96/share to just under \$80/share in 52 weeks. Old-value blue chips such as AT&T have dropped from \$42.79/share to \$20.90/share.

"Can't-miss" cable empires such as Comcast have slipped from \$22.86/share to \$12.50/share; Cablevision from \$33.00/share to \$11.00/share; Viacom went from \$44.95/share to \$13.00/share; Time-Warner from \$17.50/share to \$7.00/share. Liberty Media Corp. with holdings in DirecTV has nearly disappeared from a 52 week high of \$121.44/share to a low of \$2.54/share. Google has gone from \$724.80/share to \$247.30/share. Even Playboy Enterprises has suffered, going from \$9.81/share to \$1.03/share.

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QSLing Brokered Broadcasts

By Gayle Van Horn, W4GVH

We live in a world of cutbacks, budget slashing and bailouts. This impacts radio hobbyists because financial conditions have a direct impact on the world of broadcasting, especially shortwave radio broadcasters. And these hard economic times are also directly impacting one of the oldest practices of the radio hobby – QSLing.

When the economy gets tough, broadcasters are forced to make significant cutbacks, and one of the first areas to be impacted is in listener correspondence. The economy also affects the way we listeners do business as well. These hard times are forcing radio listeners and amateur radio operators – especially hard core, country counting, QSL collectors – to find more innovative ways to verify their conquest while lessening the strain on their personal budget.

For shortwave broadcast listeners, one economic QSL alternative that I have covered in past *QSL Report* columns is “relay transmitter-chasing.” The concept is simple – some shortwave broadcast stations use multiple relay transmitter sites scattered around the world to boost their broadcast presence. Excellent examples of this are the various worldwide relay sites operated by the Voice of America, such as São Tomé and Botswana. Two from Radio Netherlands Worldwide are located in Rwanda and Madagascar. There are a bevy of stations that use relay stations to complement their broadcast schedules, including the curious use of Sitkunai, Lithuania, by the Voice of Islamic Republic of Iran.

We hobbyists can use relays to our benefit by concentrating our listening on each of these relay stations, and combining our reports in as few envelopes as possible, thereby saving money for both parties by reducing the required postage.

Useful as “relay transmitter-chasing” may be, do not confuse it with another cost-saving aspect of shortwave broadcasting. There is a distinction between QSLing transmitter relay stations and listening to “time-leased broker” broadcasts. Unfortunately, the lines between the two at times become a bit hazy as to which stations are using relays and which are broadcasting via a broker.

So, what is it ?

To simplify things, a “brokered broadcast” is also known as a “time-leased” broadcast. The broadcast involves air-time being leased for perhaps a weekly half-hour program or even several hours a day. The leasing entity may be another station, a special programmer, or any other organization which wishes to broadcast from a particular transmitting facility’s site.

Thanks to the middle-man (the broker), organizations which lack their own transmitters (and technically do not qualify as “stations”) are able to broadcast programming to the world by leasing air time from the broker. The arrangement may also allow client broadcasters to reach an inaccessible target area without excessive cost or political entanglements.

The brokered solution

Religious broadcasters, in particular, first began using brokers to spread music, education and worship services beyond their normal coverage area. In recent years their numbers have increased, and some religious broadcasters are using brokers in addition to an already established presence on shortwave. Three evangelical stations currently using the relay site in Jülich, Germany, are Trans World Radio, Adventist World Radio and WYFR Family Radio Worldwide.

Ultimately, it also means that any station or fringe group, whether from Sudan, Ethiopia, Somalia or elsewhere, can now become an international broadcaster, provided they have a tape recorder and enough cash to buy transmitter time. Whatever the voice, whatever the cause – any group is fair game to the world of shortwave listeners. An influx of new voices have appeared on the scene in recent years, some as a weekly program and others as multiple hour broadcasts from large-scale clandestine stations.

Many of the new voices survive only a few months. One example was Radio Rhino International. RRI broadcast on 17555 kHz in opposition to the Ugandan government and promoted freedom, justice and equality to the impoverished country. For several

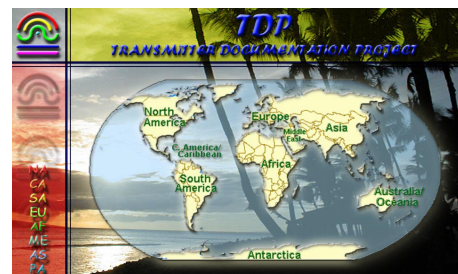
months Radio Rhino International’s afternoon broadcast demanded change from the present ruling party. Scores of DXers received email verifications from the station director Godfrey Ayoo until the final broadcast.

Radio Rainbow/Voice of Peace and Brotherhood – another opposition station which also used the Jülich transmitter facility – has also been reported as inactive. The station was operated by an Ethiopian opposition group called Research and Action Group for Peace in Ethiopia and the Horn of Africa.

United Nations Radio has been known to lease its broadcasting time, such as UN-based station Radio UNMEE (United Nations Mission in Ethiopia and Eritrea). Its broadcasts were aired over facilities in Dhabbaya, United Arab Emirates, as well as over Eritrea’s national radio and Voice of the Broad Masses of Eritrea. Radio Okapi (Congo-Kinshasa), leased time from Meyerton, South Africa, as a joint project involving the Swiss-based Foundation Hironnelle and the United Nations Mission in the Democratic Republic of the Congo (MONUC).

Active brokers

Transmitter Documentation Project (TDP) is operated by Managing Director, Ludo Maes from Rijkvovorsel, Belgium. TDP brokers lease shortwave air time and market shortwave transmitters. The website at www.tdp.info/ provides information on current and past shortwave transmitters used worldwide in continent/country order, including station name, transmitter type, site, and geographi-



cal coordinates. Active stations listed at TDP include religious, clandestine, and TDPradio on DRM. The current TDP program/frequency schedule is included in Table 1.

Radio Miami International

From Miami to the world on shortwave radio, and live on www.wrmi.net

Desde Miami al mundo en la radio de onda corta, y en vivo por www.wrmi.net

WRFM 9955 kHz 7385 kHz

Radio Miami International has been successful as another well known broker. Located in Miami, Florida, General Manager Jeff White brokers air time to religious, political, commercial or cultural programming. For \$1.00 a minute, any voice or cause can transmit their programming to the world. For additional scheduling and information consult www.wrmi.net/broadcast.php



Radio Miami International brokers three Ethiopian clandestine stations via Jülich, Germany:

- Voice of Oromiya Independence
1700-1730 UTC Saturday 9680 kHz
- Radio Oromiya Liberation
1730-1759 UTC Friday 9680 kHz
- Voice of Orimiyan Liberation Front
1600-1659 UTC Sunday/Tuesday/Thursday 9695 kHz

VT Communications Ltd., is part of the VT Group which was formed out of the privatization of BBC World Service in 1997. Originally known as Merlin Communications and then as VT Merlin Communications, VT builds and operates specialized communication systems for national security, defense and broadcast organizations. Current broadcast clients include:

- Adventist World Radio
- BBC World Service
- China Radio International
- Democratic Voice of Burma
- FEBA Radio
- HCJB Global
- KBS World Radio
- NHK-Radio Japan
- North Korea Reform Radio
- Radio Canada International
- Radio Netherlands
- Radio New Zealand International
- Star Radio/Cotton Tree News
- Trans World Radio
- WYFR Family Radio Worldwide

VT Communications does not verify reception reports; however, general correspon-

dence may be directed to: Blue Fin Building, 110 Southwark Street, London SW19 2PT, United Kingdom. Reception reports to stations using VT Communications should be directed to the individual station. To learn more about VT Communications, go to their website at www.vtplc.com/

Enter the Giant

The most prolific broker is Germany's Media Broadcast (MB), formerly known as T-Systems International, part of Deutsche Telekom. MB operates transmitters in Jülich,



Photo courtesy VT Communications



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FIELD STRENGTH METERS:

Some electric fields require measurement, but you don't need an expensive piece of lab equipment to do it. Ours does a remarkable job of measuring field intensity from 500 kHz to well above 3 GHz!



FREQUENCY COUNTERS:

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Nauen, and Wertachtal, Germany, which are leased by various international shortwave stations, including clandestine and independent stations throughout the world.

Headquartered in Jülich, Germany, Media Broadcast controls some of the leading transmission sites in Europe today. They are Europe's largest full service provider in the broadcasting and media industry, including international television as well as radio companies.

In 2006, as T-Systems, they completed the sale of the Jülich shortwave transmission facility to UK based Christian Vision, which plans to use the site for DRM (the Digital Radio Mondiale mode) and analog transmissions in numerous languages to reach audiences in Africa, West Asia, Europe, Russia and Middle East.

Media Broadcast brokers to international broadcasters as well as clandestine stations. One clandestine station using MB is Radio Voice of Oromo Liberation (Sagalee Bilisummaa Oromo-SBO), sometimes referred to as "SBO" after its title in the Oromo language. The station supports the Oromo Liberation Front and other groups opposed to the Ethiopian government. SBO was first heard from 1988 to 1992 using a shortwave transmitter in the Sudan. From 1993 onward, SBO has broadcast from the transmitter location in Jülich, Germany.

The following stations currently use Media Broadcast facilities:

Adventist World Radio
High Adventure Gospel-Bible Voice Broadcasting
Christliche Wissenschaft
Christian Vision
Democratic Voice of Burman
Ethiopesans For Democracy
Evangelische Missionsgemeinden in Deutschland
FEBA Radio UK
Gospel for Asia
Voice of the Andes
Hamburger Lokalradio
Hrvraska Radio Televizija
International Broadcast Bureau (IBB)
IBRA Radio Schweden
Lutheran World Federation
Mecklenburg-Vorpommern Baltic Radio
Missionswerk Arche
Nippon Hoso Kyokai
Pan Am Broadcasting
Polskie Radio Warsaw
Radio Huriyo (Xoriyo)
Radio Miami International
Radio Netherlands Worldwide
Radio Reveil Paroles de Vie
Radio Tramland (Belgium)
Sagalee Bilisummaa Oromoo
The Overcomer Ministry
Trans World Radio
Voice of Russia
World Radio Network
WYFR Family Radio

So, what and where is it?

Leased-time broadcasting raises the continuing question: is it truly a "broadcaster," a "program" or a "DX target?" Consider Radio Zamaneh, which is financed by the Dutch government and is produced in Amsterdam. Programming consists of current affairs and cultural programs aimed at young Iranian listeners in Iran and broadcast over leased transmitters in Russia.

Equally perplexing has been the secrecy surrounding the location of the transmitter locations of some broadcasters. While most openly acknowledge their location, the clandestine voices as a rule do not reveal their transmitter sites. In fact, some brokers guard the identity of all their leased-time clients.

One example is Southern Sudan Interactive Radio (sSIRI), funded by the U.S. Agency for International Development. The official statement is that the station is broadcasting from "various locations," targeting their programming to the people of Southern Sudan.

Radio Kurdistan, first observed in January 2007 by BBC Monitoring, has guarded their location. Their website was hosted in Germany and was registered to the Kurdistan Democratic Party of Iran. Another station seeking to guard their location is Radio Komala, which supported one of the founding members of the Communist Party of Iran,

but had a contact address in Germany.

Though not a true broker, Radio Free Asia, based in Washington, D.C., continues to guard the location of their transmitters throughout Central Asia. The standard reply for those seeking a site notation on their QSL cards is that, "in the interest of homeland security" sites are not indicated.

Despite the continued secrecy, one interesting station has been EOTC Holy Synod Radio (www.eotcholysynod.org/), also known as Zena Tewahedo the Ligament Holy Synod of the Ethiopian Orthodox Tewahedo Church. Brokered by TDP in Belgium, it is reported as being relayed from Samara, Russia, and operating from Los Angeles, California. The exiled church appeals to Ethiopians around the globe to promote peace, unity and the development of the Ethiopian Orthodox Tewahedo Church.

Brokers and QSLing

Reception reports may be directed to the following contacts with return postage or International Reply Coupons enclosed:

Transmitter Documentation Project (TDP)

Attention: Ludo Maes
Managing Director
P.O. Box 1
B-2310 Rijkevorsel
Belgium
Email contact: info@transmitter.org

For additional information on TDP, consult their website at www.tdp.info/

Radio Miami International

Attention: Jeff White
175 Fontainebleau Blvd., Suite 1N4
Miami, FL 33172 USA
Email contact: info@wrmi.net

For additional information on WRMI, consult their website at www.wrmi.net/

Media Broadcast

Reception reports are preferred via email to: qsl-shortwave@media-broadcast.com or postal address:

Media Broadcast GmbH
OMB Köln
Bastionstrasse 11-19
D-52428 Jülich
Germany

Email contacts:

Walter Brodowsky walter.brodowsky@media-broadcast.com
Michael Puetz michael.puetz@mediabroadcast.com
Sabine Gawol sanine.gawol@media-broadcast.com

For more information on Media Broadcast, consult their website at www.media-broadcast.com. The current winter B08 schedule may be found in Table 2.

Correspondence to Christian Vision (CVC) stations using Media Broadcast facilities should be directed to the United Kingdom address at P.O. Box 3040, West Bromwich, West Midlands, B70 0EJ, United Kingdom

Putting it all together

If cutbacks and budget slashing have become your least favorite word, consider QSLing using the "broker" approach. It certainly is an alternative route to consider when chasing a particular country, especially those that do not offer international or domestic shortwave broadcasts of their own.

The next time you're ready to monitor the shortwave bands, consider too a new way to budget slash by monitoring and sending for verifications from Media Broadcast, Radio Miami International and the Transmitter Documentation Project. It's an easy way to add to your QSL totals. If you've tried your hand at "relay transmitter-chasing," make your next logical step "broker-chasing."

TABLE 1: TRANSMITTER DOCUMENTATION PROJECT (TDP) - B08

Effective: 26 October 2008 - 29 March 2009

All times UTC

Moj Them Radio in Hmong:

0100-0130 on 15260 TAI 100 kW / 250 deg to SEAs Mon/Wed/Fri

Haiv Hmoob Radio in Hmong

0100-0130 on 15260 TAI 100 kW / 250 deg to SEAs Tue

Hmong Lao Radio in Hmong

0100-0200 on 15260 TAI 100 kW / 250 deg to SEAs Thu/Sun

Hmong World Christian Radio in Hmong

0100-0200 on 15260 TAI 100 kW / 250 deg to SEAs Sat

Denge Mezopotamya in Kurdish

0500-1400 on 11530 SMF 300 kW / 129 deg to WeAs

1400-2100 on 7540 SMF 500 kW / 129 deg to WeAs

TDP Radio in DRM

0800-0900 on 6015 ISS 035 kW / 060 deg to WeEu Mon

0900-1000 on 6015 ISS 035 kW / 060 deg to WeEu Tue

1000-1100 on 6015 ISS 035 kW / 060 deg to WeEu Wed

1100-1200 on 6015 ISS 035 kW / 060 deg to WeEu Thu

1200-1300 on 6015 ISS 035 kW / 060 deg to WeEu Fri

1300-1400 on 6015 ISS 035 kW / 060 deg to WeEu Sat

1400-1500 on 6015 ISS 035 kW / 060 deg to WeEu Sun

1500-1600 on 6015 ISS 035 kW / 060 deg to WeEu Daily

2300-2400 on 9790 SAC 070 kW / 227 deg to NoAm Daily

Que Huong Radio in Vietnamese

1200-1300 on 15680 DB 100 kW / 117 deg to SEAs Wed-Fri

Radio Xoriyo Ogadenia in Somali

1400-1430 on 21585 SAM 250 kW / 188 deg to EaAf Tue/Sat

Aso Radio in Hausa

1600-1645 on 15180 RUSorCIS transmitter to WCAf Mon-Fri

Ethiopian Orthodox Tewahedo Church/Holy Synod Radio in Amharic:

1600-1700 on 15195 SAM 250 kW / 188 deg to EaAf Mon

Addis Dimts Radio in Amharic

1600-1700 on 15195 SAM 250 kW / 188 deg to EaAf Sun

Ginbot 7 Radio in Amharic

1700-1730 on 12120* SAM 250 kW / 188 deg to EaAf Tue/Thu/Sun

1700-1730 on 15350 SAM 250 kW / 188 deg to EaAf Tue/Thu/Sun

* strong co-channel Radio Liberty in Georgian

TABLE 2: GERMANY, MEDIA BROADCAST - B08

Effective: 26 October 2008 - 29 March 2009

All times UTC

Freq	Start-Stop	CIRAF	Azi	Days	Loc	Power	Broad
3955	1759-1859	27W,28	ND	Daily	WER	100	HCJ
3975	1900-2000	27,28	ND	Daily	WER	125	TOM
5850	1630-1930	40	105	Daily	WER	250	IBB
5850	1930-1959	29S	75	Daily	WER	100	PRW
5935	0030-0045	41	75	Sat/Sun	WER	250	BVB
5935	1900-1929	29S,30	75	Daily	WER	100	PRW
5935	1930-2030	29S	75	Daily	WER	100	PRW
5945	0800-0900	27,28N	280	Sun	NAU	100	BVB
5945	0800-0915	27,28N	280	Sat	NAU	100	BVB
5945	0815-0915	27,28N	280	Fri	NAU	100	BVB
5955	0658-0758	27S	220	Daily	NAU	250	RNW
5955	0758-0859	18,27,28W	ND	Daily	WER	500	RNW
5955	1100-1458	18,27,28W	ND	Sun	WER	500	RNW
5955	1500-1557	18,27,28W	ND	Mon-Sat	WER	40	RNW
5955	2330-0030	41,49	75	Daily	WER	125	DVB
5960	1900-1959	28E,29	75	Sat	WER	100	CHW
5960	2000-2159	37,38W	210	Daily	WER	250	YFR
5960	2200-2300	37,38W	210	Daily	WER	250	YFR
5965	1230-1259	28NW	ND	Daily	WER	100	PRW
5965	1400-1500	27,28	ND	Sun	JUL	100	RTR
5965	1626-1659	29S,39N	90	Mon-Fri	WER	100	TWR
5965	1626-1659	28	105	Sat	WER	100	TWR
5970	1700-1900	29,30	65	Daily	NAU	250	YFR
5970	2030-2100	28NW	ND	Daily	JUL	100	PRW
5975	1230-1259	28NW	40	Daily	WER	100	PRW
5980	0430-0500	27,28	60	Daily	WER	250	NHK
6000	1530-1630	29S	97	Daily	NAU	100	PRW
6010	1659-1757	27S,36,37	240	Daily	WER	250	RNW
6015	1800-1859	27	300	Daily	WER	100	PRW
6015	1900-1930	28,29	45	Tues,Fri	WER	125	BVB
6015	1900-1945	28,29	45	Th,Sat	WER	125	BVB
6015	1900-2000	28,29	45	Sun	WER	125	BVB
6015	1915-1930	28,29	45	Mon,Wed	WER	125	BVB
6020	1931-2016	37,38	150	Sun	WER	250	PAB
6020	1931-2031	37,38	150	Sat	WER	250	PAB
6020	2000-2030	37,38	150	Fri	WER	250	PAB
6025	0500-0600	28E	120	Daily	WER	100	AWR

6030	0030-0100	41	90	Daily	WER	250	BVB
6035	0759-0857	18,27,28W	300	Daily	WER	100	RNW
6035	1430-1529	28NE,29W	60	Daily	WER	100	PRW
6040	2030-2100	47,48,52,53	190	Mon-Fri	NAU	250	IBB
6040	2030-2100	37,38,46,47	190	Sat/Sun	NAU	250	IBB
6045	0000-0100	41	105	Daily	WER	250	WRN
6045	1000-1100	27E,28	ND	Sun	WER	100	HLR
6050	1800-1859	28E	100	Daily	JUL	100	YFR
6050	2200-2300	28NE,29W	55	Daily	WER	250	PRW
6055	1000-1059	27,28	90	Sun	WER	100	CHW
6055	1130-1200	27,28	ND	Sat/Sun	WER	125	EMG
6055	1200-1215	27,28	ND	Sun	WER	250	MWA
6060	1727-1800	30S,40	90	Daily	WER	100	TWR
6105	0400-0500	28,29	60	Daily	WER	250	IBB
6105	0742-0920	27	285	Sun	NAU	125	TWR
6105	0757-0850	27	285	Mon-Fri	NAU	125	TWR
6105	0812-0850	27	285	Sat	NAU	125	TWR
6105	1700-1759	40	105	Daily	NAU	500	YFR
6110	1400-1559	27,28W	290	Daily	JUL	100	TOM
6110	1559-1657	27S,37N,28S	220	Daily	NAU	250	RNW
6110	1800-1859	39,40	120	Sat	WER	125	BVB
6110	1830-1859	39,40	120	Sun	WER	125	BVB
6120	0400-0600	29	60	Daily	WER	250	IBB
6120	0559-0657	27S,37N,28S	220	Daily	NAU	250	RNW
6120	0859-1100	27S	255	Mon-Fri	WER	250	RNW
6120	1802-1902	37N	230	Daily	NAU	250	YFR
6135	2000-2030	29N	45	Daily	WER	100	PRW
6140	1300-1400	27,28	ND	Sun	WER	100	MVB
6140	1630-1759	28NE,29W	55	Daily	WER	100	PRW
6145	1700-1800	38E, 39S,48	145	Mon,Wed,Fri	NAU	125	EFD
6155	0200-0300	6,7,8,9	300	Daily	WER	250	VOR
6155	0300-0500	6,7,8,9	300	Daily	WER	250	VOR
6165	0030-0045	41	90	Sun	WER	100	PAB
6175	2100-2200	27,28W	300	Daily	WER	100	TOM
6175	2300-2400	39,40	105	Daily	WER	125	VOR
6195	1645-1800	39,40	120	Mon,Wed	WER	100	BVB
6195	1715-1730	39,40	120	Fri	WER	100	BVB
7105	1630-1700	28NW	ND	Daily	WER	100	PRW
7165	2000-2200	29	60	Daily	WER	250	IBB
7170	1457-1600	28-30	60	Daily	WER	100	TWR
7170	1600-1629	29S	75	Daily	WER	100	PRW
7180	1430-1530	28NE,29W	60	Daily	WER	100	PRW
7200	2330-0030	41NE,43S,49	75	Daily	WER	250	GFA
7205	0230-0330	40	105	Daily	WER	250	IBB
7205	1800-1830	37NW	240	Sun	WER	100	BVB
7210	1800-1815	39,40	100	Sat	JUL	100	BVB
7210	1800-1830	39,40	100	Mon,Wed,Fri	JUL	100	BVB
7210	1800-1859	39,40	100	Tue,Th	JUL	100	BVB
7210	1830-1859	39,40	100	Sun	JUL	100	BVB
7215	0030-0130	40E,41NW	90	Daily	WER	250	GFA
7235	1900-1930	39N	105	Daily	WER	250	FEB
7245	1900-1929	52,53,57	170	Sun	NAU	500	BVB
7260	1830-2000	46,47	155	Sun	JUL	100	BVB
7260	1930-2000	46,47	180	Sat	WER	125	BVB
7280	0300-0330	48	135	Daily	WER	250	AWR
7285	1130-1200	28NE,29W	100	Daily	NAU	100	PRW
7305	2100-2159	46E,47,52N	180	Daily	WER	500	YFR
7315	0300-0330	48	135	Daily	WER	250	AWR
7315	0330-0359	48	135	Daily	WER	250	AWR
7325	1300-1400	18	5	Daily	NAU	100	PRW
7345	1800-1900	18	25	Daily	ISS	250	PRW
7375	0000-0400	7,8,9,10	300	Daily	WER	100	HRT
7375	0200-0600	2,3,6,7,10	325	Daily	WER	125	HRT
7375	2300-0400	11,12,13,14	240	Daily	WER	100	HRT
7425	0400-0430	39,40W	120	Daily	WER	250	AWR
9405	1600-1700	41	90	Daily	WER	500	YFR
9415	1600-1659	29	60	Daily	WER	250	IBB
9430	0400-0500	40	105	Daily	WER	250	IBB
9445	1130-1159	27	300	Daily	WER	100	PRW
9445	1700-1729	39,40W	120	Daily	WER	250	AWR
9450	1300-1359	27	300	Daily	WER	100	PRW
9460	1630-1915	39,40	130	Sun	NAU	100	BVB
9460	1645-1700	39,40	130	Mon,Wed	NAU	100	BVB
9460	1645-1715	39,40	130	Fri	NAU	100	BVB
9460	1645-1720	39,40	130	Tue	NAU	100	BVB
9460	1645-1745	39,40	130	Th	NAU	100	BVB
9460	1645-1929	39,40	130	Sat	NAU	100	BVB
9460	1800-1900	39,40	130	Tue	NAU	100	BVB
9460	1830-1859	39,40	130	Fri	NAU	100	BVB
9465	1800-1859	46E,47W	183	Daily	NAU	500	YFR
9470	0500-0759	55,59,60	240	Daily	WER	100	HRT
9470	1800-1859	47,48	150	Daily	WER	250	IBB
9470	1901-1931	39,40	120	Sat	WER	250	BVB

9470	1901-1946	39,40	120	Sun	WER	250	BVB	11905	1630-1659	48	135	Daily	WER	250	AWR
9470	1930-1959	39,40	120	Fri	WER	250	BVB	11905	1730-1759	48	150	Mon-Fri	WER	250	IBB
9480	1900-2200	46,47,52	180	Daily	WER	500	YFR	11905	1800-1859	48	150	Daily	WER	250	IBB
9485	1730-1800	48	135	Mon-Fri	WER	250	IBB	11935	0757-0857	27S,36,37	240	Daily	WER	250	RNW
9485	1800-1900	48	140	Daily	NAU	250	IBB	11955	1900-2000	37,38W	200	Daily	JUL	100	AWR
9485	1900-1930	48	140	Mon-Fri	NAU	250	IBB	11970	1625-1715	39,40	120	Tue,Fri	WER	250	BVB
9495	0230-0330	40	105	Daily	WER	250	IBB	11970	1625-1729	39,40	120	Mon,Wed,Th	WER	250	BVB
9500	1900-1959	37E,38	150	Daily	WER	250	YFR	11975	0800-0830	37,38W	210	Daily	WER	100	AWR
9520	1600-1700	29	45	Daily	WER	250	IBB	12005	1430-1529	41NE,43S,49	75	Daily	WER	250	GFA
9540	1700-1829	40	100	Daily	JUL	100	IBB	12010	0800-0830	37,38W	210	Daily	WER	100	AWR
9565	1400-1459	40E,41NW	75	Daily	WER	250	IBB	12010	0830-0900	37,38W	210	Daily	WER	100	AWR
9595	0700-0800	37,38W	210	Daily	WER	100	AWR	12015	1400-1500	30S	75	Daily	WER	250	IBB
9595	1400-1500	30S	75	Daily	WER	250	IBB	12025	1830-1900	29SE	90	Daily	WER	250	IBB
9595	1800-1859	40	105	Daily	WER	250	IBB	12035	1515-1559	40,41	90	Wed-Sat	JUL	100	BVB
9595	2000-2059	46E,47,52N	165	Daily	WER	500	YFR	12035	1530-1559	40,41	90	Sat/Sun	JUL	100	BVB
9605	1600-1630	29,30	65	Sat	NAU	250	EMG	12045	1759-1957	47E,48,52E,	150	Daily	WER	500	RNW
9610	1000-1100	28W	180	Sun	NAU	100	AWR	13645	1400-1415	39N,40	90	Sat	WER	250	PAB
9615	0430-0530	39,40	120	Mon-Th	WER	250	BVB	13645	1400-1430	41	90	Sun,Wed	WER	100	PAB
9615	0430-0545	39,40	120	Fri	WER	250	BVB	13645	1415-1430	41	90	Mon-Fri	WER	100	PAB
9640	2030-2100	28NW	35	Daily	GUF	250	PRW	13645	1430-1445	41	90	Sun	WER	250	PAB
9650	1600-1659	40	105	Daily	WER	500	YFR	13655	1500-1558	41SE	95	Daily	NAU	500	YFR
9660	1730-1759	39S,47E,48	140	Daily	JUL	100	IBR	13660	1600-1757	47,48	155	Daily	NAU	500	YFR
9660	2200-2300	27S	40	Daily	GUF	250	PRW	13680	1230-1559	40	105	Daily	WER	250	IBB
9665	1500-1530	41N	90	Daily	WER	250	AWR	13700	1400-1559	41	90	Daily	WER	500	YFR
9665	1530-1559	41N	90	Daily	WER	250	AWR	13750	1330-1429	41NE,43S,49	88	Daily	NAU	250	GFA
9670	0100-0300	42,43	75	Daily	WER	250	IBB	13755	1500-1559	39,40	120	Daily	WER	100	VOR
9680	1700-1730	47E,48	130	Sat	JUL	100	RMI	13790	1600-1657	47E,48	128	Wed	ISS	500	BVB
9680	1730-1759	47E,48	130	Fri	JUL	100	RMI	13810	1400-1500	28,29W,38E,	120	Daily	NAU	100	TOM
9680	1830-1930	40	100	Daily	JUL	100	IBB	13820	1300-1459	41E	84	Daily	NAU	500	YFR
9695	1600-1659	47E,48	130	Sun,Tue,Th	JUL	100	RMI	13840	1200-1229	29S	90	Daily	WER	100	PRW
9695	1900-1959	37,46	210	Daily	WER	500	YFR	13840	1400-1459	41S	105	Daily	WER	500	YFR
9730	1600-1759	38S,39S,47	140	Mon-Th	JUL	100	BVB	15185	1330-1500	41	90	Daily	WER	250	GFA
9730	1600-1830	38S,39S,47	140	Sat	JUL	100	BVB	15190	0830-0900	38-40	105	Daily	WER	500	NHK
9730	1600-1859	38S,39S,47	140	Sun,Fri	JUL	100	BVB	15215	1300-1345	41	90	Daily	WER	500	NHK
9750	1559-1657	27S,37N,28S	225	Daily	NAU	250	RNW	15215	1345-1515	41	90	Daily	WER	500	NHK
9760	1600-1659	39	120	Daily	WER	250	YFR	15225	0500-0600	39N,40W	105	Daily	NAU	250	IBB
9760	1830-1845	52,53	160	Tue,Th	JUL	100	RRP	15495	1200-1230	41NE	90	Daily	WER	250	AWR
9770	1700-1800	40	105	Daily	WER	250	IBB	15495	1230-1259	41NE	90	Daily	WER	250	AWR
9790	1530-1600	29N	45	Daily	WER	100	PRW	15520	1200-1229	29	60	Daily	WER	100	PRW
9800	1500-1600	41E	95	Daily	NAU	500	YFR	15520	1230-1330	41NE,42S,43	75	Daily	WER	250	GFA
9800	1830-1859	46S,47SE	180	Daily	WER	500	LWF	15565	1200-1230	31S,42N	70	Mon-Fri	NAU	250	BVB
9800	1900-1929	38E,39	120	Daily	WER	100	PRW	15620	1630-1700	48	135	Daily	WER	250	IBB
9805	2000-2030	37,38W	210	Daily	WER	100	AWR	17485	1500-1559	46E,47,48W,	160	Daily	JUL	100	TOM
9815	1900-1930	47,48W	150	Daily	WER	250	IBB	17545	0900-1000	38,39	135	Fri	WER	125	BVB
9820	1630-1659	38E,39S,48	145	Tue,Fri	NAU	100	RHU	17650	1530-1559	47,48	135	Wed	WER	100	BVB
9830	1730-1759	37,38W	210	Sun	WER	100	AWR	17675	0600-0700	40	105	Daily	WER	250	IBB
9830	1730-1800	37,38W	210	Mon-Sat	WER	100	AWR								
9845	1800-1859	37E,38	150	Daily	WER	250	YFR								
9845	1900-2030	46N,46SE	210	Daily	WER	100	IBR								
9850	1600-1630	39,40	100	Sun,Th	JUL	100	PAB								
9850	1700-1759	39	120	Daily	WER	250	YFR								
9895	0559-0658	28S,38,39N	140	Daily	NAU	250	RNW								
9895	0658-0757	28S	120	Daily	WER	250	RNW								
9895	1100-1557	27S,37N,28S	225	Sun	WER	250	RNW								
9925	1530-1729	39,40	105	Daily	WER	100	BVB								
11605	1600-1659	29SE	90	Daily	WER	250	IBB								
11635	0430-0500	48	135	Sun	WER	125	BVB								
11635	0430-0530	48	135	Sat	WER	125	BVB								
11645	1530-1629	40E,41NW	90	Daily	WER	250	GFA								
11645	1730-1759	47,48,52	145	Daily	JUL	100	IBR								
11675	1400-1429	30N,31W	60	Daily	WER	250	PRW								
11675	1500-1530	41N	75	Daily	WER	250	AWR								
11675	1530-1600	41N	75	Daily	WER	250	AWR								
11685	1700-1800	37,38	180	Daily	WER	100	YFR								
11690	0600-1000	58,59,60	270	Daily	WER	125	HRT								
11695	1400-1459	41	70	Sat/Sun	NAU	250	BVB								
11720	1300-1329	42,43W	70	Mon-Fri	NAU	250	AWR								
11720	1300-1329	42,43W	70	Sat/Sun	NAU	250	AWR								
11725	1330-1500	42,43W	70	Daily	NAU	250	AWR								
11760	1900-1930	37,38W	210	Daily	WER	100	AWR								
11760	1930-1959	37,38W	210	Daily	WER	100	AWR								
11795	1730-1759	48	135	Daily	WER	250	AWR								
11810	1700-1758	38E,39S,48	135	Sun,Wed	WER	125	SBO								
11830	1500-1559	41	90	Daily	WER	500	YFR								
11835	1700-1758	38E,39S,48	145	Th	NAU	125	ELF								
11840	1200-1230	19,20,21,22	35	Sat	NAU	250	EMG								
11840	1400-1429	29	60	Daily	WER	100	PRW								
11875	1630-1729	47,48	150	Daily	WER	100	BVB								
11875	1729-1745	47,48	150	Fri	WER	250	BVB								
11885	1600-1629	29S,39N	105	Daily	WER	250	IBB								
11895	1500-1530	41	87	Sat/Sun	NAU	250	BVB								
11895	1500-1556	41	87	Th,Fri	NAU	250	BVB								
11895	1515-1556	41	87	Wed	NAU	250	BVB								
11895	1530-1556	41	87	Mon,Tue	NAU	250	BVB								

List of Broadcasters which are using Media broadcast technical equipment

AWR ... Adventist World Radio
 BVB High Adventure Gospel - Bible Voice Broadcasting
 CHW ... Christliche Wissenschaft
 CVC Christian Vision
 DTK MEDIA BROADCAST (Deutsche Telekom)
 DVB Democratic Voice of Burma
 EFD Ethiopians For Democracy
 ELF Eritrean Liberation Front
 EMG ... Evangelische Missionsgemeinden in Deutschland
 FEB FEBA Radio UK
 GFA Gospel for Asia
 HCJ Voice of the Andes
 HLR Hamburger Lokalradio
 HRT Hrvatska Radio Televizija
 IBB International Broadcast Bureau
 IBR IBRA Radio Schweden
 LWF Lutheran World Federation
 MVB Mecklenburg-Vorpommern Baltic Radio
 MWA .. Missionswerk Arche
 NHK ... Nippon Hoso Kyokai
 PAB Pan Am Broadcasting
 PRW Polskie Radio Warsaw
 RHU Radio Huriyo (Xoriyo)
 RMI Radio Miami International
 RNW ... Radio Netherlands World Service
 RRP Radio Reveil Paroles de Vie
 RTR Radio Traumland (Belgium)
 SBO Sagalee Bilisummaa Oromoo
 TOM ... The Overcomer Ministry
 TWR Trans World Radio
 VOR Voice of Russia
 WRN ... World Radio Network
 YFR WYFR Family Radio



TURKISH DELIGHT

By Eric Bryan

With the ever-shrinking number of transmissions in English on shortwave, especially of those beamed to North America, maybe you, too, were delighted when the Voice of Turkey's English broadcast mysteriously appeared with an unusually good signal at 0300 (now at 0400) on 7325 kHz.

The Voice of Turkey hasn't traditionally been one of the most reliable signals out of Europe, at least in the western U.S. (Though they transmit from near Ankara, located in the Asian or Anatolian side of Turkey, I still think of VOT as an eastern European voice). It turned out that the broadcaster had leased time on the Canadian relay site in Sackville, New Brunswick, greatly increasing the Voice of Turkey's signal quality in much of North America. What a treat it was to be able to tune in and casually listen to the news and traditional Turkish music in our local evenings.

English Text and On-Demand

There are even more possibilities at the newly-revamped Turkish Radio Television website, www.trt.net.tr. English was scarce on the old TRT website; there was no English text for news or entertainment coverage. On the new homepage, you'll find an English link to the right. Click this and you'll have the homepage in English.

There is a list of news headline links to the right and a series of rotating news headline photos (which you can carousel through) to the

left. Further down, more headlines are grouped under categories: Economy; Sports; Science & Health; World; Turkey; Culture & Art.

To the right of this group is The Agenda, with links to different stories under this category. Coverage here, in late 2008, focuses on territorial disputes between Azerbaijan and Armenia; the speculated impact of the Obama presidency on The Balkans, Afghanistan, Iran, and Iraq, and how it all will affect Turkey; and the Turkey-Greece-Cyprus dilemma. Below The Agenda are special links devoted to the



coming Obama presidency and the global financial crisis.

Though the old TRT website offered live streaming, online content is always more convenient if it's available on-demand. The new site features three on-demand choices. Beneath the Obama and financial links is VOT-English *Listen to News*, with VOT's shortwave newscasts available. VOT-English *Listen to Interviews* has coverage ranging from the Frankfurt Book Fair to a talk with the Pakistani Prime Minister, Yousaf Raza Gilani. VOT-English *Listen to Broadcasts* brings you the full VOT shortwave broadcasts in English on-demand.

The next section down, *Media Today*, has links to reviews of Turkish and world newspapers in English text. This included news from Britain's *The Guardian*; *USA Today*; *El Nacional* of Venezuela; the *Chinese Global Newspaper*; Iraq's *Al Sharq Al Awsat*; *Kathimerini* of Greece; Iran's *Ettelaat*; and *Nezavisimaya Newspaper* of Russia.

At the very bottom of the English home-

page there is a Frequency link. This takes you to VOT's current English shortwave broadcast schedule, with transmissions listed for Africa, America, Asia, Australia, and Europe. English for America is listed for 2300-2400 on 5960 kHz; and at 0400-0500 on 6020 and 7325 (the latter via Sackville).

Also at the bottom of the page are links for Contact info and About TRT and VOT, giving the history and background of the broadcaster.

Live Streaming

If you go to the upper-right corner of the English homepage and hit the red bar which says LIVE you'll be whisked to a page with the Windows Media Player. To the right you'll see two vertical menus, one for TV, the other for RADYO. On the latter there are nine streams to choose from. Though there is much Turkish and other languages here, there is also a lot of music. Musically, here is what I found on the different links:

Radyo 1: Pop

Radyo 3: Jazz

Radyo 4: Traditional Turkish music

FM: Mellow pop, some with traditional elements

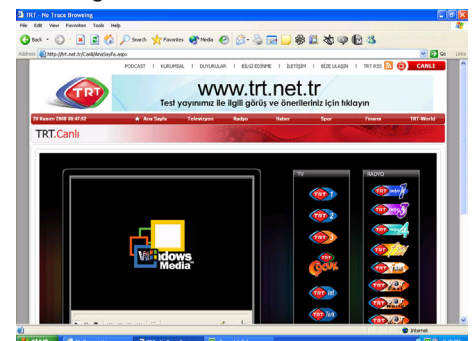
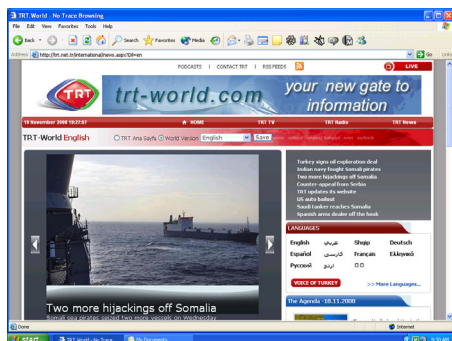
TSR: Real ethnic, traditional music, based around *bouzouki* (lute), tambourine, and lone female vocal.

VOT East: Traditional orchestral music

VOT World: The voice of Turkey's shortwave broadcasts, which usually feature some traditional and/or pop music

VOT West: Modern "traditional" music, i.e., ethnic elements with rock drums

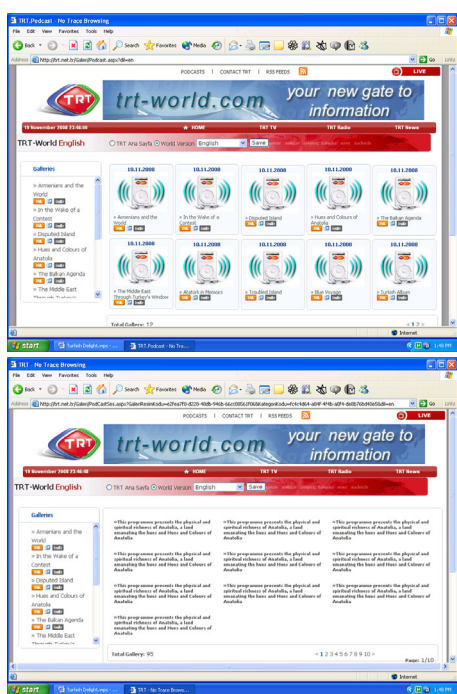
Tourism Radio: Opera; pop/rock, some sung in English



As far as the TV streams go, I've yet to get any video out of them.

Podcasts

At the very top of the English homepage and Media Player page there is a PODCASTS link. Punching this will land you on the podcasts page where there are twelve VOT podcasts in English to choose from. (The podcasts were also available on the old website.)



If you have iTunes on your computer, the easiest way to get the podcasts is simply to click the iTunes icon corresponding to the podcast you want, and it will appear in your iTunes under Podcasts. From there, you can load the podcast onto your iPod manually or automatically, depending on how you have iTunes configured. This gives you access to international programs without being tied to your computer, and expands the usefulness of your MP3 player, having it do some of the work your shortwave radio formally did, besides providing extreme portability.

Here are samples of what each podcast offers:

Armenians and the World:

Heavy anti-Armenian propaganda, with Armenian policies and behavior called "childish"; claim of Armenian hostility toward Turkey and Azerbaijan and occupation of latter;



complaints of western countries' interference and support of Armenia; dispute of Armenian claims of 1915 Armenian Genocide by Turkey.

Atatürk in Memoirs:

Atatürk's regular travels throughout Turkey, during which he visited most towns and cities; claim that Turks would celebrate wherever he turned up; letter from 5th grade student to Atatürk read; German congratulations from President Hindenburg to Atatürk on 10th anniversary of founding of modern Turkey.

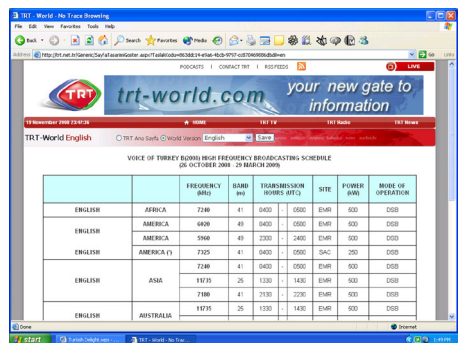
Black Sea:

Turkey's bilateral relations with Russia, vital for peace and stability, calling the nations "two friendly countries," relations improved after fall of Soviet Union; Turkey sees one million Russian tourists annually; many Turkish engineers employed in Russia; many Turkish students studying in Russia; Turkey's relations with Moldova, with which they share a common past and heritage, friendly since Moldova's independence; Turkey has invested one billion dollars in Moldova.

Turkey's relations with Ukraine, important with Ukraine's large Black Sea coastline which includes The Crimea; Ukraine's turn to democracy after Soviet collapse facilitated bilateral relations; they cooperate on military, defense, science, and technology; the Black Sea the historical bridge between Asia and Europe. The Black Sea Economic Cooperation Organization founded with Romania and Bulgaria, Russia, Georgia, Ukraine, Azerbaijan, Moldova, Armenia, these nations forming a commonwealth of independent states, with participation from Greece and Albania, to promote free trade and economic cooperation between all BSECO countries; Israel, Tunisia, Slovakia, Poland, Egypt, Austria, Italy, France, and Germany all participated as observer states; claim this cooperation has a stabilizing effect in the Black Sea area, rich in oil and natural gas, uniting East and West and soothing disputes.

Blue Voyage:

(Those who like traditional Turkish music will want to hear this program's bumper music); ancient Turkish port city (which the announcer pronounced as "Anto-drios") dating to the Trojan Wars, which held first known beauty contest; archaeology here since 2000 with excavation of 4th century BC Roman villa that had indoor plumbing.



Diplomacy Agenda:

Security deal between Iraq and US, SOFA (Statement Of Forces Agreement), with Iraq's objections to US terms, such as caveats over article which plans 2011 withdrawal of US troops; the judicial and penal responsibilities of US soldiers; concerns over US use of Iraq as base for strikes on Syria and Iran; Iraqis and Kurds want SOFA negotiations done.

Disputed Island:

"The Troubled Island, Cyprus"; the Turkey-Greece-Cyprus debacle, with proposed roadmap to agreement; focus on security, division of power, EU membership, and economy; workshops' attempts to end dispute by close of 2008; Turkey claims to foster peace and stability, but Greek Cypriot Cyprus president wants to be free of Turkish pressure and troop presence; claim that Greek Cypriots not in a hurry for a solution, which is "very far away."

Hues and Colours of Anatolia:

(Traditional Turkish music fans will want to hear this bumper music); depiction of 16th century Istanbul, with royal festival where trained animals performed; animals owned by the sultan included elephants, giraffes, lions, tigers, wildcats, wolves, bobcats, leopards, wild mules, ostriches, bears, weasels, porcupines, civet cats, hyenas, and panthers; one elephant was claimed to be 100-120 years old; lions were taken for walks in the streets; most animals were gifts brought from Sudan, Ethiopia, Egypt, and Tunisia, many by Iranian diplomats; animals were commemorated in famous miniature paintings.

In the Wake of a Contest:

Program to follow up latest essay contest to announce winners; some winners who visited Turkey were treated in Ankara to Turkish cuisine and music; listeners' letters read; claim that Anatolian Turks were first to tame horses, create an alphabet, and build an army.

International Terror and Turkey:

Turkey's struggle to deal with the new "terrorism without borders"; cross-border operations to cut off terrorist supplies, disrupt terrorist internal structure, and block terrorist counterattacks; note that terrorist strikes can be seasonal, as groups may be able to mobilize and attack in summer but not in winter in some regions; care must be taken that counterterrorism operations don't hurt civilians, which could trigger terrorist recruitment; Turkish attack on PKK in northern Iraq in late 2007 given as successful example.

The Middle East Through Turkey's Window:

(Another bumper music note); claim that relations between Palestine, Iraq, Iran, Syria, and Egypt were on upswing in early 2000s, when there was "relative stability"; statement that US occupation of Iraq brought region into chaos; the PKK attacks on Turkey from Iraq; Iran's nuclear program might create a war with

the US; the Bush middle east policy will not be remembered well.

Turkey and Energy:

The BTC Pipeline, called the Silk Road of the 21st century, meant to bring energy from the Caspian Sea through Turkey to the Mediterranean; pipeline came as an agreement between Turkey, Azerbaijan, Georgia, Turkmenistan, and Kazakhstan; the project cost 2.4 billion dollars, used 21,000 workers, and carries 50 million tons of oil a year; pipeline is 1774 km long and uses up to 46” diameter pipe; pipeline eases heavy oil tanker traffic in the Bosphorus, and is important for Turkey which claims to have no oil or gas reserves.

Turkish Album:

Turkey beats out Italy and Austria to host World Golf Championships in 2012; pop song played (sounded like Turkish salsa); world archery championships held in Turkey; famed 94 year old Turkish poet dies; more pop music; Turkey to “lessen” effects of global warming by destroying water-gobbling eucalyptus trees which were planted to drain marshes; more pop music; media center in Ankara wins Cityscape architecture award, a contest in which 40 countries competed and which was decided in Dubai; Antalya builds new university; pop song; Istanbul called the most crowded European city by Eurostat; archaeologists find that settlement in Istanbul goes back much further than they thought, to 8500 BC; more pop music; region of Muğla discovered as new tourist destination; Turkey represented at Cannes Film Festival by movie “Three Monkeys.”

With the establishment of the new website, the former *International Terror and Turkey* seems to have been replaced with *The Balkan Agenda*. This podcast covered EU membership, with Croatia and Macedonia the current candidates; Albania, Bosnia-Herzegovina, Montenegro, Serbia, and Kosovo the potential candidates; and the problem that the Balkan countries are stigmatized by the EU as corrupted by organized crime and bribery. This program also had notable bumper music.

If you click the text link or the pod icon you’ll be taken to a page where the podcasts are being archived. On this page, hit whichever link (organized by date) you want to hear. This will send you to a page with a player where you can listen to the podcast online.

A Sample Streaming/ On-Demand/Shortwave Broadcast

I listened to the 2300 VOT English broadcast streamed online. After an ID and frequency/broadcast schedule announcement, the transmission began with world news. This featured coverage of the war in Iraq; the search for a Cyprus solution for Turkey and Greece; 12 European countries, including Luxembourg, Denmark, Slovakia, Czech Republic,

VOICE OF TURKEY B(2008) HIGH FREQUENCY BROADCASTING SCHEDULE (26 OCTOBER 2008 - 29 MARCH 2009)

		FREQUENCY (kHz)	BAND (m)	TRANSMISSION HOURS (UTC)		SITE	POWER (kW)	MODE OF OPERATION
ENGLISH	AFRICA	7240	41	0400	- 0500	EMR	500	DSB
ENGLISH	AMERICA	6020	49	0400	- 0500	EMR	500	DSB
		5960	49	2300	- 2400	EMR	500	DSB
ENGLISH	AMERICA (*)	7325	41	0400	- 0500	SAC	250	DSB
ENGLISH	ASIA	7240	41	0400	- 0500	EMR	500	DSB
		11735	25	1330	- 1430	EMR	500	DSB
		7180	41	2130	- 2230	EMR	500	DSB
ENGLISH	AUSTRALIA	11735	25	1330	- 1430	EMR	500	DSB
		7180	41	2130	- 2230	EMR	500	DSB
ENGLISH	EUROPE	6020	49	0400	- 0500	EMR	500	DSB
		12035	25	1330	- 1430	EMR	500	DSB
		6050	49	1930	- 2030	EMR	500	DSB
		5960	49	2300	- 2400	EMR	500	DSB

TURKISH TIME : UTC + 2

(*) VOT Transmission from Canada - Sackville Transmitter Site

and Romania, forming an air transport fleet to fight pirates off the coast of Somalia; relations between Macedonia and Turkey; tensions between Syria and Iraq over killing of eight Syrian civilians by Iraq-based US helicopter raid on Syrian border town; the Taliban in Pakistan; and possible change of Russian election laws which would allow Putin to run for president again.

The news was followed by *Review of the Turkish Press*. This roundup of Turkish newspaper headlines featured the commemoration of the anniversary of the death of Atatürk; Turkish medical breakthroughs regarding the treatment of aneurysms; and the visit of the Swiss president to Turkey.

After that came *Agenda*. This featured coverage of the elections in Azerbaijan, and Armenian talks with Azerbaijan.

Next was a variety program, *Live From Turkey*. This featured two men chatting about football (soccer); the Atatürk commemoration; the US election and what President Obama’s policies will be and what they will bode for Turkey and the world; and critical commentary on the war in Iraq. There was also music, with one beautiful more traditional song based around lute and female voice, and another modern pop song.

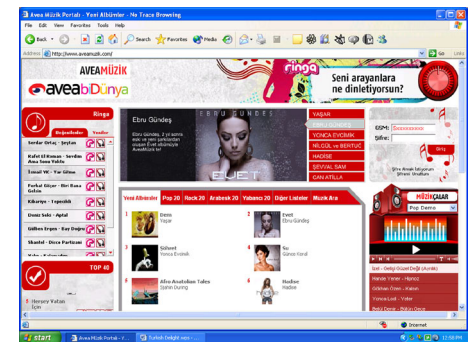
The broadcast wound up around 2350 with a news headline recap, ID and frequency/broadcast schedule, followed by VOT’s haunting piano interval signal until 0000.

More Music

There were some interesting ads on the old TRT homepage, some with English links, including one for the Spice Hotel & Spa in Belek, on the Turkish Riviera. One of these advertisers, Avea, a cell phone communications network, provided access to some Turkish music on their website. This link is missing on the new page, but there does appear to be an Avea ad on the Turkish language homepage.

To reach the Avea page which the old TRT site was linked to, go to www.avea-muzik.com Find the dancing graphic equal-

izer on the right of the page and choose Pop Demo, Rock Demo, or Fantazi Demo. Select from five different songs in each category, and press the play button. Some nice ones were “Paramparça” by veteran Sezen Aksu under Pop Demo, and “Sil Baştan” by Şebnem Ferah under Rock Demo.



Turkish Delight

All this talk of Turkey has me craving a Cadbury Turkish Delight. Though not genuine Turkish delight, a traditional ethnic sweet flavored with rose, lemon, or raspberry, www.britishdelights.com describes Cadbury’s version this way: “The Turkish Delight bar is positioned as a mystical, exotic treat that lets you escape from the everyday. Cadbury chocolate coated Turkish delight. Full of Eastern promise.”

They’re an acquired taste, having a sort of rose-flavored, thick and chewy filling surrounded by Cadbury milk chocolate. After the first bar, I wasn’t sure. Some time later I tried a second, and then wanted more. You can find them at those import marts which stock crafts and wine and treats from around the world.

Come to think of it, those are always good places for shortwave aficionados to get a taste of something exotic from some of the foreign lands they been visiting via broadcasts (or podcasts).



The “OBBD” Antenna

By R.W. Parker KB2DMD

So – you’ve just acquired a Rohde & Schwartz EK-070 through your Uncle Harry at the State Department. Nice receiver, congratulations!

As you’ve no doubt noticed, though, it doesn’t hear a thing until you connect an antenna to it. If you shove a coat hanger into its antenna input, it picks up Radio Havana plus some local medium wave signals. If you show it 50 feet of lamp cord strung over the shrubs, the darn thing really seems to come to life.

However, that 500-watt Peruvian you’ve been chasing is still tough to hear. You’ve pressed every possible button on that rig, and you’ve still no choice but to log the signal as “poor.” However, some guys have heard that station at decent levels lately, and you begin to wonder, “How do *they* do it? I’ve got one of the hottest receivers on the planet, and I can’t pull their signal out of the mud!” Believe it or not, your antenna might have something to do with it.

Now, before I go any further, a disclaimer is in order: I’m not an engineer, nor do I play one on TV. Strictly speaking, I’m an amateur. From the Latin *amator* – one who pursues an art out of love for it, rather than for financial gain. What that essentially means is this: even though I don’t know enough about HF antenna theory to write a doctoral dissertation, I still get to keep my day job. So, humbly presented, here are my findings on an equally humble (but extremely effective) HF antenna design, in hopes that this information might be useful to some.

And, if you have a technical background in this kind of stuff and think that I’m all wet, I’d be grateful if you’d write and let me know. Since I’m still learning, I value criticism from individuals more knowledgeable than myself.

Anyway, I’ve been DXing with the OBBD (or “Old Buzzard Balanced Doublet”) antenna for over a year now, and the results have been awesome. The “Old Buzzard” moniker comes from its air insulated feedline – two wires separated by a bunch of homemade wooden spacers.

The idea for constructing this antenna grew out of a need for improving north-south path performance on the 75 meter amateur band. Initially, I simply considered adding another coax-fed 1/2 wave dipole to complement the east-west antenna already in use. But after years of hearing about the merits of feeding an antenna with open wire line, my curiosity was piqued and I finally decided to give it a whirl. I also thought

that it would be fun to build an antenna the old fashioned way. However, I never expected that it would turn out to be the hottest antenna I’ve ever used for SWBC DXing.

The Art of Antennas

Since I set up my first ham shack, I never owned store bought antennas or linear amplifiers. 100 watts was all I ever had, and I tried to make every one of them count by erecting good homebrew antennas. If I built a poor antenna, it could rob power from my signal or radiate it at a less than optimum angle. And, if a feeble, distant SWBC signal was going to make it into my receiver, it would also need all the help my antenna could give it.

Like most radio cranks, I knew that the qualities of an efficient radiator were equally applicable to a receiving antenna. In other words, if I string a random length of wire between two trees and stick the end of it into my receiver, it might *seem* like a good antenna. But if that antenna showed a high SWR when transmitting (indicating a mismatch), it would also be less than ideal for DXing.

Some of the antennas on my “farm” that are fed with coaxial cable perform very well for weak signal work, but only when they’re used close to their resonant frequencies. At HF, the feedline loss of a coax fed antenna is *huge* when it’s mismatched, whether it’s a single or multi-band type. For instance, we know that 3dB of loss equals a 50% reduction in signal strength. Well, if a coax fed antenna is operated a mere 1 MHz away from its resonant frequency, we’re looking at up to 6dB of loss! So much for hearing that 500-watt Peruvian...

On the other hand, a doublet fed with open wire line can not only be used efficiently on its fundamental frequency, but also on its harmonics with an antenna tuner. An added advantage is that the antenna will often exhibit gain on its harmonics. If that same antenna was fed with coaxial cable, a tuner would only compensate for a very slight mismatch. Multi-band use would be out of the question.

Construction

Constructing an Old Buzzard Balanced Doublet seemed relatively straightforward. Besides wire, the only parts required were a center insulator, two end insulators, the wooden spacers, and some nylon cord to hang it. Except for the wire, everything I needed was in my junk

box. So, I visited Lowe’s for a 500-ft spool of 14 gauge plastic-covered solid copper wire. Only half of this would be used for the antenna, but the large spool was reasonably priced and it never hurts to have extra wire on hand.

The length of the doublet’s elements were calculated using the standard 1/4 wavelength formula – 234 divided by the desired operating frequency (in megahertz) = length in feet. Since I wanted a 1/2 wave antenna for 3.9 MHz, 234 divided by 3.9 equaled 60 feet, so each element was cut to 60-ft 10-in. This allowed 5 extra inches of wire on each end to fasten to the insulators.

Since I’d never experimented with open wire transmission line, I had to refer to my “Old Buzzard” 1948 edition of *The Radio Amateur’s Handbook* for guidance. I learned that simply feeding the antenna with 300 or 450-ohm “ladder line” or TV twin lead would give great results, but, since I wanted the old time charm of wooden spacers, I was going to have to do a bit of figuring.

In fact, if all you want is a great receiving antenna with a minimum of fuss, here’s all you need to do: First, figure for the longest antenna you can install (either “flat-topped” or inverted vee), construct a doublet that will fit in that space, feed it at the center with ladder line, and then couple the line to your receiver through a balanced line antenna tuner. I use the little MFJ-901B here, because it’s all I have. Yes, it’s more lossy than something like a Johnson Matchbox, but it works okay.

Anyway, calculating for the length of a homebrew open wire line is also pretty straightforward. The impedance of the feedline and its velocity factor are determined by the diameter of the wire used and its spacing. I decided that spacing my feeders about 2 inches apart would be a good idea, for no other reason than it would make the line fairly easy to handle.

Using the formula in the *Handbook*, I determined that 14-gauge copper wire spaced two inches apart would have an impedance of about 497 ohms, and a chart showed that open wire transmission line with 400-600 ohms impedance has a velocity factor of about 0.975. With that number, I could calculate for the physical length of a 1/4 wave feedline. The formula is 246 divided by the frequency in MHz (3.9 in my case), and the quotient is then multiplied by the velocity factor of the line. My feedline would need to be 61.5 feet long.



Getting Spaced Out

To ensure that my feeders would remain parallel, I thought it would be best to install spacers on the line at 8" intervals. Thus, I'd need 92 spacers. A partial sheet of 1/8" thick plywood that was lying around looked like it would be well suited for spacer material, so I sawed it into 3/4-in. wide strips. These strips were then sawed into 2.5-in. long segments. I made up a simple jig to drill two holes in each with a number 33 drill. The holes were spaced 1 inch on either side of the center, giving the required 2-inch spacing. (See page 20 for construction details.)

For weatherproofing the spacers, I decided to deviate from the accepted practice. The Old Buzzard method was to boil the spacers in paraffin, but I opted to coat them with Minwax Marine Spar Urethane instead. I use this stuff extensively on antenna projects, as it exhibits outstanding resistance to weather and ultraviolet radiation.

Application was easy – I hung the spacers on a length of wire strung horizontally, and went down the row with my can of spar urethane. The can was simply raised up to dip each spacer. After they had dried, I inverted the spacers and repeated the process to coat the other end. Two coats were applied using this method. When I had finished, I ran the number 33 drill through the holes again to clean them out.

With 92 spacers and two 61-ft. 9-in. lengths of #14 wire in hand (the extra three inches were for connection at the feed point), it was time to assemble the Old Buzzard Transmission Line. I planned to secure the spacers on the line by sliding a 1/2-inch length of heat shrink tubing down each wire, shrinking them in place, sliding a spacer down the line until it butted against the



From the shack window, the feedline passes an antenna tuner "doghouse" ...

pieces of heat shrink tubing, then locking the spacer in place with two more pieces of tubing on the opposite side.

With four pieces of heat shrink tubing at each spacer, I would need 368 pieces. Rather than count them, I just started to snip off short lengths of tubing until I had a big pile, and I'd cut more as the work progressed. An 8-inch length of scrap wood would be used to establish the distance between the spacers.

On installing the very first spacer, I discovered (to my horror) that my great idea for anchoring them was totally worthless. After shrinking the tubing, it would not stay in place on the plastic covered wire! The tubing slid up and down the length of the wire, and thus was incapable of securing the spacers.

What I needed was heat shrink tubing that incorporated an adhesive on the inside. I hadn't budgeted for such an expense, nor could I afford to clutter up my shop with a protracted antenna project. The feedline needed to be finished *that day!* The burning question was how to secure those spacers.

Vinyl electrical tape came to the rescue! I had a ton of it on hand. 368 individual wraps of black vinyl tape would be used in place of the short bits of heat shrink tubing, and the tape would be weatherproofed by applying a glop of spar urethane over each wrap. It *had* to work!

It did work. I made a wrap of vinyl electrical tape on each line, slid a spacer up to the wraps, then held it in place with corresponding wraps on the opposite side. Success! The spacer didn't budge. But then I looked down the remaining 61 feet of line, stretching out the shop door and into the driveway. "Ninety-one more spacers?" I asked myself. "I must have rocks in my head!"

Then, I thought of the dedication and patience of the Old Buzzards. They assembled their feedlines in a nearly identical manner (many twice as long as this one!), and they secured their spacers with a zillion individual

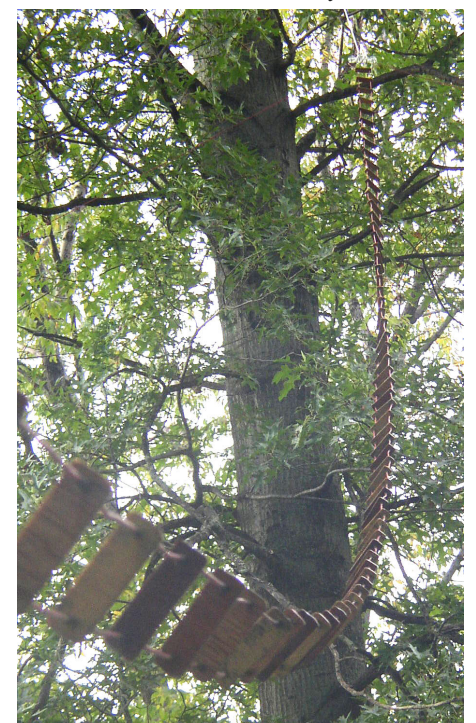
wraps of fine wire! Still, as I looked down those two long wires, my nostalgic spirit was rapidly waning. Thoughts of rolling the whole thing into a ball and stuffing it in the scrap wire box began to cross my mind. Enough 450-ohm ladder line to salvage the project could



...begins its ascent...



...crosses an overcast autumn sky...



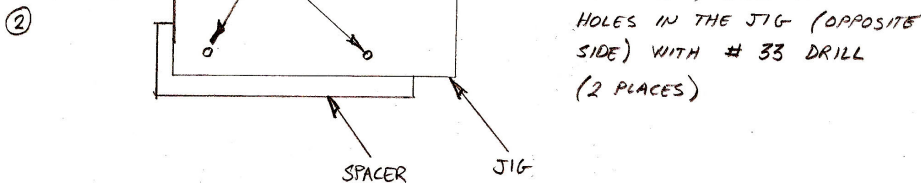
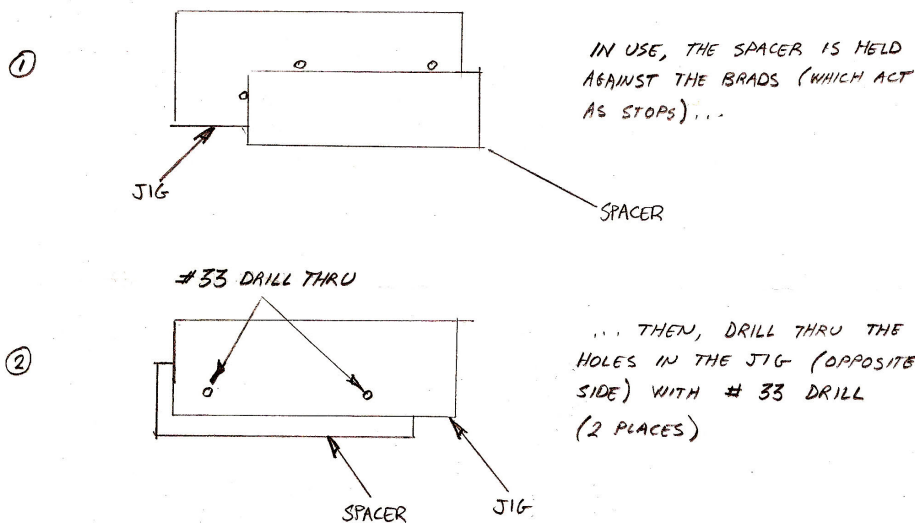
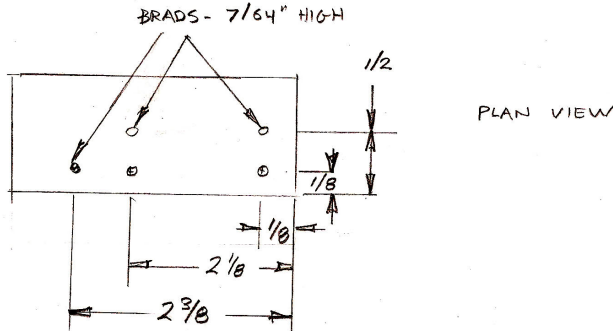
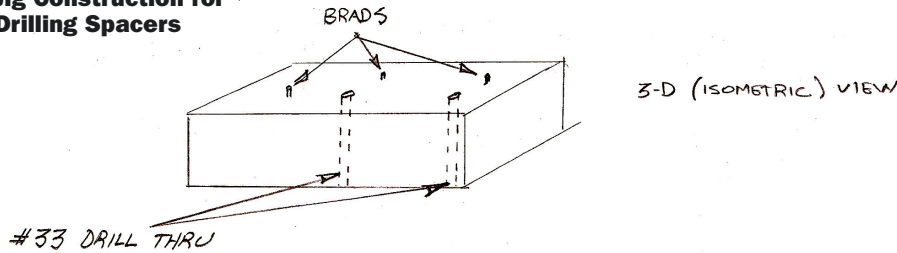
...and terminates at the feedpoint – an "old buzzard" glass dogbone insulator, suspended about 35-ft. high in a tall tree.

The "OBBD" Antenna Characteristic Impedance

$$Z_o = 276 \log \frac{b}{a}$$

Where: Z_o = Characteristic Impedance
 b = Center-to-center distance between conductors
 a = Radius of conductor (in same units as b)

Jig Construction for Drilling Spacers



be purchased for about 15 bucks, and I'd still wind up with a decent (though somewhat less romantic) antenna.

At that point my lovely bride, the extremely intelligent, unbelievably patient, and easy-on-the-eyes Miss Heidi (KB3OGL) walked into the shop. Immediately, she sensed my misery and asked what was troubling me. I pointed to the two wires stretching out of the shop door for what might as well have been miles, and told her of the desolate task that lay before me. "Is that all?" she asked. "Here" she said, handing me a roll of tape and a knife. "You cut the tape for me, and I'll make the wraps. We'll do this together - it'll be fun!" How I love that girl!

It was fun. And, scant hours later, the Old Buzzard Transmission Line was fully assembled and coiled onto a large wooden cable spool. The following day, I stretched it out between a couple of trees and applied a glop of spar urethane to each of the 368 tape wraps. I stepped back to view it in the springtime sunlight - it was beautiful.

Jackpot!

No further problems were encountered with assembling or installing the antenna; everything went like clockwork. Where the feedline entered the shack, I cut a piece of 3/4-in. thick lumber about 3 inches high and wide enough to fit the window sill. Sticky-back weather-stripping was applied to the top and bottom edges, and the window was lowered on it. Two #33 holes were drilled 2 inches apart, and the feeders were passed through them and connected to the tuner.

All of my calculations and measurements must've been correct, as the Old Buzzard Balanced Doublet loaded up beautifully. I received outstanding signal reports on 75 from various amateurs up and down the East Coast and out to the Midwest. Results were great on 40 meters as well - no problem loading up, and it beat the pants off of my 40 meter dipole.

Whenever I asked if anyone noticed a difference between "antenna A" (coax fed dipole) and "antenna B" (the OBBD), the

Old Buzzard Balanced Doublet was the clear winner in almost every instance. Received signals were also far better with the OBBD, up to 20dB stronger in some cases! There was also far less noise on these signals, compared to the unbalanced dipoles.

What took me completely by surprise, however, was the antenna's ability to capture weak signals that were well outside of its intended frequency range. It was reasonable to expect that it would be hot on the 75, 41 and 22 meter shortwave broadcast bands, and it was. However, its performance is also excellent over the entire 2-30 MHz spectrum! Some of my other antennas are a bit better on certain paths or frequencies, but, more often than not, the OBBD is the champion. For 90 and 60 meter tropical band work, I've never used a more incredible antenna. Signals that are totally inaudible with anything else often become perfectly readable when I switch to the OBBD. It's just astonishing!

The OBBD might also be a good choice for a DXer who's troubled by strong BCB stations. After extensive testing, I found that the antenna doesn't like mediumwave at all. In fact, it attenuates these signals. For example, KYW 1060 is a 50,000 watt flame-thrower located in Philadelphia, about 35 miles south of me. When received on a 160-foot inverted "L", their signal buries the meter with a carrier level of well over 100dB. If I switch to the OBBD and peak their signal with the tuner, they're only 60dB at best. If I peak the tuner on a signal in the 31 meter band and tune back to 1060 kHz, their signal drops to 20dB. And if the antenna is tuned for WWV at 15 MHz, KYW's rockcrusher signal is totally eliminated!

In Short...

While the OBBD is a very simple design, its superlative SWBC DX performance has caused me to completely rethink the way I build antennas. In my nearly 40 years of shortwave listening, the idea of feeding an antenna with anything other than coax had never occurred to me.

The ubiquitous use of coax in the hobby can be traced back to the years following WWII, when heaps of 52-ohm cable were available for next to nothing on the surplus market. Thus, it was a cheap and easy way to feed an antenna. Hams and SWLs of that era flocked to bargain coax like cats to an overturned fish truck and, after experiencing first hand the work that goes into assembling an open wire feedline from scratch, I can hardly blame them.

Air-insulated feedline, however, has rekindled in me a spark that had grown dimmer with the passing of time. I now look forward to building antennas with the same zeal that preoccupied me in grade school (when I was supposed to be paying attention in class). My "old buzzard" *Handbook* beckons to me, replete with designs that offer incredible gain and directivity. Noisy and inefficient antennas, I bid you farewell! There's a big roll of ladder line in my future!

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Uniden® SCANNERS



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CEI Special Price \$519.95

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Frequency Coverage: 25,000-512,000 MHz., 806,000-956,000 MHz. (excluding the cellular & UHF TV band), 1,240,000-1,300,000 MHz.

When you buy your Bearcat 796DGV TrunkTracker package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC796DGV scanner purchase, you also get a free deluxe scanner headphone designed for home or race track use. Headset features independent volume controls and 3.5 mm gold right angle plug. The 1,000 channel Bearcat 796DGV is packed with features to track Motorola Type I/II/III Hybrid, EDACS, LTR Analog Trunk Systems and Motorola APCO 25 Phase I digital scanner including 9,600 Baud C4FM and CQPSK. Also features control channel only mode to allow you to automatically trunk many systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control and programming with RS232C 9 pin port (cable not supplied), Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for \$29.95. For complete details, download the owners manual from the www.usascan.com web site. For fastest delivery, order on-line at www.usascan.com.

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CEI Special Price \$169.95

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



Bearcat® BCD396T Trunk Tracker IV

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

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

Frequency Coverage:

25,000-512,000 MHz., 764,000-775,987.5 MHz., 794,000-823,987.5 MHz., 849,012.5-868,876.5 MHz., 894,012.5-956,000 MHz., 1,240,000 MHz.-1,300,000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning. **Close Call Radio Frequency Capture** - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. **Dynamically Allocated Channel**

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Bearcat® BC246T Trunk Tracker III

Suggested list price \$399.95/CEI price \$214.95
Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

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

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group

ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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The Big DTV Switch & School Club Round-Up

February 19 has literally been the date to watch over the last 12 months as the nation pulls the plug on analog broadcast TV transmissions and switches to an all digital TV world. The advantages to Digital TV (DTV) over analog are worth the wait: spectacular High Definition (HD) pictures in full 16:9 aspect ratio, cinematic format; crystal clear images even in Standard Definition 4:5 aspect ratio; stunning surround sound audio and, finally, second, third and sometimes fourth auxiliary channels broadcasting weather, radar, local news, other networks and more.

DTV has been a long time coming, and, for the most part, it's a success. Of course, if you watch TV on cable or satellite you won't notice any difference. Only those who are watching over-the-air (OTA) TV will notice the big change. While that number isn't as big as it used to be, there are still some 40% of U.S. households that receive most of their TV entertainment OTA. Last September's experiment in which the Wilmington, North Carolina, area made the switch early, exposed a few of the potential problems the whole nation might anticipate this month when the final switch to DTV is made.

One of the potential problems could be a lack of converter boxes that allow DTV signals to be displayed on any conventional TV set. The FCC worries that some cities with large numbers of OTA-only households may not have an adequate supply of converter boxes available for purchase. This problem may be compounded as some electronic chain stores such as Circuit City have gone into bankruptcy.

A second problem will likely be the FCC DTV hotline which will attempt to help those who are experiencing problems with reception. Calls will range from, "When did this happen?" to "I used to get X number of channels and now I don't." The Wilmington experiment showed that, extrapolated to the nation as a whole, there may be extensive waits in queue for answers to viewers' questions.

The final problem will involve those in outlying areas who used to receive viewable analog signals with a certain amount of "snow" in the picture, but who will now not be able to receive those channels at all. If the DTV signal is weak or has interference such as "ghosting" (caused by multi-path distortion), the picture will come and go, giving

the viewer at once a perfect picture and then a blank screen.

MT Readers Respond

In the October issue of this column I asked readers to let me know how the switch to DTV was going in their area. A number of readers responded, and here are some of the results:

Jim WA4CCF uses a deep-fringe antenna with a 15 dB preamp for OTA at his beach cottage between Washington, D.C., Annapolis and Baltimore, MD. He reported that he had good to very good analog reception from that location. He bought a Zenith DTV converter and reports that only three channels are locked in day and night. "All other channels are marginal and have video and audio break-up during the day or indicate no decode at all." He is worried that he will be forced to subscribe to cable-TV in order to receive the stations he had been receiving in analog before.

Judy WI0RO wrote that she bought two different brands of converters from Radio Shack (Digital Stream and Zenith). She found that reception on the Digital Stream was "vastly inferior to the Zenith...The performance is not even close. The difference can be seen in the on-screen signal strength meters. But, with all things being equal, the Zenith can pull in stations where the Digital Stream cannot. The other difference is in the 'bells and whistles.'" She reports that "the main enhancement for me is the extra world news broadcasting" coming through a local PBS channel.

Timothy Kuryla passed along a letter from his local newspaper in which a local OTA TV viewer suggested a conspiracy afoot to get people whose reception deteriorates in the DTV switch to start subscribing to cable

or satellite TV. There's plenty of anecdotal evidence that this is the case, but there's no proverbial "smoking gun." In this case, the writer said they were receiving five local channels well in analog, but once they bought a converter and hooked it up, they got nothing.

These three examples show exactly what the FCC fears, come the 19th of this month: The outraged phone calls, the long lines to get diminishing quantities of converters that may or may not work and dissatisfied viewers who can no longer get out-of-market channels without switching to cable or satellite.

A report in **TV Technology.com** noted that FCC Chairman Kevin Martin worries that the National Telecommunications and Information Administration (NTIA), the agency overseeing the switch, may have grossly underestimated the scope of the problems that may come with the switch. It was noted that the number of "self-certified" OTA-dependent households in the Wilmington, North Carolina, experiment was 39% higher than what NTIA had estimated using Nielsen data. "More than twice as many coupons were requested as predicted by the NTIA," the report said.

February School Club Round-Up

Mark your calendars for February 9-13 for the next School Club Round-Up (SCR).

WI5ND
Wagoner High School
300 Bulldog Circle
Wagoner, Oklahoma
74467 USA
Grid EM25
Wagoner County
Wagoner Windtalkers
Honoring the American Indian Code Talkers Who Served During the World Wars

WI5ND Wagoner High School "Windtalkers" from Wagoner, Oklahoma, show how it's done. Using a full wave loop for 40 meters at 30 feet, this school puts an outstanding signal on the air. They have 120 members in their radio club, which is fantastic considering the school has just 630 students.

I'm not normally a contester, but this is one contest I love. All the schools in the U.S. with amateur radio programs are on the air during school hours to work as many other schools and individual operators as they can.

The rules are pretty strict: The contest starts Monday at 1300 UTC on February 9 and ends Friday at 2400 UTC February 13. Students have to work the contest into their regular school day and aren't allowed to work more than 24 hours total in the week-long contest.

Lew Malchick N2RQ, SCR director from Brooklyn (NY) Technical High School Amateur Radio Club, describes the SCR on the ARRL web site www.arrl.org:

"School Club Roundup (SCR) is sponsored by the Council for the Advancement of Amateur Radio in the New York City Schools (CAAR/NYCS), the ARRL and its Hudson Division Education Task Force to foster contacts with and among school radio clubs.

"The SCR is a great way to get young operators on the air. Very often a new operator will be intimidated by the fear of not knowing what to say to the stranger on the other side of the radio. The exchange information helps to overcome this fear in a low pressure contest format. Operators are encouraged to take some time to chat beyond the contest exchange."

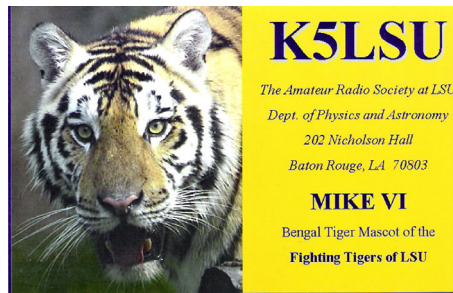
Award certificates for SCR participants are issued in the following categories: Elementary, Middle/Intermediate/Junior High School, High School and College/University. There's also a category for the rest of us individual operators. Full details on SCR are found here: www.arrl.org/SCR. Rules for this contest are found here: www.arrl.org/SCR/rules. An on-line log in various formats and a downloadable .pdf version are found here: <http://home.earthlink.net/~scr-log>. Excellent photos and comments from various SCR schools are found here: www.arrl.org/contests/soapbox/?con_id=144.

The fun part of this contest, for those of us not in school, is to hear the young voices and to get a chance to chat with the kids about other aspects of school such as sports and favorite subjects. The amazing range of schools you'll hear on the bands include the Wagoner High School (OK) "Windtalkers," who in the February 2008 SCR fielded 21 operators; Kermit King Elementary School (CA) which had an amazing 64 operators in its February 2008 SCR; and William Byrd Middle School (VA) which used 33 operators to achieve its first place in the middle school category in the February 2008 SCR.

Teachers who sponsor the clubs show a dedication to their students, their profession and their hobby that deserves recognition from all of us, hams and non-hams alike. To be able to do their jobs and get students interested in amateur radio is truly amazing. If you've ever tried to motivate your own children to get interested in radio you have just a taste of what these teachers do year after year.

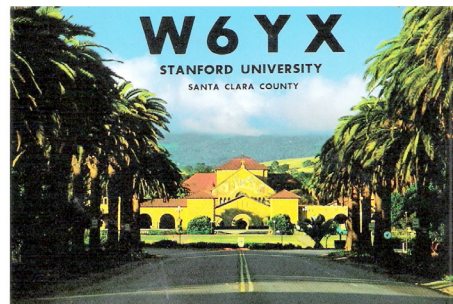
SCR Operating Tips

Here are some tips on operating SCR: Schools typically operate beginning with their



There was a tiger stalking the SCR last fall (as there is in each SCR) in the form of K5LSU from Louisiana State University in Baton Rouge. Their station is in the department of physics and astronomy on campus and they were very active on digital modes.

lunch period which will span three hours across our time zones, but most operations take place in the afternoon with many staying after school to operate. This mostly depends on the teacher, the location of the operating position, and other school activities. The schools tend to stay close to the operating frequency guidelines (see chart), though by Friday afternoon you'll hear them anywhere they can squeeze in to get those final points, so tune up and down the bands listening for the "CQ School Club Round-up" call.



The idyllic scene pictured on the W6YX QSL is from Stanford University which had a dynamic signal on 20 meters from coast-to-coast, thanks to their KLM 6-element 20 meter Yagi and their Yaesu FT1000MP pumping out the watts through an outboard linear amp.

As may be expected, the best signals come from the better financed college and university stations such as W6YX, Stanford University. Many elementary and middle school stations are set up just for the event so stations are operating in a Field Day mode. Many high schools have well appointed sta-

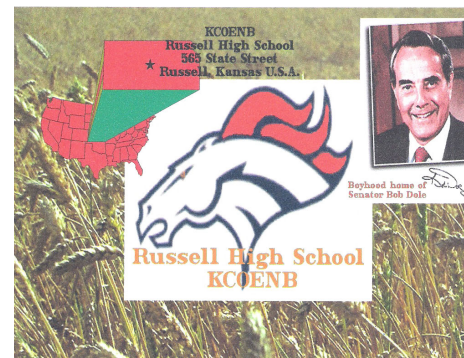
KE5EJK
Lampasas Middle School Youth A.R.C.
Lampasas County Texas, USA
Sponsor: Gene Case KDSVGT

LMSYARC Rlg: Yaesu FT-847
207 East Ave. A Ant: Cushcraft R6000
Lampasas TX 76550 Grid: EM01wc

QSO with	Date	Time UTC	Band	RST	Mode
K542R	2-9-08	20:39	20m	59	SSB

QSL: Please Thanks

Lampasas (Texas) Middle School Youth Amateur Radio Club had a great on-air presence on 20 meter SSB using a Yaesu FT-847 and a CushCraft R6000 vertical. Great job, kids!



Russell, Kansas, the boyhood home of former Kansans Senator and Presidential candidate Bob Dole, was represented in fine form by KCOENB, Russell High School. They were using an Icom IC-736 with 100 watts into a 20 meter dipole at 30 feet.

tions and put out extraordinary signals. Almost all stations are operating at 100 watts or less with minimal antennas.

Very few schools operate CW, but a growing number are operating the digital modes because it's easier for the computer-literate to work this mode. Most operate SSB and are found on 20 meters because that's where there's more chance of working other schools. Contact with other schools gives the club two points in scoring while contacts with individuals are one point. However, CW contacts count as two points as do the digital modes.

When you work an SCR station, have a little patience, because most of these kids are just learning the ropes of ham radio operating. Responses may be slow and there may be a little confusion, but it's really worth the effort. You will run across some students who are handling pile-ups like seasoned DXpeditioners. It's a lot of fun to hear.

SUGGESTED SCR FREQUENCIES:

CW (MHz):

1.800-1.810, 3.530-3.540, 7.030-7.040, 14.030-14.040, 21.130-21.140, 28.130-28.140

SSB (MHz):

1.855-1.865, 3.850, 3.880, 7.225-7.255, 14.250-14.280, 21.300-21.330, 28.440-28.460

Digital modes, both PSK31 and RTTY are found around the usual digital frequencies. Tune around and look for "CQ SCR" in the text.

MTREADER ONLY

To access the restricted website for the month of February, go to www.monitoring-times.com, click on the key, and when prompted, enter "mreader" under the user name. Your password for February is "oldbuzzard" - Check in each month for new material!



What's Happening "Down Under?"

For many radio listeners, there are few places in the world that can truly put the "distance" into "long distance listening" quite like Australia.

Radio Australia is how many of us heard our first signals from "down under." Short of having a location that was able to pull in local FM and AM radio signals, there weren't really many other options for the person seeking Australian radio programming.

Thankfully, the Internet offers a nice fix for that. Not only can one listen to Radio Australia broadcasts in a variety of languages online, but local programming abounds for the listener wanting to take a trip across the Commonwealth without even leaving their listening room.

From the metropolitan and modern Sydney, to the edge of the outback, Internet radio enthusiasts have a plethora of Australian broadcasts to tune into. For instance, **Reciva.com** lists 273 stations from Australia. Many of these are in the metro areas of Sydney, Perth, Brisbane and Melbourne. Station formats range from pop and rock to classical and talk.

Many of the stations listed on Reciva (but certainly not all) are run by the Australian Broadcasting Corporation, the same organization that operates Radio Australia. For those new to Australian broadcasting, the ABC is the government run public broadcasting operation, much like Britain's BBC. Like the BBC, the ABC has an international broadcast (Radio Australia) and then a network of national and local radio stations on both FM and AM. Many of the ABC's local and the ABC National stations can be found at Reciva.

In addition to their streams on Reciva, most of the stations have highly interactive Web sites (for instance, ABC Sydney, listed in the resource guide) which feature programming information, program podcasts, news and more.

But the ABC stations aren't the only ones streaming "down under." U.S.-based Clear Channel Communications, for instance, has a joint venture with Australian-based APN News & Media to operate the Australian Radio Network.

Stations on the network carry programming in two main formats. The first plays a wide variety of music from the 1960s to the 2000s, which is called the Classic Hits Network. The other format, the MIX network, features a more adult contemporary sound. There are also several other formats, ranging from hip-hop/r&b to easy listening.

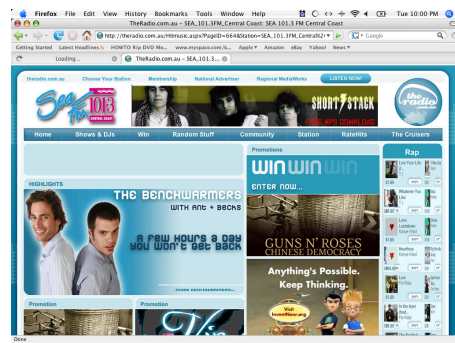
All the stations on the Australian Radio Network are locally produced, and listeners to commercial radio in the U.S. will feel right at home with commercials for local shops and restaurants. While writing this column, for instance,

I am listening to Cruise 1323 in Adelaide with commercials for Uncle Tom's Quality Small Birds (the best chicken in the "SA"), as well as a gardening book for "South Australian gardeners" and a local traffic report.

After a Bryan Adams tune and a DJ shift change, I decided to head to Gosford, New South Wales (just North of Sydney) to listen to some current hits on 101.3 Sea FM. When I was listening, it was afternoon drive for a day that had just begun here in South Carolina, and the on-air personalities were taking calls from listeners.

One of my favorite things to do when listening to local stations in other countries is to listen to their commercials. From a burger restaurant, to a cell phone promotion, to a local concert venue, there were quite a few local businesses to hear about during my listening session. Of course, right out of the commercial break was a song from AC/DC.

All-in-all, there is a lot of highly localized programming content to listen to from Australia, which should come as a welcome thing to those who have been wishing for years to be able to tune in and listen to everything from morning radio to local news.



Internet radio, in the palm of your hand?

After much debating over the past six to seven months, I finally decided to trade in my old flip-phone for a Blackberry Curve. While many of the features that have made it a pleasurable purchase for me are beyond the scope of this column, one particular feature floored me with its handiness.

After a quick Google search for Internet radio applications for Blackberry devices, I stumbled across the folks at Moodio. Moodio is a free (my favorite word) service, much like Reciva and others, that allows you to set up an account

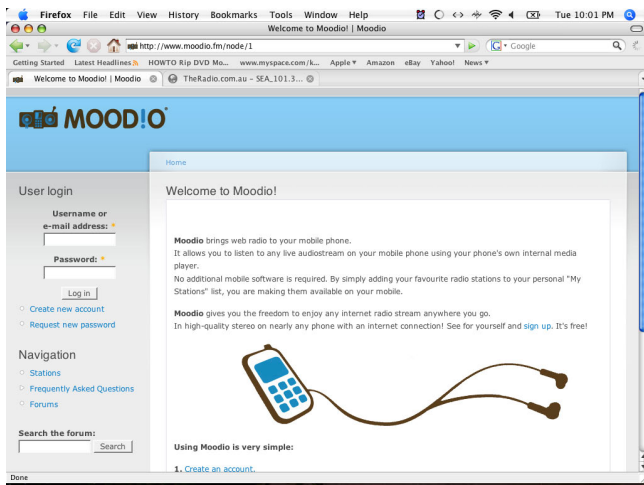


and then create a list of favorite Internet streaming radio stations.

Set-up was a breeze. I created my account, found a handful of favorite stations (starting with WWL-AM in New Orleans, LA). I then pointed my Blackberry's web browser to Moodio's mobile site: (**m.moodio.fm**). After logging in, I had my list of favorite stations to choose from and clicked on one. Within a few seconds, I was listening to live streaming audio from New Orleans, on my phone. The audio quality is pretty good. I haven't tried the service with a headset or stereo Bluetooth device, but I am sure the audio would be even better with one of these.

A word of caution. Blackberry users that have their cellular service's "Blackberry" package that gives unlimited Internet and email usage should be fine. However, while Moodio works on nearly any phone that can access the Internet (not just Blackberries or other smartphones), I advise you to have some sort of data package on your plan, or else you can rack up some serious charges on your bill.

But all in all, if you are looking for an extremely portable and handy way to bring Internet radio with you, then Moodio streaming through your Web-enabled phone seems a smart way to go for the time being.



Another smartphone application that has recent made entry into Blackberries is FlyCast. FlyCast claims to have more than 1000 stations, both terrestrial-based and Internet only, ready for streaming on your iPhone or Blackberry device (limited to certain models). FlyCast also claims that a 3G or EV-DO network is not required to listen to many of their streams, although I would certainly say it would help.

Don't have a smartphone? Don't feel left out. FlyCast also has a desktop player for your PC or Mac.

While many of the streams that can be found on FlyCast are in the U.S., there are several BBC streams available as well as a "World" category that includes streams from Radio Africa, Radio Italy and others.

Of course, one of the best things about FlyCast is it is free.

Reaching into the mailbag

Some of you have been writing with kind words since my first column a few months back.



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Radio Australia - www.radioaustralia.net.au/
 Reciva - www.reciva.com/index.php
 Cruise 1323 - www.cruise1323.com.au/
 101.3 Sea FM - http://theradio.com.au/Hitmusic.aspx?PageID=664&Station=SEA_101.3
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 Logitech Squeezebox Boom Product Information - www.slimdevices.com/pi_boom.html
 The audio design "white paper" for the Squeezebox - http://wiki.slimdevices.com/uploads/a/ad/Logitech_Squeezebox_Boom_Audio_Desig

Your letters are appreciated, especially when they include some good information for our readers.

Gary Kinsman writes this month in reference to my Internet radio reviews in the December *MT*. Gary says he has had great success with the Logitech Squeezebox Boom. Gary has found plenty to love in the Squeezebox:

"The sound quality is excellent," writes Gary, "especially considering its small size. It has a woofer and tweeter for each channel and a powerful amplifier, with very good bass extension at low to moderate

listening levels."

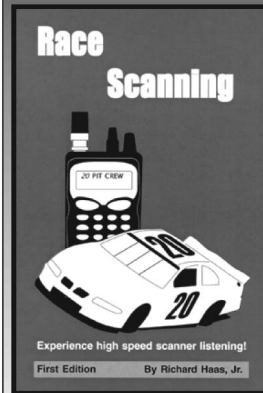
Gary goes on to say that the Squeezebox has an easy to use interface, both through the included remote control as well as a Web browser control function. He also says that it does a good job receiving a signal from his wireless "B" router, which is located on the opposite side of the house from his radio.

The Squeezebox does have a few things Gary would improve on, including inconsistencies when switching from Internet radio use to using the Squeezebox as a network media player. Gary also says the finish on the unit is prone to very visible dust and scratches. But when it comes to performance and audio quality as an Internet radio unit, Gary seems to be quite happy.

For more information on the Squeezebox, see the table at the end of this article for a few Web sites that Gary recommends.

Thanks, Gary, for giving me and our readers a heads-up on the Squeezebox. If you have an Internet radio that you are using to great success, e-mail me at the address in the header for this column!

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Access Denied

Despite the introduction of new scanners with lots of enhanced features and capabilities, there are still public safety radio systems that are difficult or impossible to scan at the present time. This month we take a look at three of these systems and then provide some detailed guidance for using an old scanner to help improve some new antenna designs.

ESK in Florida

Hi Dan,

I read your column in the November 2008 *Monitoring Times* on ESK. I have a question on something I am not sure about. You mentioned on page 25 at the bottom of column one that ESK-capable scanners and the State of Florida statewide system. Are you saying that the new scanners with ESK will decode the Florida state system? I have been under the impression that their system could not be copied with any scanner. I live in Florida, so I would like to hear it if possible.

In the next column you mention the new Uniden Scanners with ESK are coming out.

Anyway, I was wondering exactly what you were saying in the article about Florida's system.

Thanks and 73s,
Bruce in Florida

As we discussed back in November, EDACS (Enhanced Digital Access Communications System) System Key (ESK) was intended as a method to prevent unauthorized radios from operating on an EDACS system. It works by scrambling the traffic carried in the control channel. Any radio without the proper ESK would not be able to transmit or receive a properly formatted control channel message and would therefore not be able to access the system.

Because the technical method M/A-COM used to implement ESK was rather simple, scanner manufacturers were able to add ESK capability to their products without needing any "secret" information. This capability allows scanner listeners to continue to track and monitor standard EDACS systems regardless of whether ESK is in use.

The State of Florida operates a statewide EDACS network called SLERS (Statewide Law Enforcement Radio System) that makes

use of some additional features not normally found in smaller EDACS installations. These features affect both control channels and voice channels and result in scanners being unable to monitor the system properly.

Florida Control Channels

In addition to ESK, SLERS control channels use a feature called *Extended Addressing*. Standard EDACS systems use 14 bits to uniquely identify a radio, giving a possibility of just over 16,000 identifiers. Since the Florida statewide system and other large installations may have 40,000 or more radios, M/A-COM offers an option that provides six additional bits for the identifier, giving a possibility of more than one million unique radios. This same option increases the possible number of talkgroups from 2,048 to 65,534, but requires changes to the format of the data carried in the control channel.

Although the Extended Address data format is described in U.S. and Canadian patents, scanners on the market today are not programmed to understand this format and thus cannot trunk-track properly. Perhaps in the future there will be firmware upgrades to support Extended Addressing.

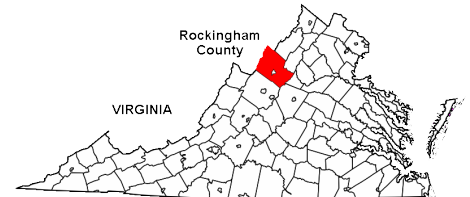
Florida Voice Channels

Conversations on the Florida SLERS are carried in one of two formats, either analog or a M/A-COM digital format called *ProVoice*. While the analog transmissions can be heard by nearly any scanner, there is no scanner on the market today that can monitor ProVoice. Even if such a device were available, the ProVoice traffic on SLERS is encrypted using the Data Encryption Standard (DES). According to FCC regulations, the use of encryption with secret keys puts such transmissions off-limits to scanner listeners.

So, despite the ability to handle ESK, monitoring the Florida Statewide Law Enforcement Radio System is still not technically possible due to the Extended Addressing control channel data format and might possibly not be fully legal due to the use of actual encryption on voice channels.

Rockingham County, Virginia

Rockingham County is located in the northwest portion of Virginia, on the border



with West Virginia. The county seat, Harrisonburg, is about 100 miles west of Washington, D.C. The county covers about 850 square miles and is home to more than 67,000 residents. The county lays claim to being the "Turkey Capital" of Virginia, producing more poultry than any other county in the state.

Public safety agencies in the county have switched over to a new \$19 million M/A-COM EDACS trunked radio system. Officials say that better agency interoperability is the reason for the upgrade, but unfortunately for scanner listeners, the new system carries voice traffic in a proprietary digital format called ProVoice. There is no consumer-level scanner that can monitor ProVoice transmissions, whether encrypted or not.

Planning for the new system began about five years ago and agencies began transitioning last September. By the end of November, Harrisonburg Police, the County Sheriff and Fire/Rescue had all switched over.

According to the Sheriff's Department, the new system provides additional channels and better coverage in rural areas.

Although listeners won't be able to hear the audio, scanners that are capable of tracking EDACS will be able to display talkgroup identifiers. Here are the frequencies used by the new system. Remember that EDACS frequencies must be entered in Logical Channel Number (LCN) order:

LCN	Frequency
01	851.3000
02	851.4625
03	851.5625
04	851.8250
05	852.1125
06	852.3375
07	852.3875
08	852.6000
09	852.6875
10	852.8625
11	852.9375
12	853.1250
13	852.1875
14	853.3750
15	853.4750
16	853.9250





Oakland County, Michigan

Oakland County is part of the Detroit metropolitan area in southeastern Michigan. The county serves as coordinator for the area's \$42 million M/A-COM OpenSky radio network through their Courts and Law Enforcement Management Information System (CLEMIS). The cost of installing and operating this network is paid through a monthly 911 Service surcharge on local telephone bills.

By the end of 2008, the towns of Clawson, Farmington, Lake Orion, Rochester and Troy Police Departments had migrated to the new system. Bloomfield Hills, Ferndale, Hazel Park and Waterford are next, along with the Oakland County Sheriff's Office. The new system is expected to eventually host 80 public safety agencies as well as local hospitals.

Police officers and firefighters receive eight hours of training on the new system prior to "going live," while dispatchers complete 16 hours of procedural and operational training.

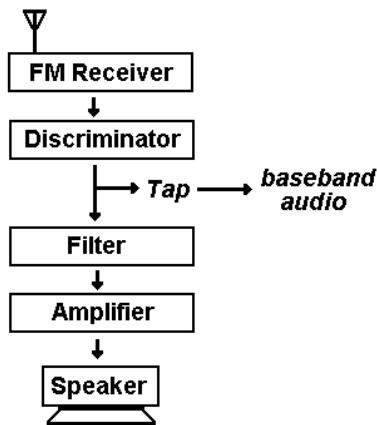
Prior to the new system, agencies were limited in their ability to communicate with other emergency service providers due to incompatible radio formats and frequencies.

Unfortunately, there is no publicly available scanner that can track or monitor OpenSky networks. For the more technically minded, OpenSky uses a proprietary digital voice format called AMBE (Advanced Multi-Band Excitation) and carries it in a TDMA (Time Division Multiple Access) channel. There is no specific "control channel" like in other trunked radio systems. M/A-COM is quite protective of the specific details of their OpenSky data formats, making it unlikely that there will be an OpenSky-capable scanner in the foreseeable future.

Radio Shack PRO-2045

Hi Dan,

I'd like to take up your offer of questions as per your column. I've got an old Radio Shack Pro-2045 scanner that I'm still using and was wondering if you'd know where I could tap into the circuit to check signal strength as I'm also playing around with setting up a home built Yagi in the attic. I have the full schematic/manual for the unit, but



can't get any answers here in Canada because Radio Shack doesn't exist anymore. Maybe you could point me in a direction that could be of some help.

Joe via the Internet

The PRO-2045 is a base/mobile scanner built by Uniden and introduced back in 1996. It has the ability to scan in four frequency ranges: 29 to 54 MHz, 108 to 174 MHz, 216 to 512 MHz, and 806 to 1000 MHz (with cellular frequencies blocked in U.S. versions). It scans and searches rapidly and has memory for 200 channels organized into 10 banks.

Despite its age, the PRO-2045 has some nice features, including "auto-store," where active frequencies are automatically stored during a search, and "channel count," that displays how many times a particular frequency has been active. It includes coverage of the UHF Military Aircraft band, which is sometimes lacking in models of this vintage. It appears to be available on the used market for anywhere from \$65 on up to \$150 or so.

CTCSS

The PRO-2045 was designed to accept an optional CTCSS (Continuous Tone-Coded Squelch System) board purchased separately from the scanner itself. Late model scanners typically have this feature built into the firmware, but when the PRO-2045 was designed, the additional cost of the CTCSS decoder circuitry must have been deemed too high to include in every radio.

CTCSS allows different users to share a common repeater without having to hear each other. Radio system operators are able to program individual radios to send a specific CTCSS tone when transmitting and *unsquelch* (allow the speaker to produce sound) only when that CTCSS tone is received. Different groups of users sharing the repeater use different CTCSS codes and can operate as if they are the only users on the repeater.

CTCSS tones are *sub-audible*, meaning they are below the typical audio frequencies of human speech. In addition, many radios have high-pass filters that prevent the tones from reaching the speaker. Standard tones range from 67 Hz up to 257 Hz.

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Modifications

By designing the PRO-2045 to accept an optional circuit board, Uniden has made some modifications to the scanner much easier. Common modifications on other scanners typically require soldering or other physical changes. Because the CTCSS board plugs into the main circuit board of the PRO-2045, Uniden provided connectors that can accept wires as well as circuit board connecting pins.

One common modification is to tap the discriminator output in order to aid in the decoding of some types of digital signals. The discriminator is at the core of a FM receiver and provides raw, unfiltered signal, sometimes referred to as *baseband audio*. Normal analog scanner audio passes through filters and an amplifier prior to reaching the speaker. This path distorts digital signals, which is why decoding software often performs poorly when fed scanner audio from an earphone jack. Output taken directly from the discriminator avoids this distortion.

The PRO-2045 contains a circuit board with a clear indication on the silkscreen of where the optional CTCSS board is to be installed. To get to this board, remove the three bottom screws and two side screws and carefully pull back the top of the case. Be aware that the speaker is mounted to the cover and will still be attached to the lower assembly, so be gentle.

At the front of the scanner, just behind the main knob, is the area for the optional plug-in board. If there is no CTCSS board installed you will see two plug-in connectors, one toward the front with three holes and one toward the rear with four connectors. To tap the discriminator, connect one wire to the center hole of the three-hole connector (this will be the signal) and another wire to the second-from-the-left (as seen from the front) hole in the four-hole connector (this will be ground). You can see photographs of this process on the web at www.severum.net/scan/2045-tap.html

The two wires you just installed can be connected to an audio phone jack, making connection to a computer sound card or a *data slicer* more convenient.

Information about the signals available on each of the connector holes should also be available on the schematic you have, where you can trace the baseband audio from pin 9 of the MC3361 integrated circuit.

Of course, you'll need to take the normal precautions when working with electronics, including a static-safe work area and proper safety procedures. You may also want to consider a decoupling capacitor and/or a current-limiting resistor to protect the scanner from inadvertent damage when connecting it to your computer.

Measuring Signal Strength

Unfortunately, unlike some other integrated circuits that perform FM demodulation, the MC3361 used in the PRO-2045 does not provide a direct signal strength output, so you may want to consider another way of measuring the performance of your different antenna

designs.

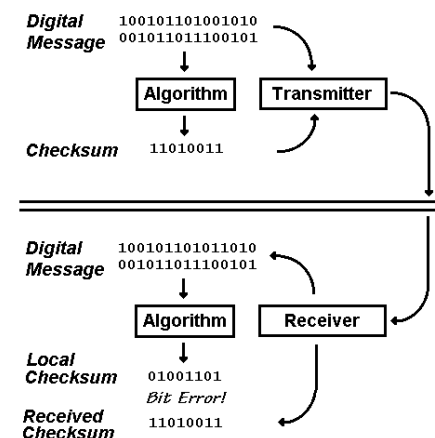
Having a discriminator tap, along with the proper decoding software, will allow you to use the PRO-2045 as an efficient data monitoring receiver. What you want to find is a software package that provides a measurement of *bit error*.

Bit Error

Digital data streams are made up of sequences of binary digits ("bits"), where each bit has only one of two values, either a "0" or a "1". When these bits are transmitted over the air, it is possible that radio noise or other interference will confuse the receiver into mistaking a 0 for a 1 or vice versa. These mistakes are called bit errors. The number of bit errors usually correlates fairly well with signal strength – the stronger the received signal, the fewer the number of bit errors.

Most digital streams contain both the original data and additional bits used to detect (and sometimes correct) bit errors. One of the most straightforward methods is to simply transmit the same digital message a number of times and have the receiver look for two identical messages. This method is fairly simple to implement, but relies on the assumption that bit errors will not occur in the same place twice in a row. It also requires enough signal strength to deliver at least two messages without any errors.

Slightly more complicated error detection methods make use of *checksums* or *cyclic redundancy checks* (CRCs), which are more efficient in terms of the number of bits the sender needs to transmit. The original message is run through an algorithm that produces the checksum or CRC, which is transmitted along with the message. The receiver runs the message it got through an identical algorithm and compares the local result with the CRC or checksum it received over the air. If the two values match, the receiver can be fairly certain there were no bit errors.



Some complex systems make use of *forward error correction* (FEC), where the sender transmits enough extra information that the receiver can actually correct some number of bit errors.

Fortunately for scanner listeners, this complexity is transparent, since the hard work is being done by a microprocessor inside the

scanner or by software running on a personal computer.

Trunking Decoders

If you are located in an area that has a trunked radio system, you can use that system as a source of binary data. By tuning the scanner to an active control channel and using a computer software package like *UniTrunker*, you can measure the number of bit errors you're experiencing and use that to judge how strong a signal you're receiving.

UniTrunker can be found on the web at www.unitrunker.com. The software package will automatically identify and decode control channel data from the following types of systems:

- APCO Project 25
- EDACS
- Logic Trunked Radio (LTR)
- Motorola
- MPT1327

It operates on the Microsoft Windows operating system (from 95 up through Vista) and uses the audio input from the computer's sound card. The output from the PRO-2045's discriminator modification can be plugged into the soundcard's input jack to provide the necessary baseband audio.

UniTrunker has a number of useful features for monitoring trunking systems, but for your purposes you'll want to look for the signal strength bar graph in the upper left corner of the "Site Window" screen.

There are other software packages that can also provide signal strength measurement, but they are geared toward specific data streams. Since bit error rate measurement requires knowledge of the underlying data stream, you have to use a decoding package that is capable of understanding the data stream source your scanner can receive. UniTracker appears to be able to handle the most common trunking systems in the United States, but if something works better for you, by all means use it.

Procedure

Once you have your discriminator tap ready and your decoding software installed and running, you'll want to locate a nearby repeater site with a strong, steady signal. Use that signal with a known antenna and establish a baseline bit error rate measurement. Once that is done, you can replace the known antenna with your various Yagi designs and compare their bit error rates to the baseline.

I would be interested in hearing from readers who are using other digital decoders that provide quantitative bit error rate information.

That's all I have for this month. More information these and other topics are available on my web site at www.signalharbor.com. I welcome your questions, comments and frequency lists via electronic mail to danveeneman@monitoringtimes.com. Until next month, happy scanning!

Q. *Would the use of the H-800 Skymatch active antenna cause overload on an Eton E-1 receiver? (Sumner Stewart, email)*

A. While it would be impossible to answer the overload problem because of the variables, I can give you some basics to help you make up your mind:

- (1) The H-800 provides approximately the same signal levels as a 100 foot dipole antenna;
- (2) Virtually any receiver can be overloaded if the signals are strong enough;
- (3) As a general rule, all portable shortwave receivers are more easily overloaded than professional desktop receivers;
- (4) Generally speaking, the more expensive the radio, the more tolerant it is of strong signals;
- (5) Virtually all receivers are equipped with an attenuator to reduce strong-signal overload;
- (6) Signal strengths vary depending upon distance, power, antenna gain, and propagation.

Q. *What do you think causes global warming? I've heard everything from coal-fired power plants and cars to solar activity to the end of times and the wrath of God! Some say that it is junk science financed by the far left who have duped Al Gore into believing their "big lie." Others say we are actually entering a period of global cooling as evidenced by some of the severe snowstorms of last winter. What can you reveal to us, Master Bob? (Mark Burns, Terre Haute, IN)*

A. Mark, you can ask some of the *darndest* questions! But let's have a look at this timely topic.

Conspiracy theories are especially popular among people who don't have the education, experience, motivation, or intelligence to investigate more reasonable explanations for unfamiliar circumstances. A side benefit is that they get to feel victimized and blame someone else for something they don't understand.

The best way to detect such a theory is when the theorist attributes it vaguely: "They are going to tax the Internet," or "The

government is watching everything we do." Who are "They"? And what branch of "The government"? How are they doing this? Where did you hear this? Simply ask those questions back and watch the theorist grope for answers.

Global warming isn't a conspiracy, it's a fact. Temperature records over the past century, available to anyone from myriad sources, show that the atmosphere really is gradually heating up.

The heat isn't coming from beneath the earth; in fact, the earth's interior is actually cooling down, thus contracting and causing earthquakes. Solar radiation isn't increasing; we've had ways of measuring that for a long time. So it must be something we're doing.

By far, the most destructive source of global warming is carbon dioxide produced by combustion from vehicles, aircraft, coal furnaces, power plants, and forest slashing and burning.

Minor causes include methane produced by agriculture, water vapor which increases during the earth's warming, and other sources as well. An excellent web page is: www.ecobridge.org/content/g_cse.htm.

So far as global cooling, in the short term, we are merely witnessing "epicycles," short periodic changes in weather systems which happen over time. Sadly, in the long haul (hundreds of millions of years), the earth will succumb to a final cooling as it is sheathed by glacial ice, eradicating life. Mankind will have to have relocated by then to a distant planet for survival.

Q. *I heard a "true" story that about 1978 a radio operator aboard the Queen Mary II (QE2) received a WWII Morse code message intended for the QE1. How can natural phenomena account for this claim? (Eric Hopkins, Ayer, MA)*

A. It can't, at least in the physics we know. Radio operators call these messages long delayed echoes (LDEs). Short-duration radio echoes are common, repeatedly bouncing from the ionosphere while simultaneously following more direct paths.

Hams occasionally communicate via "moonbounce," deliberately pointing their antennas at the moon, sending and receiving messages over the curvature of the earth in that manner. On average, such earth-moon-earth (EME) communications take 2.7 seconds.

Echoes exceeding 2.7 seconds in duration qualify as LDEs; no rebounding terrestrial or lunar reflections can last that long and be strong enough to be heard; they would fade

into the thermal noise of the atmosphere.

So what causes these interesting phenomena? Pranks perpetrated by radio operators who play back recordings of early transmissions? Space aliens who acknowledge their reception of terrestrial transmissions by sending them back instead of a QSL card? Some unknown anomaly of physics awaiting discovery? Or outright fabrications of the reporters?

For now, there are no demonstrable answers. This is one of the fascinating mysteries encountered by radio listeners.

Q. *I have two older shortwave radios that I would like to attach to an antenna; they are a Radio Shack DX-150 and a Hallicrafters S38E. Both radios have the three posts in the back for a wire antenna (A1, A2, GND – with a jumper between A2 and GND). Is there some sort of adapter I can buy to convert the output from a coax lead-in to attach to these receivers? (Dan Marshall, Appling, GA)*

A. In the "olden days" (tube-type radios), consumer radios frequently had provisions on the back via screw terminals for a choice of antenna feeds. The three posts labeled "A1, A2 and GND" would allow a balanced antenna (center-fed dipole) to be fed with twin lead. For coax feed (unbalanced), A2 was shorted to the GND (ground) post, and the center wire of the coax would be connected to A1 while the shield to A2/GND. This resulted in the greatest symmetry for the antenna feed.

From a realistic standpoint, however, the symmetry of response isn't really important, so the balanced feed is virtually never used any longer at HF (and rarely at VHF/UHF or even microwave).

So the simple answer to your question is to go ahead and short the A2/GND terminals together and connect the coax to it. For these frequencies, use virtually any kind of coax, and either strip the lower end bare for a direct connection, or attach/solder a couple of wires to an appropriate female connector to match the male plug on the end of the coax.

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

British Numbers: Cherry Ripe Is Alive!

Cherry Ripe is alive and well somewhere in Australia. At least, that's what reliable sources indicate. This "numbers" station hadn't been reported in so long that people were starting to give it up for dead, but some Europeans have started hearing it again.

Cherry Ripe is currently designated as E03a by the European Numbers Information Gathering and Monitoring Association 2000, keeper of the ENIGMA Internet group and the official list of these things. Like the better known Lincolnshire Poacher (E03), the broadcast gets its name from a little folk ditty played (somewhat out of tune) at the start.

Both of these most likely come from the UK foreign intelligence agency variously known as SIS (Secret Intelligence Service) or MI6 (Military Intelligence, Group 6). Both use the same format. A machine-generated female voice in upper sideband (USB) gives messages in 5-figure groups. They start on the hour, sometimes for several hours.

The main difference is that the Poacher is heard daily by just about everyone, while Cherry Ripe has always been something of a catch. E03a was thought to originate on Guam, with a beam towards China, meaning that most of the audience consisted of fish swimming in the Pacific. The power and time schedules guaranteed tough going in North America and Europe.

Then, in the summer of 2008, it seemed to vanish altogether. Well, we can happily report that the transmitter has simply moved to one of two suspected sites Down Under. It's thought that the power is now even lower, and still on a beam towards Asia.

Cherry Ripe would still be a good bet on the US West Coast, except that the current broadcasts begin at 1000, 1100, and 1200 Coordinated Universal Time (UTC). Even if western US listeners are awake, the band probably won't be. Frequencies being reported in Western Europe are 18864, 20474, and 23461 kilohertz (kHz).

Keeping Time

If you haven't set your watch to WWV/WWVH in a few weeks, it's an extra second off. That's right, we had another one of those "leap seconds" inserted into UTC at the end of 2008. To be exact, it was at the internationally specified time of 23:59:59 UTC on December 31st, meaning that 2008 had a 23:59:60 before 2009 began.



The issue with these is that UTC has atomically generated seconds, and these go slowly out of sync with the Earth's position. Leap seconds are called for whenever the difference from UT1, an astronomical time scale, reaches 0.9 seconds. This correction can be positive or negative. Due to the Earth's rotation, all have been positive.

The first leap second was in June of 1972. For around 28 years, an extra second was inserted every year or two. But oddly enough, only two have been needed since the end of 1998. More information is at <http://tf.nist.gov/general/leaps.htm> While another insertion opportunity is provided at the end of June, regulations call for the closest one to be used. 2008's necessity came on abruptly in December, causing the short notice.

As long as we're discussing time signals, we should mention that Central America listeners are reporting a new station. It's a test by the Time Service Division of the Brazilian National Observatory. An official web site at <http://pcdsh01.on.br/> has a link to a "broadcast schedule," but at press time it goes to a blank page.

Horacio Nigro of Uruguay posted at www.goeur.com/listen.php?v=0d90fa5 a recording of a female voice and beeps for Brazilian Legal Time ("Hora Legal Brasileira"). The frequency was originally at 9999 kHz, full amplitude modulation, one kilohertz below WWV/WWVH. Naturally, that created a huge 1-kHz heterodyne, so it has now moved to 10,000 kHz.

No NRD-555?

Most of us know about the Japan Radio Company, Ltd. (JRC) from its tabletop communications receivers. These were always intended for hams and serious short wave enthusiasts who were willing to pay a little more. For the extra money, you always got a solid, professional look and feel.

The NRD-505 was first, in 1977. Its 1979 replacement was the legendary NRD-515, which cemented JRC's reputation. The NRD-525 added internal memories in 1986,

and the highly regarded 535 came in 1991.

In 2001, JRC took the plunge into true digital signal processing (DSP), with the NRD-545. The DSP had some well-documented peculiarities, and people have either loved or hated it. I'm one of the love people. I've done some amazing things with this unit, and the variable bandwidth continues to be absolutely perfect for utilities.



Speculation about a possible NRD-555 picked up in early 2007, when JRC announced plans to discontinue the 545. Given the evolution of DSP technology, everyone expected a real winner.

Two years later, however, JRC appears to have left the amateur market. The only receiver currently shown in the Grove and Universal catalogs is the commercial-grade NRD-630. It looks like a real nice box, as well as it should for a \$12,000 manufacturer's list. Of course, bargain hunters can get it by mail order for only nine grand.

In general, the selection of dedicated tabletop short wave radios is getting thin. Icom, for now, continues with its popular R-75. Drake is out of short wave (again), which is too bad. Yaesu, of "Fox Tango" fame, is now the amateur radio division of Vertex Standard. It has no dedicated short wave receiver.

Options seem to be changing. Tabletops are evolving into ultra-wideband superboxes, typically covering a few kilohertz up to the gigahertz range. As a class, though, they tend toward feature-itis, with prices to match. Also the ones covering cellular phone frequencies are illegal in the US.

Another alternative is to use the general-coverage receiver section in most of the better ham transceivers. It will do the job, and presumably there's an incentive to study and get a license for the transmitter part.

Finally, the real leading edge is going to software-defined radios or remote-controlled black boxes. Both are essentially computer peripherals that receive signals. We'll have to keep up with this exciting area, especially regarding their use as utility receivers. Meanwhile, see you next month.



Japan Radio Co., Ltd.

ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
AM.....	Amplitude Modulation
ASCII.....	American Standard Code for Information Interchange
AWACS.....	Airborne Warning And Control System
CAMSLANT.....	Communications Area Master Station, Atlantic
COTHEN.....	Customs Over-The-Horizon Enforcement Network
Coq-8.....	Coquelet-8, old French teleprinting system
CW.....	On-off keyed "Continuous Wave" Morse telegraphy
DEA.....	US Drug Enforcement Administration
DHFCS.....	UK Defence High Frequency Communications Service
DSC.....	Digital Selective Calling
E10.....	Israeli Intelligence, female phonetic voice
E10a.....	All E10 variants
FAX.....	Radiofacsimile
FEMA.....	US Federal Emergency Management Agency
HFDL.....	High-Frequency Data Link
HF-GCS.....	High-Frequency Global Communication System
MARS.....	Military A l iate Radio System
Meteo.....	Meteorological (weather of ce)
MCW.....	Modulated CW, also Morse on an AM carrier
MFA.....	Ministry of Foreign Affairs
NAVTEX.....	Navigational Telex
NDB.....	Non-Directional Beacon
PACKTOR.....	Packet Teleprinting Over Radio
R3E.....	Single sideband, reduced carrier
RTTY.....	Radio Teletype
SITOR-A.....	Simplex Telex Over Radio, mode A
SITOR-B.....	Simplex Telex Over Radio, mode B
UK.....	United Kingdom
Unid.....	Unidenti ed
US.....	United States
USAF.....	US Air Force
USCG.....	US Coast Guard
V02a.....	Cuban "Atencion" Spanish numbers, 3-msg format
VOLMET.....	Formatted aviation weather broadcasts

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

60.0	MSF-UK National Physics Laboratory, Anthorn, CW standard time signals at 1824. (Ary Boender-Netherlands)
75.0	HBG-Swiss Federal Of ce of Metrology, Prangins, CW time signals at 1840. (Boender-Netherlands)
77.5	DCF77-Deutsche Wetter Dienst (DWD, German Weather Of ce), CW time signals at 1843. (Boender-Netherlands)
129.1	DCF49-European power grid control, Main ingen, Germany, 300-baud ASCII at 1844. (Boender-Netherlands)
135.6	HGA22-European power control, Lahihegy, Hungary, 300-baud ASCII at 1849. (Boender-Netherlands)
139.0	DCF39-European power control, Burg, Germany, 300-baud ASCII at 1845. (Boender-Netherlands)
146.6	Unid-Dutch Datatrak system, Holland, pulses at 1856. (Boender-Netherlands)
147.3	DDH47-DWD, Pinneburg, RTTY weather at 1852. (Boender-Netherlands)
277.0	CHT-NDB, Chiltern, England, MCW at 0947. (Mike-UK)
282.0	LA-NDB, Lyneham, England, MCW at 0953. (Mike-UK)
321.0	ABY-NDB, Albert Bray, France, MCW at 2005. (Boender-Netherlands)
323.0	SMA-NDB, Santa Maria, Azores, MCW at 2133. (Mike-UK)
359.0	LK-NDB, Lidköping, Sweden, MCW at 0204. (Boender-Netherlands)
369.0	RFB-NDB, British Gas/ Rough B Platform, MCW at 1815. (Mike-West Sussex, UK)
372.0	ODR-NDB, Odderoy, Norway, MCW at 0210. (Boender-Netherlands)
373.0	OZN-NDB, Greenland, MCW at 1749. (Mike-UK)
373.0	KEM-Kemi-Tornia, Finland, MCW at 0209. (Boender-Netherlands)
379.0	REK-NDB, Reksten, Norway, MCW at 0214. (Boender-Netherlands)
385.0	NJ-NDB, Leczyca, Poland, MCW at 2235. (Mike-UK)
397.0	NF-Fallköping, Sweden, MCW at 1836. (Boender-Netherlands)
401.0	LA-Laval, France, MCW at 1810. (Boender-Netherlands)

409.0	SG-Satenas, Sweden, MCW at 0221. (Boender-Netherlands)
417.0	AH-Angelholm, Sweden, MCW at 0226. (Boender-Netherlands)
418.0	L-Tallinn, Estonia, MCW at 0223. (Boender-Netherlands)
419.0	MK-Calais, France, MCW at 0224. (Boender-Netherlands)
419.0	RD-Visteras/Hasslo, Sweden, MCW at 0229. (Boender-Netherlands)
429.0	KDR-NDB, Kadra, Libya, MCW at 2058. (Mike-UK)
490.0	WAK-NDB, Vakarel, Bulgaria, MCW at 2028. (Mike-UK)
521.0	BSW-NDB, Baneasa Southwest, Romania, MCW at 1022. (Mike-UK)
1720.0	OKN-NDB, Kandahar, Afghanistan, MCW at 2001. (Mike-UK)
2070.4	WSPAN-German Water Protection Authority, Oldenburg, ALE sounding at 2216. (MPJ-UK)
2187.5	9VNG-Singapore registry cargo vessel <i>CHL Innovator</i> , DSC test with Lyngby Radio, Denmark, at 0713. P3CU8-Cyprus registry "Ro-Ro" ferry <i>Celtic Star</i> , DSC test with Holyhead, UK, at 0716. SZXO-Greek registry tanker <i>Cap Guillaume</i> , DSC test with Canadian Coast Guard Iqaluit at 0719. LNXW-Norwegian registry supply vessel <i>Far Sapphire</i> , DSC test with Aberdeen, UK, at 0721. (Michel Lacroix-France) 006221113-Port Said Radio, Egypt. DSC test at 2140. (PPA-Netherlands)
2216.0	XSS-UK DHFCS net control, Forest Moor, sounding in ALE, also on 2705, 2784, 3226, 3236.5, 4168.5, 4706, 8107, 12230, and 14485.5, at 1847. (MPJ-UK)
2733.0	SDJ-Stockholm Radio, Sweden, weather at 1818. (Lacroix-France)
3236.5	XPK-DHFCS, calling XSS, ALE at 2010. (MPJ-UK)
3255.0	Yekaterinburg-Russian ground station, working unknown ight, at 1706. (Lacroix-France)
3322.0	Unid-Russian Air Defense, 14-character automated CW tracking messages with local time stamps, at 2356. (MPJ-UK)
3801.5	DEK25-German Red Cross, Stuttgart, working portables DEKA2510 and DEKA2520 in German, then RTTY traf c to DEK99, at 2025. (ALF-Germany)
3805.0	20111-Protection Civile Marocaine (Moroccan Civil Protection), working 2418 and 2212, also on 4855, 5792, 5823, and 9200, ALE at 1918. (MPJ-UK)
3850.0	BP26-German Police boat 26 (<i>Eschwege</i>), working LEZSEE, Police Net station, Cuxhaven, in ALE, also sounding on 2070.4, 2151.5, 2503.5, and 5208, at 1948. (MPJ-UK)
4026.9	AAV4HL-US Army MARS, Region 4 net with AAR4BH, AAR4CW, and AAT4TV, at 1215. (Mark Cleary-SC)
4032.9	AAA3VA-US Army MARS, VA, in LSB Region 3 net, at 1220. (Cleary-SC)
4096.0	Unid-CW hobby cluster beacon "Coxie," CA, long drifting dashes at 2211. (Hugh Stegman-CA)
4096.2	Unid-CW cluster beacon "Hexie," CA, dashes at 2210. (Stegman-CA)
4096.6	Unid-CW cluster beacon "Kelsie," CA, long dashes at 2221. (Stegman-CA)
4097.3	Unid-CW cluster beacon "Inyo Whooper," CA, downward drifting dashes at 2210. (Stegman-CA)
4114.0	HNCB-Abnormal Israeli AM identi er only (E10a), repeated from 1850 until 1856. (Mike-UK)
4209.5	XSW-Kaohsiung Radio, Taiwan, SITOR-B NAVTEX at 1830. (PPA-Netherlands)
4239.5	XSS-DHFCS, St. Eval site, ALE sound, also 5268.5 and 5269, at 2201. (MPJ-UK)
4457.0	RHL-Saudi Arabian Air Force "Air Field Status Net," working AAL in ALE, at 2222. (ALF-Germany)
4484.5	EHJR-Russian Air Defense, CW tracking data at 1615. (MPJ-UK)
4518.5	Calorie-French Military, RTTY markers at 2004. (MPJ-UK)
4560.0	TAH-Istanbul Radio, Turkey, SITOR-B maritime weather in Turkish, at 2005. (MPJ-UK)
4721.0	G05036-US Army AH-64D, calling ADW (Andrews AFB) in ALE, at 1912. (Cleary-SC)
4880.0	ULX2-Israli Phonetic Station (E10), R3E identi er only, at 1801. (Mike-UK)
4924.5	R23476-US Army UH-60A, calling TZAVGL, ALE at 2104. (Cleary-SC)
4951.5	Unid-Russian Air Defense, CW tracking data at 1643. (PPA-Netherlands)
5103.0	Unid-Russian FAX chart, took an hour to send at 60 lines per minute, simulcast on 7090 (in the 40 meter band), at 1400. (DL8AAM-Germany)

- 5192.0 VA78CTSCSP-Unknown emergency station, calling SEMOHQ, NY State Emergency Management, ALE at 1951. (Jack Metcalfe-KY)
- 5195.0 DRA5-German Amateur Radio Club propagation beacon, CW marker at 1202. (MPJ-UK)
- 5213.0 RMP-Russian Navy Baltic Sea Fleet headquarters, Kaliningrad, calling RGR77, CW at 0513. (ALF-Germany)
- 5250.0 ABQPRI-US Customs, Albuquerque, NM, ALE sound at 2100. LNT-USCG CAMSLANT Chesapeake, ALE and voice with TBZ and TSC, at 22505. (Metcalfe-KY) [COTHEN players, but not the scanned net. ?? -Hugh]
- 5379.0 TXX1-Spanish police, Madrid, working TWCO2, Oviedo, ALE at 1723. (Lacroix-France)
- 5402.5 Unid-Russian military ash-priority traf c, CW at 1713. (ALF-Germany)
- 5430.0 USDSRAYF-Unknown airline ground station at Tarko-Sale Airport, Russia, RTTY marker at 0359. (ALF-Germany)
- 5708.0 Armor-French Navy Atlantic control, Brest, taking ops-normal from units MJ and LC, in French at 1130. (ALF-Germany)
- 5732.0 J38-USCG MH-60J, calling OPB in ALE, then voice as Juliet 38 with OPBAT (DEA Operations, Bahamas and Tortugas), at 0416. (PPA-Netherlands)
- 5820.0 YHF-Israeli Intelligence Phonetic Station (E10), 5-letter R3E message being jammed, at 1741. (PPA-Netherlands)
- 5830.0 RMW36-Russian military, CW ash-priority traf c, at 1131. (ALF-Germany)
- 5833.5 R23555-US Army UH-60A, calling TZAVGL, ALE at 1257. (Cleary-SC)
- 5875.0 R24533-US Army National Guard UH-60A, calling KBDLNG, CT, ALE at 0107. (Cleary-SC)
- 6240.0 Turkmenabad-Russian aero station, working Mary Aero and Ashkhabad Center, in Russian at 0505. (ALF-Germany)
- 6270.0 ULX1-E10, identifier only, at 1531. (Mike-UK)
- 6500.0 130111-Protection Civile Marocaine, ALE sound at 2004. (MPJ-UK)
- 6507.0 Unid-Russian VOLMET in Russian, at 1410. (Lacroix-France)
- 6522.0 RS002-Macedonian Army, calling CS001, ALE at 1418. (Lacroix-France)
- 6542.0 JRB-Georgian Army, calling F1L, ALE at 1722. F1L, calling R1B, ALE at 1716. (Lacroix-France)
- 6556.0 Dhaka-Bangladesh air traf c control, calling Malaysian 201, at 1803. (Lacroix-France)
- 6679.0 VRK-Hong Kong VOLMET, identifying at 2018. (Lacroix-France)
- 6823.5 Unid-Russian Air Defense, CW tracking strings at 0628. (PPA-Netherlands)
- 6840.0 EZI-E10, phonetic 5-letter group message at 0620. (PPA-Netherlands)
- 6880.0 CS003-Macedonian Army, ALE to RS0013, at 1411. (Lacroix-France)
- 6894.0 CGA3-Venezuelan Navy headquarters, Caracas, lower-sideband ALE with T643, vessel *Los Llanos*, at 0500. (ALF-Germany)
- 6903.0 "5-J-F"-US military, broadcasting a 28-character exercise EAM, at 0417. (Jeff Haverlah-TX)
- 6911.5 R23572-US Army National Guard UH-60A, calling KBD, ALE at 2103. (Cleary-SC)
- 6971.7 Unid-Egyptian Embassy, Spain, SITOR-A messages for Cairo in Arabic, at 1653. (PPA-Netherlands)
- 7000.0 2508-Italian Carabinieri, ALE message "DIAL4" to 2050, at 1155. (ALF-Germany)
- 7361.5 T12-US Army 12th Aviation, calling R24609, ALE at 1819. (Cleary-SC)
- 7670.0 Zef ro-Italian Army deployed to United Nations forces in Lebanon, working Ares 100 and 109, and Zef ro 60 and 65, in Italian at 2229. (ALF-Germany)
- 7816.7 SSE-Egyptian MFA, Cairo, SITOR-B message to DGMG (London), then into SITOR-A, at 1717. (ALF-Germany)
- 7822.0 DDQA-German sailing yacht *Karina*, attempting PACTOR connect to XJN714 (SailMail, Canada), no joy at 2112. (ALF-Germany)
- 8000.0 LESKOVIKU-Albanian police, Leskovik, calling SHEBENIKU, ALE at 1513. (PPA-Netherlands)
- 8023.0 010CDCNHQ-FEMA, also using callsign WGY9030, working USDAHQ1 (US Department of Agriculture, DC), ALE on National Public Health Radio Net, at 18095. (Metcalfe-KY)
- 8156.0 Coral Harbour Base-Royal Bahamas Self-Defence Force, working C6R2066 and C6R2067 in hurricane Paloma, at 1239. (Cleary-SC)
- 8161.5 RIAASF-Rhode Island Army Aviation Support Facility, ALE sound at 20425. (Metcalfe-KY)
- 8171.5 R00293-US Army National Guard CH-47D, calling KBDLNG, ALE at 1550. (Cleary-SC)
- 8251.5 ZRK696-Global Link Network, Melville Radio, South Africa, CW identifier in PACTOR marker, at 2217. (DL8AAM-Germany)
- 8291.0 CAMSLANT-USCG, VA, calling units at 1225. (Cleary-SC)
- 8294.0 Shark 12-USCG cutter on drug interdiction, clear and secure at 1422. (Cleary-SC)
- 8376.5 Unid-Unknown Canadian Coast Guard, SITOR-B weather for north, at 1605. (Lacroix-France)
- 8422.0 VMQ9315-Australian pleasure boat *Orono*, no joy calling OSY (SailMail, Brugge, Belgium), PACTOR at 1957. (ALF-Germany)
- 8467.5 JJC-Tokyo Radio, slow FAX newspaper from Kyodo News Service, at 1615. (PPA-Netherlands)
- 8743.0 HSW-Bangkok Meteo, Thailand, musical identifier at 2022. (Lacroix-France)
- 8816.0 30378-Russian military aircraft, working RJF94, Moscow, and RCB, Kaliningrad with formatted ops data, at 1114 and 1255. (MPJ-UK)
- 8829.0 Turk Hava Yollari-Turkish Airlines Long-Distance Operational Control, Istanbul, working TC-JGU, a 737, in Turkish at 1340. (ALF-Germany)
- 8831.0 N70LJ-"Jet ICU," Lear Jet air ambulance based in FL, working Gander at 1345. (ALF-Germany)
- 9007.0 Canforce 2593-Canadian Forces CC-130, patch via Trenton Military at 1942. (Cleary-SC)
- 9025.0 ADW-USAF, Andrews AFB, MD, calling 450031 (KC-10A, 305th Air Mobility Wing), ALE at 1837. (Cleary-SC)
- 9130.0 EZI-E10, identifier and 113-group message, at 1858. (Mike-UK)
- 9253.0 Manaus-Brazil Navy Amazon Flotilla, working River Hospital Boat *Doutor Montenegro* (PWMN), in Portuguese at 0125. (ALF-Germany)
- 9255.2 NASHOC-Brazil Navy Amazon Flotilla, working River Hospital Boat *Oswaldo Cruz* (PWOW), Portuguese at 0315. (ALF-Germany)
- 10202.0 049CDCT30US-US Centers for Disease Control, working 010CD-CNHQ, ALE at 17405. (Metcalfe-KY)
- 10344.5 XDA-DHFCs, working XSS at 1511. (MPJ-UK)
- 10670.5 STS-US military, working L28, also heard on 5066.5, 7361.5, and 7718.5, ALE at 1955. (Metcalfe-KY)
- 11155.0 RIT-Russian Navy Northern Fleet Headquarters, Severomorsk, working vessel RAL68, went to 12752, CW at 1438. (ALF-Germany)
- 11175.0 Topcat 39-USAF, tried patches to the 38th Recon via Hickam and Andrews HF-GCS, no answers, at 1730. (Allan Stern-FL)
- Tuff 11-USAF B-52H, calling Raymond 06 (Barksdale AFB), then working Tuff 02, at 2018. (Cleary-SC)
- 11220.0 Baseball-US military, data with Lajes Field, Azores, at 2027. (Cleary-SC)
- 11232.0 Sentry 06-USAF E-3 AWACS, patch via Trenton Military to Tinker Meteo for weather, at 1910. (Cleary-SC)
- 11312.0 9V-SKE-Singapore Airlines ight 318, an A380, HFDL position for Bahrain at 1345. (PPA-Netherlands)
- 11387.0 AXQ421-Australian VOLMET, aviation weather at 1501. (PPA-Netherlands)
- 11427.5 TNS-Algerian Embassy, Tunis, ALE sound at 1552. (MPJ-UK)
- 11494.0 Coast Guard 1704-USCG HC-130, patch to Sacramento Air, at 1950. (Cleary-SC)
- 12183.8 GAGOL35-Polish Military, working LUKA31, ALE at 1514. (MPJ-UK)
- 13215.0 200201-Possible UK Royal Air Force C-17A, calling ADW (USAF, Andrews AFB, MD), ALE at 1405. (MPJ-UK)
- 13499.0 1101-Protection Civile Marocaine, ALE sound at 1517. (MPJ-UK)
- 13927.0 AFA6PF-USAF MARS, CA, patching B-52H Doom 91 to Barksdale Ops, to report an engine shutdown, at 1925. Doom 91, patch to ops via MARS AFA2CU, VA, also at 1925. (Stern-FL)
- 14455.0 KHA908-US National Aeronautics and Space Administration, CA, weekly NASA net at 1610. (Metcalfe-KY)
- 14556.0 RIW-Russian Navy, Moscow, CW marker at 1210. (PPA-Netherlands)
- 15016.0 Andrews-USAF HF-GCS, MD, EAM for Premium at 1507. (Cleary-SC)
- 16278.6 7RQ20-Algerian MFA, Algiers, Coq-8 all-embassy circular in French, at 1000. (PPA-Netherlands)
- 16804.5 002371000-Olympia Radio, Greece, working 248487000 (9HFO6, Malta registry bulk carrier *Nota A*) in DSC, went to voice on 12290, at 1156. (PPA-Netherlands)
- 17515.0 Cuban Spanish AM female numbers voice (V02a), 5-figure group message in progress, at 1608. (PPA-Netherlands)
- 18003.0 PLA-USAF, Lajes Field, Azores, ALE sound at 1324. (PPA-Netherlands)
- 18529.4 7RW70-Algerian Embassy, Kuwait, Coq-8 traf c in Arabic for Algiers at 1015. (PPA-Netherlands)
- 18554.5 OEY51-Austrian Army, Vienna, calling OEY71, Austrian contingent in United Nations Disengagement Observer Force, Golan Heights, ALE at 1242. (MPJ-UK)
- 19036.4 7RY20-Algerian Embassy, Ghana, Coq-8 traf c in French for Algiers, at 1038. (PPA-Netherlands)

Marines on Exercise and Ecuador on HF

This month, we take a look at some new signals around the bands.

Exercise Red Reef

Trawling around the 10000 to 11000 kHz area one evening, I came across some weak and watery MIL-188-110A serial tone high speed modem bursts on 10212kHz USB. Unable to decode the traffic because of the poor signal strength, I left the receiver parked on the channel with the decoder set to record any further activity. I also enabled the MIL-188-141A decoder module, just in case the high speed modem was being triggered by ALE.

Returning to the radio in the morning, I was rewarded with a lot of ALE traffic and some very long identifiers. The 110A decoder had also successfully captured some signals using 2400bd and long interleaves, but it was very apparent that everything was being encrypted and there was not even a lead-in or trailing signature from the modems in use to provide a clue. However, the ALE identifiers looked a lot more promising in terms of a lead to the origin of this network.

After some poking around the Internet and some help from our own Larry Van Horn, I was able to confirm that the signals were originating from a regular military exercise called Red Reef being conducted by the US Marines Expeditionary Unit in Saudi Arabia (and likely other locations in the vicinity). Official sources stated:

"Approximately 800 Marines and sailors offloaded from the ships of the *USS Iwo Jima* Strike Group Oct. 20 and 21 to conduct bilateral military training exercises. They joined an advanced party of approximately 150 MEU Marines and sailors from *USS Carter Hall*. While ashore, these Marines will train for coordination, weapons and unit exercises during the next several days".

Here are is the full run-down of the identifiers seen on the net:

BLT	2nd Battalion, 6th Marines (BLT 2/6) Forward
BLTFWDREDFREE	2nd Battalion, 6th Marines (BLT 2/6) Forward
BLTSHIPREDREE	2nd Battalion, 6th Marines (BLT 2/6) Ship
CLB	Combat Logistics Battalion 26 (CLB 26)
CLBFWDFREDFREE	Combat Logistics Battalion 26 (CLB 26) Forward
CLBSHIPREDREE	Combat Logistics Battalion 26 (CLB 26) Ship
CLBKORREDFREE	Unknown
CLD	Unknown
CLP	Unknown
WORKHORREDFREE	Unknown
WORKHSCOREDFREE	Unknown

In the days after first reporting the network to the UDXF list, a number of other frequencies came to light, with listeners from Europe, US and Australia spotting other channels sporting the

same activity:

5335, 5389, 7800, 10212, 11487, 13550 kHz USB

Clearly this is one exercise to look for in the fall of next year when the 2009 exercise should take place.

Mexican PEMEX Network

In May and June 2008, we first pointed out the ALE-equipped network operated by the Mexican national oil and gas company PEMEX and covering many of its Bahia Campeche assets. At the time, despite many channels having been logged and with much ALE activity, little had been heard by way of voice or data traffic triggered by the link establishment signals.

For the first time in many months, I happened on one of the 8 MHz channels and noted a couple of new stations joining the network. These stations use the generic identifiers "STATION1" and "STATION2". However, voice traffic consistently followed link-ups on a number of channels in the PEMEX pool. The same two Mexican guys were heard chatting about a variety of home and work issues after the ALE signals.

Here again are the identifiers and channels that make up this network:

2165, 2182, 2260, 3700, 4078.8, 4487.5, 7450, 8242.9, 8291.1, 9265 and 11095.0 kHz USB

The identifiers, corresponding to terminals, oil platforms, compressor stations and accommodation platforms in the Bahia Campeche, are:

AKALJ1, AKALJ2, AKALL1, AKALN1, AKALN2, ATASTA1, ATASTA2, CARMEN, EXEST1, EXEST2, REBOM1 and REBOM2

Another Ecuadorian Navy Frequency

Tipped off by a report in UDXF from longtime listener Mark Zavatsky concerning an unidentified digital signal on 18201 kHz with accompanying Spanish voices, we cooperated in some concentrated effort on the mystery. Sure enough, on-cue at around 1900 UTC, the two OMs appeared. One signal was much stronger than the other and unfortunately, the weaker of the two was also responsible for starting up the modem.

Mark had never obtained very much of a signal from the modem but was pretty sure that its parameters were 109bd and 400Hz shift approximately. With weak signals myself, I set up every conceivable decoder module on frequency along with the speed/shift measurement tools. Like Mark, a sniff of a signal confirmed the parameters but still not enough for any copy. I had, however, come across a similar signal before

from the Ecuadorian Navy and left my SITOR-B module set up accordingly. Returning to the house in the evening, the screen showed the following text, confirming the Ecuadorians as the origin:

```
zczc
allpp
mensaje de prueba cfme si me copia
nnnnqkqkq
mgeik timvn lhwsp
nnnn
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Note the distinctive "allpp" header and "qkqkq" trailer. Later that evening, there were much longer messages with a daily press summary from the radio station HCJB. Here's the complete list of confirmed frequencies for this organization:

7667.7, 7668.5, 7900, 12323.5, 16416.4, 18201.5, 18450 & 18451.5 kHz (center of data)

Rogue US Coast Guard Transmitter

Before we leave this month's column, a quick story about reporting rouge transmitters: We've often covered the utility of the ITU's monitoring service, but a few weeks ago, I got to do my own piece of rogue transmitter reporting.

I had just been enjoying fax pictures from the Japan Met Agency's JMH transmitter in Tokyo on 13988.5 kHz, when I tuned towards the 20m amateur band. Much to my surprise, there was a fax transmission on 14000 kHz, something I'd not noticed before. I left the fax picture building up as I grabbed a cp of coffee from downstairs and returned, even more to my surprise, to see a picture from NMG, the US Coast Guard's station in New Orleans.

I sent a few emails to various engineering addresses found on the website and received a prompt reply from a Communications Officer at CAMSLANT Chesapeake who told me that they were looking into the problem. A few days later I received a polite reply from the same officer letting me know that one of the scheduled transmitters was poorly set up and left on the computer's default frequency of 14000 kHz and thanking me for the heads-up.

So, if you hear something you think doesn't belong there, report it! Certainly the folks at the US Coast Guard are ready to track and correct any issues.

That's all for this month.

RESOURCES

Ecuadorian Navy - www.armada.mil.ec
US Marine Forecasts - www.weather.gov/om/marine/radiofax.htm

Money Makes the World Go 'Round

This month, we shine the *Programming Spotlight* on a subject area of increasing interest in our modern world. Financial news has dominated the headlines in recent months, with wild fluctuations in stock markets and economic prospects around the world. I will be the first to admit that economics is "Greek to me." I had never failed a course in my life until I got to University. That is until I enrolled in Economics 190, a course I completed spectacularly...poorly. I have no idea why, but I enrolled in the course again the following year and passed it, barely. Despite this, I have often been intrigued by the workings of the economy and sought to understand the whole process.

The past few months have been interesting, to say the least. As I grappled to understand what was going on, I started looking around to see what programming was available on the international bands and the internet to see if I could make some sense of world events.

Let's start in Europe.

England

As one can imagine, the BBC has a wealth of business programs. BBC World Service is home to a number of programs, accessible at www.bbc.co.uk/worldservice/business/

World Business News: Updated 10 times per day, it "provide(s) analysis of the biggest global business issues, as they affect consumers, investors and the environment." www.bbc.co.uk/worldservice/programmes/081028_world_business_news.shtml

Business Daily: "Presenting *Business Daily* is like using a giant paintbrush. We are trying to paint in the colourful backdrop to the biggest business stories in the news – so you get the whole picture of what's happening in the world, and suddenly it all makes sense." It is hosted by Leslie Curwen and Stephen Evans in a very fast paced and entertaining style. www.bbc.co.uk/worldservice/programmes/business_daily.shtml

Business Weekly: Also hosted Leslie Curwen and Stephen Evans. The program is perhaps a bit more in depth, less "newsy." www.bbc.co.uk/worldservice/programmes/businessweekly.shtml

Global Business aka Peter Day's World of Business: Peter Day takes an in depth look at some aspect of the business world or economics. Topics have included whistle blowing within companies, the rise of the internet, the fortunes of various old and new brand names and social entrepreneurs.



www.bbc.co.uk/worldservice/programmes/global_business.shtml

All BBC World Service business shows are audible online; *Global Business* is also available as a downloadable podcast.

There are many fine programs available online via BBC Radio 4. These include:

In Business: Currently off air; however, most episodes seem to be recycled from the World Service program *Global Business*.

www.bbc.co.uk/radio4/news/inbusiness/inbusiness.shtml

Money Box, Money Box Live: Saturdays at 1204 and Mondays at 1502. This is one of the better "money" programs on the air. It looks at such issues as interest rate cuts and how they will affect people, redundancy and losing one's job, repossession and tenants and other "meat and potato" topics.

<http://news.bbc.co.uk/1/hi/programmes/moneybox/>

Alvin Hall's World of Money: This is another program currently not on air, however the previously aired shows are archived at the web page. Its sort of interesting considering it was made before the October market slide. "Where do investors put money during the time of a credit crunch – commodities, wine, art, films or exclusive property?"

"Financial guru Alvin Hall explores the options in this new series, which broadcasts this summer while BBC Radio 4's Money Box programme takes a break."

<http://news.bbc.co.uk/1/hi/programmes/moneybox/7510244.stm>

Inside Money: This is apparently a summer replacement program (in place of *Money Box*). Although the website was last updated in July, most of the program information and topics are still posted and of interest. It's another show presented by Leslie Curwen (she gets around the BBC). In 2007 it was chosen as the Personal Finance Broadcast Programme of the Year. Lots of interesting stuff!

http://news.bbc.co.uk/1/hi/programmes/inside_money/default.stm

Continental Europe

In Continental Europe, there are a couple of excellent financial programs.



Deutsche Welle –

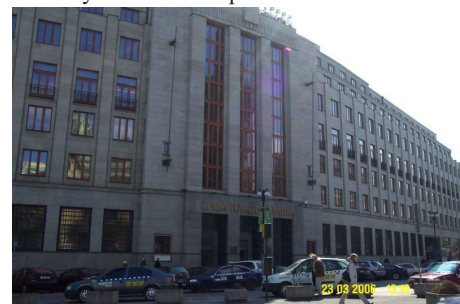
Money Talks: "For business news from Europe's financial powerhouse – tune in to our weekly business and economics magazine *Money Talks*. The half-hour program keeps you up-to-date on the latest European business trends and financial developments with news, reports and interviews. *Money Talks* is broadcast every Wednesday and Thursday, or download the program as a podcast." The program, hosted by Anja Kueppers, "explores the economic strengths and weaknesses of the German economy" and includes the latest business reports from across Europe.

Recent episodes looked at the Irish pork industry and the one area of the Spanish economy that is booming – debt collectors. Plus German and European economic news. Second only to BBC coverage.

www.dw3d.de/dw/article/0,,2580342,00.html

Radio Prague –

Business News: A weekly round-up of business and technology news from the Czech Republic. Hosted by Rosie Johnston, the program looks at such diverse topics as lowered sales figures at Christmas as Czechs tighten their belts, the addition of the Czech Republic to a US list of countries where widespread pirating of intellectual property takes place, the scale back of the Skoda auto company and the difficulties faced by athletes and sports teams in the Czech



Republic as corporate sponsorships dry up and disappear. The program is heard on Radio Prague's Friday broadcast. www.radio.cz/en/current/economic

Bulgaria –

Magazine Economy: The program is heard on UTC Tuesday at 2200 and Wednesdays at 00, 03. Selected items can be read or in some cases heard online at Radio Bulgaria's "Economy" page: www.bnr.bg/RadioBulgaria/Emission_English/Theme_Economy/default.htm

Romania –

Business Club: Business club can be heard on UTC Tuesdays. The most recent program interviewed the president of the Romanian Anti-Counterfeiting Association who talked about counterfeiting and Romanian efforts to combat it. Not terribly informative. If past shows as listed on the website are any indication, it reminds me of the old Soviet reports of massive production and bumper harvests (see Russia below). 2130 UTC on 6115 and 9755 kHz; 2300 UTC on 6115 and 9610; 0100 UTC on 6145 and 9515 kHz and 0400 UTC on 6115 and 9515 kHz.

Voice of Russia –

Newmarket: Sadly this one seems to be gone from the Voice of Russia schedule. In the January 2008 column I looked at Voice of Russia. At the time I noted, "Newmarket looks at the 'rapidly changing Russian economic scene.' Trust me, this program is nothing like the old Soviet reports of tractor production and bumper grain harvests. Russia has gone through an amazing transformation in the past decade or so to a market economy, and this program is a window onto those developments. Judging by this program, Russia is open for business (mostly)." Or maybe not. Still the Voice of Russia website maintains a page of stories on the economy, which can be read at www.ruvr.ru/main.php?lng=eng&e=46&p=

Slovakia –

Radio Slovakia International also maintains a page of economic news, which one can read at: www.rozhlas.sk/inetportal/rsi/core.php?lang=2&page=spravy&katID=5

Around the World

Of course the world economy does not just revolve around North America or Europe. There are several interesting programs from Asia and the Pacific.

China Radio International –

Biz China: Biz China can be heard UTC Tuesdays in the second half hour of CRI English broadcasts. Also *Business News* can be heard within *News and Reports* at the top of the hour. China seems to be the coming economic superpower. This is a most interesting business segment as a window into what is happening there. The global economic slowdown has affected the Chinese economy, and it's interesting to see how the Chinese are handling it.

The CRI website, like the country is big



and bureaucratic. Here you can read reports and listen online to selected parts of Biz China. <http://english.cri.cn/webcast/biz.htm>

CRI also maintains a business news page at: <http://english.cri.cn/business/> Clearly the Chinese are still open for business.

Radio Japan –

Radio Japan's English service isn't what it used to be, even a few short months ago when it was featured in one of my first columns. It's the old story I guess. Cutbacks. Like many broadcasters, Radio Japan seems to be weaning its listeners off of shortwave and onto the internet.

While there is no dedicated business program on Radio Japan, they do offer a web page www.nhk.or.jp/daily/english/politics.html Japan is a major economy of the world, so the page is an interesting window onto developments in Asia.

Korea –

Business Watch: This is a weekly program, heard in the last 15 minutes of RKI transmissions on UTC Tuesdays. It offers economic news, and reports about Korean business and economic prospects.

Australia –

Asia Pacific Business: "Karon Snowdon presents a weekly regional report on what's making news in the business world including economic conditions, regulatory changes, mergers and acquisitions, and the pitfalls and opportunities of doing business in new markets." Recent episodes have included such topics as a proposed Qantas-British Airways merger, when will recession hit in Asia, mining in Papua New Guinea and the slashing of the Australian government surplus. The program can be heard at 0130, 0430, 0730 and 1005 UTC. www.radioaustralia.net.au/programguide/203.htm

Radio New Zealand

RNZ International – Tradewinds: "Our news editor Walter Zweifel compiles this weekly programme featuring Pacific regional business and economic news and features." Tuesdays 0830, 1130, 1330, 1530, 1708, 2115 and Wednesdays 0330 UTC

RNZ National – Business News: The domestic service of Radio New Zealand offers business news five times a day in the six o'clock hour (exact time variable), around 8:20 am, around 12:15 pm and around 17:20 and 18:20. These times correspond to 1700, 1920, 2315, 0420 and 0520 UTC. All times approximate.

www.radionz.co.nz/national/programmes/businessnews

Nigeria –

Business Weekly: The Voice of Nigeria website lists this program at 1715 UTC Sunday and 1015 Saturday. Unfortunately, I was unable to hear it. I'm sure it would have some interesting insight. Presumably not about fabulous business opportunities involving dead dictators, coming to an Inbox near you.

Obviously, one doesn't need to listen to business or financial programs to get information on the world economic slowdown. The headlines scream out at us every day. In fact one writer at the *New York Times* decided to have some fun with the over-the-top reporting on Wall Street's fluctuations. ("The Dow Jones industrial average yesterday pierced the planet's core and reappeared hours later in the city of Xian in the Shaanxi region of central China, where it enjoyed a meal of dumplings and hacked chicken and watched a performance of traditional dances by local school children, on fears that financial news writers, having exhausted every possible metaphor to describe its endless downward trend, would simply stop writing about it." www.nytimes.com/2008/11/23/weekinreview/23jamieson.html)



Nevertheless these programs do fill a niche, often going into more depth than your typical news story. What have I learned so far? I've decided I'm sticking to my tried and true investments: \$4 a week in lottery tickets.

What's a Widget?

While looking around the Deutsche Welle website a while back, I discovered a reference to "Yahoo Widgets." While this program may be old news to you, I had never heard of it. I still haven't decided whether I like it or not, but it has some intriguing features.

Basically, it is a little application that sits on your desktop, to which you can add different features. These update on a regular basis or provide you with a shortcut to various websites and or information. Apropos of this month's column, it has a stock ticker, which updates about every 10 minutes during the trading day.

The Yahoo calendar is useful, too, as is the analog clock. There are also a ton of radio related applications that you can download. I added DW Desktop News. I even got this to play DW TV once, but that may have been a fluke. I also added a widget, which gives me links to French language radio services throughout the world.

There are many widgets, which connect you to one or more radio stations. Some work, some don't. Nonetheless if you like playing with software, you might want to check them out. <http://widgets.yahoo.com>

I'm also told that Google has its own version called gadgets. You can access that software at <http://desktop.google.com>

Will the Obama Administration Reform U.S. International Broadcasting?

The *Media Network* blog reports: The US Public Diplomacy Council has published recommendations to the new Administration and Congress for an urgent reform of America's publicly funded international broadcasting. Recommended steps include:

Immediate restoration of all radio services reduced at the Voice of America in FY 08.

The Broadcasting Board of Governors should be replaced by a new nonpartisan oversight commission that would assume more of an advisory role, leaving daily management in the hands of a commission-appointed professional CEO, the VOA director, and the presidents of Radio Free Europe/Radio Liberty, Radio Free Asia, the Middle East Broadcast Networks (Radio Sawa and Alhurra TV), and Radio-TV Marti to Cuba.

Through direct and public reporting on a regular basis, the commission should be accountable to the legislative and executive branches of the federal government for operations of all these networks, including program content.

A long-range commitment to consolidation and integration of all broadcast entities into a single international network.

Cooperation with private sector public service NGOs. Non-governmental, nonpro fit American media beamed overseas have grown rapidly. US-funded international networks should collaborate with this community and draw strength and support from it.

The CEO should abolish the International Broadcasting Bureau, placing its administrative functions related to VOA within VOA, as is now the case with the other four networks. An office of Engineering and Technical support should continue to provide state-of-the-art distribution channels for all of them.

The CEO should be empowered to coordinate all program and technical operations to eliminate redundancies, cut costs, and straighten out tangled lines of authority.

Maintaining at VOA core services essential to the nation's security: a strengthened central news service and important languages such as Arabic, Chinese, French, Persian, Russian, Spanish, and particularly our own predominant language, English.

VOA Arabic should be restored immediately under this proposal. Neither Radio Sawa, despite its popularity, nor Alhurra TV, despite its wide availability, offers consistent, authoritative news and perspective.

Read the comments of Kim Andrew Elliott on the Council's proposals: www.kimandrewelliott.com/?id=5268 – and Murray Fromson, <http://murrayfromson.com/fromsonfile/tag/voa/>

Meanwhile, Ted Kaufman, adviser to Vice President Biden and charter member of the Broadcasting Board of Governors, was selected by Delaware's governor to take Biden's Senate seat, according to *CQ Politics* via kimandrewelliott.com which also reports:

Ted Kaufman was the primary force behind the shutting down of many VOA radio broadcasts, including programs to Russia, a secretive action taken last summer only days before the Russian army attacked Georgia. Upon learning of Kaufman's appointment to the U.S. Senate, a high-ranking Union leader told FreeMediaOnline.org that "Ted Kaufman was no friend to the employees of the VOA."

ALBANIA As a 70th anniversary gift for R. Tirana, Christian Milling of Radio 700, Euskirchen, Germany, went to Tirana and set up a webstream for R. Tirana. There was not a website to start with, but the direct audio link is

🔊 <http://radiotirana.funkhaus.info:8000> or

🔊 <http://radiotirana.funkhaus.info:8000/listen.pls>

This includes most of the language services also on SW, English except for 1530 UT when there is a scheduling conflict, i.e. Mon-Sat 1945-2000, 2100-2130, UT Tue-Sun 0130-0145, 0245-0300, 0330-0400 and 0430-0500. During hours when there is no programming, the player runs silently (gh)

Additionally, we broadcast the German shows of Radio Tirana as podcast on our platform

🔊 <http://www.radio700.info> (Christian Milling, Radio 700, DX LISTENING DIGEST)

ALGERIA [non] B-08 of RTA, not the Holy Qur'an radio, 500 kW via Issoudun, FRANCE, 162 or 194 degrees to Africa, until Feb 28: 0400-0657 5865; overlapping: 1800-1957 9390; 1900-2157 7455; 2100-2257 5865.

From March 1: 0400-0657 7295, 1800-2057 9390, 1900-2057 9825, 2100-2157 7455, 2100-2257 7295 (DX Mix News, Bulgaria) Yet 5865 was often heard with Qur'an until cut off at 0657 (gh)

ARGENTINA I heard LOL when in Buenos Aires back in August 2008. Schedule on 10000 kHz is only 14-15 UT now, which is also on website with description of the timesignal format.

www.hidro.gov.ar/Observatorio/QueHoraUtiliza.asp

Signal originates directly from premises of the Observatorio Naval at 34 37 19 S, 58 21 18 W. I went there with the radio and heard the last 15 minutes just in front of their gate; strength of the signal and harmonic at 20 MHz made the site quite clear. Not strong at other locations (Eike Bierwirth, CO, DXLD) But see BRAZIL

BHUTAN Received an electronic QSL card via e-mail in 9 days from Bhutan Broadcasting Service, 6035 kHz. Report sent to bbs@bbs.com.bt Website: www.bbs.com.bt V/s: Dorji Wangkhunk (Head of Transmissions) dwangk@bbs.com.bt QSL may be seen at: <http://img58.imageshack.us/my.php?image=bhutanbbsgm2.jpg> (Ivan Zelenyi, UA9JBO, Nizhnevartovsk, Russia, <http://ivanzelenyi.by.ru> via Dario Monferini, playdx yg)

QSL says 100 kW transmitter TSW 2100 D is "DRM" – fortunately they are still running it in AM. But contradictory details

elsewhere: (gh) E-QSL received from different e-mail address sherubt@bbs.com.bt (Sherub Tharchen). Report was sent to: webmasterbbs@bbs.com.bt (Ivan A. Zelenyi, Cumbredx)

Then several others reported e-QSL from Dorji at another different address: dwangk@gmail.com Google the v/s name and you get some interesting hits: Jigme Dorji Wangchuk (1929-July 21, 1972) was king of Bhutan. He ended his country's isolation, introduced modernity but may have inspired namesakes (gh) "Wangchuk" is like "Smith" in the US or "Nguyen" in Vietnam (John Mayson, TX, Cumbredx)

BRAZIL New timesignal station on 10000: Nov 23 at 1807, Observatório Nacional, Rio de Janeiro with time announcements (Marcelo Bedene, DX Clube do Paraná, DXLD) Actually on 9999 (Jorge Freitas, *ibid.*) Time announced every 10 seconds, same as via www.horalegalbrasil.mct.on.br/ (Dario Monferini, playdx yg) In local time of UT -2. Female voice is same as heard under religious programming on R. Relógio Rio de Janeiro, 580 kHz (Rudolf Grimm, SP, *radioescutas* yg)

I spoke with the observatory and they confirm this is a new service testing (Denis Zoabi, *dxclubbr yg*) It's on exactly 9999.0 and in USB plus carrier, a little bit of attenuated LSB. The 1000 Hz pips fall exactly on WWV 10000; they should be on LSB instead (Roland M. Zurmely, *radioescutas* yg)

The time service chief was surprised to hear this is getting out all over South America and even to Europe, as it's only 300 watts via an untuned longwire (Denis Zoabi, *ibid.*) Good that Brazil again has a time signal station, but too bad it's on the almost the same frequency blocking WWV; it's unstable varying 9998.9 to 9999.5. Also suffering from hums including 60/120/180 Hz, inadmissible (Roland M. Zurmely, PY4ZBZ, *ibid.*)

Can separate something on 9999 from WWV on 10000 evenings (Mark Schiefelbein, MO, WORLD OF RADIO) Barely audible on 9999.00 at 2126 with ID (Terry L Krueger, FL, DXLD) No call sign for this has emerged. At 1815 I was hearing pips from somewhere offset a semisecond from WWV 10000. ON could have been distanced from WWV, e.g. 10004. See also ARGENTINA (gh)

At 1700 I am hearing R. Globo on spurious 13695 colliding with 500 kW from France; totally incorrect since their highest authorized frequency is 11805 (Adalberto Marques de Azevedo, Brasil, *radioescutas* yg) Another day on 11920 interfering with other Brazilians on 11915, 11925; where's ANATEL? (Jorge Freitas, Bahia, *dxclubbr yg*)

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; sesqui = one and a half; B-08=fall/winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

Globo also heard very distorted around 11960 at 0700 going from preacher to music. Globo's nominal frequency 11805 has been hijacked by CVC Chile at 0000-0800, so one could hardly blame Globo for moving elsewhere, except this is probably unintentional (gh) Also heard here on 11960 at 0233. ANATEL is preoccupied with implanting powerline communications to deliver the national blow to SW (Jorge Freitas, *dxclubepgr yg*)

BULGARIA In late November, two R. Bulgaria frequencies were totally out of order for a week, unstable and warbling, obvious with BFO but also interfering with their own modulation, 7400 and 15700, heard at many different times of day (gh) One of the 300 kW transmitters at Plovdiv/Padarsko had a technical problem, then resolved. Thanks for the monitoring (Ivo Ivanov, Frequency Manager, Radio Bulgaria)

CANADA After a disappointing reactivation, weak signal, and barely modulated, CFRX 6070, Toronto disappeared again in late November and still unheard as of mid-December (gh) It's just an engineer's plaything (Bob Chandler, Ont., ODXA)

CHU frequency change from 7335 to 7850 was to go into effect January 1, as first notified to us, then on website and announced at :15 seconds past each minute. 7335 had suffered more and more interference from high-power broadcast stations. There was also a leap-second inserted at the end of 2008, so check to see if your clock is one second off now (gh)

R. Canada International, 9610, heard at 1547 with an English lesson for Portuguese-speaking immigrant children, despite being scheduled in Russian at this hour. Have they decided to mix up their nominal language schedule? (gh)

CHAD RNT had been inactive on 4905 for some weeks, on 6165 instead, but in early December back on 4905 (gh) At 1609 with vernacular, hiliife songs, 59 (Zacharias Liangas, Greece, WORLD OF RADIO) Instead of changing frequencies by time of day, seems to stay on one for several weeks at a time; also heard around 0600, probably from *0430 (gh)

CHINA 3303-USB, Zhoushan Maritime Meteorological Radio, with a 12-minute broadcast at *1400-1412*, starting with Kenny G's instrumental music - "Forever in Love", then woman in Chinese, presumably with maritime weather conditions, poor/QRN. After hearing them on Sept 29 and 30, I never heard them again until Dec 5. Current website is <http://220.189.205.5/> where I find no schedule or reference to SW. The reference at www.zshyqx.com/js3.asp (their former website) is: SSB to receive high-powered radio (frequency 3303).

4940, Voice of Strait, heard four Sundays in Nov and Dec with weekly English program *Focus on China* at 1500-1525, presented by two Chinese announcers (Gary and an unnamed woman), news about China the past week with music bridges between items. Some interference from India (Ron Howard, CA, DXLD)

ETHIOPIA UnID Horn-of-Africa-sounding station at 1810 on 6889.3, radio play, phone-ins and music. Mauno Ritola monitored sign-off at 2056. Next day was already on at 1500 and much stronger, sports news, talks. Day after that at 1500, ID as Radio Fana and weak parallel on 6110 under Brother Stair. Wonder if deliberate move or audio being used to jam (Jari Savolainen, Finland, WORLD OF RADIO) New 6889.89 at *0256-0310, ex-7210. IS, Horn-of-Africa style instrumentals at 0259. Threshold signal at sign on, weak but readable at 0407. Much better on // 6110; also on 6889.93 at 2030-2059* (Brian Alexander, PA, DXLD)

UnID on 6090 at 0345-0431, HOA vocals and talk under co-channel AWR Moosbrunn in Farsi, later well atop Melissa Scott. Maybe Oromiya, ex-6030? (Martien Groot, Netherlands, *ibid.*)

[non] 12120, Ginbot 7 Dimts answered my report with some info: "We are a political organisation that is trying to bring about democratic change in Ethiopia. Ginbot 7 is month in Ethiopian calendar in which in 2005 an accidental democratic election happened in which the ruling party was so sure of winning, but were resoundingly defeated; but in the end rigged the votes to stay in power and also suppressed by force any protest to what had happened. Ginbot is the equivalent of May in Western calendar. So Ginbot 7 Dimts means the Voice of May 15th, in honour of the lost opportunity to bring about real change in Ethiopia!" (Anker Petersen, Denmark, DSWCI DX Window)

UnID on 11760, extensive discussions with African language and music, abrupt end at 1659 (Tomás Méndez, Spain, DXLD) Voice of the Oromo Liberation Front, Sunday, Tuesday and Thursday 1600-1700 which added 11760 // 9695 in Oromo, both 100 kW from Wertachtal, Germany (Andy Sennitt, *ibid.*)

GERMANY The German magazine *Focus* reports about a draft of the Deutsche Welle plans for 2010-2013: "Important audiences can be reached only by considerably increasing the amount of English-language offerings." Most cost savings will be done at the expense of German-language services. Thus DW employees already founded an initiative called "Pro Deutsche Welle" that calls these plans "a good-bye to our audiences." The *Focus* report also points out that DW is required by law to promote the German language (Kai Ludwig, Germany, DXLD)

Later: A pdf paper on the DW website gives some details about changes planned for budget year 2009:

- * Reducing SW service of DW German in Europe by canceling half of currently used airtime,
- * Reducing DRM service for Europe, keeping a "best of" program, probably with partners like BBC,
- * Canceling about 30 daily frequency hours via VTC facilities,
- * Cutting back current affairs magazines in German to three editions a day,
- * Reducing radio programs in Greek, Polish, Romanian, Bulgarian, Serbian,

Croatian, Bosnian, Albanian and Macedonian in favor of online offerings.

It also shows program feed routings. Most go by cable from Bonn to uplink in Köln, to Hotbird 8 to various transmitter control centers and on to the transmitters. Except feed to Kigali goes via DW-TV Berlin, to GlobeCast uplink in Paris to Atlantic Bird 4 on C-band. Sites in eastern Russia go via cable to Hong Kong uplink to AsiaSat 3 on C-band; and Sackville goes via Berlin, cable to Atlanta Uplink, to Intelsat 9 (Kai Ludwig, Germany, WORLD OF RADIO)

After trying five years, I just bagged "bit eXpress" from Erlangen, a 100-Watt student radio station on the roof of a university. Somehow at the bottom of the sun cycle it came in (Mark Phillips, G7LTT/N12O, NJ, *drmma yg*) DRM 15886-15906 kHz (gh) Congratulations, Mark, you're only the third person I know of to receive this in North America. Mark Fine was the first about three years ago, then me, now you (Ralph Brandi, *ibid.*)

GUATEMALA Another month went by without the return of R. Verdad, Chiquimula, to 4052.5, so we contacted Dr Edgar Amilcar Madrid, and he replied in late November:

A very bad lightning destroyed the two power modules of our transmitter. It took me a whole month to find a technician who would do the job. Then, it took us another month to get the power transistors from Miami (very difficult to find). But he took two weeks to pick up the transistors from the dealer, and still has not started to install the modules. We have been pleading him to do the job soon, but he has been indifferent. Every time we call him on the telephone, he promises to send the modules within three or four days, but he doesn't do it. So, we are just praying God that He may lead him to start the job. In the meantime, you can tune our signal over Internet, even though I am sure that all DXers prefer shortwave signals. Our Internet address is

☞ www.radioverdad.org (DXLD)

LAOS 7145, LNR Vientiane, 1248-1258 Khmer, 1357 not improved and could not tell if English as scheduled, to 1411 carrier off after about 10 minutes of dead air. Frequency was blocked by Russia in Chinese last year but clear in B08 (Martien Groot, Netherlands, DXLD)

Must certainly be LNR, although I could not hear a positive ID. 7145, from 1307 non-stop talking in French, 1330 into English; poor reception due to strong adjacent stations on both 7140 and 7150, so I bounced between USB and LSB.

Also heard LNR with fair reception on 6130, 1417-1433 with English lesson (along with Laotian translations) for "New Dynamic English, a basic English language course and an introduction to American people and culture." In addition to scheduled Mon & Tue times for English, they often broadcast English again on Fri & Sat (Ron Howard, CA, *ibid.*)

LIBERIA [non] Star Radio via Ascension on new 11875, ex-9525, heard at 0720-0730, English and Vernacular (Kouji Hashimoto, *Japan Premium*) *0700-0730, threshold at sign on, slowly improved to a weak but readable level by 0725 (Brian Alexander, PA, DXLD) 9525 was much better for us (gh)

MÉXICO XEQM, 6105, Mérida, which had been relaying Candela FM, planned to change that to relay XEQM, 810, which is now in the Maya language, between 1100 and 0100, and relay the RASA network station in Mexico City, XENK 620, between 0100 and 1100. Transmission was improved in mid-November, the best heard yet (Julián Santiago Diez de Bonilla, DF, DXLD)

However, by mid-December the signal had weakened and all we could detect was a het from 6104.8v to much stronger 6105 stations in the 1330-1500 period, not sure if in Maya yet during the daytime (gh, OK) Radio Yoo'l I'ik, which translates as the Essence of the Wind. Its slogan is "in t'aan tu yool iik," which translates, in Spanish, to "mi voz a través del viento" or "my voice through the wind." (RASA via Don Jensen, NASWA yg)

MONGOLIA Dave Kernick of Interval Signals Online writes: Mongolia's public broadcaster, Mongolian National Broadcasting (MNB), now provides live audio and video streaming of its main radio and television services from its website at

☞ <http://www.mnb.mn>

The recently revamped website is mainly in Mongolian; 1st and 2nd Program streams are designated in English as FM 106.0 and FM 100.9 respectively. The 2nd Program was noted occasionally identifying in English simply as "Public Radio" (*Media Network* blog)

Voice of Mongolia external service is not yet streaming or available on demand from the site, though their Russian broadcast is still available via the Voice of Russia website <http://ruvr.ru> - link is on the left of Russian home page (David Kernick, UK, WORLD OF RADIO)

I only got the FM 106 embedded player to work. Also heard VOM in Russian relay via Russia at 1349 on 12025 with IS, ID, news (gh, OK) Also from 1334 on // 13600 (Rumen Pankov, Bulgaria, *Australian DX News*)

NEW ZEALAND An early B-08 schedule of RNZI shows reduced powers: 50 kW on AM frequencies, 25 kW on DRM, though both transmitters are rated 100 kW. That could explain why RNZI's signal has generally seemed weaker, saving 50 kW at expense of fringe areas. Also ran across RNZI in French at unscheduled time, UT Monday until 2151 on 17675 (gh)

NIGERIA 6089.8, R. Kaduna, in Hausa, quite distinctive loud and dirty modulation and het to 6090 almost every day from 1700, later dominating over other stations (Thorsten Hallmann, Germany, DXLD)

Later same day, Anguilla missing from 6090, but QRDRM from Germany? So Kaduna with strong but very distorted signal, singing/chanting in Hausa. 2259 anthem and off (gh) Next day, 6089.83, 2102-2112, news and old reports; wildly fluctuating audio levels; fair in USB to avoid DRM hash (Scott Barbour, NH, DXLD)

PAPUA NEW GUINEA 3290, R. Central, 1152 drama, island pop music, 1159 "Voice of Hope" Sunday religious program promo, then of cial ID as "The

Voice of Papua New Guinea, National Radio." Usual bird call/native wind instrument IS played twice, National Radio ID and English news (Dave Valko, PA, *Cumbredx*) Also at 1259 NBC IS, news, apparently in English. Signal much improved at 1328 distinct ID as "NBC National Radio, the Voice of Papua New Guinea" (Mark Schiefelbein, MO, *DXLD*)

PORTUGAL Extremely distorted talk on about 15858 at 1526, RDP Internacional ID, spur of 15690 which had loud and clear signal, and accompanied by another spur 168 kHz lower around 15522, not as strong as upper one. Tuesday 1530 into *Caixa Postal* DX program, rescheduled from Mondays at 1418; repeat of UT Tue 0030 (gh)

ROMANIA RRI's new transmitters at Tiganesti put amazing signals into CNA; at 1816 found English hour for Europe very good on 9640. Besides new 300 kW Continentals which we may safely assume are being run at full rated power unlike most aging SW transmitters, the refurbished antennas must be very efficient and high-gain. These are 8 x 4 curtains, but how much gain in the 307 degree boresight? (gh) English at 1300-1400 on 11970 ex-17745, // 15105 (Tony Rogers, UK, *BDCX-UK* yg) 17745 was sometimes good here, but 11970 blocked by WYFR until 1345; 15105 remains good (gh, OK)

RUSSIA 6075, Radio Rossii Kamchatka, new ID, via Petropavlovsk, heard with local programming at 0110-0200 and 0810-0900. 6085, R. Rossii via Krasnoyarsk, not // other outlets at 0241, so local/regional programming here must be 0210-0300. GTRK Magadan, 7320 // 5935 with WWCR QRM, also has local programming M-F 0210-0300 (Ron Howard, CA, *DXLD*)

[non] Updated Media-Broadcast schedule shows V. of Russia on 7335 originates from Montsinéry, GUIANA FRENCH, only at 0400-0600 [English]. Between 0200 and 0400 [Russian] it's Wertachtal instead, running full 500 kW (Kai Ludwig, Germany, *DXLD*)

SAINT HELENA Radio St. Helena Day 2008, Nov 15, was widely reported on 11092.5-USB between 1930 and 2345, but reception was rather spotty with some locations frustrated, especially in Europe (gh)

RSH received 295 emails and two successful telephone calls during the broadcast. The "new postal route" works, via UK rather than via South Africa to South Atlantic Ocean. Do not expect any RSD 2008 QSL cards to be posted before about July of 2009. The cards will probably be printed in January. It will then take about two months to ship the cards to St. Helena. From about April or May, RSH will be able to actually fill in the details and sign the QSL cards. That may take a month or two. This is the usual procedure and has been the approximate time table of events in the past years.

The RSD 2008 Team at Radio St. Helena sends their thanks to all SWLs everywhere (Gary Walters, Station Manager, Radio St. Helena, and Robert Kipp, *DXLD*)

SIERRA LEONE [non] Cotton Tree News, on new 11875 ex-9525 via Ascension at *0730-0750, English and vernacular, news, IS and ID at 0730 and 0737 (Kouji Hashimoto, *Japan Premium*) Nov 28, talk about local election during entire broadcast. They usually go into vernacular talk around 0740 but they were all in English. Improved to fair level by 0736 (Brian Alexander, PA, *DXLD*) Likewise, LIBERIA, q.v.

SOLOMON ISLANDS SIBC, Honiara, back on 31m, 9541.55. Hasn't been traced on 5020v of late. 0600 BBC *World Today* relay, 0630, "This is the National Service of the Solomon Islands Broadcasting Corporation," followed by string of ads in English, local reggae-avored song, Pidgin announcements, 0700 local news. 1200 re-check, BBC News. Also heard mornings, 2000 with local news. Quite strong here, 29/11 (Craig Seager, NSW, *ARDXC*)

Nominal 9545; QRDRM from UK 9540-9550 after 1000. No luck here, with Cuba 9550 until 0700. SIBC scheduled to switch to 5020 at 0800 but apparently staying on 9541.5 (gh) 9541.53, 0645-0710, pop music and island tunes, to ID at 0700, news, very weak (Guy Atkins, WA, *WORLD OF RADIO*)

SIBC, Guadalcanal, 9541.51, very weak at tune in about 0550, slowly improving. Annoying splash from Cuba on 9550 but no QRM on lower side. Good quality audio even though just above noise floor. 0601 BBC News; 0700, news on the hour in Pidgin and English (Jerry Lenamon, TX, *DXLD*) 9541.54, SIBC (presumed) at 1401 With BBC news, sports, need USB due to 9540 Slovakia (Harold Frodge, MI, *ibid.*) Also lots of reports of it from Europe (gh)

SPAIN REE in Spanish kept changing frequencies in the 2000-2300+ period, 9630, 9690, but usually 9640 (gh)

SUDAN [non] More on the new R. Dabanga [see last month]: Reply in 8 hours by e-mail for report of 0430 broadcast on 7315 via Wertachtal sent to *radiodabanga@yahoo.com* but reply from Leon Willems using *willems@pressnow.nl* who attached background info, including derivation of the name:

Dabanga is a large storage vessel used by Sudanese farmers to preserve food; also a small village near El Fasher (North Darfur); and a well in the Wilayat area in South-Darfur, 528 meters above sea level. In December 2007 over a thousand people were displaced from this area due to insecurity and lack of humanitarian assistance (via Rich D'Angelo, PA, *BC-DX*)

SYRIA Radio Damascus English program is now also on Internet. After a few weeks of the daily German language program online, you can also download the daily recording of the English program. Direct link is:

☛ <http://www.rtv.gov.sy/index.php?m=541>

There will also be a link on homepage of Syrian Radio & Television, www.rtv.gov.sy to the international foreign language services of Radio Damascus (Kris Janssen, Belgium, R. Damascus Listeners Club, *WORLD OF RADIO*)

I am trying often since Oct 30th, to catch Radio Damascus on 9330 or 12085 kHz, but always there are not any signals at 1700-2000 and 2100-2315. Rather their foreign service is canceled maybe? (Rumen Bulgaria, Dec 8, *BC-DX TopNews*) I have also been unable to hear even the 9330 carrier lately. Maybe they finally added no carrier to no modulation. WBCQ remains

on 9330.0 at 1900-2000 (gh)

TIBET 6200, PBS Xizang, heard on several dates in Nov at 1630-1700 with *Holy Tibet* program in English. Plays variety of music, at first hard to understand announcements with mushy audio, but reception improving as time went on. Dealt with social services, medical massages with prices, directions, on three different broadcasts; indigenous music and songs, development thanks to government money, visiting Potala Palace, solar energy, most popular song; *Eyes on Tibet* feature. One date when 6200 was totally covered with QRN, heard it on 4905 // 4920.

Finally heard in Dec with decent audio at sign-off: "Okay, that's all for today's program. Hope you had a good time listening to Holy Tibet program. Thank you for joining me. This is China Tibet Broadcast Company calling Tibet. Holy Tibet will take you to visit the roof of the world. Holy Tibet is the window into the world of Tibet." (Ron Howard, CA, *DXLD*)

TURKEY Voice of Turkey has opened a "new" website (redesigned), www.trt.net.tr (JM Aubier, France, *DXLD*) Inaugurated with great pride, big ceremony in Ankara, as a "news portal to the world" (gh) Turkish Radio and Television Corporation has 30 languages in its new web page www.trt-world.com (Mustafa Cankurt, Turkey, *ibid.*)

Has several live webcast streams, but the one including English is **WORLD**:

☛ www.trt.net.tr/Canli/anasayfa.aspx?kanal=RDVOT

From there you can also link to TRT World which has one-day archives of the English broadcasts at 1330 and 1930. News differs but features are the same except for Tue & Thu due to *Live from Turkey*. Instead of moving anywhere into the 50+ minute file you can only fast-forward it at 5x speed as the sound zips by (gh)

U K [and non] In Kyrgyzstan, State radio has taken BBC programming off the airwaves, days after withdrawing broadcasting rights from U.S.-funded Radio Liberty's Kyrgyz Service (AP via Zacharias Liangas, Dec 7) Earlier on Nov 26 we heard a BBCWS loop announcement on 15180 at 1334 repeating every 29 seconds saying there is "no programming on this channel at present. Details of all our services are at bbcworldservice.com"; it was very nice of BBCWS to go to the trouble and expense to tell me that there was nothing to be heard on 15180, but not really needed. Why pick this channel, instead of countless others to re-up a transmitter and tell us they have nothing to say??

Then we found an updated VTC schedule showing a new BBC Kyrgyz transmission effective Dec 11 at 1300-1330 on 15180 via Rampisham UK. The WRTH A08 update did not show any Kyrgyz from BBC. So apparently that had been off SW, and now BBC is forced to resume using this antiquated medium! BBC Kyrgyz website www.bbc.co.uk/kyrgyz/institutional/frequencies.shtml still said nothing about SW, imagining that it's on FM, and the 1300 broadcast was only 5 minutes long – which could also explain the 'nothing' announcements in my original unid (gh)

U S A The VOA 2009 calendar features individual stories and pictures of international broadcasters and many have fascinating personal stories, said VOA Director Danforth Austin. To request a copy of the 2009 VOA Calendar, please e-mail lettersuser@voanews.com The VOA website also offers a downloadable PDF version www.voanews.com/english/About/2008-11-21-2009-calendar.cfm (VOA press release) Directly: www.voanews.com/english/About/upload/VOA_2009_Calendar_Final_11_08_Layout-1.pdf

In past, VOA has been stingy about sending paper calendars to Americans who are paying the bills. Good B&W portraits of 12 VOA broadcasters, and most of them have faces made for TV, not just radio. (gh) Overwhelmed by the beauty of Miroslava, Aneka and Lina (March, September and November, respectively). Surely I'll marry one of those queens of the mike, if I could (Raúl Saavedra, Costa Rica, *DXLD*)

Surprised to find very strong, loud and clear signal from R. Marti on 15530, Nov 22 at 1447, // 13820 with heavy jamming, and nothing but jamming on 15330 where it's supposed to be. Obviously a punch-up error, but temporarily escaped jammers. At 1456 back on 15330, uncovering a poor victim on 15530, VOA Kurdish via South Africa. Americans vs Americans! (gh) Also by mistake on 6300 instead of 6030 Nov 24 at 2202-2205 (Wendel Craighead, KS, *Cumbredx*) Is there a lysdexic at Greenville? (gh)

WWRB used 3270 only briefly; some military or utility user must have objected. Then besides 3185, WWRB went on 3215 during the four hours before WWCR starts on same, 2200-0200, entirely Brother Stair – and then switching to new 3145. So the 24-hour *Overcomer* service became: 0500-1255 3185, 1300-2200 9385, 2200-0155 3215, 0200-0500 3145, according to Dave Frantz (gh)

WWRB 3145 and 3185 produce leapfrogging spurs on 3105 and 3225, heard at 0345-0425, at very weak to threshold levels. WWCR 3215 puts out matching spurs on 3230.58 and 3199.42 also at threshold (Brian Alexander, PA, *DXLD*) So if you hear such new signals on 90m, check for matches rather than expecting hot DX (gh)

In Dec, WBCQ changed archive **WORLD OF RADIO** replays on 7415 to M-F 2000 (gh)

VANUATU VBTC you heard on 7260 is being run by an amateur radio enthusiast with only 400 Watts. RNZ have been contracted to install two 10 kW HF transmitters. There have been delivery delays, but it is hoped to be on air in Jan or Feb 2009 (Adrian Sainsbury, Technical Manager, Radio New Zealand International, via Bryan Clark, NZ, *DXLD*)

ZANZIBAR RTZ, 11735, good signal in mid-Dec at 1927 with hilife music, but the unstable transmitter warbling is getting worse. TDP shows the 50 kW Dole unit started in 1984y (gh)

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

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

http://mt-shortwave.blogspot.com

0000 UTC on 4795

KYRGYZSTAN: Kyrgyz Radio. News and commentary in Kyrgyz language at tune-in. Audio muf ed and modulation low with hum on the carrier. Signal S5 with S3 interference from ubiquitous China on 4800 kHz (Al Muick, Kabul, Afghanistan).

0004 UTC on 4955

PERU: Radio Cultural Amauta (presumed). Spanish text from announcer to Quecha music. Signal weak but clear (Scott Barbour, Intervale, NH). 4955, 2329-0003. (Joe Wood, Greenback, TN). Additional Peruvians in Spanish: **Radio Vision** 4790, 0445-0455. (Jim Evans, Germantown, TN) **Radio Libertad de Junin** (presumed) 5039.129, 1045; **Radio Manantial** 4991.06, 1046. (Dave Valko, PA/Cumbre DX) **Radio Tawantinsuyo** 6173.81, 1010-1030; **Radio Huanta Dos Mil** 4746.90, 2341-0015; **Radio La Hora** 4857.44, 2346-0008 (Chuck Bolland, Clewiston, FL).

0050 UTC on 4750

BANGLADESH: Bangla Betar (presumed). Vernacular text to string instrumentals. Koran recitations into text at 0039. Signal poor and fading by 0045. (Barbour) 7250, 1227 (Valko)

☞ On-demand audio www.betar.org.bd/

0117 UTC on 4925

BRAZIL: Rádio Educacion Rural. Non-stop Portuguese talk from DJ to station ID at 0121. Promos with echo effects during poor signal. Additional Brazilians in Portuguese: **Rádio Dif de Macapa** 4915, 0335-0340; **Rádio Record** 9504, 2300-2318 (Wood). **Rádio Imaculada Conceição** 4754.9, 0442-0452 (Evans). **Rádio Nove de Julho** 9820, 0743-0800; **Rádio Educação Rural** 4925, 2255-2305 (Arnaldo Slaen, Buenos Aires, Argentina).

0320 UTC on 4780

DJIBOUTI: Radio Djibouti. Arabic text with sweeper interferences observed, best to monitor in USB (Wood). 4780, 1930 (French) broadcasting past scheduled 2000* (Muick).

0500 UTC on 7320

RUSSIA: Radio Rossii via Magadan. Russian programming to slow ballad style Russian music. SINPO 24222, via Yakutsk 7200, 2230-2235 in Russian with interference from Radio Bulgaria (Evans). **Voice of Russia** 6155, 0200-0500 (Ronnie Smith, Hot Springs, AR). **VOR** 7335, 0418; 7125, 1845 Stewart MacKenzie WDX6AA, Huntington Beach, CA) 6175, 1930 // 7290 (Bob Fraser, Belfast, ME). **VOR**

☞ On-demand, streaming audio and podcast www.vor.ru/world.html

0740 UTC on 9660

AUSTRALIA: Radio Australia. Program discussion on the world financial crisis to abrupt sign-off at 0758. English to Pacific on 5995, Pidgin news at 0900. Fair signal with frequent fading, 6020, 1020-1030 Pidgin to English ID at 1030. 6020, 1130-1140. (Bruce Barker, Broomall, PA). English via Shepparton 11880, 1923. (MacKenzie).

☞ Streaming audio and podcast www.abc.net.au/ra/

1030 UTC on 5965

CHINA: China Radio International. Program of Mandarin language comments to news and features. Signal fair and may be relayed via transmitter in the Xi'an area. **China National Radio Five** 7620, 1040-1055 (Chinese) 7260, 1123-1145 (Japanese). **China National Radio 1**, 4460, 1104-1110 (Chinese) (Bolland). **CNR-2 Geermu** (presumed) 3985, 1113-1122 (Mandarin). Very poor signal under amateur radio chatter. **PBS Chengdu** (presumed) 7225, 1128-1142 (Mandarin). **Voice of Puijiang Shanghai** 4950, 1156-1210 (vernacular). **Voice of Zhonghua** Beijing 7620, 1128-1140 (Mandarin) (Barbour). **Firedrake** (music jammer) 7335, 1601 (Ron Howard, Asilomar Beach, CA). **Firedrake** 9355, 1852 (MacKenzie). **Quinghai PBS**, Xining 4750, 2250-2255 (vernacular) (Slaen). **CPBS** 11750, 2305 (Chinese). **CRI** 7110, 1842 (English) 9665, 0350 (Chinese) 7150, 1847 (Chinese) (MacKenzie). **CRI** via Sackville, Canada relays: 6005, 0100-0200; 6190, 0300-0357; 15230, 1400-1459 (MacKenzie).

☞ **CRI** streaming audio <http://english.cri.cn/>

1045 UTC on 9290

LATVIA: Radio SWH relay via Ulbroka, Latvia. *Latvia Today* program of chats, ID and pop music selections. "We've got Latvia...Latvia Today" at 1056. Filler music to 1100.* Poor signal quality (Barbour). Heard 9290, 1413 with DJ format for rock music during extremely weak signal. (Muick)

☞ Streaming audio www.radioswh.lv/swhrock/page.php

1148 UTC on 3260

PAPUA NEW GUINEA: Radio Madang. Tok Pisin/English. Music ballads to announcer at 1200. "NBC" identification to news and

weather. Audible to 1204 sign-off. PNG's **Radio New Ireland** 3905, 1217-1233 (Barbour).

1306 UTC on 15105

ROMANIA: Radio Romania International. Inside Romania program, with recipes for business success. SIO 434 // 17745 (SIO 353) (Fraser). Romanian service 9590, 1925 (MacKenzie). 9610, 2320 music program from Romanian artist (Wood). French service 15150, 1141-1200 (Bolland).

☞ Streaming audio www.rrr.ro/

1320 UTC on 4319 USB

DIEGO GARCIA: Armed Forces Radio Network. CBS Radio Network news segment to sports news and Pentagon Report. Golf Minute, Environment Minute, Consumer Report, and Market Place. Dr. Joy Brown talk show, military PSA to "this is AFN" identification. Signal fair-poor (Howard). **AFN via Key West** 7811USB, 2255 (Wood). Website: <http://myafn.dodmedia.osd.mil/>

1326 UTC on 9450

GERMANY: Polish Radio relay. Program on progressive jazz composer Cristoval. SIO 454. 6015, 1814 special on Poland's *Independence Day* (Fraser). 6000, 1600. Ukrainian program for very good signal (Muick).

☞ Streaming audio and podcast www.polskieradio.pl/zagranica/gb/

1421 UTC on 6035

BHUTAN: BBS. Usual very pleasant lady announcer's call-in talk-show program to easy-listening pop songs. Most of the callers were young girls, did not hear Yunnan interference today (Howard).

☞ Streaming audio www.bbs.com.bt/

1450 UTC on 15650

RWANDA: Deutsche Welle, Kigali relay. Listed as Amharic service. Announcer duo with interview to *Horn of Africa* style music bits. Sign-off announcements amid poor signal (Barbour). 11925, 1905 Arabic, SIO 333 (MacKenzie). 11690, 2100 (Fraser). **FEBA** via Kigali 9550, 1942-2002 (Barbour).

☞ Streaming and on-demand audio, video and podcasting www.dw-world.de/

1558 UTC on 6280

TAIWAN: WYFR/Family Radio Worldwide relay. Nice choral music to English station identification. Interval signal to Hindi service with fair signal despite severe fading (Muick). **Radio Free Asia** relay via Taiwan 7385, 1850 (Chinese). Additional RFA relays // 9355, 9455 (Saipan) 9875 (Palau) 11945 (Northern Marianas) (MacKenzie).

☞ WYFR streaming audio www.familyradio.com/

1635 UTC on 11850

FRANCE: Radio France International. Mission Paris focuses on a computer type quest game. SIO 453 // 17605 SIO 452. **Radio Taiwan International** relay via Issoudun, France 11850, 1700 with ID and news. SIO 452 (Fraser).

☞ RFI streaming and on-demand audio www.accueil.asp

1900 UTC on 15290

CUBA: Radio Nacional Venezuela via Havana, Cuba relay. Spanish featured program on domestic violence to "Radio Nacional Venezuela" identification. SIO 433. Subsequent check on 11670, 2257 (Spanish) with ID. (MacKenzie). 8080, 1145-1158.* (Spanish/English) (Barker).

2100 UTC on 7135

BELARUS: Radio Belarus. Station sign-on with ID into newscast. Strong signal despite excessive band noise. Comments on web site and postal address to music and station ID/phone number (Barker). Russian text at 1838 on 7100 (MacKenzie).

☞ Streaming and on-demand audio www.radiobelarus.tvr.by/eng/

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

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

Tales of Tentative Reporting

A recent email posed an interesting query, reminding me of a topic I haven't covered in some time: "When should I use a tentative reception report?"

The gist of the query was as follows: considering the time, propagation, and partial programming details, Mark felt certain he had logged Radio New Ireland from Papua New Guinea. After reading his partial program details, it left little doubt to me he had nabbed the station.

Although Mark was "almost certain" it was Papua New Guinea, he'd heard no station identification or local time, and the station had abruptly left the air.

I've seen this scenario countless times from hobbyists, as well as experiencing it first hand from my own listening post. As the name implies, a "tentative" report is composed when there is every indication it is the station in question, despite less than desirable program details.

Use this alternative reporting style sparingly, reserving it for those occasions when there may be little hope of future reception within a reasonable length of time. Gather as many details as possible, including the time/frequency, date, parallel frequencies observed, radio conditions, music titles, featured programs, or the announcer's name. When reporting programming details, make it politely clear to the station that, while you are not positively certain, based on your monitoring details you believe it to be the station in question.

If possible, try monitoring the station over several sessions to gather additional details and observations on radio conditions. Occasionally, you have no choice but to use a "tentative report," but don't rely exclusively on the station to confirm what "you think" you heard.

The shortwave hobby is graced by DXers that have used tentative reporting successfully, and each will tell you, "use it, but don't overdo it."

AMATEUR RADIO

Belgium OT0P, 10 meters USB. Full data multicolored card. Received in three months via ARRL bureau (Larry Van Horn N5FPW, NC).

Canada VE3NOO, 30 meters PSK31. Full data card. Received in three months via: Michael Bell, 22 A Richmond Street, RR1, Bath Ontario, Canada K0H 1G0 (Van Horn).

Poland SP1PEA, 12 meters USB. Full data card in two years via ARRL bureau (Van Horn).

United Kingdom G3USA, 20 meters PSK31. Full data photo card via ARRL bureau (Van Horn).

AUSTRIA

Radio Austria International via Moosbrun, 13730 kHz. Full data verification letter. Received in 14 days for an English report. Station address: Argentinistrasse 30A, A-1040 Vienna, Austria (Joe Wood, Greenback, TN).

Streaming audio and podcast <http://oe1.orf.at/service/international>

BHUTAN

Bhutan Broadcasting Service 6035 kHz. Frequency-only Ecard (my original report was included). Reply received in less than six hours after a follow-up email to dwangk@gmail.com from report sent via postal mail six months earlier. Logged BBS in Bao Loc, Lam Dong, Vietnam on three consecutive days, despite Yunnan PBS interference being on frequency. I have heard BBS a very few times in Kansas, but it was barely audible. Perhaps this email will assist others to QSL Bhutan (Wendel Craighead, Prairie Village, KS).

Streaming audio www.bbs.com.bt/

CANADA

Radio Sweden via Sackville, Canada relay 11640 kHz. Full data color Stockholm Harbor scenery card without site notation, plus program schedule. Received in 25 days for reception report to: info@radiosweden.org Postal address: SR International, Oxenstiernsgatan 20, 105 10 Stockholm, Sweden (Elke Bierwind, Boulder, CO/HCDX).

On-demand and podcast www.sr.se/rs/english/

CLANDESTINE

Ginbot 7 Radio 12120 kHz, possibly via Samara, Russia relay. Personal email reply as G7 Org in four days to info@ginbot7.org. No data noted, but did include my reception report, as well as political comments on 2008 US presidential election, and "we are a group that is trying to bring about change to Ethiopia" (Craighead).

ITALY

IRRS 9510 kHz Full data QSL card for 39 Dover Street program. Program slogan, "made off the south coast of England, and broadcast from the south of the Alps." Received in seven days for an email report to reports@nexus.org (Harold Woering, Easthampton, MA).

MALAYSIA

Traxx FM, 7295 kHz. Verification letter from Ms Suhaila MD Zaini, Program Manager, plus program schedules (none for SW) and two FM bumper stickers. Received in two weeks for email and attached audio clip to station DJ Shaz. Station has changed their slogan to *Travel N Music*, which is actively promoting international tourism. Email: mail@traxxfm.net Letter mailed from: Traxx FM, Tingkat 4 (u), Wisma Radio, Peti Surat 11272, 50740 Angkasapuri, Kuala Lumpur, Malaysia. Mailing address: Traxx FM, 2nd Floor Utara, Wisma Radio, P.O. Box 11272, Angkasapuri, Kuala Lumpur, Malaysia (Ron Howard, Asilomar Beach, CA).

Streaming audio www.traxxfm.net/index.php

MEDIUM WAVE

CFZM 740 AM kHz. Full data color station card signed by Brian Smith-QSL Manager, plus AM/FM program schedules. Received in 73 days for a CD report. Station address: 155 Main Street North, #313, Newmarket, Ontario, Canada L3Y 8C2. (Patrick Martin, Seaside, OR)

KBIS 1490 AM kHz *Classic Country*. Prepared QSL card returned as verified by Steve Rhyner. Received in seven days. Station address: P.O. Box 450, Forks, WA 98331 USA (Martin).

KHBX 970 AM kHz. Blue/yellow QSL card *Newsradio 970 KFBX*, plus letter from Scott

Diseth-Chief Engineer, mentioning "they rarely get reports from the lower 48." Station address: KFBX, Clear Channel Radio, 546 9th Avenue, Fairbanks, AK 99701 USA. (Martin) Congrats to Pat, this being his 60th Alaskan station verified and a whopping 3,000 medium wave QSL cards from 95 countries! -GVH

NIGER

La Voix du Sahel, 9705 kHz. Partial data multi-colored card, unsigned. Received in six months. Station address: La Voix du Sahel, O.R.T.N., Boite Postal 361, Niamey, Niger (Craighead).

Archived 2007 on-demand audio www.ortn-niger.com/radio.php Email: ornity@ortn-niger.com



RUSSIA

(Asiatic) Voice of Russia via Petropavlovsk-Kamchatski, 13635 kHz. Partial data 300th Anniversary QSL card of St. Petersburg. Received in 59 days for an English report. Station address: Ms. Elena Osipova, Letters Department World Service English, Voice of Russia, FGU RGRK Golos Rossii, ul. Pyatnitaskaya 25, 115326 Moscow, Russia (Wood).

On-demand and streaming audio, podcast www.vor.ru/world.html

USA

WRNO, Metairie, Louisiana 7505 kHz. Full data studio/card with slogan, *WRNO Worldwide 7505, You'll Rave About the Wave*. Received in one month. QSL address: WRNO Worldwide, P.O. Box 895, Fort Worth, TX 76101 TX (Craighead). Website: www.wrnoworldwide.org.

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) 3, 4, 5 or 6 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

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

Find the station you want to hear.

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

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

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

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

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

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

the Shortwave Guide up-to-date as of one week before print deadline.

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

Target Areas

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

Mode used by all stations in this guide is AM unless otherwise indicated.

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager

gaylevanhorn@monitoringtimes.com

Larry Van Horn, MT Asst. Editor

larryvanhorn@monitoringtimes.com

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D' Angelo/*NASWA Flash Sheet, NASWA Journal*; Rachel Baughn/MT; Alokesh Gupta, New Delhi, India; Ivo Ivanov; Bulgaria; Ricardo Lorenzo, Philippines; Bro. Mark/Overcomer Ministries; Michael Puetz/Media Broadcast; Thomas, Bridgeport, CT; Adrian Sainsbury/RNZ Intl; Daniel Sampson, Ernest Riley/PTSW; Harold Sellers, Canada/*ODXA, DX Listening-In*; Jeff White/WRMI; Jaisakthivel, India; José Miguel Romero, Spain; Evelyn Marcy/WYFR; Tom Taylor, UK; Wolfgang Büeschel, Germany/*WDXC BC DX, Top News; AOKI; Ardic DX Club; Cumbre DX; DX Asia; British DX Club; EIBI; HFCC; Hard-Core DX; DX Mix News; World DX Club/Contact*.

Shortwave Broadcast Bands

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

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated of cially for use by HF broadcasting stations in 2007 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide
- Note 4

**GLENNHAUSER'S
WORLD OF RADIO**
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0000UTC-7PMEST/6PMCST/4PMPST

0000	0005	Canada, R Canada International	9755na
0000	0020	Japan, NHK World Radio Japan	5920eu
		6110na 6120na 6145na 11705na	
		13650as 17810as	
0000	0030	Australia, HCJB Global	15410as 15525as
0000	0030	Egypt, Radio Cairo	6850na
0000	0030	Thailand, Radio Thailand World Svc	9680na
		12095na	
0000	0030	USA, Voice of America	7405as
0000	0045	India, All India Radio	9705as 9950as
		11620as 11645as 13605as	
0000	0045	USA, WYFR/Family Radio Worldwide	6085na
0000	0057	Canada, R Canada International	9800as
0000	0057	China, China Radio International	6020na
		6075as 6180as 7130eu 7350eu	
		9425as 9570as 11650as 11790as	
		11885as	
0000	0057	Germany, Deutsche Welle	7265as
0000	0058	Germany, Deutsche Welle	9785as
0000	0100	Anguilla, Worldwide Univ Network	6090am
0000	0100	Australia, ABC NT Alice Springs	2310do
		4835do	
0000	0100	Australia, ABC NT Katherine	5025do
0000	0100	Australia, ABC NT Tennant Creek	4910do
0000	0100	Australia, Radio Australia	9660as 12080as
		13690as 15240pa 17715as 17750va	
		17775va 17795va	
0000	0100	Bulgaria, Radio Bulgaria	5900na 7400na
0000	0100	Canada, CFRX Toronto ON	6070na
0000	0100	Canada, CFVP Calgary AB	6030na
0000	0100	Canada, CKZN St John's NF	6160na
0000	0100	Canada, CKZU Vancouver BC	6160na
0000	0100	Costa Rica, Worldwide Univ Network	5030va
		6150va 7375va 9725va	
0000	0100	Germany, Deutsche Welle	15595as
0000	0100	Guyana, Voice of Guyana	3291do
0000	0100	Malaysia, RTM/Traxx FM	7295as
0000	0100	DRM New Zealand, Radio NZ International	17675pa
0000	0100	vi New Zealand, Radio NZ International	15720pa
0000	0100	Papua New Guinea, Wantok R. Light	7325va
0000	0100	Spain, Radio Exterior Espana	6055na
0000	0100	UK, BBC World Service	5970as 6195as
		7105as 9410as 9740as 15335as	
		15360as 17615as	
0000	0100	USA, Armed Forces Radio Network	4319usb
		5446usb 5765usb 6350usb 7811usb	
		10320usb 12132usb 13362usb	
0000	0100	USA, WBCQ Monticello ME	5110am
0000	0100	mtffas USA, WBCQ Monticello ME	7415am
0000	0100	USA, WBOH Newport NC	5920am
0000	0100	USA, WEWN Vandiver AL	11520af
0000	0100	USA, WHRA Greenbush ME	5850eu
0000	0100	USA, WHRI Cypress Creek SC	5875na
		7315sa 7385na	
0000	0100	USA, WINB Red Lion PA	9265am
0000	0100	USA, WRMI Miami FL	9955am
0000	0100	USA, WTJC Newport NC	9370na
0000	0100	USA, WWCR Nashville TN	5070na 7465na
		9980na	
0000	0100	USA, WWRB Manchester TN	3185va 5050na
		5745va 6890va	
0000	0100	USA, WYFR/Family Radio Worldwide	5950na
		9505na 11720sa 15440am	
0000	0100	Zambia CVC/ The Voice Africa	4965af
0005	0100	Mon Greece, Voice of Greece	7475eu 9420eu
0030	0045	Sun Germany, Pan American BC	9640as
0030	0058	vi Lithuania, Radio Vilnius	9875na
0030	0100	Australia, Radio Australia	15415as
0030	0100	China, China Radio International	11730as
0030	0100	fas UK, Bible Voice BC	6030as
0030	0100	USA, Voice of America	7405va 9325va
		9620va 9715va 11695va 12005va	
		15185va 15205va 15290va	
0030	0100	Uzbekistan, CVC International	7395as

0100UTC-8PMEST/7PMCST/5PMPST

0100	0104	Canada, R Canada International	9755na
0100	0127	China, China Radio International	11730as
0100	0127	Czech Rep, Radio Prague	6200na 7345na
0100	0127	Slovakia, R Slovakia International	7230na
		9440sa	
0100	0128	Vietnam, Voice of Vietnam	6175na
0100	0130	Australia, Radio Australia	9660as 12080as
		13690as 15240pa 17715as 17750va	

0100	0130	mtwhfa	17775va 17795va
0100	0155		Serbia, Intl Raido Serbia 6190na
0100	0156		Turkey, Voice of Turkey 6165am
			Romania, R Romania International 6145na
			9515na
0100	0157	DRM	China, China Radio International 6080na
0100	0157		China, China Radio International 6005na
			6020na 6075as 7180as 7350 ey
			9410na 9570na 9580as 11650as
			11885as
0100	0158	DRM	New Zealand, Radio NZ International 17675pa
0100	0159		Canada, R Canada International 5840va
			6165as 7255as
0100	0200		Anguilla, Worldwide Univ Network 6090am
0100	0200		Australia, ABC NT Katherine 5025do
0100	0200		Australia, ABC NT Tennant Creek 4910do
0100	0200		Australia, HCJB Global 15410as
0100	0200		Canada, CFRX Toronto ON 6070na
0100	0200		Canada, CFVP Calgary AB 6030na
0100	0200		Canada, CKZN St John's NF 6160na
0100	0200		Canada, CKZU Vancouver BC 6160na
0100	0200		Costa Rica, Worldwide Univ Network 5030va
			6150va 7375va 9725va
0100	0200		Cuba, Radio Havana Cuba 6000na 6140na
0100	0200		Guyana, Voice of Guyana 3291do
0100	0200		Malaysia, RTM/Traxx FM 7295as
0100	0200		New Zealand, Radio NZ International 15720pa
0100	0200		North Korea, Voice of Korea 7140as 9345as
			9730as 11735am 13760am 15180am
0100	0200		Palau, T8WH/World Harvest 15680as
0100	0200	vi	Papua New Guinea, Wantok R. Light 7325va
0100	0200		Sri Lanka, SLBC 6005as 9770as 15745as
0100	0200		Taiwan, R Taiwan International 11875as
0100	0200		UK, BBC World Service 5940va 5970as
			9410as 7105as 7410me 11750as
			11955as 15310as 15335as 15360as
			17615as
0100	0200		Ukraine, R Ukraine International 7440na
			9785sa
0100	0200		USA, Armed Forces Radio Network 4319usb
			5446usb 5765usb 6350usb 7811usb
			10320usb 12133usb 13362usb
0100	0200		USA, Voice of America 7325va 9435va
			11705va
0100	0200		USA, WBCQ Monticello ME 5110am
0100	0200		USA, WBCQ Monticello ME 7415am
0100	0200		USA, WBOH Newport NC 5920am
0100	0200		USA, WEWN Vandiver AL 11520af
0100	0200		USA, WHRA Greenbush ME 5850eu
0100	0200		USA, WHRI Cypress Creek SC 5875na
			7315sa 7385na
0100	0200		USA, WINB Red Lion PA 9265am
0100	0200		USA, WRMI Miami FL 9955am
0100	0200		USA, WTJC Newport NC 9370na
0100	0200		USA, WWCR Nashville TN 5070na 7465na
			9980na
0100	0200		USA, WWRB Manchester TN 3185va 5050na
			5745va 6890va
0100	0200		USA, WYFR/Family Radio Worldwide 5950na
			7455na 9505na 15195as 15440am
0100	0200		Uzbekistan, CVC International 7395as
0100	0200		Zambia CVC/ The Voice Africa 4965af
0105	0200	twhfa	Canada, R Canada International 9755na
0130	0145	twhf	Albania, Radio Tirana 7425na
0130	0200	twhf	Australia, Radio Australia 9660as 12080as
			13690as 15240pa 15415as 17715as
			17750va 17795va
0130	0200		Iran, VOIRI/IRIB 6120na 7160na
0130	0200	twhfa	USA, Voice of America 5960va 7405va

0200UTC-9PMEST/8PMCST/6PMPST

0200	0204	twhfa	Canada, R Canada International 9755na
0200	0227		Czech Rep, Radio Prague 6200na 7345na
0200	0227		Iran, VOIRI/IRIB 6120na 7160na
0200	0230		Serbia, Intl Raido Serbia 6190na
0200	0230		Uzbekistan, CVC International 7395as
0200	0257		China, China Radio International 11770as
			13640as
0200	0258	Sun	Lithuania, Mighty KBC Radio 6110na
0200	0300		Anguilla, Worldwide Univ Network 6090am
0200	0300	mtwhf	Argentina, RAE 15345va
0200	0300		Australia, ABC NT Alice Springs 2310do
			4835do
0200	0300		Australia, ABC NT Katherine 5025do
0200	0300		Australia, ABC NT Tennant Creek 4910do
0200	0300		Australia, HCJB Global 15410as
0200	0300		Australia, Radio Australia 9660as 12080as
			13690as 15240pa 15415as 15515as

0200	0300	17750va	21725va		
0200	0300	Canada, CFRX Toronto ON	6070na		
0200	0300	Canada, CFVP Calgary AB	6030na		
0200	0300	Canada, CKZN St John's NF	6160na		
0200	0300	Canada, CKZU Vancouver BC	6160na		
0200	0300	Costa Rica, Worldwide Univ Network	5030va		
		6150va	7375va	9725va	
0200	0300	Cuba, Radio Havana Cuba	6000na	6140na	
0200	0300	Egypt, Radio Cairo	7535na		
0200	0300	Guyana, Voice of Guyana	3291do		
0200	0300	Indonesia, Voice of Indonesia	9526va	11784al	
0200	0300	Malaysia, RTM/Traxx FM	7295as		
0200	0300	DRM New Zealand, Radio NZ International	17675pa		
0200	0300	New Zealand, Radio NZ International	15720pa		
0200	0300	North Korea, Voice of Korea	13650as	15100as	
0200	0300	Palau, T8WH/World Harvest	15680as		
0200	0300	Papua New Guinea, Wantok R. Light	7325va		
0200	0300	Philippines, Radyo Pilipinas	11880va	15285va	
		17710va			
0200	0300	Russia, Voice of Russia	6100na	6240na	
		7250na	12040na	13735na	
0200	0300	South Korea, KBS World Radio	9580sa		
0200	0300	Sri Lanka, SLBC	6005as	9770as	
0200	0300	Taiwan, R Taiwan International	5950na		
0200	0300	Thailand, Radio Thailand World Svc	15275na		
0200	0300	UK, BBC World Service	6005af	6195me	
		15310as			
0200	0300	USA, Armed Forces Radio Network	4319usb		
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
0200	0300	USA, KJES Vado NM	7555na		
0200	0300	USA, KJES Vado NM	7555na		
0200	0300	smt USA, WBCQ Monticello ME	7415am		
	m	USA, WBCQ Monticello ME	5110am		
0200	0300	USA, WBOH Newport NC	5920am		
0200	0300	USA, WEWN Vandiver AL	11520af		
0200	0300	USA, WHRA Greenbush ME	5850eu		
0200	0300	USA, WHRI Cypress Creek SC	5875na		
		7315sa	7490na		
0200	0300	USA, WINB Red Lion PA	9265am		
0200	0300	USA, WRMI Miami FL	9955am		
0200	0300	USA, WTJC Newport NC	9370na		
0200	0300	USA, WWCR Nashville TN	3215na	5070na	
		5890na			
0200	0300	USA, WWRB Manchester TN	3185va	5050na	
		5745va	6890va		
0200	0300	USA, WYFR/Family Radio Worldwide	5985sa		
		7455na	9505na	9525am	11855sa
0215	0230	Nepal, Radio Nepal	5005as		
0230	0257	China, China Radio International	15435me		
0230	0258	Vietnam, Voice of Vietnam	6175ca		
0230	0300	Malaysia, RTM/Voice of Malaysia	15295pa		
0230	0300	Netherlands, R Netherlands Worldwide	11550as		
0230	0300	South Korea, KBS World Radio	9560na		
0230	0300	Sweden, Radio Sweden	6010na	11550va	
0230	0300	Uzbekistan, CVC International	11650as		
0245	0300	Albania, Radio Tirana	7390na		
0245	0300	Myanmar, Myanma Radio	9731do		
0250	0300	Vatican City, Vatican Radio	6040am	7305na	
0255	0300	Rwanda, Radio Rwanda	6055do		

0300UTC-10PMEST/9PMCST/7PMPST

0300	0315	Croatia, Voice of Croatia	3985eu	7375va	
0300	0320	Vatican City, Vatican Radio	6040am	7305na	
0300	0330	Egypt, Radio Cairo	7535na		
0300	0330	Myanmar, Myanma Radio	9731do		
0300	0330	Philippines, Radyo Pilipinas	11880va	15285va	
		17710va			
0300	0330	Sri Lanka, SLBC	6005as	9770as	15745as
0300	0330	USA, KJES Vado NM	7555na		
0300	0330	Vatican City, Vatican Radio	7360af	9660af	
0300	0357	China, China Radio International	6190na		
		9460as	9690na	11770as	13620as
		15110as	15120as		
0300	0358	Germany, Deutsche Welle	9800as		
0300	0359	Germany, Deutsche Welle	13810as		
0300	0400	Anguilla, Worldwide Univ Network	6090am		
0300	0400	Australia, ABC NT Alice Springs	2310do		
		4835do			
0300	0400	Australia, ABC NT Katherine	5025do		
0300	0400	Australia, ABC NT Tennant Creek	4910do		
0300	0400	Australia, Radio Australia	9660as	12080as	
		13690as	15240pa	15415as	15515as
		17750va	21725va		
0300	0400	Bulgaria, Radio Bulgaria	5900na	7400na	
0300	0400	Canada, CBC NQ SW Service	9625na		
0300	0400	Canada, CFRX Toronto ON	6070na		
0300	0400	Canada, CFVP Calgary AB	6030na		

0300	0400	Canada, CKZN St John's NF	6160na		
0300	0400	Canada, CKZU Vancouver BC	6160na		
0300	0400	Costa Rica, Worldwide Univ Network	5030va		
		6150va	7375va	9725va	
0300	0400	Cuba, Radio Havana Cuba	6000na	6140na	
0300	0400	Guyana, Voice of Guyana	3291do		
0300	0400	Malaysia, RTM/Traxx FM	7295as		
0300	0400	Malaysia, RTM/Voice of Malaysia	6175as		
		9750as	15295as		
0300	0400	New Zealand, Radio NZ International	15720pa		
0300	0400	DRM New Zealand, Radio NZ International	17675pa		
0300	0400	North Korea, Voice of Korea	7140as	9345as	
		9730as			
0300	0400	Oman, Radio Oman	15355as		
0300	0400	Palau, T8WH/World Harvest	15680as		
0300	0400	Papua New Guinea, Wantok R. Light	7325va		
0300	0400	vi Russia, Voice of Russia	6100na	6155na	
		6240na	7340na	7350na	12040na
		13735na			
0300	0400	Rwanda, Radio Rwanda	6055do		
0300	0400	South Africa, Channel Africa	3345af	7390af	
0300	0400	Taiwan, R Taiwan International	5950na		
		15215sa	15320as		
0300	0400	UK, BBC World Service	3255af	6005af	
		6145af	6190af	6195me	6245af
		7255af	7375af	9410me	9750af
		11760va	15310as	17790as	
0300	0400	USA, Armed Forces Radio Network	4319usb		
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
0300	0400	USA, Voice of America	4930af	6080af	
		9885af	15580af		
0300	0400	USA, WBCQ Monticello ME	7415am		
0300	0400	m USA, WBCQ Monticello ME	5110am		
0300	0400	USA, WBCQ Monticello ME	9330am		
0300	0400	USA, WBOH Newport NC	5920am		
0300	0400	USA, WEWN Vandiver AL	9455af		
0300	0400	USA, WHRA Greenbush ME	5850eu		
0300	0400	USA, WHRI Cypress Creek SC	5875na		
		7315sa	7385va		
0300	0400	USA, WRMI Miami FL	9955am		
0300	0400	USA, WTJC Newport NC	9370na		
0300	0400	USA, WWCR Nashville TN	3215na	5070na	
		5890na			
0300	0400	USA, WWRB Manchester TN	3185va	5050na	
		5745va	6890va		
0300	0400	USA, WYFR/Family Radio Worldwide	7455na		
		9505na	9985sa	13615sa	
0300	0400	Uzbekistan, CVC International	11650as		
0300	0400	Zambia CVC/ The Voice Africa	4965af		
0330	0358	Vietnam, Voice of Vietnam	6175ca		
0330	0400	Albania, Radio Tirana	6110na		
0330	0400	Sweden, Radio Sweden	6010na		
0330	0400	UK, BBC World Service	11945af		

0400UTC-11PMEST/10PMCST/8PMPST

0400	0427	Czech Rep, Radio Prague	6080na	6200na	
		7345na			
0400	0430	Australia, Radio Australia	9660as	12080as	
		13690as	15240pa	15515as	17750va
		21725va			
0400	0430	mtwhf France, Radio France International	7315af		
		9805af			
0400	0430	Netherlands, R Netherlands Worldwide	9575af		
0400	0430	Uzbekistan, CVC International	11650as		
0400	0445	USA, WYFR/Family Radio Worldwide	7455na		
		9505na			
0400	0455	Turkey, Voice of Turkey	6020am	7240va	
		7325na			
0400	0456	Romania, R Romania International	6115na		
		9515na	9690as	11895as	
0400	0457	China, China Radio International	6190na		
		9590as	13650as	15120as	17725as
0400	0457	Germany, Deutsche Welle	5945af		
0400	0458	Germany, Deutsche Welle	15600af		
0400	0458	New Zealand, Radio NZ International	15720pa		
0400	0458	DRM New Zealand, Radio NZ International	17675pa		
0400	0459	Germany, Deutsche Welle	5905af		
0400	0500	Anguilla, Worldwide Univ Network	6090am		
0400	0500	Australia, ABC NT Alice Springs	2310do		
		4835do			
0400	0500	Australia, ABC NT Katherine	5025do		
0400	0500	Australia, ABC NT Tennant Creek	4910do		
0400	0500	Canada, CBC NQ SW Service	9625na		
0400	0500	Canada, CFRX Toronto ON	6070na		
0400	0500	Canada, CKZN St John's NF	6160na		
0400	0500	Canada, CKZU Vancouver BC	6160na		
0400	0500	Costa Rica, Worldwide Univ Network	5030va		

0400	0500		6150va	7375va	9725va		
0400	0500		Cuba, Radio Havana Cuba		6000na	6140na	
0400	0500		Germany, Deutsche Welle		6180af		
0400	0500		Guyana, Voice of Guyana		3291do		
0400	0500		Malaysia, RTM/Traxx FM		7295as		
0400	0500		Malaysia, RTM/Voice of Malaysia			6175as	
			9750as	15295as			
0400	0500		Netherlands, R Netherlands Worldwide			12080af	
0400	0500		Palau, T8WH/World Harvest		15680as		
0400	0500	vl	Papua New Guinea, Wantok R. Light		7325va		
0400	0500		Russia, Voice of Russia		6135na	6155na	
			6240na	7335na	7250na	9840na	
			9855na	12030na			
0400	0500	DRM	Russia, Voice of Russia		15735as		
0400	0500	vl	Rwanda, Radio Rwanda		6055do		
0400	0500		South Africa, Channel Africa		7230af		
0400	0500	vl	Uganda, UBC Radio		4976do	5026do	
0400	0500		UK, BBC World Service		3255af	5875eu	
			6005af	6190af	7255af	9410me	
			9650af	11945af	12035af	15310as	
			15360me	17790as			
0400	0500		Ukraine, R Ukraine International			7440eu	
0400	0500		USA, Armed Forces Radio Network			4319usb	
			5446usb	5765usb	6350usb	7811usb	
			10320usb	12133usb	13362usb		
0400	0500		USA, Voice of America		4930af	4960af	
			6080af	9885af	15580af		
0400	0500	stwhfa	USA, WBCQ Monticello ME		7415am		
0400	0500		USA, WBCQ Monticello ME		9330am		
0400	0500		USA, WBOH Newport NC		5920am		
0400	0500		USA, WEWN Vandiver AL		9455af		
0400	0500		USA, WHRA Greenbush ME		5850eu		
0400	0500		USA, WHRI Cypress Creek SC			5875na	
			7315sa	7385va			
0400	0500		USA, WRMI Miami FL		9955am		
0400	0500		USA, WTJC Newport NC		9370na		
0400	0500		USA, WWCR Nashville TN		3215na	5070na	
			5890na				
0400	0500		USA, WWRB Manchester TN		3185va	5050na	
			5745va	6890va			
0400	0500		USA, WYFR/Family Radio Worldwide			5950am	
			6915na	9680na			
0400	0500		Zambia CVC/ The Voice Africa			4965af	
			7160af				
0430	0457		Czech Rep, Radio Prague		9855af		
0430	0500	twhf	Albania, Radio Tirana		6100na		
0430	0500		Australia, Radio Australia		9660as	12080as	
			13690as	15240pa	15415as	15515as	
			17750va	21725va			
0430	0500		Nigeria, Radio Nigeria/Kaduna			6090do	
0430	0500	mtwhf	Swaziland, TWR		3200af		
0430	0500		Uzbekistan, CVC International			155610as	
0459	0500		New Zealand, Radio NZ International			11725pa	
0459	0500	DRM	New Zealand, Radio NZ International			11675pa	

0500UTC-12AMEST/11PMCST/9PMPST

0500	0507	twhf	Canada, CBC NQ SW Service		9625na		
0500	0530		Australia, Radio Australia		9660as	12080as	
			13690as	15160as	15240pa	15515as	
			17750va				
0500	0530	mtwhf	France, Radio France International			9805af	
			11995af				
0500	0530		Germany, Deutsche Welle		6180af	7285af	
			9755af	12045af	15600af		
0500	0530		Japan, NHK World Radio Japan			5975eu	
			6110na	9770af	9875as	15325as	
0500	0530	twhfa	USA, WBCQ Monticello ME		7415am		
0500	0530		Vatican City, Vatican Radio		7360af	9660af	
			11625af				
0500	0557		China, China Radio International			5960na	
			6190na	11880as	15350as	15465as	
			17505va	17540as	17725as	17855as	
0500	0600		Anguilla, Worldwide Univ Network			6090am	
0500	0600		Australia, ABC NT Alice Springs			2310do	
			4835do				
0500	0600		Australia, ABC NT Katherine		5025do		
0500	0600		Australia, ABC NT Tennant Creek			4910do	
0500	0600		Bhutan, Bhutan Broadcasting Svc			6035as	
0500	0600		Canada, CFRX Toronto ON		6070na		
0500	0600		Canada, CKZN St John's NF		6160na		
0500	0600		Canada, CKZU Vancouver BC		6160na		
0500	0600		Costa Rica, Worldwide Univ Network			5030va	
			6150va	7375va	9725va		
0500	0600		Cuba, Radio Havana Cuba		6000na	6060na	
			6140na	9550na	11760am		
0500	0600		Guyana, Voice of Guyana		3291do		
0500	0600		Iran, VOIRI/IRIB		6120na	7160na	
0500	0600		Kuwait, Radio Kuwait			15110me	

0500	0600		Malaysia, RTM/Traxx FM		7295as		
0500	0600		Malaysia, RTM/Voice of Malaysia			6175as	
			9750as	15295as			
0500	0600		New Zealand, Radio NZ International			11725pa	
0500	0600	DRM	New Zealand, Radio NZ International			11675pa	
0500	0600		Nigeria, Radio Nigeria/Kaduna			4770do	
0500	0600		Palau, T8WH/World Harvest		15680as		
0500	0600	vl	Papua New Guinea, Wantok R. Light			7325va	
0500	0600		Russia, Voice of Russia		6135na	7335na	
			7350na	9840na	9855na	12030na	
0500	0600	DRM	Russia, Voice of Russia			15735as	
0500	0600		South Africa, Channel Africa		7230af		
0500	0600		Swaziland, TWR		3200af		
0500	0600		Swaziland, TWR		3200af		
0500	0600	vl	Uganda, UBC Radio			4976do	5026do
0500	0600		UK, BBC World Service		3255af	6005af	
			6190af	7255af	9410me	11765af	
			11945af	12095eu	15310as	15360me	
			15420af	17640af	17790as		
0500	0600	DRM	UK, BBC World Service		6195af		
0500	0600		USA, Armed Forces Radio Network			4319usb	
			5446usb	5765usb	6350usb	7811usb	
			10320usb	12133usb	13362usb		
0500	0600		USA, Voice of America			4930af	6080af
			9885af	15580af			
0500	0600		USA, WBOH Newport NC		5920am		
0500	0600		USA, WEWN Vandiver AL		9455af		
0500	0600		USA, WHRA Greenbush ME		7465va		
0500	0600	mtwhf	USA, WHRI Cypress Creek SC			7315sa	
0500	0600	Sat/Sun	USA, WHRI Cypress Creek SC			11565pa	
0500	0600		USA, WHRI Cypress Creek SC			5875na	
			7385va				
0500	0600		USA, WRMI Miami FL		9955am		
0500	0600		USA, WTJC Newport NC		9370na		
0500	0600		USA, WWCR Nashville TN		3215na	5070na	
			5890na				
0500	0600		USA, WWRB Manchester TN		3185va		
0500	0600		USA, WYFR/Family Radio Worldwide			5950na	
			6915na	9680na			
0500	0600		Uzbekistan, CVC International			15610as	
0500	0600		Zambia CVC/ The Voice Africa			4965af	
			7160af				
0515	0530	vl	Rwanda, Radio Rwanda		6055do		
0530	0600		Australia, Radio Australia		9660as	12080as	
			13690as	15160as	15240pa	15415as	
			15515as	17750va			
0530	0600	mtwhf	Italy, NEXUS-IRRS/EGR		5990va		
0530	0600	vl	Rwanda, Radio Rwanda		6055do		
0530	0600		Thailand, Radio Thailand World Svc			11730va	

0600UTC-1AMEST/12AMCST/10PMPST

0600	0615	Sat/Sun	South Africa, Trans World Radio			11640af	
0600	0629		Germany, Deutsche Welle		5945af	7240af	
0600	0630	Sat/Sun	Australia, Radio Australia		15180as	15290as	
0600	0630		Australia, Radio Australia		9660as	11650as	
			12080as	13690as	15160as	15240pa	
			15515as	17750va			
0600	0630	mtwhf	France, Radio France International			7315af	
			11995af	13680af	15160af		
0600	0630		Germany, Deutsche Welle		12045af		
0600	0630	mtwhf	Italy, NEXUS-IRRS/EGR		5990va		
0600	0630		Nigeria, Radio, National Svc/Abuja			7275do	
0600	0630		Vatican City, Vatican Radio		4005eu	5965eu	
			7250eu				
0600	0645	mtwhf	South Africa, Trans World Radio			11640af	
0600	0657		China, China Radio International			16115na	
			11750af	11880as	13645as	15145me	
			15350as	15465as	17505va	17540as	
			17710as	17770me			
0600	0658		New Zealand, Radio NZ International			11725pa	
0600	0658	DRM	New Zealand, Radio NZ International			11675pa	
0600	0700		Anguilla, Worldwide Univ Network			6090am	
0600	0700		Australia, ABC NT Alice Springs			2310do	
			4835do				
0600	0700		Australia, ABC NT Katherine		5025do		
0600	0700		Australia, ABC NT Tennant Creek			4910do	
0600	0700		Canada, CFRX Toronto ON		6070na		
0600	0700		Canada, CFVP Calgary AB		6030na		
0600	0700		Canada, CKZN St John's NF		6160na		
0600	0700		Canada, CKZU Vancouver BC		6160na		
0600	0700		Costa Rica, Worldwide Univ Network			5030va	
			6150va	7375va	9725va	11870va	
0600	0700		Cuba, Radio Havana Cuba		6000na	6060na	
			6140na	9550na	11760am		
0600	0700		Guyana, Voice of Guyana		3291do		
0600	0700		Kuwait, Radio Kuwait			15110me	
0600	0700		Malaysia, RTM/Traxx FM		7295as		
0600	0700		Malaysia, RTM/Voice of Malaysia			6175as	

		9750as	15295as		
0600	0700	Nigeria, Radio Nigeria/Kaduna	4770do		
0600	0700	Papua New Guinea, Wantok R. Light	7325va		
0600	0700	Russia, Voice of Russia	17665pa	17805pa	
0600	0700	South Africa, Channel Africa	7230af	15255af	
0600	0700	UK, BBC World Service	6005af	6190af	
		7255af	9410af	9860af	11760me
		11765af	15310as	15420af	17640af
		17790as			
0600	0700	UK, BBC World Service	6195af		
0600	0700	Ukraine, R Ukraine International	7440eu		
0600	0700	USA, Armed Forces Radio Network	4319usb		
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
0600	0700	USA, Voice of America	6080af	9885af	
		15580af			
0600	0700	USA, WBOH Newport NC	5920am		
0600	0700	USA, WEWN Vandiver AL	9455af		
0600	0700	USA, WHRA Greenbush ME	7465va		
0600	0700	USA, WHRI Cypress Creek SC		7315sa	
0600	0700	USA, WHRI Cypress Creek SC		11565pa	
0600	0700	USA, WHRI Cypress Creek SC		7385va	
0600	0700	USA, WRMI Miami FL	9955am		
0600	0700	USA, WTJC Newport NC	9370na		
0600	0700	USA, WWCR Nashville TN	3215na	5070na	
		5890na			
0600	0700	USA, WWRB Manchester TN	3185va		
0600	0700	USA, WYFR/Family Radio Worldwide	5745eu		
		6000sa	9680na	11530eu	11580af
0600	0700	Uzbekistan, CVC International		15610as	
0600	0700	Vanuatu, Radio Vanatu	7260do		
0600	0700	Zambia CVC/ The Voice Africa		6065af	
		13590af			
0630	0656	Romania, R Romania International	7180eu		
		9690eu	15135pa	17780pa	
0630	0700	Australia, Radio Australia	9660as	11650as	
		12080as	13690as	15160as	15240pa
		15415as	15515as	17750va	
0630	0700	Vatican City, Vatican Radio	7360af	9660af	
		11625af			
0659	0700	New Zealand, Radio NZ International	9765pa		
0659	0700	New Zealand, Radio NZ International	9870pa		

0700UTC-2AMEST/1AMCST/1PMPST

0700	0703	vi	Croatia, Voice of Croatia	6165eu	9470pa
			11690pa		
0700	0706		UK, BBC World Service	6005af	
0700	0727		Slovakia, R Slovakia International		13715va
			15460va		
0700	0730		France, Radio France International		11725af
			15605af		
0700	0730	mtwhf	UK, BBC World Service	15575as	
0700	0745		USA, WYFR/Family Radio Worldwide	5745eu	
0700	0757		China, China Radio International	11785eu	
			11880as	15125as	15350as
			17540as		17490eu
0700	0800		Anguilla, Worldwide Univ Network	6090am	
0700	0800		Australia, ABC NT Alice Springs	2310do	
			4835do		
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek	4910do	
0700	0800		Australia, Radio Australia	9475as	9660as
			9710as	11650as	11945as
			13630pa	15160va	15240pa
			17750va		
0700	0800		Bhutan, Bhutan Broadcasting Svc	6035as	
0700	0800		Canada, CFRX Toronto ON	6070na	
0700	0800		Canada, CFVP Calgary AB	6030na	
0700	0800		Canada, CKZN St John's NF	6160na	
0700	0800		Canada, CKZU Vancouver BC	6160na	
0700	0800		Costa Rica, Worldwide Univ Network	5030va	
			6150va	7375va	9725va
			11870va		
0700	0800	DRM	Germany, Deutsche Welle	7310eu	
0700	0800		Guyana, Voice of Guyana	3291do	
0700	0800		Kuwait, Radio Kuwait	15110me	
0700	0800	Sat	Latvia, Radio SWH9290eu		
0700	0800		Liberia, Star Radio 9525af		
0700	0800		Malaysia, RTM/Traxx FM	7295as	
0700	0800		Malaysia, RTM/Voice of Malaysia	6175as	
			9750as	15295as	
0700	0800		Myanmar, Myanma Radio	9731do	
0700	0800		New Zealand, Radio NZ International	9765pa	
0700	0800	DRM	New Zealand, Radio NZ International	9870pa	
0700	0800		Nigeria, Radio Nigeria/Kaduna	4770do	
0700	0800		Palau, T8WH/World Harvest	9930as	15680as
0700	0800	vi	Papua New Guinea, R East New Britain	3385do	
0700	0800	vi	Papua New Guinea, Wantok R. Light	7325va	
0700	0800	DRM	Russia, Voice of Russia	11635eu	
0700	0800		Russia, Voice of Russia	17665pa	17805pa

0700	0800	vi	Solomon Islands, SIBC	5020do	
0700	0800	vi	South Africa, Channel Africa	9625af	
0700	0800		UK, BBC World Service	6190af	9860af
			11760me	11765af	15310as
			15420af	17790as	17830af
0700	0800	Sat	UK, Bible Voice BC	5945eu	
0700	0800		USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Vandiver AL	9455af	
0700	0800	mtwhf	USA, WHRI Cypress Creek SC		7315sa
			11565va		
0700	0800	Sat/Sun	USA, WHRI Cypress Creek SC		5875va
			11565va		
0700	0800		USA, WHRI Cypress Creek SC		7385na
0700	0800		USA, WRMI Miami FL	9955am	
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3215na	5070na
			5890na		
0700	0800		USA, WWRB Manchester TN	3185va	
0700	0800		USA, WYFR/Family Radio Worldwide	6915na	
			7455na	9495sa	9715am
			9985af		
0700	0800		Uzbekistan, CVC International		15610as
0700	0800	vi	Vanuatu, Radio Vanatu	7260do	
0700	0800		Zambia CVC/ The Voice Africa		6065af
			13590af		
0730	0745		Vatican City, Vatican Radio	4005eu	5965eu
			7250eu	9645eu	11740eu
			15595eu		
0730	0800		Australia, HCJB Global	11750pa	
0730	0800		Bulgaria, Radio Bulgaria	5900eu	7400eu
0730	0800	Sat/Sun	UK, BBC World Service	15575as	
0745	0800	Sun	Germany, TWR-Europe	6105eu	
0745	0800	Sun	Monaco, TWR-Europe	9800eu	
0750	0800		Saudi Arabia, BSKSA	17785as	

0800UTC-3AMEST/2AMCST/12AMPST

0800	0815	Sat	Guam, KTWR/TWR	11840pa	
0800	0815	Sat	UK, Bible Voice BC	5945eu	
0800	0825		Malaysia, RTM/Voice of Malaysia		6175as
			9750as	15295as	
0800	0827		Czech Rep, Radio Prague	7345eu	9860eu
0800	0830		Australia, ABC NT Katherine	5025do	
0800	0830		Australia, ABC NT Tennant Creek		4910do
0800	0830		Myanmar, Myanma Radio	9731do	
0800	0835	mtwhf	Guam, KTWR/TWR	11840pa	
0800	0845		USA, WYFR/Family Radio Worldwide		9985af
0800	0850	mtwhf	Germany, TWR-Europe	6105eu	
0800	0850	mtwhf	Monaco, TWR-Europe	9800eu	
0800	0857		China, China Radio International		9415as
			11785eu	11880as	15350as
			15625va	17490eu	17540as
0800	0900		Anguilla, Worldwide Univ Network		6090am
0800	0900		Australia, ABC NT Alice Springs		2310do
			4835do		
0800	0900		Australia, HCJB Global	11750pa	
0800	0900		Australia, Radio Australia	5995as	9475as
			9580va	9590as	9710as
			12080as	13630pa	11945pa
0800	0900		Bhutan, Bhutan Broadcasting Svc		6035as
0800	0900		Canada, CFRX Toronto ON	6070na	
0800	0900		Canada, CFVP Calgary AB	6030na	
0800	0900		Canada, CKZN St John's NF	6160na	
0800	0900		Canada, CKZU Vancouver BC	6160na	
0800	0900		Costa Rica, Worldwide Univ Network		5030va
			6150va	7375va	9725va
			11870va		11870va
0800	0900	Sun	Germany, TWR-Europe	6105eu	
0800	0900		Guyana, Voice of Guyana	3291do	
0800	0900		Malaysia, RTM/Traxx FM	7295as	
0800	0900	Sun	Monaco, TWR-Europe	9800eu	
0800	0900		New Zealand, Radio NZ International	9765pa	
0800	0900	DRM	New Zealand, Radio NZ International	9870pa	
0800	0900		Nigeria, Radio Nigeria/Kaduna	4770do	
0800	0900		Nigeria, Voice of Nigeria/Lagos	9690af	
0800	0900		Palau, T8WH/World Harvest	9930as	15680as
0800	0900	vi	Papua New Guinea, R East New Britain	3385do	
0800	0900	vi	Papua New Guinea, Wantok R. Light	7325va	
0800	0900		Russia, Voice of Russia	15195as	17665pa
			17805pa		
0800	0900	vi	Solomon Islands, SIBC	5020do	
0800	0900	vi	South Africa, Channel Africa	9625af	
0800	0900	Sun	South Africa, SA Radio League		7205af
			17860af		
0800	0900		South Korea, KBS World Radio		9570as
0800	0900		UK, BBC World Service	6190af	9860af
			11760me	15310as	15400af
			17790af	17830af	21470af
0800	0900	Sat/Sun	UK, BBC World Service	15575me	

0800	0900	Sun	UK, Bible Voice BC	5945eu	
0800	0900		USA, Armed Forces Radio Network	4319usb	
			5446usb 5765usb 6350usb	7811usb	
			10320usb 12133usb 13362usb		
0800	0900		USA, KNLS Anchor Point AK	9615as	
0800	0900		USA, WBOH Newport NC	5920am	
0800	0900		USA, WEWN Vandiver AL	9455af	
0800	0900	mtwhf	USA, WHRI Cypress Creek SC	7315sa	
			11565va		
0800	0900	Sat/Sun	USA, WHRI Cypress Creek SC	5875va	
			11565pa		
0800	0900		USA, WHRI Cypress Creek SC	7385na	
0800	0900		USA, WRMI Miami FL	9955am	
0800	0900		USA, WTJC Newport NC	9370na	
0800	0900		USA, WWCR Nashville TN	3215na	5070na
			5890na		
0800	0900		USA, WWRB Manchester TN	3185va	
0800	0900		USA, WYFR/Family Radio Worldwide	5950am	
			6915na 7455na		
0800	0900		Uzbekistan, CVC International	15610as	
0800	0900	vl	Vanuatu, Radio Vanatu	7260do	
0800	0900		Zambia CVC/ The Voice Africa	6065af	
			13590af		
0805	0900	thf	Guam, KTW/TWR	15170as	
0815	0850	Sat	Germany, TWR-Europe	6105eu	
0815	0850	Sat	Monaco, TWR-Europe	9800eu	
0815	0900	f	UK, Bible Voice BC	5945eu	
0820	0900	w	Guam, KTW/TWR	15170as	
0830	0900		Australia, ABC NT Katherine	2485do	
0830	0900		Australia, ABC NT Tennant Creek	2325do	
0835	0900	m	Guam, KTW/TWR	15170as	

0900UTC-4AMEST/3AMCST/1AMPST

0900	0915	Sun	UK, Bible Voice BC	5945eu	
0900	0920	Sun	Germany, TWR-Europe	6105eu	
0900	0920	Sun	Monaco, TWR-Europe	9800eu	
0900	0930		Australia, HCJB Global	11750pa	
0900	0930		Japan, NHK World Radio Japan	9625va	
			9825pa 11815as 15590as	17810as	
0900	0930		Uzbekistan, CVC International	15610as	
0900	0957		China, China Radio International	9415as	
			15210pa 15270eu 15350as	17490eu	
			17570eu 17690pa 17750as		
0900	0958		Lithuania, Radio Vilnius	9710eu	
0900	1000		Anguilla, Worldwide Univ Network	6090am	
0900	1000		Australia, ABC NT Alice Springs	2310do	
			4835do		
0900	1000		Australia, ABC NT Katherine	2485do	
0900	1000		Australia, ABC NT Tennant Creek	2325do	
0900	1000		Australia, Radio Australia	9475va	9580va
			9590va 11945as 12080as		
0900	1000		Bhutan, Bhutan Broadcasting Svc	6035as	
0900	1000		Canada, CFRX Toronto ON	6070na	
0900	1000		Canada, CFVP Calgary AB	6030na	
0900	1000		Canada, CKZN St John's NF	6160na	
0900	1000		Canada, CKZU Vancouver BC	6160na	
0900	1000		Costa Rica, Worldwide Univ Network	5030va	
			6150va 7375va 9725va	11870va	
			13750va		
0900	1000		Germany, Deutsche Welle	17710as	21840as
0900	1000		Guyana, Voice of Guyana	3291do	
0900	1000		Malaysia, RTM/Traxx FM	7295as	
0900	1000		Netherlands, R Netherlands Worldwide	9795as	
0900	1000		New Zealand, Radio NZ International	9765pa	
0900	1000	DRM	New Zealand, Radio NZ International	9870pa	
0900	1000		Nigeria, Radio Nigeria/Kaduna	4770do	
0900	1000		Nigeria, Voice of Nigeria/Lagos	9690af	
0900	1000		Palau, T8WH/World Harvest	9930as	15680as
0900	1000	vl	Papua New Guinea, R East New Britain	3385do	
0900	1000	vl	Papua New Guinea, Wantok R. Light	7325va	
0900	1000		Russia, Voice of Russia	15195as	17665pa
0900	1000	DRM	Russia, Voice of Russia	13670eu	
0900	1000		Saudi Arabia, BSKSA	15250af	
0900	1000	vl	Solomon Islands, SIBC	5020do	
0900	1000	vl	South Africa, Channel Africa	9625af	
0900	1000		UK, BBC World Service	6190af	6195as
			9740as 9860af 11760me	15310as	
			15400af 15575me 17640af	17760as	
			17790as 17830af 21470af		
0900	1000		USA, Armed Forces Radio Network	4319usb	
			5446usb 5765usb 6350usb	7811usb	
			10320usb 12133usb 13362usb		
0900	1000		USA, WBOH Newport NC	5920am	
0900	1000		USA, WEWN Vandiver AL	9390as	
0900	1000	mtwhfa	USA, WHRI Cypress Creek SC	7315sa	
0900	1000	Sun	USA, WHRI Cypress Creek SC	11565pa	
0900	1000		USA, WHRI Cypress Creek SC	7385na	
			9865sa		

0900	1000		USA, WRMI Miami FL	9955am	
0900	1000		USA, WTJC Newport NC	9370na	
0900	1000		USA, WWCR Nashville TN	5070na	5890na
			9985na		
0900	1000		USA, WWRB Manchester TN	3185va	
0900	1000		USA, WYFR/Family Radio Worldwide	5950am	
			6915na 7455na 9450as	9465as	
0900	1000	vl	Vanuatu, Radio Vanatu	7260do	
0900	1000		Zambia CVC/ The Voice Africa	6065af	
			13590af		
0930	1000		Australia, CVC International	15555as	

1000UTC-5AMEST/4AMCST/2AMPST

1000	1027		Czech Rep, Radio Prague	9955am	15710af
			21745af		
1000	1030		Vietnam, Voice of Vietnam	9840as	12020as
1000	1057		China, China Radio International	5995as	
			7135as 7215as 9415as	13590as	
			13720as 15190as 15210pa	15270eu	
			15350as 17490eu 17570eu	17690pa	
			17750as		
1000	1058		New Zealand, Radio NZ International	9765pa	
1000	1058	DRM	New Zealand, Radio NZ International	9870pa	
1000	1100		Anguilla, Worldwide Univ Network	11775am	
1000	1100		Australia, ABC NT Alice Springs	2310do	
			4835do		
1000	1100		Australia, ABC NT Katherine	2485do	
1000	1100		Australia, ABC NT Tennant Creek	2325do	
1000	1100		Australia, CVC International	15555as	
1000	1100		Australia, Radio Australia	9475va	9580va
			9590va 11945as 12080as		
1000	1100		Canada, CFRX Toronto ON	6070na	
1000	1100		Canada, CFVP Calgary AB	6030na	
1000	1100		Canada, CKZN St John's NF	6160na	
1000	1100		Canada, CKZU Vancouver BC	6160na	
1000	1100		Costa Rica, Worldwide Univ Network	5030va	
			6150va 7375va 9725va	11870va	
			13750va		
1000	1100		Guyana, Voice of Guyana	3291do	
1000	1100		India, All India Radio	7270as	13710pa
			15235as 15260as 17510as	17800as	
			17895pa		
1000	1100		Indonesia, Voice of Indonesia	9526va	11784al
1000	1100		Malaysia, RTM/Traxx FM	7295as	
1000	1100		Netherlands, R Netherlands Worldwide	6040as	
			9720as 12065as		
1000	1100		Nigeria, Radio Nigeria/Kaduna	4770do	
1000	1100		Nigeria, Voice of Nigeria/Lagos	9690af	
1000	1100		North Korea, Voice of Korea	6185as	6285am
			9335am 9850as		
1000	1100		Palau, T8WH/World Harvest	9930as	12130as
1000	1100	vl	Papua New Guinea, R East New Britain	3385do	
1000	1100	vl	Papua New Guinea, Wantok R. Light	7325va	
1000	1100		Saudi Arabia, BSKSA	15250af	
1000	1100	vl	Solomon Islands, SIBC	5020do	
1000	1100	vl	South Africa, Channel Africa	9625af	
1000	1100	Sat/Sun	UK, BBC World Service	15400af	17830af
1000	1100		UK, BBC World Service	6190af	6195as
			9605as 9740as 9860af	11760me	
			15310af 15575as 17640af	17790as	
			21470af		
1000	1100		Ukraine, R Ukraine International	9950eu	
			15635pa		
1000	1100		USA, Armed Forces Radio Network	4319usb	
			5446usb 5765usb 6350usb	7811usb	
			10320usb 12133usb 13362usb		
1000	1100		USA, KNLS Anchor Point AK	6150as	
1000	1100		USA, WBOH Newport NC	5920am	
1000	1100		USA, WEWN Vandiver AL	9390as	
1000	1100	Sun	USA, WHRI Cypress Creek SC	11565pa	
1000	1100	mtwhfa	USA, WHRI Cypress Creek SC	7315sa	
1000	1100		USA, WHRI Cypress Creek SC	7385na	
			9865sa		
1000	1100		USA, WINB Red Lion PA	9265am	
1000	1100		USA, WRMI Miami FL	9955am	
1000	1100		USA, WTJC Newport NC	9370na	
1000	1100		USA, WWCR Nashville TN	5070na	5890na
			15825na		
1000	1100		USA, WWRB Manchester TN	3185va	
1000	1100		USA, WYFR/Family Radio Worldwide	5950am	
			6890na 6915na 7455na	9450as	
			9465as 9900 skd0109		
1000	1100		Zambia CVC/ The Voice Africa	6065af	
			13590af		
1015	1045	Sun	UK, Bible Voice BC	5985as	
1030	1100		Australia, HCJB Global	15400as	
1030	1100		Iran, VOIR/IRIB	15460as	17660as
1030	1100	Sun	Italy, NEXUS-IRRS/EGR	9510va	

1030 1100 Mongolia, Voice of Mongolia 12085as
 1059 1100 New Zealand, Radio NZ International 13660pa

1100UTC-6AMEST/5AMCST/3AMPST

1100 1103 mtwhf Croatia, Voice of Croatia 9830eu
 1100 1127 Iran, VOIR/IRIB 15460as 17660as
 1100 1130 Australia, CVC International 15555as
 1100 1130 UK, BBC World Service 15400af
 1100 1130 Vietnam, Voice of Vietnam 7285as
 1100 1145 USA, WYFR/Family Radio Worldwide 5950am
 6000sa
 1100 1157 China, China Radio International 5960na
 5995as 6060as 9570as 11650as
 11795as 13645as 13665eu 17490eu
 1100 1158 DRM New Zealand, Radio NZ International 9870pa
 1100 1200 Anguilla, Worldwide Univ Network 11775am
 1100 1200 Australia, ABC NT Alice Springs 2310do
 4835do
 1100 1200 Australia, ABC NT Katherine 2485do
 1100 1200 Australia, ABC NT Tennant Creek 2325do
 1100 1200 Australia, HCJB Global 15400as
 1100 1200 DRM Australia, Radio Australia 5995pa
 Australia, Radio Australia 6020va 9475as
 9560as 9580va 9590va 11945as
 1100 1200 Sat/Sun Canada, CBC NQ SW Service 9625na
 1100 1200 Canada, CFRX Toronto ON 6070na
 1100 1200 Canada, CFVP Calgary AB 6030na
 1100 1200 Canada, CKZN St John's NF 6160na
 1100 1200 Canada, CKZU Vancouver BC 6160na
 1100 1200 Costa Rica, Worldwide Univ Network 5030va
 6150va 7375va 9725va 11870va
 13750va
 1100 1200 Sun Italy, NEXUS-IRRS/EGR 9510va
 1100 1200 Malaysia, RTM/Traxx FM 7295as
 1100 1200 New Zealand, Radio NZ International 13660pa
 1100 1200 Nigeria, Radio Nigeria/Kaduna 4770do
 Nigeria, Voice of Nigeria/Lagos 9690af
 1100 1200 Palau, T8WH/World Harvest 9930as 12130as
 1100 1200 vl Papua New Guinea, R East New Britain 3385do
 1100 1200 vl Papua New Guinea, Wantok R. Light 7325va
 1100 1200 Saudi Arabia, BSKSA 15250af
 1100 1200 vl Solomon Islands, SIBC 5020do 9545al
 1100 1200 vl South Africa, Channel Africa 9625af
 1100 1200 Taiwan, R Taiwan International 7445as
 11715as
 1100 1200 UK, BBC World Service 6190af 6195as
 9605as 9740as 9860af 11895as
 15310as 15575me 17640af 17790as
 17830af 21470af
 1100 1200 Ukraine, R Ukraine International 15635pa
 1100 1200 USA, Armed Forces Radio Network 4319usb
 5446usb 5765usb 6350usb 7811usb
 10320usb 12133usb 13362usb
 1100 1200 USA, WBOH Newport NC 5920am
 1100 1200 USA, WEWN Vandiver AL 9390as
 1100 1200 mtwhfa USA, WHRI Cypress Creek SC 7315sa
 1100 1200 USA, WHRI Cypress Creek SC 5875na
 7385na
 1100 1200 USA, WINB Red Lion PA 9265am
 1100 1200 USA, WRMI Miami FL 9955am
 1100 1200 USA, WTJC Newport NC 9370na
 1100 1200 USA, WWCR Nashville TN 7490na 9980na
 15825na
 1100 1200 USA, WWRB Manchester TN 3185va
 1100 1200 USA, WYFR/Family Radio Worldwide 6890na
 7455na 11725sa 11830sa
 1100 1200 Zambia CVC/ The Voice Africa 6065af
 13590af
 1105 1200 Sun Greece, Voice of Greece 9420eu 15605eu
 1115 1130 mwf UK, Bible Voice BC 5950as
 1115 1145 st UK, Bible Voice BC 5950as
 1115 1200 Sat UK, Bible Voice BC 5950as
 1130 1157 Czech Rep, Radio Prague 11640eu 17545af
 1130 1200 Australia, CVC International 13635as
 1130 1200 Guam, KSDA/AWR 15260as
 1130 1200 Vietnam, Voice of Vietnam 9840as 12020as
 1145 1200 UK, Bible Voice BC 5950as

1200UTC-7AMEST/6AMCST/4AMPST

1200 1230 France, Radio France International 21620af
 1200 1230 Japan, NHK World Radio Japan 6120na
 9625va 9695as 17585eu
 1200 1230 Saudi Arabia, BSKSA 15250af
 1200 1245 USA, WYFR/Family Radio Worldwide 6890na
 1200 1257 China, China Radio International 5955as
 7250as 9460as 9600as 9645as

9730as 9760pa 11650as 11690as
 11760pa 11980as 12080as 13665eu
 13790eu 17490eu
 1200 1258 New Zealand, Radio NZ International 13660pa
 1200 1300 Anguilla, Worldwide Univ Network 11775am
 1200 1300 Australia, ABC NT Alice Springs 2310do
 4835do
 1200 1300 Australia, ABC NT Katherine 2485do
 1200 1300 Australia, ABC NT Tennant Creek 2325do
 1200 1300 Australia, CVC International 13635as
 1200 1300 Australia, HCJB Global 15400as 15540as
 1200 1300 Australia, Radio Australia 6020va 9475as
 9560pa 9580va 9590va 11945as
 1200 1300 DRM Australia, Radio Australia 5995va 12080pa
 1200 1300 Sat/Sun Canada, CBC NQ SW Service 9625na
 1200 1300 Canada, CFRX Toronto ON 6070na
 1200 1300 Canada, CFVP Calgary AB 6030na
 1200 1300 Canada, CKZN St John's NF 6160na
 1200 1300 Canada, CKZU Vancouver BC 6160na
 1200 1300 Costa Rica, Worldwide Univ Network 9725va
 11870va 13750va
 1200 1300 Sun Italy, NEXUS-IRRS/EGR 9510va
 1200 1300 Sun Latvia, Radio SWH9290eu
 1200 1300 Malaysia, RTM/Traxx FM 7295as
 1200 1300 Nigeria, Radio Nigeria/Kaduna 4770do
 Nigeria, Voice of Nigeria/Lagos 9690af
 1200 1300 Palau, T8WH/World Harvest 9930as 12130as
 1200 1300 vl Papua New Guinea, Wantok R. Light 7325va
 1200 1300 vl Solomon Islands, SIBC 5020do 9545al
 1200 1300 South Korea, KBS World Radio 9650na
 1200 1300 f/ DRM Taiwan, R Taiwan International 9850eu
 1200 1300 UK, BBC World Service 5975as 6190af
 9605as 9740as 9860af 11760me
 15310as 15575me 17640af 17790as
 21470af
 1200 1300 Ukraine, R Ukraine International 9950eu
 1200 1300 USA, Armed Forces Radio Network 4319usb
 5446usb 5765usb 6350usb 7811usb
 10320usb 12133usb 13362usb
 1200 1300 USA, KNLS Anchor Point AK 6150as 6915as
 1200 1300 USA, Voice of America 9345va 9640va
 11705va 11730va 15190va
 1200 1300 USA, WBOH Newport NC 5920am
 1200 1300 USA, WEWN Vandiver AL 5755va
 1200 1300 USA, WHRA Greenbush ME 15665af
 1200 1300 Sat USA, WHRI Cypress Creek SC 7315sa
 9410sa
 1200 1300 mtwhf USA, WHRI Cypress Creek SC 7335sa
 1200 1300 Sun USA, WHRI Cypress Creek SC 9410sa
 1200 1300 USA, WHRI Cypress Creek SC 7385na
 1200 1300 USA, WINB Red Lion PA 9265am
 1200 1300 USA, WRMI Miami FL 9955am
 1200 1300 USA, WTJC Newport NC 9370na
 1200 1300 USA, WWCR Nashville TN 7490na 9980na
 15825na
 1200 1300 USA, WWRB Manchester TN 3185va
 1200 1300 USA, WYFR/Family Radio Worldwide 7455na
 11530sa 11970am
 1200 1300 Zambia CVC/ The Voice Africa 6065af
 13590af
 1215 1300 Egypt, Radio Cairo 17835as
 1230 1257 China, China Radio International 11780as
 1230 1300 Bangladesh, Bangla Betar 7250as
 1230 1300 Bulgaria, Radio Bulgaria 11700eu 15700eu
 1230 1300 Germany, AWR-Europe 15495as
 1230 1300 Thailand, Radio Thailand World Svc 9810va
 1230 1300 Vietnam, Voice of Vietnam 9840as 12020as

1300UTC-8AMEST/7AMCST/5AMPST

1300 1330 Australia, HCJB Global 15540as
 1300 1330 Egypt, Radio Cairo 17835af
 1300 1330 Poland, Polish Radio 9450eu 7325eu
 1300 1345 USA, WYFR/Family Radio Worldwide 7455na
 11970am
 1300 1356 Romania, R Romania International 15105eu
 17745eu
 1300 1357 China, China Radio International 5955as
 7300as 9590na 9655as 9730as
 9765as 9870as 11760pa 11885na
 11900pa 11980as 13610eu 13790eu
 15230na
 1300 1400 Anguilla, Worldwide Univ Network 11775am
 1300 1400 Australia, CVC International 13635as
 1300 1400 Australia, Radio Australia 6020va 9560as
 9580va 9590va
 1300 1400 DRM Australia, Radio Australia 5995va 12080pa
 1300 1400 Sat/Sun Canada, CBC NQ SW Service 9625na
 1300 1400 Canada, CFRX Toronto ON 6070na

1300 1400		Canada, CFVP Calgary AB	6030na	
1300 1400		Canada, CKZN St John's NF	6160na	
1300 1400		Canada, CKZU Vancouver BC	6160na	
1300 1400		Costa Rica, Worldwide Univ Network	9725va	
		11870va	13750va	
1300 1400		Indonesia, Voice of Indonesia	9526va	11784al
1300 1400		Malaysia, RTM/Traxx FM	7295as	
1300 1400		New Zealand, Radio NZ International		6170pa
1300 1400		Nigeria, Radio Nigeria/Kaduna		4770do
1300 1400		Nigeria, Voice of Nigeria/Lagos		9690af
1300 1400		North Korea, Voice of Korea	7570eu	9335na
		11710na	12015eu	
1300 1400		Palau, T8WH/World Harvest	9930as	
1300 1400 vl		Papua New Guinea, Wantok R. Light		7325va
1300 1400 vl		Solomon Islands, SIBC		9545al
1300 1400		South Korea, KBS World Radio		9570na
		9770as		
1300 1400		UK, BBC World Service	5975as	6190af
		6195as	9410as	9740as
		11760me	15310as	15420af
		17640af	21470af	15575me
1300 1400		USA, Armed Forces Radio Network		4319usb
		5446usb	5765usb	6350usb
		10320usb	12133usb	13362usb
1300 1400		USA, Voice of America		9345va
		11705va		9640va
1300 1400		USA, WBOH Newport NC		5920am
1300 1400		USA, WEWN Vandiver AL		5755va
1300 1400		USA, WHRA Greenbush ME		15665af
1300 1400 Sat/Sun		USA, WHRI Cypress Creek SC		9495sa
		9840na		
1300 1400		USA, WHRI Cypress Creek SC		11785na
1300 1400		USA, WINB Red Lion PA		9265am
1300 1400		USA, WRMI Miami FL		9955am
1300 1400		USA, WTJC Newport NC		9370na
1300 1400		USA, WWCR Nashville TN		7490na
		15825na		9980na
1300 1400		USA, WWRB Manchester TN		9385va
1300 1400		USA, WYFR/Family Radio Worldwide		11830na
		11520as	11560as	11855na
		15670as		13810as
1300 1400		Zambia CVC/ The Voice Africa		6065af
		13590af		
1310 1340		Japan, NHK World Radio Japan		9875as
1330 1357 fa/DRM		Czech Rep, Radio Prague		9850eu
1330 1400		Australia, HCJB Global		15435as
1330 1400 hfa		Guam, KSDA/ AWR		11935as
1330 1400		India, All India Radio		9690as
		13710as		11620as
1330 1400		Laos, National Radio		7145as
1330 1400		Sweden, Radio Sweden		7465va
1330 1400		Turkey, Voice of Turkey		11735pa
1330 1400		Vietnam, Voice of Vietnam		9840as
1335 1400		Guam, KTWR/TWR		9975as

1400UTC-9AMEST/8AMCST/6AMPST

1400 1425		Turkey, Voice of Turkey		11735pa	12035eu
1400 1427		Czech Rep, Radio Prague		11600as	13580na
1400 1430		Australia, HCJB Global		15400as	15425as
1400 1430		Australia, Radio Australia		5995va	6080va
		7240va		9590va	
1400 1430 sw		Germany, Pan American BC		15205as	
1400 1430 mhf		Guam, KTWR/TWR		9975as	
1400 1430 Sun		Italy, NEXUS-IRRS/EGR		15725va	
1400 1430		Japan, NHK World Radio Japan			9875as
		11705va		11780eu	21560eu
1400 1430 DRM/ Sat		New Zealand, Radio NZ International			9750pa
1400 1430		Serbia, Intl Raido Serbia			7200eu
1400 1430		Thailand, Radio Thailand World Svc			9725va
1400 1430 Sun		United Arab Emirates, FEBA			12045as
1400 1457		China, China Radio International			5995as
		7300as		9460as	9700eu
		9795as		11665as	11675na
		13740na		15230na	17630af
1400 1500		Anguilla, Worldwide Univ Network			11775am
1400 1500		Australia, CVC International			13635as
1400 1500		Bhutan, Bhutan Broadcasting Svc			6035as
1400 1500 Sat/Sun		Canada, CBC NQ SW Service			9625na
1400 1500		Canada, CFRX Toronto ON			6070na
1400 1500		Canada, CFVP Calgary AB			6030na
1400 1500		Canada, CKZN St John's NF			6160na
1400 1500		Canada, CKZU Vancouver BC			6160na
1400 1500		Costa Rica, Worldwide Univ Network			9725va
		11870va		13750va	
1400 1500		Germany, CVC Intl/Voice Africa			15745af
1400 1500		Germany, Overcomer Ministries			6110eu
		13810eu			
1400 1500 tw		Guam, KTWR/TWR			9975as

1400 1500		India, All India Radio		9690as	11620as
		13710as			
1400 1500		Iran, VOIRI/IRIB		15460as	17660as
1400 1500		Jordan, Radio Jordan			11690na
1400 1500		Libya, Voice of Africa			17725af
1400 1500		Malaysia, RTM/Traxx FM			7295as
1400 1500		Netherlands, R Netherlands Worldwide			5825as
		9345as		11520as	12080as
1400 1500		New Zealand, Radio NZ International			6170pa
1400 1500		Nigeria, Radio Nigeria/Kaduna			4770do
1400 1500		Nigeria, Voice of Nigeria/Lagos			9690af
1400 1500		Oman, Radio Oman			15140as
1400 1500		Palau, T8WH/World Harvest			9930as
1400 1500 vl		Papua New Guinea, Wantok R. Light			7325va
1400 1500 vl		Solomon Islands, SIBC			5020do
1400 1500		UK, BBC World Service			5960as
		6190af		6195as	9410as
		9860af		11760me	11915as
		21470af			
1400 1500 Sat/Sun		UK, Bible Voice BC			11695as
1400 1500		USA, Armed Forces Radio Network			4319usb
		5446usb		5765usb	6350usb
		10320usb		12133usb	13362usb
1400 1500		USA, KJES Vado NM			11715na
1400 1500		USA, KNLS Anchor Point AK			6150as
1400 1500		USA, Voice of America			4930af
		7125va		9480va	9760va
		12150va		15205va	15580af
		17750af			
1400 1500		USA, WBOH Newport NC			5920am
1400 1500		USA, WEWN Vandiver AL			5755va
1400 1500		USA, WHRA Greenbush ME			15665af
1400 1500 Sat/Sun		USA, WHRI Cypress Creek SC			9495sa
		9840na			
1400 1500		USA, WHRI Cypress Creek SC			11785na
1400 1500		USA, WINB Red Lion PA			13570am
1400 1500		USA, WRMI Miami FL			9955na
1400 1500		USA, WTJC Newport NC			9370na
1400 1500		USA, WWCR Nashville TN			7490na
		15825na			9980na
1400 1500		USA, WWRB Manchester TN			9385va
1400 1500		USA, WYFR/Family Radio Worldwide			6135as
		7320as		9365as	9615as
		11560as		11565na	11725as
		na		11860as	13695na
		13810as			17760am
1400 1500		Zambia CVC/ The Voice Africa			6065af
		13650af			
1415 1430 mtwhfa		Germany, Pan American BC			15205as
1415 1430		Nepal, Radio Nepal			5005as
1430 1445 Sun		Germany, Pan American BC			15205as
1430 1445 vl/ mtwhf		Moldova, Radio PMR/Pridnestrovie			7370eu
1430 1500		Australia, Radio Australia			5995va
		7240va		9475as	9590va
					11660pa
1430 1500		Ethiopia, Radio Ethiopia			5990af
		9704af			7110af
1430 1500 f/ DRM		South Korea, KBS World Radio			9750eu
1430 1500		Sweden, Radio Sweden			9400va

1500UTC-10AMEST/9AMCST/7AMPST

1500 1510 mtwhfa		Turkmenistan, Turkmen Radio			5015eu
1500 1527		Czech Rep, Radio Prague			9955na
1500 1528		Vietnam, Voice of Vietnam			7285va
		12020va			9840va
1500 1530		Australia, HCJB Global			15425as
1500 1530		Guam, KSDA/ AWR			12105as
1500 1530		Nigeria, Radio, National Svc/Abuja			7275do
1500 1530		UK, BBC World Service			9410af
		15105af			11860af
1500 1530 Sat		UK, Bible Voice BC			11895as
1500 1545		USA, WYFR/Family Radio Worldwide			15210as
1500 1550		New Zealand, Radio NZ International			6170pa
1500 1557		Canada, R Canada International			9635as
		11975as			
1500 1557		China, China Radio International			5955as
		6095va		7160as	7325as
		9525eu		9720va	9785as
		13685af		13740na	17630af
1500 1557		Libya, Voice of Africa			17725af
1500 1600		Anguilla, Worldwide Univ Network			11775am
1500 1600		Australia, CVC International			13635as
1500 1600		Australia, Radio Australia			5995va
1500 1600					9475as
					9590va
					11660pa
1500 1600 Sat/Sun		Canada, CBC NQ SW Service			9625na
1500 1600		Canada, CFRX Toronto ON			6070na
1500 1600		Canada, CFVP Calgary AB			6030na
1500 1600		Canada, CKZN St John's NF			6160na
1500 1600		Canada, CKZU Vancouver BC			6160na
1500 1600		Costa Rica, Worldwide Univ Network			9725va

1700	1800		7335eu	9600me		
1700	1800		Anguilla, Worldwide Univ Network	11775am		
1700	1800		Australia, CVC International	13635as		
1700	1800		Australia, Radio Australia	5995va	6080va	
			9475as	9580va	9710as	11880as
1700	1800	Sat	Canada, CBC NQ SW Service	9625na		
1700	1800		Canada, CFRX Toronto ON	6070na		
1700	1800		Canada, CFVP Calgary AB	6030na		
1700	1800		Canada, CKZN St John's NF	6160na		
1700	1800		Canada, CKZU Vancouver BC	6160na		
1700	1800		Canada, R Canada International	9610as		
1700	1800	DRM	Canada, R Canada International	9800na		
1700	1800		Costa Rica, Worldwide Univ Network	11870va		
			13750va			
1700	1800		Egypt, Radio Cairo	12170af		
1700	1800		Equatorial Guinea, Radio Africa	15190af		
1700	1800		Germany, CVC Intl/Voice Africa	15745af		
1700	1800	vl	Italy, NEXUS-IRRS/EGR	15650af		
1700	1800		Malaysia, RTM/Traxx FM	7295as		
1700	1800		Nigeria, Radio Nigeria/Kaduna	4770do		
1700	1800		Nigeria, Voice of Nigeria/Lagos	15120af		
1700	1800		Palau, T8WH/World Harvest	9930as		
1700	1800	vl	Papua New Guinea, Wantok R. Light	7325va		
1700	1800		Russia, Voice of Russia	4975me	6175as	
			7125as	7320eu	9470va	
1700	1800	vl	Rwanda, Radio Rwanda	6055do		
1700	1800	vl	Solomon Islands, SIBC	5020eu	9545al	
1700	1800	vl	South Africa, Channel Africa	15235af		
1700	1800		Taiwan, R Taiwan International	11850eu		
1700	1800		Uganda, Dunamis Shortwave	4750af		
1700	1800		UK, BBC World Service	3255af	5975as	
			6190af	7270as	9740as	11665af
			12095af	15400af	15420af	
1700	1800	Sun	UK, Bible Voice BC	9460me		
1700	1800		USA, Armed Forces Radio Network	4319usb		
			5446usb	5765usb	6350usb	7811usb
			10320usb	12133usb	13362usb	
1700	1800		USA, Voice of America	6080af	13710af	
			15580af	17895af		
1700	1800		USA, WBOH Newport NC	5920am		
1700	1800		USA, WEWN Vandiver AL	15610eu		
1700	1800		USA, WHRA Greenbush ME	17650af		
1700	1800		USA, WHRI Cypress Creek SC	9495sa		
			9840va	11785na		
1700	1800		USA, WINB Red Lion PA	13570am		
1700	1800		USA, WRMI Miami FL	9955am		
1700	1800		USA, WTJC Newport NC	9370na		
1700	1800		USA, WWCR Nashville TN	9980na	12160na	
			15825na			
1700	1800		USA, WWRB Manchester TN	9385va		
1700	1800		USA, WYFR/Family Radio Worldwide	9790af		
			13630af	13695na	17545af	17555am
			18980eu	21455eu		
1700	1800		Zambia CVC/ The Voice Africa	4965af		
			9420af			
1715	1730		Vatican City, Vatican Radio	4005eu	5885eu	
			7250eu	7290eu	9645eu	
1715	1800		UK, Bible Voice BC	9460me		
1730	1745		UK, Bible Voice BC	9460me		
1730	1800		Slovakia, R Slovakia International	5915eu		
			6055eu			
1730	1800	mtwhf	UK, Sudan Radio Service	9840af		
1730	1800		Vatican City, Vatican Radio	9755af	11625af	
			13765af			
1745	1800		Bangladesh, Bangla Betar	7250as		
1745	1800		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	15075af
			15155af	17670af		
1751	1800	DRM	New Zealand, Radio NZ International	9890pa		
1751	1800		New Zealand, Radio NZ International	9765pa		

1800UTC-1PMEST/12PMCST/10AMPST

1800	1804		Canada, R Canada International	9610as		
1800	1804	DRM	Canada, R Canada International	9800na		
1800	1815	vl	UK, Bible Voice BC	9460me		
1800	1827		Czech Rep, Radio Prague	5930eu	9400va	
1800	1828		Vietnam, Voice of Vietnam	9765eu		
1800	1830		Australia, CVC International	13635as		
1800	1830		Nigeria, Radio, National Svc/Abuja	7275do		
1800	1830		Poland, Polish Radio	6015eu	7345eu	
1800	1830	DRM	Romania, R Romania International	5895eu		
1800	1830		South Africa, AWR Africa	3215af	3345af	
			11830af			
1800	1830		UK, BBC World Service	7260as	9740as	
1800	1830	mtwhf	USA, Voice of America	4930af	12080af	
			15775af			
1800	1850		New Zealand, Radio NZ International	9765pa		
1800	1850	DRM	New Zealand, Radio NZ International	9890pa		

1800	1856		Romania, R Romania International	7215eu		
			9640eu			
1800	1857		China, China Radio International	6020eu		
			6100eu	6165me	7100eu	7265eu
1800	1859		Canada, R Canada International	7185af		
			11805af	11875af	13650af	15365af
			17790af			
1800	1900		Anguilla, Worldwide Univ Network	11775am		
1800	1900	mtwhf	Argentina, RAE	15345va		
1800	1900		Australia, Radio Australia	6080va	7240as	
			9475va	9580as	9710as	11880as
1800	1900		Bangladesh, Bangla Betar	7250eu		
1800	1900		Canada, CFRX Toronto ON	6070na		
1800	1900		Canada, CFVP Calgary AB	6030na		
1800	1900		Canada, CKZN St John's NF	6160na		
1800	1900		Canada, CKZU Vancouver BC	6160na		
1800	1900		Costa Rica, Worldwide Univ Network	11870va		
			13750va			
1800	1900		Equatorial Guinea, Radio Africa	15190af		
1800	1900		Germany, CVC Intl/Voice Africa	11775af		
1800	1900		India, All India Radio	7410eu	9445af	
			9950eu	11620eu	11935af	15075af
			15155af	17670af		
1800	1900		Kuwait, Radio Kuwait	11990va		
1800	1900		Malaysia, RTM/Traxx FM	7295as		
1800	1900		Netherlands, R Netherlands Worldwide	6020af		
			11655af	12045af		
1800	1900		Nigeria, Radio Nigeria/Kaduna	4770do		
1800	1900		Nigeria, Voice of Nigeria/Lagos	15120af		
1800	1900		North Korea, Voice of Korea	7570eu	12015eu	
1800	1900		Palau, T8WH/World Harvest	9930as	9955as	
1800	1900	vl	Papua New Guinea, Wantok R. Light	7325va		
1800	1900		Russia, Voice of Russia	4975me	6125as	
			7230af	7240eu	7320eu	7335va
			11510af			
1800	1900	Sat/Sun	Russia, Voice of Russia	6055eu	6175eu	
			6245eu			
1800	1900	vl	Rwanda, Radio Rwanda	6055do		
1800	1900	vl	Solomon Islands, SIBC	5020do	9545al	
1800	1900		South Korea, KBS World Radio	7275eu		
1800	1900		Swaziland, TWR	3200af		
1800	1900		Taiwan, R Taiwan International	3965eu		
1800	1900		Uganda, Dunamis Shortwave	4750af		
1800	1900		UK, BBC World Service	3255af	5875eu	
			5945me	5955va	6190af	7390eu
			9630af	12095af	15400af	15420af
1800	1900	Sat/Sun	UK, Bible Voice BC	6110me	9460	
			skd1208			
1800	1900		USA, Armed Forces Radio Network	4319usb		
			5446usb	5765usb	6350usb	7811usb
			10320usb	12133usb	13362usb	
1800	1900		USA, Voice of America	4930af	6080af	
			11975af	13710af	15580af	17895af
1800	1900		USA, WBCQ Monticello ME	15420am		
1800	1900		USA, WBOH Newport NC	5920am		
1800	1900		USA, WEWN Vandiver AL	15610eu		
1800	1900	mtwhf	USA, WHRA Greenbush ME	15665af		
1800	1900	Sat	USA, WHRA Greenbush ME	13730af		
1800	1900	Sun	USA, WHRA Greenbush ME	17650af		
1800	1900	mtwhf	USA, WHRI Cypress Creek SC	17650va		
1800	1900	Sat/Sun	USA, WHRI Cypress Creek SC	9495va		
1800	1900		USA, WHRI Cypress Creek SC	9840va		
			11785na			
1800	1900		USA, WINB Red Lion PA	13570am		
1800	1900		USA, WRMI Miami FL	9955am		
1800	1900		USA, WTJC Newport NC	9370na		
1800	1900		USA, WWCR Nashville TN	9980na	12160na	
			15825na			
1800	1900		USA, WWRB Manchester TN	9385va		
1800	1900		USA, WYFR/Family Radio Worldwide	6045af		
			7395af	9895af	13630af	13695na
			13730af	13780me	15115af	17535na
			17555am	18980eu		
1800	1900		Yemen, Rep of Yemen Radio	9780me		
1800	1900		Zambia CVC/ The Voice Africa	4965af		
			9420af			
1830	1900		Bulgaria, Radio Bulgaria	6200eu	7400eu	
1830	1900		UK, BBC World Service	6005af	9410af	
1830	1900		UK, Bible Voice BC	9460me		
1845	1900	Sun	UK, Bible Voice BC	7260af		
1851	1900	DRM	New Zealand, Radio NZ International	9890pa		
1851	1900		New Zealand, Radio NZ International	11725pa		

1900UTC-2PMEST/1PMEST/11AMPST

1900	1928		Vietnam, Voice of Vietnam	7280va	9730va	
1900	1929		Germany, Deutsche Welle	11690af		
1900	1930		Germany, Deutsche Welle	9735af	13780af	
			15275af			

1900	1935		New Zealand, Radio NZ International	11725pa	
1900	1935	DRM	New Zealand, Radio NZ International	9890pa	
1900	1945		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15155af	17670af	15075af
1900	1945	Sat	UK, Bible Voice BC	6015eu	9460me
			7245af		
1900	1945		USA, WYFR/Family Radio Worldwide		6085sa
			15565eu	18980eu	
1900	1957		China, China Radio International		7285eu
			7295va	9440va	
1900	1957		USA, WYFR/Family Radio Worldwide		7395af
1900	2000		Anguilla, Worldwide Univ Network		11775am
1900	2000		Australia, Radio Australia	6080va	7240as
			9500va	9580va	9710as
					11880as
1900	2000		Canada, CFRX Toronto ON		6070na
1900	2000		Canada, CFVP Calgary AB		6030na
1900	2000		Canada, CKZN St John's NF		6160na
1900	2000		Canada, CKZU Vancouver BC		6160na
1900	2000		Costa Rica, Worldwide Univ Network		11870va
			13750va		
1900	2000		Egypt, Radio Cairo		9310af
1900	2000		Equatorial Guinea, Radio Africa		15190af
1900	2000		Germany, CVC Intl/Voice Africa		11775af
1900	2000		Germany, Overcomer Ministries		3975eu
1900	2000		Iran, VOIRI/IRIB	6160as	7330as
1900	2000	fas	Italy, NEXUS-IRRS/EGR		7290va
1900	2000		Kuwait, Radio Kuwait		11990va
1900	2000		Malaysia, RTM/Traxx FM		7295as
1900	2000		Netherlands, R Netherlands Worldwide		7120af
			11655af	11805af	12045af
1900	2000		Nigeria, Radio Nigeria/Kaduna		4770do
1900	2000		Nigeria, Voice of Nigeria/Lagos		15120af
1900	2000		North Korea, Voice of Korea	7100af	9975va
			11535va	11910af	
1900	2000		Palau, T8WH/World Harvest		9930as
1900	2000	vl	Papua New Guinea, Wantok R. Light		7325va
1900	2000		Russia, Voice of Russia	6175eu	7240eu
			7290eu	7335af	11510af
1900	2000	vl	Rwanda, Radio Rwanda		6055do
1900	2000	vl	Solomon Islands, SIBC		5020do
1900	2000	vl	South Africa, Channel Africa		3345af
1900	2000	mtwhf	Spain, Radio Exterior Espana		9605af
1900	2000		Swaziland, TWR	3200af	9690eu
1900	2000		Thailand, Radio Thailand World Svc		9805eu
1900	2000	vl	Uganda, UBC Radio		4976do
1900	2000		UK, BBC World Service	3255af	5875eu
			5945me	5955va	6190af
			9630af	12095af	15400af
1900	2000	Sun	UK, Bible Voice BC		9470me
1900	2000		USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
1900	2000		USA, KJES Vado NM		15385na
1900	2000		USA, Voice of America	4930af	4940af
			6080af	9785va	11975af
			13710af	15580af	17895af
1900	2000	mtwhf	USA, WBCQ Monticello ME		7415am
1900	2000		USA, WBCQ Monticello ME		15420am
1900	2000		USA, WBOH Newport NC		5920am
1900	2000		USA, WEWN Vandiver AL		15610eu
1900	2000	mtwhf	USA, WHRA Greenbush ME		13730af
1900	2000		USA, WHRI Cypress Creek SC		9495sa
			9840va	11785na	
1900	2000		USA, WINB Red Lion PA		13570am
1900	2000		USA, WRMI Miami FL		9955am
1900	2000		USA, WTJC Newport NC		9370na
1900	2000		USA, WWCN Nashville TN		9980na
			15825na		12160na
1900	2000		USA, WWRB Manchester TN		9385va
1900	2000		USA, WYFR/Family Radio Worldwide		3230af
			6020af	7240eu	7345me
			9480af	9520eu	9610af
			13695na	15115af	17535na
1900	2000		Zambia CVC/ The Voice Africa		4965af
			9420af		
1905	1910	Sat	Croatia, Voice of Croatia		6165eu
1905	1915	mtwhf	Croatia, Voice of Croatia		6165eu
1905	2000	Mon	South Africa, SA Radio League		3215af
1930	2000	fas	Germany, Pan American BC		9515af
1930	2000		Iran, VOIRI/IRIB	6010eu	6115eu
			9855af	11695af	7320eu
1930	2000		Lithuania, Radio Vilnius		6115eu
1930	2000		Serbia, Intl Radio Serbia		6100eu
1930	2000		Slovakia, R Slovakia International		5915eu
			7345eu		
1930	2000		Turkey, Voice of Turkey		6050eu
1930	2000		UK, Bible Voice BC		9470me
1936	1950		New Zealand, Radio NZ International		11725pa
1945	2000	mtwhfa	Albania, Radio Tirana		7465eu
					11645na

1951	2000	DRM	New Zealand, Radio NZ International	13730pa
1951	2000		New Zealand, Radio NZ International	11725pa

2000UTC-3PMEST/2PMCST/12PMPST

2000	2005	Mon	South Africa, SA Radio League		3215af
2000	2015	Sun	Germany, Pan American BC	9515af	
2000	2025		Turkey, Voice of Turkey		6050eu
2000	2027		China, China Radio International		7160eu
2000	2027		Iran, VOIRI/IRIB	6010eu	6115eu
			9855af	11695af	7320eu
2000	2028		Lithuania, Radio Vilnius		6115eu
2000	2030		Egypt, Radio Cairo		9310af
2000	2030	fa	Germany, Pan American BC		9515af
2000	2030		Swaziland, TWR	3200af	
2000	2030		USA, Voice of America	4930af	4940af
			6080af	11975af	13710af
2000	2030		Vatican City, Vatican Radio	7365af	9755af
			11625af		
2000	2045		USA, WYFR/Family Radio Worldwide		5745eu
			9480af	9610af	9635af
			15115af	15195af	17535na
2000	2050		New Zealand, Radio NZ International		11725pa
2000	2050	DRM	New Zealand, Radio NZ International		13730pa
2000	2057		China, China Radio International		5960eu
			5985va	7190eu	7285eu
			9440va	9660eu	11640va
2000	2057		Germany, Deutsche Welle		9735af
2000	2058		Germany, Deutsche Welle		13780af
2000	2059		Germany, Deutsche Welle		9545af
2000	2100		Anguilla, Worldwide Univ Network		11775am
2000	2100		Australia, ABC NT Alice Springs		2310do
			4835do		
2000	2100		Australia, ABC NT Katherine		2485do
2000	2100		Australia, ABC NT Tennant Creek		2325do
2000	2100	Sat/Sun	Australia, Radio Australia	6080va	7240va
			12080as		
2000	2100		Australia, Radio Australia		9500va
			11660pa	11880as	11650as
2000	2100		Canada, CFRX Toronto ON		6070na
2000	2100		Canada, CFVP Calgary AB		6030na
2000	2100		Canada, CKZN St John's NF		6160na
2000	2100		Canada, CKZU Vancouver BC		6160na
2000	2100		Costa Rica, Worldwide Univ Network		13750va
2000	2100		Equatorial Guinea, Radio Africa		15190af
2000	2100		Germany, CVC Intl/Voice Africa		11775af
2000	2100	fas	Italy, NEXUS-IRRS/EGR		7290va
2000	2100		Kuwait, Radio Kuwait		11990va
2000	2100	vl	Liberia, ELWA	4760do	
2000	2100		Malaysia, RTM/Traxx FM		7295as
2000	2100		Netherlands, R Netherlands Worldwide		7120af
			11655af	17810af	
2000	2100		Nigeria, Radio Nigeria/Kaduna		4770do
2000	2100		Nigeria, Voice of Nigeria/Lagos		15120af
2000	2100		Palau, T8WH/World Harvest		9930as
2000	2100	vl	Papua New Guinea, R East New Britain		3385do
2000	2100	vl	Papua New Guinea, Wantok R. Light		7325va
2000	2100		Russia, Voice of Russia	6145eu	7240eu
			7330eu		
2000	2100	vl	Rwanda, Radio Rwanda		6055do
2000	2100	vl	South Africa, Channel Africa		3345af
2000	2100	vl	Uganda, UBC Radio		4976do
2000	2100		UK, BBC World Service	3255af	6190af
			9630af	12095af	15400af
2000	2100	DRM	UK, BBC World Service		5875eu
2000	2100		Ukraine, R Ukraine International		5840eu
			9785sa		
2000	2100		USA, Armed Forces Radio Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
2000	2100		USA, WBCQ Monticello ME		15420am
2000	2100	smtwhf	USA, WBCQ Monticello ME		7415am
2000	2100		USA, WBOH Newport NC		5920am
2000	2100		USA, WEWN Vandiver AL		11520me
2000	2100	Sat/Sun	USA, WHRA Greenbush ME		11740af
2000	2100	mtwhf	USA, WHRA Greenbush ME		7520va
2000	2100	asmtwh	USA, WHRI Cypress Creek SC		9495va
2000	2100	f	USA, WHRI Cypress Creek SC		15665va
2000	2100		USA, WHRI Cypress Creek SC		9515va
			11785na		
2000	2100		USA, WINB Red Lion PA		13570am
2000	2100		USA, WRMI Miami FL		9955am
2000	2100		USA, WTJC Newport NC		9370na
2000	2100		USA, WWCN Nashville TN		9980na
			15825na		12160na
2000	2100		USA, WWRB Manchester TN		9385va
2000	2100		USA, WYFR/Family Radio Worldwide		6020af
			7430eu	9480af	9610af
			11970eu	15115af	15195af
					17535na

2000	2100	17575sa Zambia CVC/ The Voice Africa 9420af	4965af
2030	2045	Thailand, Radio Thailand World Svc	9535eu
2030	2058	Vietnam, Voice of Vietnam 9550va 9730va	7220va 7280va
2030	2100	Cuba, Radio Havana Cuba	9505va 11760va
2030	2100	Sweden, Radio Sweden	9895va
2030	2100	USA, Voice of America 6080af 7595as	4930af 11975af 13710af
2045	2100	India, All India Radio 9910pa 9950eu	7410eu 9445eu 11620eu 11715pa
2045	2100	Vatican City, Vatican Radio	9800am
2050	2100	Vatican City, Vatican Radio 7250eu	4005eu 5885eu
2051	2100	New Zealand, Radio NZ International	17675pa
2051	2200	New Zealand, Radio NZ International	15720pa
2051	2200	New Zealand, Radio NZ International	15720pa

2100UTC-4PMEST/3PMCST/1PMPST

2100	2120	Vatican City, Vatican Radio 7250eu	4005eu 5885eu
2100	2127	Czech Rep, Radio Prague	5930eu 9430va
2100	2130	Albania, Radio Tirana	7510eu 9345na
2100	2130	Australia, ABC NT Katherine	2485do
2100	2130	Australia, ABC NT Tennant Creek	2325do
2100	2130	Austria, AWR-Europe	9830af
2100	2130	Canada, CBC NQ SW Service	9625na
2100	2130	Cuba, Radio Havana Cuba	9505va 11760va
2100	2130	Nigeria, Radio, National Svc/Abuja	7275do
2100	2130	USA, Voice of America 7595as	
2100	2130	Vatican City, Vatican Radio	9800ca
2100	2145	USA, WYFR/Family Radio Worldwide 17535na 17555am	6915eu
2100	2157	China, China Radio International 6135eu 7120eu 7190eu	5960eu 7205af 7225eu 7285eu 7325af 11640af 13630af 9600eu
2100	2157	Germany, Deutsche Welle	13780af
2100	2159	Germany, Deutsche Welle	7280af
2100	2200	Angola, Radio Nacional de Angola	7217do
2100	2200	Anguilla, Worldwide Univ Network	11775am
2100	2200	Australia, ABC NT Alice Springs 4835do	2310do
2100	2200	Australia, Radio Australia 11650pa 11660pa 11695as	9500as 9660as 12080as
2100	2200	Belarus, Radio Belarus Minsk 7390eu	7135eu 7360eu
2100	2200	Canada, CFRX Toronto ON	6070na
2100	2200	Canada, CFVP Calgary AB	6030na
2100	2200	Canada, CKZN St John's NF	6160na
2100	2200	Canada, CKZU Vancouver BC	6160na
2100	2200	Costa Rica, Worldwide Univ Network	13750va
2100	2200	Equatorial Guinea, Radio Africa	15190af
2100	2200	Germany, Deutsche Welle	9545af 11690af
2100	2200	Germany, Overcomer Ministries	6175eu
2100	2200	Guyana, Voice of Guyana	3291do
2100	2200	India, All India Radio 9910pa 9950eu	7410eu 9445eu 11620eu 11715pa
2100	2200	Liberia, ELWA	4760do
2100	2200	Malaysia, RTM/Traxx FM	7295as
2100	2200	New Zealand, Radio NZ International	17675pa
2100	2200	Nigeria, Radio Nigeria/Kaduna	4770do
2100	2200	Nigeria, Voice of Nigeria/Lagos	7255af
2100	2200	North Korea, Voice of Korea	7570eu 12015eu
2100	2200	Palau, T8WH/World Harvest	9930as
2100	2200	Papua New Guinea, Wantok R. Light	7325va
2100	2200	Russia, Voice of Russia	6145eu 7330eu
2100	2200	South Africa, Channel Africa	3345af
2100	2200	Syria, Radio Damascus	9330eu
2100	2200	UK, BBC World Service 5965as 5975as 6005af	3255af 3915as 6110af
2100	2200	UK, BBC World Service 6190af 6195as 7445af	15400af
2100	2200	USA, Armed Forces Radio Network 5446usb 5765usb 6350usb	4319usb 7811usb
2100	2200	USA, Voice of America 10320usb 12133usb	6080af 15580af
2100	2200	USA, WBCQ Monticello ME	15420am
2100	2200	USA, WBCQ Monticello ME	7415am
2100	2200	USA, WBOH Newport NC	5920am
2100	2200	USA, WEWN Vandiver AL	11520me
2100	2200	USA, WHRA Greenbush ME	7520af
2100	2200	USA, WHRI Cypress Creek SC 9525va 11785na	7315sa
2100	2200	USA, WINB Red Lion PA	9265am
2100	2200	USA, WRMI Miami FL	9955am
2100	2200	USA, WTJC Newport NC	9370na
2100	2200	USA, WWCR Nashville TN	7465na 9980na

2100	2200	12160na USA, WWRB Manchester TN	9385va
2100	2200	USA, WYFR/Family Radio Worldwide 7430eu 9480af 9610af	5950na 12055af
2100	2200	15115af Zambia CVC/ The Voice Africa 9420af	4965af
2115	2200	Egypt, Radio Cairo	6255eu
2130	2156	Romania, R Romania International 6115na 7145na 9755na	6030eu
2130	2157	China, China Radio International 7325eu	7160eu
2130	2200	Australia, ABC NT Katherine	5025do
2130	2200	Australia, ABC NT Tennant Creek	4910do
2130	2200	Canada, CBC NQ SW Service	9625na
2130	2200	Guam, KSDA/ AWR	9625as
2130	2200	Lithuania, Mighty KBC Radio	6055eu
2130	2200	Sweden, Radio Sweden	7390va
2130	2200	Turkey, Voice of Turkey	7180va
2130	2200	USA, Voice of America	7405as

2200UTC-5PMEST/4PMCST/2PMPST

2200	2100	Sat/Sun	Spain, Radio Exterior Espana	6125eu
2200	2225		Turkey, Voice of Turkey	7180va
2200	2228		Lithuania, Mighty KBC Radio	6055eu
2200	2230		India, All India Radio 9910pa 9950eu	7410eu 9445eu 11620eu 11715pa
2200	2230		Japan, NHK World Radio Japan	13640va
2200	2230		Serbia, Intl Radio Serbia	7200eu
2200	2230		South Korea, KBS World Radio	3955eu
2200	2230	w	USA, WBCQ Monticello ME	15420am
2200	2235		New Zealand, Radio NZ International	17675pa
2200	2235	DRM	New Zealand, Radio NZ International	15720pa
2200	2245		Egypt, Radio Cairo	6255eu
2200	2245		USA, WYFR/Family Radio Worldwide	17690af
2200	2257		China, China Radio International 7170eu	5915as
2200	2300		Anguilla, Worldwide Univ Network	6090am
2200	2300		Australia, ABC NT Alice Springs 4835do	2310do
2200	2300		Australia, ABC NT Katherine	5025do
2200	2300		Australia, ABC NT Tennant Creek	4910do
2200	2300		Australia, HCJB Global	15525as
2200	2300		Australia, Radio Australia 15230va 15240pa 15515as	13630pa 17785pa
2200	2300		Belarus, Radio Belarus Minsk 7390eu	7135eu 7360eu
2200	2300		Bulgaria, Radio Bulgaria	6200eu 7400eu
2200	2300	smtwhf	Canada, CBC NQ SW Service	9625na
2200	2300		Canada, CFRX Toronto ON	6070na
2200	2300		Canada, CFVP Calgary AB	6030na
2200	2300		Canada, CKZN St John's NF	6160na
2200	2300		Canada, CKZU Vancouver BC	6160na
2200	2300	DRM	Canada, R Canada International	9800na
2200	2300		Costa Rica, Worldwide Univ Network	13750va
2200	2300		Equatorial Guinea, Radio Africa	15190af
2200	2300		Guyana, Voice of Guyana	3291do
2200	2300	vl	Liberia, ELWA	4760do
2200	2300		Malaysia, RTM/Traxx FM	7295as
2200	2300		Nigeria, Radio Nigeria/Kaduna	4770do
2200	2300		Nigeria, Voice of Nigeria/Lagos	7255af
2200	2300	vl	Papua New Guinea, Wantok R. Light	7325va
2200	2300		UK, BBC World Service 6110af 6135as 6155af	5955as 5965as 6195as
2200	2300		Ukraine, R Ukraine International 9785sa	5830eu
2200	2300		USA, Armed Forces Radio Network 5446usb 5765usb 6350usb	4319usb 7811usb
2200	2300		USA, Voice of America 10320usb 12133usb	6080af 15580af
2200	2300	fs	USA, WBCQ Monticello ME	15420am
2200	2300		USA, WBOH Newport NC	5920am
2200	2300		USA, WEWN Vandiver AL	11520me
2200	2300		USA, WHRA Greenbush ME	7520af
2200	2300		USA, WHRI Cypress Creek SC 9525va 11785na	7315sa
2200	2300		USA, WINB Red Lion PA	9265am
2200	2300		USA, WRMI Miami FL	9955am
2200	2300		USA, WTJC Newport NC	9370na
2200	2300		USA, WWCR Nashville TN 9980na	7465na
2200	2300		USA, WWRB Manchester TN	9385na
2200	2300		USA, WYFR/Family Radio Worldwide 7285af 9620eu 11740na	5950na 15440am
2200	2300		17690af Zambia CVC/ The Voice Africa	4965af

2230	2245	vl/ mtwhf	Moldova, Radio PMR/Pridnestrovie	6240na
2230	2257		Czech Rep, Radio Prague	5930na
2230	2300		Guam, KSDA/ AWR	15320as
2230	2300		Sweden, Radio Sweden	5850va
2230	2300		USA, Voice of America	7230va
			15445va	9780va
2236	2300		New Zealand, Radio NZ International	15720pa
2236	2300	DRM	New Zealand, Radio NZ International	17675pa
2245	2300		India, All India Radio	9705eu
			11620as	9950as
			11645as	13605as

2300UTC-6PMEST/5PMCST/3PMPST

2300	0000		Anguilla, Worldwide Univ Network	6090am
2300	0000		Australia, ABC NT Alice Springs	2310do
			4835do	
2300	0000		Australia, ABC NT Katherine	5025do
2300	0000		Australia, ABC NT Tennant Creek	4910do
2300	0000		Australia, HCJB Global	15525as
2300	0000	smtwhf	Canada, CBC NQ SW Service	9625na
2300	0000		Canada, CFRX Toronto ON	6070na
2300	0000		Canada, CFVP Calgary AB	6030na
2300	0000		Canada, CKZN St John's NF	6160na
2300	0000		Canada, CKZU Vancouver BC	6160na
2300	0000	DRM	China, China Radio International	9800ca
2300	0000		China, China Radio International	5990sa
			6020na	6040nana
			skd0109	skd0209na
2300	0000		Costa Rica, Worldwide Univ Network	13750va
2300	0000		Egypt, Radio Cairo	6850na
2300	0000		Guyana, Voice of Guyana	3291do
2300	0000		India, All India Radio	9705eu
			11620as	11645as
			11695af	13605as
2300	0000		Iran, VOIRI/IRIB	6010eu
			9855af	7260eu
			11695af	7320eu
2300	0000		Malaysia, RTM/Traxx FM	7295as
2300	0000		New Zealand, Radio NZ International	15720pa
2300	0000	DRM	New Zealand, Radio NZ International	17675pa
2300	0000	vl	Papua New Guinea, Wantok R. Light	7325va
2300	0000		UK, BBC World Service	3915as
			5965as	6000as
			9570as	6135as
			9740as	6195as
			11955as	
2300	0000		USA, Armed Forces Radio Network	4319usb
			5446usb	5765usb
			10320usb	6350usb
			12133usb	7811usb
2300	0000		USA, Voice of America	6105va
			7265va	7405va
			11610va	7480va
			11610va	7220va
			11610va	9490va
2300	0000	fas	USA, WBCQ Monticello ME	7415am
2300	0000		USA, WBOH Newport NC	5920am
2300	0000		USA, WEWN Vandiver AL	11520me
2300	0000		USA, WHRA Greenbush ME	5850eu
2300	0000		USA, WHRI Cypress Creek SC	7315sa
			5875na	7335na
			7335na	9615na
2300	0000		USA, WRMI Miami FL	9955am
2300	0000		USA, WTJC Newport NC	9370na
2300	0000		USA, WWCR Nashville TN	5070na
			9980na	7465na
2300	0000		USA, WWRB Manchester TN	5050na
			6890va	5745va
			9385va	
2300	0000		USA, WYFR/Family Radio Worldwide	5950na
			9430sa	15400sa
			15400sa	15440am
2300	0000		Zambia CVC/ The Voice Africa	4965af
2300	2305	vl	Liberia, ELWA	4760do
2300	2315		Nigeria, Radio Nigeria/Kaduna	4770do
2300	2330		Australia, Radio Australia	9660as
			12080pa	13690pa
			17785va	15230va
			17795va	15240pa
2300	2330		USA, Voice of America	6180va
			11840va	7460va
2300	2345		USA, WYFR/Family Radio Worldwide	11740na
2300	2345	DRM	Vatican City, Vatican Radio	7370am
2300	2355		Turkey, Voice of Turkey	5960va
2300	2356		Romania, R Romania International	6015eu
			6115eu	7105eu
			7105eu	9610na
2300	2357		China, China Radio International	5915as
			6145as	7180as
			11790as	7350eu
			11790as	9610as
2315	2330	mtwhf	Croatia, Voice of Croatia	3985eu
2315	2330		Moldova, Radio PMR/Pridnestrovie	6240na
2330	0000		Australia, Radio Australia	9660as
			12080as	13690as
			17750va	15230va
			17795va	15415as
2330	0000		UK, BBC World Service	6170as
2330	0000		USA, Voice of America	6180va
			11655va	7460va
			11840va	13640va
2330	0000	m	USA, WBCQ Monticello ME	7415am
2330	2357		Czech Rep, Radio Prague	5930na
2330	2358	vl	Lithuania, Radio Vilnius	7325na
2330	2358		Vietnam, Voice of Vietnam	9840as
				12020as

MT ENGLISH LANGUAGE SHORTWAVE STATION RESOURCE GUIDE

Albania, Radio Tirana	http://rtsh.sil.at/
Angola, Radio Nacional de Angola	www.rna.ao/
Anguilla, Worldwide Univ Network	www.worldwideuniversitynetwork.com/
Argentina, RAE	www.radiocacional.gov.ar/rae/rae.asp
Australia, ABC NT Alice Springs	www.abc.net.au/radio/
Australia, ABC NT Katherine	www.abc.net.au/radio/
Australia, ABC NT Tennant Creek	www.abc.net.au/radio/
Australia, CVC International	www.christianvision.com/
Australia, HCJB Global	www.hcjb.org/
Australia, Radio Australia	www.abc.net.au/ra/
Austria, AWR Europe	www.awr2.org/
Austria, Radio Austria Intl	http://oe1.orf.at/service/international
Bahrain, Radio Bahrain	www.radiobahrain.net/
Bangladesh, Bangla Betar	www.betar.org.bd/
Belarus, Radio	www.radiobelarus.tv.by/eng/
Bhutan, BBS	www.bbs.com.bt/
Bulgaria, Radio	www.bnr.bg/
Canada, CBC NQ SW Service	www.cbc.ca/north/
Canada, Radio Canada Intl	www.rcinet.ca/
China, China Radio Intl	www.cri.cn/
Costa Rica, Worldwide Univ Network	www.worldwideuniversitynetwork.com/
Croatia, Croatian Radio	www.hrt.hr/
Cuba, Radio Havana	www.radiohc.cu/
Czech Rep, Radio Prague	www.radio.cz/en/
Finland, Overcomer Ministries	www.overcomerministries.org
France, Radio France Intl	http://r-english.com
Germany, AWR Europe	www.awr2.org/
Germany, CVC Intl/Voice Africa	www.christianvision.com/
Germany, Deutsche Welle	www.dw-world.de/
Germany, Overcomer Ministries	www.overcomerministry.org/
Germany, Pan American BC	www.radiopanam.com/
Germany, The Overcomer Ministries	www.overcomerministry.org/
Germany, TWR Europe	www.twr.org/
Greece, Voice of Greece	www.voiceofgreece.gr/
Guam, AWR/KSDA	www.awr2.org/
Guam, TWR/KTWR	www.twr.org/
Guyana, Voice of	http://voiceofguyana.com/
India, All India Radio	www.allindiaradio.org/
Indonesia, Voice of Indonesia	www.voi-online.com/
Iran, Voice of the Islamic Rep of Iran	www2.irib.ir/worldservice/
Italy, IRRS	www.nexus.org
Japan, NHK World/Radio Japan	www.nhk.or.jp/english/
Jordan, Radio	www.jrtv.jo/rj/index.php
Latvia, Radio SWH	www.radioswh.lv/index.php
Liberia, ELWA	www.elwaministries.org/
Liberia, Star Radio	www.radioswh.lv/index.php
Libya, Voice of Africa	www.ljbc.net/home.php
Lithuania, Radio Vilnius	www.lit.lt/
Malaysia, RTM/Traxx FM	www.traxxfm.net/index.php
Malaysia, RTM/Voice of Malaysia	http://202.190.233.9/vom/utama.htm
Monaco, TWR Europe	www.twr.org/
Nepal, Radio Nepal	www.radionepal.org/
Netherlands, Radio Netherlands	www.radioneetherlands.nl/
New Zealand, Radio NZ Intl	www.rnz1.com
Nigeria, Radio, Natl Svc/Abuja	http://radionigeriaonline.com
Nigeria, Radio/Kaduna	http://radionigeriaonline.com
Nigeria, Voice of/ Ext. Svc Lagos	www.voiceofnigeria.org
Oman, Radio Oman	www.oman-tv.gov.om
Pakistan, Radio	www.radio.gov.pk
Papua New Guinea, NBC	www.nbc.com.pg/
Papua New Guinea, Wantok R. Light	http://wantokradio.net/
Philippines, Radio Pilipinas	www.radiopilipinas.com/
Poland, Polish Radio	www.polskieradio.pl/zagranica/gb/
Romania, Radio Romania Intl	www.rr1.ro/
Russia, Voice of Russia	www.vor.ru/world.html
Saudi Arabia, BSKSA	www.saudiradio.net/
Slovakia, Radio Slovakia Int	www.rsi.sk
Solomon Islands, SIBC	www.sibconline.com.sb/
South Africa, AWR Africa	www.awr2.org/
South Africa, Channel Africa	www.channelfrfrica.org
South Africa, Trans World Radio	www.twr.org/
South Korea, KBS World Radio	http://rki.kbs.co.kr/english/
Spain, Radio Exterior Espana	www.ree.rne.es/
Sri Lanka, SLBC	www.slbc.lk
Swaziland, Trans World Radio	www.twr.org/
Sweden, Radio	www.sr.se/rs/english/
Syria, Radio Damascus	www.rtv.gov.sy/
Taiwan, Radio Taiwan Intl	http://english.rii.org.tw/
Thailand, Radio	www.hsk9.com/
Turkey, Voice of	www.trt.net.tr
UK, BBC World Service	www.bbc.co.uk/worldservice/
UK, Bible Voice BC	www.biblevoice.org/
UK, FEBA	www.feba.org.uk
UK, Sudan Radio Service	www.sudanradio.org/
Ukraine, Radio Ukraine Intl	www.nrcu.gov.ua/
USA, American Forces Radio	http://myafn.dodmedia.osd.mil/
USA, KNLS Anchor Point AK	www.knls.org/
USA, KTBN Salt Lake City UT	www.tbh.org/
USA, KWHR Naalehu HI	www.whr.org/
USA, Voice of America	www.voanews.com/
USA, WBCQ Monticello ME	www.wbcq.com/
USA, WBOH Newport NC	www.fbnradio.com/
USA, WEWN Vandiver AL	www.ewtn.com
USA, WHRA Greenbush ME	www.whr.org/
USA, WHRI Cypress Creek SC	www.whr.org/
USA, WINB Red Lion PA	www.winb.com/
USA, WRMI Miami FL	www.wrmi.net/
USA, WTJC Newport NC	www.fbnradio.com/
USA, WWCR Nashville TN	www.wwcr.com
USA, WWRB Manchester TN	www.wwrb.org/
USA, WYFR/Family Radio Worldwide	www.worldwide.familyradio.org
Uzbekistan, CVC International	www.christianvision.com/
Vatican City, Vatican Radio	www.vaticanradio.org
Vietnam, Voice of Vietnam	www.vov.org.vn
Yemen, Rep of Yemen Radio	www.yemenradio.net
Zambia, CVC Intl/Christian Voice	www.christianvision.com/

SHORTWAVE GUIDE

Coast Guard/COTHEN Comms Merger?

In last month's column, I mentioned that U.S. military communications were currently undergoing a period of change throughout the radio spectrum. I barely put that column to bed when we learned of another possible change that may be underway by a major military player in the HF radio spectrum.

Currently, the U.S. Coast Guard is undergoing a communications systems (COMMSYS) transformation to unify their communications service-wide. Part of this transformation will be the merger of CAMSLANT and CAMSPAC into one Communications Command or COMCOM. This is supposed to help HF communications in the Coast Guard, particularly at the sector level, that are unreliable and difficult to maintain because of a lack of coverage and a complicated communications protocol.

The Coast Guard currently uses point-to-point HF communications. This means that each transmission/reception site has its own coverage area, and assets communicate directly with a particular site. The user must pick the frequency in which to communicate, the transmission goes to a land site, and then is sent out to the receiving unit. In order to do this properly, the user needs a good understanding of HF wave propagation.

Earlier this year the Telecommunications and Information Systems Command (TISCOM) sponsored the testing of COTHEN, operated by the Customs and Border Patrol, as a possible communications solution. COTHEN (the acronym now stands for Cellular Over the Horizon Enforcement Network) is an HF ALE network that uses landlines to connect to 19 unmanned transmission sites spanning the nation in order to form one unified coverage area. The landlines serve as a backbone, connecting the network sites to one another to provide seamless communications coverage.

This network satisfies the communications needs of the Customs service in terms of reliability and nationwide coverage. Currently, the network has 19 sites, 89 remote communications consoles (RCCs), and a Technical Service Center (TSC) headquartered in Orlando, Florida.

Automatic Frequency Selection

The COTHEN network uses the Automatic Link Establishment (ALE) protocol to select the best transmission frequency from the unit to a COTHEN site and vice versa. ALE is a software based communications protocol that establishes radio links and eliminates human error. The

ALE radio frequently sends and receives signals (known as soundings) in order to determine the optimal operating frequencies for that particular radio and location. Based on these soundings, the radio is able to automatically connect or "handshake" with other radios without requiring the user to manage the frequencies. This ensures maximum connectivity between assets.

For example, a call made from a unit in the Pacific Ocean to a unit on the Atlantic, may be received by a COTHEN site in New Mexico and sent along the land line to another site located in Florida for transmission to the Atlantic unit. The COTHEN network itself selects the optimal transmission sites and paths for communications through software. This way the best suited site manages the radio call. There is a TSC that ensures the optimal sites are used for communications and continuously provides technical support.

COTHEN is an all purpose communications network. COTHEN can receive calls from air, sea, or shore and maintain seamless communications regardless of the origin of the call. Once an asset is connected to the network, the TSC monitors the call and the communications. The signals travel across landlines in order to use a combination of transmission sites to optimize the signal for both the receiver and the sender.

The Coast Guard has been using COTHEN since 2003 for the purpose of flight following. Currently, the majority of the Coast Guard COTHEN operations falls on CAMS (Communications Area Master Station), as they are the designated entity for flight following and position report logging. The Coast Guard represents approximately 85 % of COTHEN's daily communications activities. The system has the potential to expand with Coast Guard assistance, if the Coast Guard decides to use COTHEN full time.

Merging Channels

We are not sure about any of the time lines



for a possible full merger of the Coast Guard and COTHEN systems, but we do know that one of the proposals that is part of the plan involves the Coast Guard integrating their frequencies into the COTHEN net. If the Coast Guard jumps on the COTHEN bandwagon, they will be dragging over 1000 additional assets to this system, so additional frequencies are a requirement for good communications, especially during periods of low sunspot numbers.

COTHEN currently uses 11 frequencies (see below). Based on recent government tests, channels 1 through 5 carry more traffic than channels 6 through 11.

Channel	Frequency (kHz)
1	5732.0
2	7527.0
3	8912.0
4	10242.0
5	11494.0
6	13907.0
7	15867.0
8	18594.0
9	20890.0
10	23214.0
11	25350.0

With the added system loading that bringing the Coast Guard full time on COTHEN involves, additional frequencies will be needed. And we may be seeing the first signs of those new frequencies as this column goes to press.

One of the more interesting frequencies that popped up is 5250.0 kHz. Based on observations, we do not believe that this frequency is part of the 11 frequencies mentioned above, which means it is either some sort of single frequency test or part of a new secondary network. Here is a list of COTHEN players who have been logged on this frequency.

Users Logged on 5250 kHz

15X	Possible COTHEN Unmanned transmission site in Cedar Rapids, IA
27XPRI	Possible COTHEN Unmanned transmission site in Cedar Rapids, IA
30PRI	Possible COTHEN Unmanned transmission site in Cedar Rapids, IA
270PRI	Possible COTHEN Unmanned transmission site in Cedar Rapids, IA
330PRI	Possible COTHEN Unmanned transmission site in Cedar Rapids, IA
502	USCG HC-130H #1502
6516	USCG MH-65C #6516
A48	US BICE UH-60A #86-24548
ALBPRI	COTHEN Unmanned transmission site - Albuquerque CONUS HF Omni Directional
ALTPRI	COTHEN Unmanned transmission site - Unknown location
CAMSPAC	USCG CAMSPAC Point Reyes, CA



❖ US Navy Logistics Aircraft Change Callsigns

In recent weeks the radio hobby has been abuzz about a new military callsign – CONVOY. Based on monitoring we have determined that this callsign being used by various Navy air transport aircraft. Sometime around the second week in November, monitors and Mode-S boxes started reporting the Convoy (CNV #####) callsign and the tie ups were associated with various US Navy C-9B, C-20, C-40, C-130 aircraft and USMC KC-130 tankers.

After detailed study, the Milcom Monitoring Post blog team has broken the number system being used by these aircraft. The first number indicates the aircraft type and the next three numbers are the last three numbers of the aircraft's assigned mission number from NALO (Navy Air Logistics Office). Here is how it looks in brief.

Convoy 2####	C-20 aircraft
Convoy 3####	C-130 aircraft
Convoy 4####	C-40 aircraft
Convoy 9####	C-9 aircraft

We still need more intercepts to lock down the Navy C-12 aircraft convoy number series, since we only have one noted to date with no confirmed tie-up. We have also seen a few oddballs that do not fit an obvious pattern as noted below:

CNV 61R1	C-130T/BD-161 VR-64 NAS Willow Grove. PA 165161 [Note the first two callsign numbers and the last two numbers of the Buno number]
CNV 467B	C-40A/RV-833 VR-59 NAS/JRB Fort Worth, TX AE0976 165833
CNV 0921B	KC-130T/NY-597 VMGR-452 Fort Stewart IAP, NY AE03D4 #164597
CNV 900	C-12 User unknown

So to summarize, the first number indicates aircraft type and the last three are from the NALO assigned mission number.

I should also mention that I have also seen these aircraft use the NALO callsign, but sporadically. My first record of one was back in Dec 2007, and the last time I saw one was on 12/6/2008.

I am sure there is more to this story, but that will have to wait for now. More as we get additional intercepts, we will be passing that along here in the Milcom column.

❖ Some Air Force Callsigns Decoded

While recently doing some other research for this column I came across the following list of US Air Force callsign sets.

317AG Group callsign C-130 aircraft Dyess AFB, TX (Voice call: Hazard)

Hazrd 01-09	Reserved and available if future Commanders want to reinstate the CC's individual call signs
-------------	--

Hazrd 10	Used for formation flying only
Hazrd 20	Used for formation flying only
Hazrd 30	Used for formation flying only
Hazrd 40	Used for formation flying only
Hazrd 50-59	Used for Pros
Hazrd 60-69	Used for JA/ATTs: Joint Airborne/Air Transportability Training
Hazrd 70-79	OSTs (Off Station Trainer) these are for any off-station missions that do not utilize the Reach or command and control directed callsign
Hazrd 80-89	Available for future uses or if two JA/ATT or two OST formations are off-station at the same time.
Hazrd 90-99	Available for future uses or if two JA/ATT or two OST formations are off-station at the same time.

Here is my latest ICAO24 and Airframe list for this unit:

ICAO24	Serial
AE0325	#74-1661
AE0308	#74-1663
AE0326	#74-1664
AE030C	#74-1669
AE030D	#74-1670
AE030E	#74-1671
AE030F	#74-1673
AE0310	#74-1674
AE0311	#74-1675
AE0328	#74-1676
AE0314	#74-1680
AE0329	#74-1682
AE031B	#74-2065
AE031D	#74-2069
AE0321	#74-2134

Finally, I have confirmed the C-37 callsigns associated with the 310AS based at MacDill AFB, Florida.

Local Mission callsigns

Flash 01	6 AMW Senior Leadership on-board: WG/CC
Flash 02	6 AMW Senior Leadership on-board: WG/CV
Flash 03	6 AMW Senior Leadership on-board: OG/CC
Flash 28	#01-0028 Local Mission
Flash 29	#01-0029 Local Mission
Flash 30	#01-0030 Local Mission

SAM CONUS Mission callsigns

Spar 28	#01-0028 SAM CONUS Mission
Spar 29	#01-0029 SAM CONUS Mission
Spar 30	#01-0030 SAM CONUS Mission
Spar 40-49	C-37A 6 OSS/OSO SAM OCONUS Mission

310AS C-37 Airframe List

Selcal	ICAO24	Serial
FS-BG	AE087E	#01-0028
HS-KQ	AE087F	#01-0029
DS-EH	AE115E	#01-0030

If you would like to learn more about military and civilian callsigns, be sure to check out our latest publication, the *International Callsign Handbook v2* on CD-ROM. It is available from Grove Enterprises, Universal Radio, or direct from the publisher – Teak Publishing.

And that does it for this month. Until next time, 73 and good hunting.

CDRPRI	COTHEN Unmanned transmission site - Cedar Rapids CONUS HF (South) Remote Marion, IA
CNT	US BICE Regional Communications Node Central
CSK	Possible USCG COMMSTA Kodiak, AK
FTMPRI	COTHEN CONUS HF Omni Directional Remote - Fort Meyers, FL
HSD 149	USCGC Drummond (WPB-1323) US BICE Cessna 550 Interceptor Asset #N12549
I53	US BICE Cessna 550 Interceptor Asset #N753CC
J03	USCG HH-60J #6003
J17	USCG HH-60J #6017
J38	USCG HH-60J #6038
K33	USCG MH-65C #6533
K59	USCG MH-65C #6559
K61	USCG MH-65C #6561
LNEPRI	COTHEN Unmanned transmission site - Unknown location
LNT	USCG CAMSLANT Chesapeake, VA
MEMPRI	COTHEN Unmanned transmission site - Memphis
OMNIPRI	COTHEN Unmanned transmission site - Unknown location
OPB	US BICE OPBAT Services Center Nassau, Bahamas
PAC	USCG CAMSPAC Point Reyes, CA
SARPRI	COTHEN Unmanned transmission site - Sarasota
SARSEC	COTHEN Unmanned transmission site - Sarasota
T58	US BICE Beech King Air 200 Tracker Air Asset #N1558
TSC	US BICE Customs National Law Enforcement Communications Center -- Technical Service Center Orlando, FL
UGW	USCGC Gannet (WPB-87334)
UCG	USCG Unknown
WHD	USCGC Kodiak Island (WPB-1341)
XYZ	Unknown user/usage
Z13	Unknown user/usage

Another possible frequency may have also been uncovered – 7970.0 kHz. Two ALE addresses seen on this frequency include E15 and T72.

More monitoring is going to be needed in the coming months to work out what is happening with COTHEN/Coast Guard communications. If you have something to share, please pass along your reports to the email address in the masthead.

The Disappearing Radio?

Every once in a while, you read something and think “I didn’t know that – and I should have known that.”... That’s what I felt recently as I read an iBiquity press release.

The title: “It’s the Device, Stupid!” The gist of the article is to suggest that broadcasters are concentrating on *transmitting* a program – and aren’t paying enough attention to the *receivers* their audience is using.

Or aren’t using. Writer Bob Struble cites figures that indicate the number of radios sold annually dropped 20% almost overnight. Apple’s iPod has replaced the Sony Walkman. Clock radios have been replaced by iPod docking stations. When I need to wake up early, I set the alarm in my cell phone – for millions, the cell phone is also their source of music.

Struble suggests the next step for HD Radio is to lobby for inclusion in these new devices. Your cell phone, PDA, or GPS navigator should include an HD Radio chip. Arguably, new low-power chipsets should make this possible. If we get back to the point where radio is everywhere, the consumers who’ve abandoned radio will come back.

The question DXers will ask is, will listeners more than five miles from a radio tower be able to receive anything on these small devices? To be sure, the sensitivity of HD receivers have improved greatly over the last year or two. Still, even in analog it is difficult to imagine a cell phone containing an antenna efficient enough to receive FM broadcast signals from more than a few miles away. Useful AM reception in this kind of device seems a pipe dream. (I wonder if that may be why we’re seeing an increase in the number of AM stations being simulcast on the HD2 and HD3 channels of co-owned FM stations?)

I didn’t watch the Grammy Awards, but something was apparently said during the presentation of the “Best New Artist” award that has radio executives unhappy, to say the least. Reportedly, one of the voice-overs said: “When the first Grammys were given out, artists were discovered on the radio. Today, it’s a digital world...” Implying that radio is obsolete, as far as the music industry is concerned.

Analog TV: Not dead yet?

In late November, the “Short-term Analog Flash and Emergency Readiness Act,” S.3663, passed the U.S. Senate. This legislation would allow (but not require) analog TV stations to

continue to operate for up to 30 days after the February 17th shutdown date. However, they could only broadcast information about the digital transition and safety/emergency information. Continuing analog operation would also be prohibited if the station’s analog channel was necessary for some other station’s digital operation, or if it was “outside core,” i.e. above channel 51.

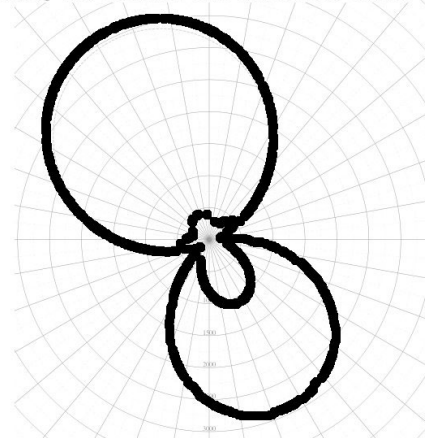
While the bill promptly passed the Senate, it did not see rapid action in the House. Given the economic meltdown, it is very possible this legislation will not reach the House before the 17th – at which point it becomes a moot point! Even if the bill does pass, observers believe few stations would use the authority granted. Most haven’t budgeted to operate their analog transmitters after the deadline, and with airtime sales slow there isn’t any extra money around to stretch budgets.

(Why “Flash” in the bill’s title? I don’t know for sure – but if that word’s there, the acronym spells “SAFER”.....)

FCC notes

The Commission has been quite busy issuing Special Temporary Authorities for AM stations to use FM translators to improve their service. The regular rules do not allow for this, but waiver requests are routinely granted. Amendments to the rules to allow FM translators to relay AM stations without rule waivers had been on the FCC’s agenda for late 2008 – but were deleted at the last minute. At

KMZQ LAS VEGAS, NV BMP-20071207ABC 670 kHz



The daytime (upper lobe) and nighttime (lower lobe) directional patterns of new station KMZQ-670, Las Vegas.

deadline this issue has not been put back on the agenda.

It is not particularly unusual for stations to get in trouble with the FCC for not obeying the rules. But a Congressional report released in December has the Federal Communications Commission itself in trouble. “Deception and Distrust” accuses FCC Chairman Kevin J. Martin of withholding information from the other Commissioners and of mismanaging relations with the other Commissioners and FCC staff. It accuses the Commission of not acting in an open and transparent manner, and of lax oversight of the Telecommunications Relay Service.

I see nothing in this report directly related to broadcasting. (I suspect many DXers would feel the Committee on Energy and Commerce should have looked into the IBOC decision!) Hams would be interested in item #6. This item alleges the FCC ignored complaints of interference from Broadband over Power Lines (BPL) data systems, delayed Enforcement Bureau action, and withheld engineering data.

Canadian notes

Last year, the CBC received permission to build a “nested FM relay” in Windsor, Ontario. The 3,300-watt transmitter on 102.3 would relay their existing station CBE-1550, but the AM station would remain on the air.

The FM transmitter was never built. The CBC has now come back with another plan. They’ve filed for a more powerful FM transmitter, 19,000 watts, on 97.5, along with a 10,400-watt relay transmitter on 91.5 in Leamington, Ontario. The two FM transmitters would fully replicate the AM coverage area – so AM 1550 would be shut down. As of my deadline, the Canadian Radio-television and Telecommunications Commission (CRTC) has not yet acted on this request.

Another AM-to-FM move has been denied. CKKY-830, Wainwright, Alberta, had filed to move to 101.9 FM. In smaller Canadian markets, a single company may own no more than two FM stations. CKKY’s owners already own another FM station, CKWY-FM, in Wainwright – and they also own CKSA-FM in nearby Lloydminster. The Wainwright tower is only 35 miles from Lloydminster; all three stations – CKWY, CKSA, and CKKY – would have overlapping coverage.

The Commission did suggest the application may be approved if it’s refiled with FM technical parameters that don’t cover Lloyd-

minster. If an alternate plan is not approved – and CKKY stays on 830 – then CFCW-790 Camrose may not be able to implement their planned move to 840.

Reversing the general trend in Canada, applications have been filed for two new AM stations in Toronto suburbs. The Markham, Ontario, station would use the frequency abandoned by CIAM-960 Cambridge when it moved to 107.5 FM. The Scarborough station would use the frequency abandoned by CKDO-1350 Oshawa when it moved to 1580. Both stations would be ethnic.

Mexican notes

The IRCA has come out with the 13th Edition of their *Mexican Log*. Similar to the National Radio Club's *AM Radio Log* for the U.S. and Canada, the IRCA's publication is valuable for those who DX stations south of the border. The book is \$9.50 for IRCA members in North America; \$11.50 if you aren't a member. Write IRCA Bookstore, 9705 Mary NW, Seattle WA 98117-2334 or see their website at the address at the end of this column.

Callsign weirdnesses

New three-letter callsigns became a thing of the past in 1930, after WIS was assigned to the station that's now WVOC-560 in Charleston, South Carolina. But every few years, someone finds a way to get an old three-letter call resued. This time, it's happened in Baltimore.

The WJZ calls were initially on Westinghouse's station in Newark, New Jersey. Since the 1953, that station has been WABC-770, New York City. In 1957, Westinghouse acquired WAAM-TV, Baltimore. They managed to convince the FCC to assign the WJZ calls, idle for four years, to their TV station. Channel 13 in Baltimore has been WJZ-TV ever since.

More recently, Westinghouse's broadcasting operations merged with CBS. This left them with radio stations in Baltimore to go along with WJZ-TV. And just before the November election, a programming change gave CBS Radio an opportunity, or an excuse, to bring the WJZ calls back to radio. The station long known as WJFK-1300 is now WJZ. (This station was WFBR for most of its life.) CBS also flipped their suburban Catonsville, Maryland, FM station to an all-sports format and gave it the WJZ-FM calls.

The FCC has assigned the call letters KCBE to a new FM station. This wouldn't be newsworthy, except that the station is in Napeague, New York – on Long Island, which is most definitely not west of the Mississippi River!

Shipboard DX

Reader Ron Reyno VE3RYN brought along a Sony Digital Walkman on board the cruise ship *Carnival Spirit* during a visit to Hawaii. He got some pretty impressive mainland DX while docked at Maui. You might expect to hear stations right on the Pacific Coast: KNX-1070 Los Angeles, KGO-810 San Francisco, KFMB-760 San Diego, KEX-1190 Port-

land, and CBU-690 Vancouver. You wouldn't expect to hear inland stations, like KSL-1160 Salt Lake City. But Ron's best DX, without a doubt, was CBW-990 Winnipeg. Winnipeg is in the center (centre?) of Canada, nowhere near the coast – this is quite a haul!

'Til next month

I took a DX-398 receiver with me when I visited relatives in Milwaukee for Thanksgiving. There was a lot of interesting DX to be heard up there. Have you heard anything interesting on vacation? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

URLS IN THIS MONTH'S COLUMN

<http://americanbandscan.blogspot.com>
My AM DX blog.
www.iberquity.com/about_us/bobs_column_thoughts_on_radios_digital_future - Bob Struble's column on HD Radio in portable electronic devices.
<http://textpattern.kurthanson.com/articles/546/rain-125-execs-take-offense-at-grammys-internet-replacing-radio-comment> - Grammy awards slight radio?
<http://energycommerce.house.gov/images/stories/Documents/PDF/Newsroom/fcc%20majority%20staff%20report%20081209.pdf> - Congressional report criticizing FCC.
www.am-dx.com/ircabooks.htm - IRCA Bookstore.

AMBANDSCANSTATIONREPORT

NEW:

New stations on the air

Evergreen, Montana	1340	KQJZ	1,000/670 ND
Las Vegas, Nevada	670	KMZQ	30,000/600 DA-2

New station permits granted

Excel, Alabama	1400	1,000/1,000 ND
He in, Alabama	1370	250/250 DA-N
Pine Bluff, Arkansas	1190	10,000/350 DA-N
Garden City, Kansas	1340	1,000/880 ND
Rockville, Minnesota	1180	50,000/5,000 DA-3

(8,000 critical hours, with a third pattern, hence DA-3. Already assigned call letters **KYES**.)

Stations to be deleted

Annapolis, Maryland	1190	WBIS
---------------------	------	------

New station applications denied/dismissed

Ketchikan, Alaska	1260
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Applications for new stations

Calgary, Alberta	700	50,000/20,000
Bakers eld, California	1310	1,400/2,500 DA-2
Desert Hot Springs, Cal.	1220	1,400/1,200 DA-2
Easton, California	1150	260/5,500 DA-N
Dalton Gardens, Idaho	1490	810/810 ND
Rowe, New Mexico	1420	2,500/140 ND
Markham, Ontario	960	1,000/175
Scarborough, Ontario	1350	1,000/87

CHANGES:

Stations requesting moves to new frequencies

High Prairie, Alberta	93.5	CKVH	from 1020 AM
St. Paul, Alberta	97.7	CHLW	from 1310 AM
Windsor, Ontario	97.5	CBE	from 1550 AM

Stations granted moves to new frequencies

Camrose, Alberta	840	CFCW	from 790
(but see article, this one may not happen)			
Dartmouth, Nova Scotia	92.9	CFDR	from 780 AM
Sudbury, Ontario	93.5	CIGM	from 790 AM
Leesburg, Virginia	1190	WAGE	from 1200

Callsign changes

Carrollton, Alabama	950	WREN	from WRAG
Hot Springs, Arkansas	590	KZHS	from KPZA
Santa Barbara, California	1340	KCLU	from KIST
Santa Barbara, California	1490	KIST	from KBKO
Loveland, Colorado	1570	KPIO	from KSXT
Kendall, Florida	1020	WURN	from WRHB
Palm Springs, Florida	1500	WVAA	new station
Ochlocknee, Georgia	1020	WSBX	from WJEP
Baltimore, Maryland	1300	WJZ	from WJFK
Morningside, Maryland	1580	WHFS	from WPGC
St. Peter, Minnesota	1310	KGLB	from KRBI
Jackson, Mississippi	1400	WJQS	from WKXI
Jacksonville, N. Carolina	1400	WSTK	from WJQQ
Walhalla, S. Carolina	1000	WJTP	from WWQF
Powell, Tennessee	1040	WKTI	from WQBB
New Boston, Texas	1530	KLBW	from KNBO

ND: non-directional

DA-N: directional at night only

DA-D: directional during daytime only

DA-2: directional all hours, two different patterns

DA-3: directional day, night and critical hours, three different patterns

AIRNAV.COM

A Resource for Aircraft Listeners

Frequencies, frequencies! Discovering reliable sources for frequency information is a very necessary facet of the scanning hobby, including aircraft communications.

AirNav.com is a quick and very useful Internet resource for Tower, Ground Control, Clearance Delivery, UNICOM, ATIS, AWOS/ASOS, Approach, Departure, and some other frequencies. Often, hobbyists only explore the site this far, but AirNav.com has more to offer. Let's get right to it!

❖ Starting Point

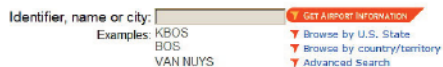
There are different ways to find airports and frequencies at this site. The usual starting point is www.airnav.com/airports/ which is the same as the "Airports" tab at www.airnav.com.

Here, the choices are: The search box "Identifier, name or city," and then to the right in blue, links to "Browse by U.S. State," "Browse by country/territory," and "Advanced Search." Let's begin with the search box.

In the search box you may enter the airport name, the city, or the three-letter or four-letter code for the airport. If AirNav.com isn't sure what you are seeking, it will list possibilities for you to select from.

A quick note on Airport codes: On the AirNav.com screen under the search box, it lists "BOS" and "KBOS" as examples of valid search terms. Both codes are for Boston Logan International Airport. The three-letter code "BOS" is an International Air Transportation Association (IATA) code. Add the letter K in front, which stands for United States, and it then becomes an International Civil Aviation Organization (ICAO) code. Expect to encounter both forms when it comes to airport codes.

Airport Information



This is the starting point at www.airnav.com/airports/. Be sure to explore the various searches and especially the Advanced Search.

❖ Airport Communications

Once you have gone to a selected airport, scroll down to "Airport Communications." There, you will see the frequencies and their uses. These may include some or all of the following:

CTAF (Common Traffic Advisory Frequency) is a

frequency used by pilots to communicate their intentions to each other in an airport area with no Control Tower or one that is not open and operating. The CTAF frequency can be UNICOM, MULTICOM (similar to non-towered UNICOM but no ground station), Flight Service Station (FSS), or the Tower frequency itself as indicated in each AirNav.com airport listing. More on CTAF at www.aviationwise.org/AC90-42F.html

UNICOM (at non-towered airports) is where pilots self-announce their intentions to other pilots in the airport area, and, where there is a licensed non-government ground station available at least part of the time for pilot requests and information but not air traffic control.

UNICOM (at towered airports) is an air/ground frequency where pilots can communicate non-ATC requests and information. This is usually on 122.95.

TOWER is Control Tower and sometimes called Local Control (LC). The Tower controllers coordinate and clear aircraft for takeoffs and landings and handle aircraft in the airport airspace even if not landing there. The Tower routinely accepts aircraft handed off from Approach Control and makes handoffs to Departure Control.

APPROACH is Approach Control and a function of the area TRACON (Terminal Radar Approach Control) facility. Approach controllers routinely receive handoffs from the Air Route Traffic Control Center (ARTCC) overhead and, in turn, hand the planes off to the Tower as they get closer to the airport.

Please see the article on TRACONs in the November 2008 issue of *Monitoring Times*. Don't forget the *MT Anthology* CDs for other interesting and informative articles: www.grove-ent.com/mtantindividual.html

DEPARTURE is Departure Control and a function of the area TRACON. Departure controllers ensure that aircraft are on proper and safe departure courses. They routinely hand off departing planes to the ARTCC, but it can be to another TRACON sector controller if the destination airport is relatively near by and within that TRACON area.

APCH/DEP SVC PROVIDED BY [] ARTCC - Some small airports may not be within a TRACON area but the ARTCC, in some instances, handles the Approach and Departure service. ARTCC map: www.freqofnature.com/aviation/images/artcc.jpg

GROUND is Ground Control. Ground controllers issue taxiing instructions to aircraft prior to takeoff and after landing. Ground Control hands off departing planes to the Tower. Arriving aircraft are handed off by the Tower to Ground Control. The Ground

controller is located in the Tower cab along with the Tower controller.

CLEARANCE DELIVERY issues instrument flight (IFR) clearances based on what pilots have filed. The clearances typically include a "clearance limit" which can be the destination airport or an intermediate airspace fix; a "departure procedure" which can include departure course details or the use of a published, named procedure; the route of the flight; the SQUAWK Code (See *MT - Radar, ADS-B, and the Future*, February 2008), and other items.

Clearances are issued many minutes before the flight on the CD frequency and sometimes the CD function occurs on the Ground Control frequency.

ATIS (Automated Terminal Information Service) is a pre-recorded and periodically updated voice message that includes such things as wind speed and direction, visibility, cloud ceiling, temperature, dew point, altimeter (barometric pressure for calibrating cockpit altimeters), the active runway(s), plus any pertinent items of safety.

D-ATIS is Digital ATIS, available to properly equipped aircraft via VHF, HF, or satellite. From ARINC: "Already available at over 90 of the world's busiest airports and in use by over 60 airlines and hundreds of smaller aircraft companies, D-ATIS allows pilots to receive and read ATIS text messages using the aircraft's existing display format via ARINC's GLOBALink service - or any other data link service."

WX ASOS - "WX" is weather and ASOS is Automated Surface Observing Systems. Sensors automatically gather weather information which is broadcast in a computer voice. See www.weather.gov/ost/asostech.html. When the AirNav.com listing says something like "WX ASOS at OAK (10 nm NE)," this means the ASOS site is 10 nautical miles northeast of the indicated airport, Oakland International in this case.

WX AWOS - Automated Weather Observing System is similar to ASOS. For good info,

AIRPORT DIAGRAM



This is the corner of the airport diagram for San Francisco International (KSFO) which shows the airport frequencies.

see: www.allweatherinc.com/aviation/awos_dom.html

EMERG: 121.5 – This is the VHF aeronautical emergency frequency. Keep this frequency in your aero scan sequence. It may not have much activity, but when it does, it can be riveting.

CLASS B: 120.9(NW) 125.35(NE-E) 127.0(NORTH) 134.5(SE) 135.1 WEST 135.65 SOUTH. This is from San Francisco International www.airnav.com/airport/KSFO. “Class B” is one of the airspace classifications and is used for the busiest airports and with the greatest restrictions. The frequencies shown are Approach / Departure for the various directions from the airport. Great airspace info may be found at www.aopa.org/asf/publications/sa02.pdf - a 1MB, 16-page PDF file.

IC is Initial Contact. It can be initial contact with the Tower or Ground Control or other controllers, but in this context, it is initial contact with Approach Control for planes that are not being handed off to Class B airspace controllers by a TRACON or ARTCC.

Location and Airport Operations

In the AirNav.com listing for your selected airport, under, “Airport Communications” are “Location” and “Airport Operations.” Under “Location,” you will find information like the Lat/Long of an airport, its elevation, distance to a nearby city, and time zone.

“Airport Operations” info includes whether the airport is for public or private use, the applicable Sectional aeronautical chart, whether it has a control tower and its hours if part time, the ARTCC in which the airport is located, the name of the associated FSS and sometimes an entry like “Fire and rescue: ARFF index C” which refers Aircraft Rescue / Fire Fighting and to a defined level of response capability.

VOR Radial/Distance

In very simple terms, VOR (VHF Omnidirectional Range) stations transmit signals in the 108-117.95 MHz range that help pilots to navigate. You will hear references to them often on the radio. At www.airnav.com/airport/KSMF, as an example, you will see the VOR listing “TZZr009/ (23.5).” The “TZZ” is the VOR ID for “TRAVIS VOR” and in the AirNav.com listing, the ID is an active link that leads to the VOR information. “r009” is the 9 degree radial (like a spoke in a wheel with the VOR being the hub) with reference to magnetic north (zero degrees) and “23.5” is nautical miles. Thus, leaving from the VOR on a course of 9 degrees magnetic, Sacramento International is 23.5 NM away.

When you listen to a VOR, you will mostly hear a warbling tone, but some VORs include voice transmissions, so give a listen from time to time. The voice can be Hazardous Inflight Weather Advisory Service (HIWAS), ATIS, AWOS, or FSS. It is not uncommon for pilots in certain areas, when communicating with FSS facilities, to transmit on 122.1 and listen on a specified VOR frequency. Other aircraft transmit frequencies may be 122.05, 122.15, and 123.6.

Please see the article *NAVAIDS – Some Talk, Some Don't* in the February 2005 issue of *Monitoring Times*.

NDB Name

An NDB is a Non-Directional Beacon. They are used for direction finding (often for homing in on), and their use dates ‘way back. NDBs simply repeat their call letters over and over in Morse Code. Their locations are shown on aeronautical charts.

An NDB example from the AirNav.com listing for Los Angeles International is “COMPTON 277/8.6 378 15E CPM - - - - -” where “COMPTON” is the NDB name, and the name is an active link that leads to the NDB information. “277/8.6” indicates 277 degrees magnetic and 8.6 nautical miles from the beacon to LAX. “378” is the frequency in kHz (below the standard A.M. broadcast band). “15E” is the local magnetic variation and is of little interest to listeners. “CPM” is the NDB call sign – followed by a visual depiction of the call in Morse Code.

Some people make a serious sport out of DXing NDBs at night during the months of shorter daylight hours.

Runway Information

As you listen to VHF aero frequencies, you will hear runways called out. In an AirNav.com airport listing, scroll down to “Runway Information” and you will see the runway numbers. They are derived from their magnetic compass direction. A landing strip that points East and West has two runway numbers depending on the landing / takeoff direction – “Runway 9” for 90 degrees clockwise from north (East) and “Runway 27” for 270 degrees (West).

When you only hear a runway number on your scanner, you will gradually begin to recognize which airport in your listening area it likely refers to.

Instrument Procedures

Under this heading are “STARs - Standard Terminal Arrivals,” “IAPs - Instrument Approach Procedures,” and “Departure Procedures.”

While IFR charts are used during the enroute phase of flight at altitude, STARs, IAPs, and DPs are used at lower altitudes in airport areas. They make the jobs of the pilots and controllers more efficient and safe. It can be interesting to see what the planes at airports nearby you are doing when you hear the procedure names called out. All are downloadable at AirNav.com. For chart symbols, see: http://avn.faa.gov/index.asp?xml=naco/online/aero_guide

FBO, Fuel Providers, and Aircraft Ground Support

Here, you will find Fixed Base Operator (FBO) frequencies. FBOs provide services to aircraft and for pilots. Some airports list none, while others list several. Go to www.airnav.com/airport/KVNY as an example, and scroll down to the above heading. There, you will see ASRI 128.85, ASRI 130.35, ASRI 131.50, ASRI 129.075 for various FBOs. ASRI is Aviation Spectrum Resources Incorporated who manages these frequencies www.asri.aero/about_agsa.html

Other Pages about [] Airport

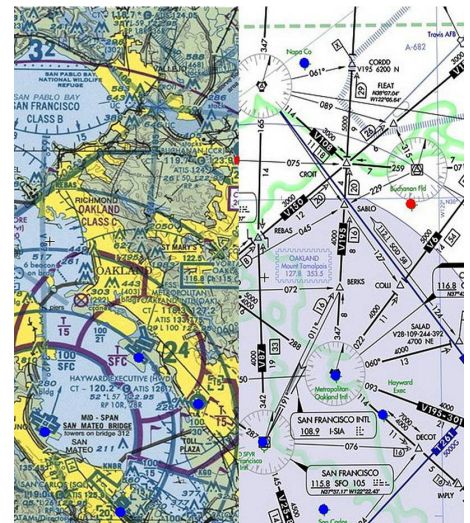
Sometimes you will find rather informative websites relating to a given airport. They are worth checking out.

Sectional chart

Using San Francisco International www.airnav.com/airport/KSFO as an example, on the right, you will see part of a sectional chart. Click on the chart to make it full screen. For those who have not studied Sectional and other charts, this is an easy opportunity.

When open, you can right-click on different chart features for additional info. At the bottom right, it can be zoomed in or out. The chart can be clicked on and dragged to establish a new center.

At the top right, for this example, you will see “Enroute H-3,” “Enroute L-3,” “Enroute L-2,” “SFO Area,” and “San Francisco TAC.” These are links to IFR High Altitude chart H-3, Low Altitude charts L-3 and L-2 as well as the San Francisco area and VFR Terminal Area Charts. On these charts, you will see things that are called out during aircraft communications that you will hear. Some charts will have a legend and frequencies. Drag the San Francisco TAC to reveal the top left corner to take a look.



This shows the stark difference between Sectional (left) and IFR Enroute (right) aeronautical charts and the amazing amount of information each presents. They are viewable via AirNav.com and provided by SkyVector.com.

Airport diagram

These can be interesting and helpful and show many features like buildings, terminals, runways, taxiways, fire stations, Control Tower, plus airport frequencies. They are downloadable at AirNav.com.

Unfortunately....

Due to space limitations, I am unable to cover additional features of this site. It is a great resource for aircraft listeners. Explore it! See you next time.

Mailbag & News

There has been an unusual (but very welcome) surge in reader mail over the past few months. Our column this time is focused on these letters and other news items of interest. Let's get started!

VLF on Your PC

Bryan Turner, W8LN (AL) forwarded a link that should be of interest to Natural Radio fans or anyone interested in the lowest reaches of the radio spectrum. Have you wanted to try Natural Radio, but haven't gotten around to building a receiver for it? Would you like a second receiver to use for NR? How about one that requires nothing more than your soundcard-equipped PC and an antenna?

It may seem too good to be true, but there actually is a free, downloadable program that can turn your computer's soundcard into a VLF receiver (0-22 kHz)! The program works with the majority of PCs made in the past 10 years. You can download it free at <http://web.telia.com/~u33233109/saqr/saqr.html>.

After a simple installation procedure, you set the frequency by dragging the "receive passband" to the desired range, turn up your speakers and begin listening. Of course, a suitable antenna is required. It must be connected to the audio input jack of your soundcard. Be sure to review the help files that come with the program before using it.

According to the developer, Swedish ham SM6LKM, one of the prime uses for the

program is to tune into historic station SAQ (17.2 kHz). This station uses an alternator to generate high power RF energy, and transmits several times per year from a museum in Grimeton, Sweden. SAQ's frequency is marked on the panoramic display of the program (see Figure 1).

LWBC Catches

Don CeCaria, NF7R (NV) writes: "Kevin, I'm writing to let you know that I read your column every month, and I have some longwave broadcast catches to report. Tonight, I copied Radio Medi1 on 171 kHz... the copy was 3x3 (weak but readable) with Middle Eastern music and talk. I received them from 0410 thru 0425Z, until a deep fadeout occurred."

"I confirmed it was Radio Medi1 by tuning them in via the Internet...with Internet lagging the radio by a second or less! Tonight I also bagged ZLS, Bahamas, on 526 kHz and GLS, Galveston, on 206 kHz. My equipment is a TS-440S, using a 450-ft. long wire and the radio's built in attenuator to prevent overloading. I am located in Logandale, NV, a very low noise QTH in rural southern Nevada."

Thanks for writing, Don. Using the Internet to verify a LWBC reception is an excellent idea, and one that I had not heard of until now. This is similar to the trick SWLs use in finding a "parallel" transmission on a second SW frequency, but longwave listeners gener-

ally don't have this luxury. Your catches are impressive, especially for being so far inland from the coasts. Keep up the good work and keep those logs coming!

Best Antenna to Use?

Next, we hear from Tom Humes (AZ) who writes: "Kevin, I live in a rural area of AZ on one acre of land that is fenced. I have been using a variety of antennas over the years to receive on a variety of frequencies. My favorite place to listen is below BC on the Beacon Band. My best success has been with a whip antenna 8 feet in length. I have done fairly well with it, but I'm sure there are better antennas to use. My question is if I dedicated a receiver to receiving only beacons in the 190-500 kHz range, what antenna would you prefer if it was you?"

Hello Tom, and thanks for writing. If I had just one antenna to choose from for general purpose LF work, I would pick an *active antenna* specifically designed for the band, such as the LF Engineering L-400B (<http://www.lfengineering.com/>). Active antennas tend to be low noise, omni-directional, small in size, and easy to install. Given your rural location, noise may not be a major problem, so I would also try a wire antenna of 200 feet or more. I heard my first Lowfer beacon on such an antenna many years ago. You may be interested in an upcoming article we're working on for a longwave antenna tuner, which should help improve the performance of any wire antenna used on LF.

WiNRADiO on LF

John Bishop (FL) wrote in with an update on his listening activities. Now retired, and back in Florida, he enjoys listening from a large lakeside lot with 60 acres of woods behind him. He reports low noise conditions, except when thunderstorms crop up.

John goes on to report: "Right before leaving Maryland, I picked up a WiNRADiO G-303/E with the Professional Detector. I am very satisfied with the radio—I only wish I could have made the pilgrim-

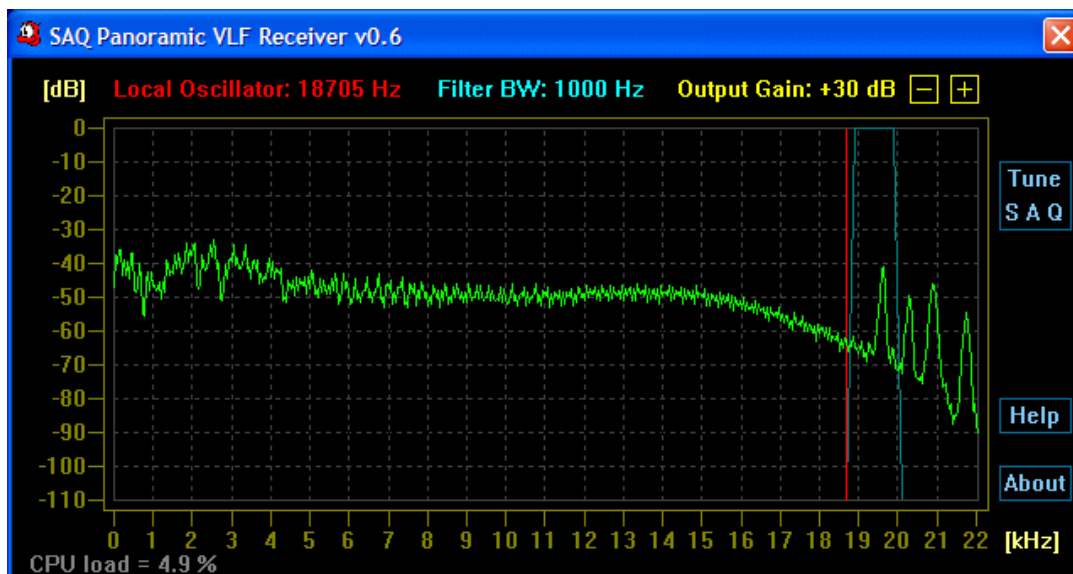


Figure 1. The SAQ VLF program lets you tune longwave signals from your PC!

continued on page 71

Clandestine and International Broadcasters Still Needed

Arinaldo Slaen of Argentina relays the news via *Explorer* that Reporters without Borders have appealed to Ilham Aliyev, the President of Azerbaijan, to reverse the Azerbaijan government's decision to remove major international broadcasters from the FM band in Azerbaijan in 2009. Stations slated for departure from the local airwaves include the **British Broadcasting Corporation**, the **Voice of America**, and **Radio Free Europe/Radio Liberty**.

In recent years many international broadcasting organizations have abandoned their shortwave radio broadcasts. In many instances they have replaced the shortwave radio broadcasts with internet web sites and with local "placement" broadcasts on domestic FM and medium wave stations.

The Azerbaijan situation is a good example of a major flaw in that strategic decision. If local governments ban foreign broadcasts on their own domestic radio stations, then the international broadcasters are left with no coverage at all within the country that bans local "placement." With the world obviously in a global crisis right now, both in financial and political terms, many countries appear to have blundered in a major sense by curtailing their ability to transmit international broadcast signals to important target areas around the world via shortwave. Ironically, in some of those countries, the only remaining shortwave broadcast capability is retained by pirate and clandestine radio stations.

Radio Morania

Perhaps the most clever pirate radio production of all time was **Radio Morania**. As we see in the logs this month, somebody has been relaying an old tape of this classic pirate radio station. It is a very amusing parody of international shortwave propaganda broadcasters from the 1960s and 1970s. The announcer mimics the style of many of the old international broadcasters. He gives a roundup of what is going on at the capitol city of Morania. That is followed up with feature stories on the farmers out in the fields bringing in the spaghetti harvest and with workers down in the chocolate mines. The parody of the old **Radio Moscow** and **Voice of America** was right on the money, and the production is hilarious.

Somebody should be congratulated for bringing back this old classic pirate radio program. WBCQ in Maine is doing its part to popularize this historic broadcast, which origi-

nally was promoted by various radio magazines including *Popular Electronics*. The show can be downloaded from WBCQ at:

🔊 <http://worldmicroscope.com/archives/RadioMorania.zip>

What We Are Hearing

Monitoring Times readers heard 29 different pirate radio stations this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through typically used pirate radio frequencies to find the stations, but more than 95% of all North American shortwave pirate broadcasts are heard on **6925 kHz**, plus or minus 30 or 40 kHz.

Captain Morgan- TV audio from the old Twilight Zone show is added to their rock music format. (None, says to send loggings to the Free Radio Network web site)

Dead Cat Radio- As we see here this month, QSLs are forthcoming from this rock music station with a subplot of cats. (cattus.mortuus@gmail.com)

Di Dah Radio- Their pop music from various decades is identified only using Morse code. (None)

James Bond Radio- Their format is simple. It revolves around music from old James Bond movies. (None known)

Liquid Radio- Recent shows have supplemented rock music with techno dance music. (www.rbfm@gmail.com)

MAC Shortwave- Paul Starr's well produced replica of old top 40 radio is still on the pirate bands on unusual frequencies such as 6850 and 6950 kHz. (macshortwave@yahoo.com)

Mystery Radio- We continue to get reports from east coast DXers who hear this Europirate on 6220 kHz on weekends near local sunset. (radio6220@hotmail.com)

Northwoods Radio- Their rock music "from the Great Lakes" still is preceded by their "loon call" interval signal. (northwoodsradio@yahoo.com)

Old Turkey Radio- The gruff voiced announcer on this classic station returned once again this year at Thanksgiving. Look for their gobbling turkey noises around the holiday every year. (Announces oldturkeyradio@yahoo.com e-mail, but recent reports to that address have bounced)

Outhouse Radio- As you might expect, country music appears to be their specialty. (None known)

Radio Azteca- Bram Stoker's comedy station is the reigning champion of DX comedy stations on shortwave radio today. (Belfast)

Radio Morania- Somebody has been relaying this old classic pirate radio production. We discuss this in our central broadcast above this month. (None, sorry)



Radio Jamba International- Pirate radio discussions are mixed with their rock music, sometimes via a **WBCQ** relay. (Belfast)

Random Radio- As their name implies, their musical format varies from broadcast to broadcast. (None, asks for reports to the Free Radio Network web site)

Rodent Revolution Reinforcement Team- What apparently is a **WBNY** spinoff, this one invites monkeys to build a giant shrine to Commander Bunny. (None announced)

Sycko Radio- Comedy, rock and novelty music are their traditional fare. (syckoradio@yahoo.com)

Tangerine Radio- Relays of Raunchy Rick's well produced old anarchist programs have reappeared on multiple occasions lately. This is one of the well produced historic pirate stations, so its resurrection is welcome. (Belfast)

The Hole- This one features country music and complaints about the Presidential election results. (kahn@whoever.com)

Undercover Radio- Dr. Benway's rock music, pirate advocacy, and fables still come "from the middle of nowhere." Around major holidays he adds seasonal fare. (Merlin and undercoverradio@gmail.com)

Underwear Mineral Radio- Believe it or not, this new one featured pop music from the 40s and 60s with a computer for its announcer. (None announced)

Voice of the Abnormal- Another classic pirate radio program has returned to the air. Their shows are certainly abnormal, and they focus around the theme of insanity. The announcer claims that going crazy is appropriate nowadays. (Belfast)

WBNY- Although Commander Bunny of the Rodent Revolution was not elected President of the USA after all, he still brings satire to the pirate bands. (Belfast and rodentrevolutionhq@yahoo.com)

WMR- "We Monkeys Radio" plays only short clips from rock tunes as they broadcast to monkeys, on the theory that monkeys have short attention spans. (None announced)

WPON- This pirate complains about the political and economic situation with rock music, a slogan of "The Weapon," and machine gun noises. (None)

Wolverine Radio- Their rock music programming is normally preceded by a rock music riff interval signal. (None announced)

WTCR- Twentieth Century Radio plays music from various decades of the 1900s, from ancient pop to more modern rock. (Belfast)

WTKY- This new holiday pirate featured "All Turkey, All the Time," with plenty of novelty music and comedy. (None)

WTPR- The unusual format at "Tire Pressure Radio" claims that listeners should turn off their radios and not listen to the show. They cite several DXers who ignored the warning and subsequently got four at tires on their car. (None)

Zex Chetel Aliens- This one was bizarre, and nobody has completely gured it out yet. In a message from outer space, these aliens pledged to disrupt Obama's inauguration and take over the world. Their demands included some saxophone reeds, Tina Fey and Sarah Palin in bikinis, and Mr. Peabody with a wayback machine. (None)

QSLing Pirates

Reception reports to pirate stations require

Continued on page 63

Thaw out your Kit-Building Skills

February in the Northeast is usually fairly bleak and cold. But hams know how to break the winter doldrums. Sure, there are opportunities to operate, the bands being significantly less noisy (and they are even picking up a bit), but this time of year always finds me down at the workbench keeping warm by the heat of my soldering iron.

It has been something like 40 years since I first walked into the Heathkit Store on Frankfort Ave. in Philadelphia, PA and dropped several months' allowance on my first radio kit. When Heathkit gave up the kit business on that fateful day of March 30, 1992 (I hold a moment of silence every year), many a ham home builder went into an extended period of mourning. Where was a dedicated amateur radio operator to go to satisfy his or her kit building obsession?

Lucky for us, more than a few folks missed the days when Benton Harbor Green was the color of choice in many ham shacks. Some of these folks went on to start businesses to fill in the gap created when Heath left the kit business. Several of these operations have evolved into sources of fun and challenging projects in the spirit of Heathkit.

Of course there are the large companies that make kit offerings such as Elecraft, TenTec, MFJ and Ramsey. However, for this article, I would like to concentrate on the smaller operations that are really doing more with less when compared with the aforementioned companies. Let's take a look at what is out there today. Perhaps you will find just the project to keep you occupied at your workbench until the spring thaw.

Hendricks QRP Kits
862 Frank Ave.
Dos Palos, Ca 93620
Phone 209-704-3522
www.qrpkits.com

I first met Doug Hendricks, KI6DS almost 10 years ago when he came east to attend a NJQRP Club meeting. At the time Doug was best known for directing the NorCal QRP Club's kitting efforts. Perhaps the best known of these was the NorCal 20, no compromise, 20 meter CW rig.

Doug is still quite active with NorCal, but has started up his own kitting business, Hendricks QRP Kits. Doug offers a number of full-featured transceiver kits covering both phone and CW operation. Three of these kits are real stand-outs.

The BitX20A SSB Transceiver is based on a design by Ashlan Farhan. Ashlan's original design was built as a breadboard "ugly" construction project. Doug enlisted the help of several folks to layout a printed circuit board for this design so it



The Hendricks QRP Kits' BitX20A is the perfect project to get you through until Spring breaks out.

could be made into a kit that could be built by any ham who knows which end of a soldering iron to hold. The kit puts out an honest 10 Watts, making it a great kit for phone operators looking for something they might want to take portable. Also, if you are enjoying the conversations on 17 Meters, the kit can also be ordered as the BitX17A.

If you are familiar with the ARRL Homebrew Challenge, you may have run across the winner of this contest, the MMR 40 CW/SSB transceiver. Designed by Steve Weber KD1JV, this is a perfect rig for getting your feet wet in the world of QRP.

Steve also contributed another design to Doug's lineup, the Three Band Portable Field Radio. Designed for folks who like to take their radio into the outdoors, the PFR3 is a 5 watt CW rig that is a mere 7.3" long, 4.4" wide, 1.6" high – perfect for throwing into a backpack or a kayak hatch! That would be enough right there, but this kit also has the added features of a memory keyer and balanced line tuner. Just toss a wire into a tree and connect the key (also available from Hendricks) and you are on the air from wherever you are.

Doug has a number of other exciting kits well worth your time. Cruise on over to his website for more details. You'll be happy you did.

Speaking of Steve Weber KD1JV, he has his own line of kits you might be interested in as well.

KD1JV Designs
633 Champlain St.
Berlin, NH 03570
<http://kd1jv.qrpradio.com/>

I haven't been calling Steve by his more common handle. In the QRP world, he is better known as Steve "Melt Solder" Weber. Steve has been encouraging folks to build their own radios and test equipment for many years. I first encoun-

tered Steve when he made a modification kit for the Maxon MCB-30 CB radio.

Several "big box" stores were closing this rig out for as little as twenty dollars. Steve couldn't help but notice that it would make a swell 10 meter AM portable. Mine has been going strong for almost 10 years now.

Steve has gone on to offer dozens of great projects since then. He is between active kits on his web site right now, but not to worry, his site has 20 projects posted that many folks might want to try to pull together by themselves. I built his Linear Scale Analog Watt Meter from the plans and information he provides on his website. Check back regularly; whenever Steve gets an idea in his head, another kit or project is not far behind.

Small Wonder Labs
PO Box 187
Newport, NH 03773
<http://smallwonderlabs.com>

Another person I met through various QRP gatherings over the years is Dave Benson K1SWL. Dave first came to radio kitting fame with his 40-40 Transceiver design published in the November 1994 issue of *QST*. Dave made a few updates to the original design and the kit is available through his Small Wonder Labs business as the SW+. The kit can be ordered in its original 40 meter configuration or on the 20, 30 or 80 meters bands as you see fit.

Dave also makes a fun accessory for this kit, the Freq-Mite, a Morse Frequency Counter that helps you keep track of where your SW+ (or many other rigs) is operating.

If you are interested in trying your hand at PKS-31, Dave offers a series of kits to take you there. The PSK 20, 30 or 40 kits are simple to build and fun to operate. Dave was also responsible for (and sells) the diminutive 80 meter PSK rig known as "The Warbler." If you think there is no PSK-31 activity on 80 meters, you need to remember that over 2000 of these kits have been sold to date.

I like Dave's PSK series of kits because they allow you to operate on PSK-31 without needing to tie up your primary transceiver.

Oak Hills Research
10691 E. Bethany Drive, Suite 800
Aurora CO 80014
Phone: (303) 752-3382
1-866-647-5487
www.ohr.com/

One of the great minds in home-built ham radio was the late great Doug DeMaw W1FB.

(Don't be too surprised if Doug's name comes up more than a few times in this article. He was a true pioneer in this field.) Doug's work lives on through the auspices of Oak Hills Research.

Now a division of Milestone technologies, the flagship of the DeMaw design line remains the OHR-500, a 5 band CW rig that can be outfitted with an accessory keyer and digital readout. They also offer single band transceivers as well. They are perhaps best known for their WM2 QRP Wattmeter, a common sight in many QRPers' shacks.

Wilderness Radio
P.O. Box 3422
Joplin, MO 64803-3422
(417) 782-1397

As the name suggests, this company offers a very comprehensive line of kits designed with the outdoor adventuring ham radio operator in mind. They are perhaps best known for their SSTs or Simple Superhet Transceivers. They also make the full featured multi-band Sierra Transceiver designed by Wayne Burdick N6KR, who went on to found Elecraft with Eric Swartz WA6HHQ.

The Club Connection

There are clubs that offer fine kits worth spending a few evenings building. I have already mentioned the NorCal QRP Club in passing.

NorCal QRP Club Inc.
www.norcalqrp.org

They have a number of current kit offerings. Their main project right now is the 2N2/XX transceiver. Evolving from the original Jim Kortge K8IQY 2N2/40 design, these kits are now available for 20, 30 or 40 meters.

Another kit that is great for any workbench is their S9 Signal Generator. It has switchable output levels and frequencies to allow for S-meter calibration, receiver alignment and sensitivity testing.

NorCal is also a great source for fundamental crystals for many of your radio projects. They routinely stock 3.580 MHz, 7.030 MHz, 7.040 MHz, 10.116 MHz, and 14.060 MHz rocks for the popular QRP operating frequencies.

The North Georgia QRP Club
www.nogaqrp.org/

Better known as NOGA, these folks have been making kits of various levels of difficulty available for over 10 years. Lately they have been specializing in accessories for the famous WIFB Tuna Tin transmitter. Their kits have very creative names as well, such as the NoGaPig, NoGaWaTT, and my favorite, the Guppy (which stands for the Genuinely Useful and Practical qRP accessorY). Inexpensive, easy to build, and a whole lot of fun. Check their site out for more information and current offerings.

The American QRP Club
www.amqrp.org/

If you need a Tuna Tin (or any of a number of other great kits) you may want to check out the American QRP Club. This club is currently sell-

ing the venerable Doug DeMaw WIFB design. The Tuna Tin has never gone out of style since its introduction in 1976.

One of the greatest moments of my radio hobby life was getting to operate Doug's original Tuna Tin at the 2000 Atlanticon QRP Convention. If you want to play with a piece of radio history, this is the kit for you.

AMQRP doesn't limit itself to simple transmitter kits. This club is at the forefront of digital design in the radio hobby.

Another club devoted to the building art is:

The New England QRP Club
<http://newenglandqrp.org/>

Currently they offer a very useful kit, the NEScaf Switched Capacitive Audio Filter. Based on the MF100 chip, this filter allows you to vary the audio bandwidth smoothly over a wide range – a great addition to the various low power transceiver kits mentioned in this article. They offer other kits and projects from time to time, so this is a site worth bookmarking for future reference.

And then there are kits from Maine:

QRPME
PO Box 160
Limerick, ME 04048
www.qrpme.com/

QRPME has taken the Tuna Tin concept to its ultimate extreme. Rex Harper WIREX is currently offering over 20 kits, mostly built on (or arriving in) standard size tuna cans. Not only can you get a classic Tuna Tin kit here, you can get any number of interesting variations. This site is a lot of fun with a lot of great kit building opportunities as well. Lots of radio fun for very little coin.

It doesn't matter if you take on the task of assembling a simple two transistor Tuna Tin or go all out building an Oak Hills Research OHR-500 or a Wilderness Radio Sierra. It's all about the fun

Outer Limits continued from page 59

three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses:

PO Box 1, Belfast, NY 14711
PO Box 109, Blue Ridge Summit, PA 17214
PO Box 146, Stoneham, MA 02180
PO Box 293, Merlin, Ontario N0P 1W0.

PO Box 69, Elkhorn, NE 68022 is no longer a valid address.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletin for submitting pirate loggings is the e-mailed *Free Radio Weekly* newsletter, free to contributors via freeradioweekly@gmail.com. A few pirates will sometimes QSL reports left on the outstanding Free Radio Network web site, at www.frn.net. *The ACE*, a former widely read print bulletin, now has a good loggings section and a valuable archive of *Free Radio Weekly* issues at www.theaceonline.com/

UNCLE SKIP'S CONTEST CALENDAR

Vermont QSO Party
Feb 7 0000 UTC - Feb 8 2400 UTC

10-10 International Winter Contest (SSB)
Feb 7 0001 UTC - Feb 8 2359 UTC

Minnesota QSO Party
Feb 7 1400 - 2400 UTC

Louisiana QSO Party
Feb 7 1500 UTC - Feb 8 0300 UTC

Delaware QSO Party
Feb 7 1700 UTC - Feb 8 0500 UTC
Feb 8 1300 UTC - Feb 9 0100 UTC

North American Sprint (CW)
Feb 8 0000 - 0400 UTC

CQ WW RTTY WPX Contest
Feb 14 0000 UTC - Feb 15 02400 UTC

FISTS Winter Sprint
Feb 14 1700 - 2100 UTC

North American Sprint (SSB)
Feb 15 0000 - 0400 UTC

ARRL International DX Contest (CW)
Feb 21 0000 UTC - Feb 22 2400 UTC

CQ 160-Meter Contest SSB
Feb 21 0000 UTC - Feb 22 2359 UTC

Mississippi QSO Party
Feb 21 1500 UTC - Feb 22 0300 UTC

North Carolina QSO Party
Feb 22 1700 UTC - Feb 23 0300 UTC

of putting a radio together with your own hands and experiencing the thrill of putting it on the air. Being able to say "Rig here is Homebrew" is a real badge of honor on the bands. Give it a try.

Have fun. I'll see you on the bottom end of 40 Meters.

Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Brian Alexander, Mechanicsburg, PA; Skip Arey, Beverly, NJ; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Wendel Craighead, Prairie View, KS; Richard Cuff, Allentown, PA; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Bill Finn, Philadelphia, PA; John M. Fisher North Chelmsford, MA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Corpus Christi, TX; Ed Insinger, Summit, NJ; Fred Jodry, New Rochelle, NY; Kracker, Belfast, NY; Ed Kusalik, Camrose, Alberta; Chris Lobdell, Tewksbury, MA; Michael Maher, Hillsborough, NJ; Greg Majewski, Oakdale, CT; Kevin Mikell, Chicago, IL; Adrian Peterson, Indianapolis, IN; Mike Rhode, Columbus, OH; Lee Silvi, Mentor, OH; Arnaldo Slaen, Argentina; John Wilkins, Wheat Ridge, CO; and Joe Wood, Greenback, TN.

Antennas Which Neither Communicate nor Broadcast

Antennas are versatile devices: so versatile, in fact, that some antennas support activity other than radio communications. Let's take a look at some of them, starting with an antenna that doesn't actually exist!

The isotropic antenna is an important antenna, even though it exists only in our imagination. Being imaginary, it certainly doesn't support communication!

The isotropic antenna is considered to be a point in space from which radio signals would radiate or would be received equally in all compass directions and at all vertical angles. This results in a spherical-shaped, totally non-directional radiation pattern which is used as a standard of comparison for other antennas in terms of their gain and directional patterns.

Storm Detectors

Even in the early pioneer days of radio, the legendary Nikola Tesla was able to track storms with his newly-invented radio system. He did this by using an antenna and receiver to detect the electromagnetic waves (natural radio waves) that the storm's lightning produced.

A later system of storm detection was developed using orthogonally-crossed horizontal antennas, and an oscillographic readout. This system is known as a "lightning recorder," or "sferics receiver." "Sferics" is a shortening of the term "atmospherics," which is a term used to describe lightning-created static.

Radio Direction Finding

There are several different radio direction

finding (RDF) antenna designs. Rather than supporting communication, these antennas can be used to determine the direction from which a received signal originates. Radio direction finding systems have been very useful for such tasks as locating distressed ships at sea, locating sources of radio interference, and locating enemy transmitters in war time. Hams use RDF antennas in the radio sport called "fox hunting" to locate hidden transmitters. Some RDF systems depend on the directional characteristics of the antenna utilized; others depend on the difference in time of signal arrival at multiple antennas.

Radar Antennas

Depending on the application, there are many different designs for radar antennas. Antennas with very narrow beams are used in most radar work. Some of these antennas are rotated to scan the terrain between the horizon and the antenna. After sending out a pulse of signal the radar set pauses to "listen," and receives the reflections from objects in the signal's path. The antenna then rotates a bit, and sends out another beam, listens again, and so on. As the beam rotates completely around in this fashion, the radar set can "draw" a picture of the territory surrounding the antenna. Radar can be used to observe such things as weather conditions and aircraft in flight.

Measuring the Height of the Ionosphere

The refraction of radio signals from the ionosphere back to earth is the basis of the long-distant communication on the high-frequency band. And

when the ionosphere is sufficiently ionized, then signals of appropriate frequency directed straight upward will reflect from the ionosphere directly back down to earth. A special type of radar system called an "ionosonde" is used for this purpose.

As with other radar systems, an ionosonde includes an antenna, transmitter, receiver, and data display or data recorder. By analysis of the echoes of signals reflected from the ionosphere, the layering, density, and the height of the ionosphere can be determined. This information is useful in predicting such factors as the maximum usable frequency for communications which depend on ionospheric refraction for their success.

Field-Strength Meter Antennas

Field-strength meters indicate the strength of signals which their antennas capture. Field-strength meters are often used as indicators for adjusting the relative strength of the output of a radio transmitter. Calibrated field-strength meters can be used to determine the actual strength of received signals. For example, calibrated field-strength meters can be used to determine the strength of television signals received at a specific location. This helps to determine the amount of antenna gain needed at that location to obtain good picture quality.

Receiving Natural Radio Waves from Space

Radio astronomers utilize antennas to capture natural radio emissions generated by stars and other objects in outer space. Even areas in the heavens that seem dark to our eyes are sometimes shown to be active sources of natural radio emissions. The antennas used to capture these extraterrestrial signals are called "radio telescopes."

Antennas such as ordinary dipole antennas can have limited usefulness as radio telescopes; however, larger, more complex directional antennas such as the large dish-reflector designs are very useful. The most well-known of these is the 1000 ft diameter behemoth at Arecibo, the world's largest single-dish radio telescope.

The HAARP Research Program

Antennas have been used in the High Frequency Active Auroral Research Program (HAARP) to direct radio-frequency power upward to create a slight warming of the ionosphere. It is

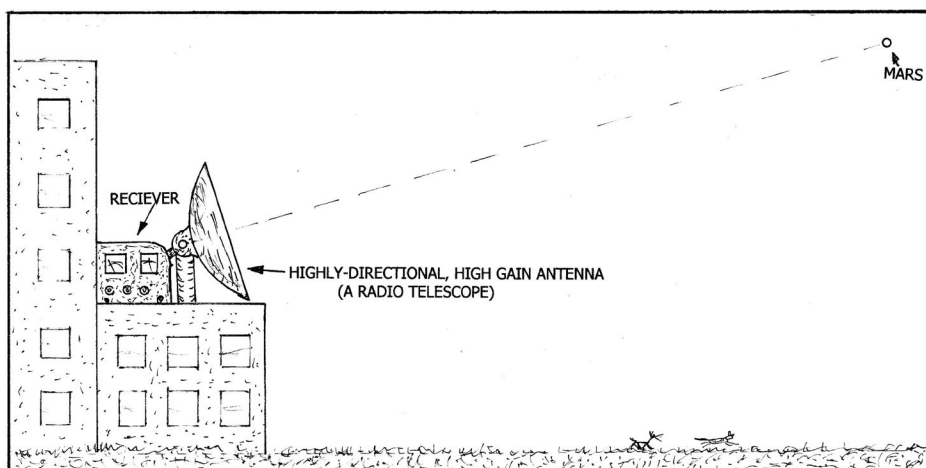


Fig. 1. Schematic of how an antenna might be set up to collect data to determine the temperature of a distant object.

This Month's Interesting Antenna-Related Web site:

This site gives a brief discussion of a different radio or electronics-related fact each day. It's a great way to learn a bit about your hobby every day:

www.smeter.net/daily-facts/daily-facts.php

Remote temperature sensing:

www.encyclopedia.com/doc/1O80-antennatemperature.html

About ionosondes, and related things:

www.ngdc.noaa.gov/stp/IONO/Dynasonde/whatis.htm

hoped that the results of this warming will lead to a greater understanding of how the ionosphere works and how it affects radio communication.

Remote Temperature Sensing

Perhaps the most remarkable non-communication use of antennas is the sensing of the temperature of remote objects. It is possible to aim an antenna at a distant object, such as the planet Mars, and determine the temperature of that object by the amount of radio-frequency energy received from the object by the antenna (fig. 1).

Non-Electronic Applications of Antennas

We've probably all seen automobiles proudly decorated with tall whip antennas even though there was not a sign of a radio receiver or transmitter in the vehicle! And some hams, wanting to disguise the presence of their home-base antennas,

RADIO RIDDLES

Last month

I asked: "When a feed line and antenna are mismatched then some of the energy sent toward the antenna by a transmitter is not accepted by the antenna and will be reflected back down the line. This will cause what is called 'standing waves' on the line. What is a standing wave, and what is standing-wave ratio (SWR)? And what is it that is standing?"

Well, the combining of the energy moving on the feed line toward the antenna with that reflected back from the antenna, creates a stationary (doesn't move along the feed line) pattern of values of both voltage and current along the line. When graphed, this pattern has the shape of a sine wave with recurring maximum and minimum values. Because this

distribution of energy along the feed line is stationary, the pattern is referred to as "standing waves."

The ratio of the maximum value to the minimum value of either voltage or current standing waves is known as the "standing-wave ratio," or "SWR." If there were a perfect impedance match between antenna and feed line, then there would be no reflected energy, and no standing waves.

This Month

The perfectly matched situation above can be described as a 1:1 level of SWR. How essential to good communication is it to have a perfect impedance match between your antenna and feed line, and thus a 1:1 SWR?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

have used antennas as functional flag poles in addition to their functioning as antennas.

It has been said that the radio telescope of Grote Reber, the first radio astronomer, was sometimes used by his mother for hanging her clothes out to dry. On one occasion this is said to have actually delayed his showing the antenna to a group of scientists while his mother's wash finished drying! I fear that this story may be apocryphal, however, because the antenna was a dish, and not a wire.

Antenna Designer

New Version 2.1 for Microsoft Windows 95 and 98

Computer program helps you design and build 17 different antennas from common materials. Based on Antenna Handbook by W. Clem Small.

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Visit our web site: www.popular-communications.com

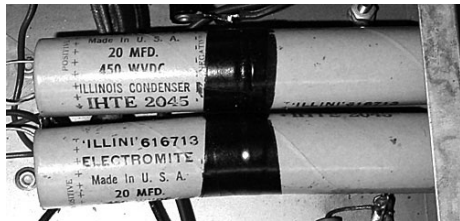
The Globe Scout: Limited Progress

Last month, I ran into a blank wall on the Globe Scout 680 restoration and sent you a column on vacuum tube history instead. This month I've managed to advance the cause a bit.

When I took on this project, I figured to make quick work of what appeared to be a pleasant, simple, Novice transmitter in excellent physical condition. It was quite different from my last couple of grimy project sets, which had obviously been stored with no climate control. But appearances were deceiving!

The Story So Far

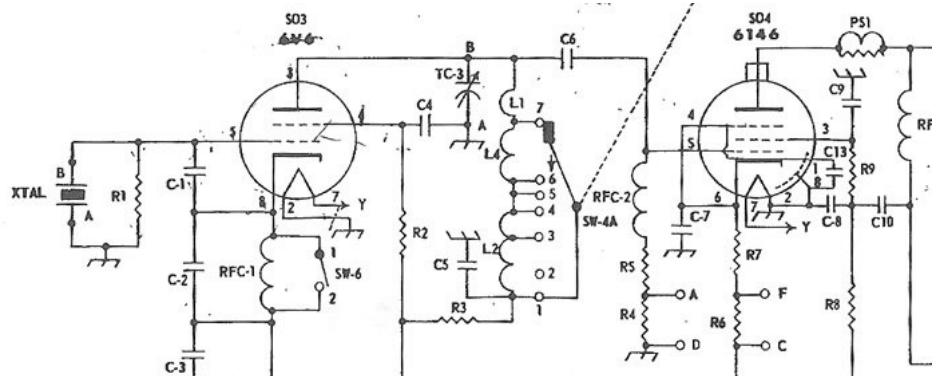
In my first sessions with the Globe Scout, I checked the tubes and found them to be good, replaced the faulty line cord, applied power with the rectifier removed and found that the power transformer was okay, and replaced all eight of the electrolytic capacitors. Then it was time to plug in the rectifier and do a "smoke test."



Four of the eight electrolytic caps that needed replacing in the Globe Scout 680. Each taped-together pair is connected in series to meet the voltage requirement (see December issue).

I inserted an 80-meter crystal (ordered in advance for the frequency of a local a.m. net), set the bandswitch to 80 meters, put the rig in c.w. transmit mode, flipped the meter switch to read final grid current, and attempted to tune the crystal oscillator. I was confidently expecting the meter to peak at the requisite 3 mA – but the pointer refused to budge off the pin!

I double checked all the controls for proper position and tried again. Still nothing. Checking the manual for troubleshooting data, I found some tube pin voltages that had been factory measured with grid current at 2.5 mA and final plate current of 120 mA. Come on – what kind of help is that? The problem was that I had no grid current or plate current. A set of power-off resistance readings would have been so much more helpful!



Crystal oscillator (left) and final stages of the Globe Scout. Coupling capacitor C6 is horizontally oriented at top of picture (see text).

However, I went ahead and checked the voltages in transmit mode with no grid or plate current – but was confused by a strange lack of consistency. The readings seemed to change each time I re-measured. Later, I happened to be browsing through Joseph Carr's venerable but useful book *The Complete Handbook of Radio Transmitters* (Tab books, Inc. No. 1224, 1960), when I found the answers. He cautions that meters with semiconductor amplifiers are easily confused by oscillating circuitry.

A Bit of Progress

Hmm – well if that was the reason, perhaps my 6V6 crystal oscillator circuit was indeed oscillating even if there was no indication on the final grid current meter. I substituted my trusty old Simpson 260 for the DVM and shortly was enjoying a set of readings that could be reproduced. They looked to be reasonably close to correct.

That gave me an idea. On my bench was a little National SW-54 receiver that had been the subject of an earlier restoration. Bringing it over to the workbench, I turned it on, set

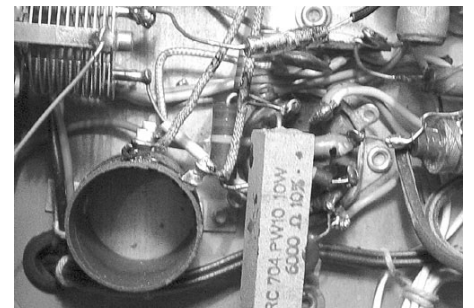
it near the crystal frequency, and placed its antenna wire near the Globe Scout 680's 6V6 oscillator tube. Turning on the transmitter and tuning around on the SW-54, I did indeed hear a signal – though it was a little weak and "buzzy." And I could maximize it by adjusting the 680's oscillator tuning knob.

Well, if the 6V6 oscillator stage was indeed oscillating but showing no grid current at the 6146 final stage, there was one obvious possible culprit. It was the coupling capacitor between the two stages. It's labeled C6 on the schematic section that I'm including with this article. The print quality on this downloaded schematic might not be good enough for you to be able to make out the C6 designation, but it is the horizontally oriented capacitor at the top – connected between the plate of the oscillator (at left) and the grid of the final.

The parts list specified C6 as a 33 pF ceramic tubular. Disconnecting it for checking on my capacitor tester, I found it was open – or at least with a capacity so small as to be offscale at the smallest measurement range. I had a



In this shot, all eight of the 680's electrolytics have been replaced. The group of four mounted on terminal strips at center replaces the taped-together pairs shown in the "before" picture.



The connections at the crystal oscillator tube socket are partially obscured by a large power resistor, but you can still get a feeling for the very tight construction.

51 pF silver mica on hand and, substituting that, I was momentarily elated to find I was now getting a grid current reading in transmit mode. And the buzzing oscillation heard on the receiver was much louder. But the reading was full scale, pinning the meter, and unaffected by the oscillator tuning control.

Substituting a 22pF silver mica (unfortunately I didn't happen to have a 33 pF), I found that the grid current meter now would jump up only to three-quarter scale, giving me some leeway to experiment. Rotating the oscillator tuning capacitor, I found I could peak the meter – but the peak and null occurred at the top of the constant three-quarter deflection – which was quite strange. This deflection would occur in transmit mode even with the oscillator crystal and oscillator tube removed.

There were two other ceramic tubulars in the oscillator as well as three disc ceramics. Certainly if one of the ceramic tubulars had gone open, the others – of the same manufacture – might also have problems. I wanted to check them out – but the wiring around the oscillator tube socket was the tightest and most compact I'd ever seen. I know r.f. circuits need short leads, but this was ridiculous!

There would be no way to remove these components for testing without disconnecting other components to move them out of the way. Their leads would probably have to be cut to remove them from the circuit and many were so short that reinstallation would be all but impossible. I can see only one way to go and that would be to arm myself with new resistors and caps to rebuild the oscillator circuit (there are only half a dozen or so), strip the parts out, and install new ones. I'll make sure that the parts I remove will have leads at least long enough so I can test them. I'll report on the results next time.

Using a BC-221 at VHF

I recently received a couple of interesting communications relating to our BC-221 heterodyne frequency meter project. Gene Wiggins, W9CWG, of Valparaiso, Indiana, has always been fascinated by the instrument – which he used during World War II and, later, in classes he taught at Valparaiso Tech. His letter describes a method I never would have imagined for using the '221 (which normally reads only to 20 MHz) to check the frequencies of transmitters in the 155 MHz range.

As an example, let's say you wish to make an exact check of a transmitter nominally operating on 155.130 MHz. Key up the transmitter, adjust the '221 to the check point nearest to 130 kHz, and leave the 1000 kHz calibration crystal running. Its 155th harmonic will beat with the nominal 155.130 MHz signal to generate a signal at or near 130 kHz. Now adjust the tuning dial of the '221's VFO to zero beat with that signal to determine its exact frequency.

You will hear many zero beats going by quickly, "zip, zip, zip," as you adjust the VFO. These are the result of the crystal oscillator beating with the VFO frequency. The zero beat you want will be obvious because it is a very broad one.

If you've been careful, your frequency readout will be within 80 Hz. However, the frequency of your 1000 Hz crystal needs to be dead accurate. Use the crystal trimmer on your '221 to adjust it to beat with a WWV signal.

As it happens, there is a military heterodyne frequency meter actually designed for VHF work. I don't have the model number handy, but it looks almost exactly like the BC-221. I have one somewhere, though they're not too common.

The '221 as a Regen Frequency Monitor

Mike Murphy e-mails that he acquired two BC-221s last summer – one wooden-cased and the other metal-cased. Instead of using a gas tube voltage regulator in his power supply, as I did, he went solid state using a Zener diode and a MOSFET circuit.

Mike likes to use vintage regenerative receivers in amateur radio work. Regeneratives have a habit of frequency-locking on strong local stations – and so sometimes you are not on the frequency you think you are when in contact with a DX station. Zero-beating the contacted station with a BC-221 provides a stable, accurate reference to its frequency.

Golden Oldie Book Reviews

Ghirardi Radio Service Books

Still very common at radio meets and flea markets is Alfred A. Ghirardi's monumental tome *Modern Radio Servicing*. My copy is the 1935 first edition published by Murray Hill books (New York, NY). In its more than 1300 pages, this book contains a more comprehensive review of mid 1930s (and earlier) consumer radio receiver design than can be found in any other single source.

The book is entirely practical in its approach and content. The first three of its four parts cover the theory and construction of radio test equipment, practical radio receiver servicing, and specialized servicing problems. Part 4 is an appendix containing tables of vacuum tube characteristics and basing diagrams as well as the book's index.

In Part 1 will be found a review of the operation and construction of every item of test equipment that might be used in a service shop of the era. There are even instructions on how to build service equipment such as a tube checker, set analyzer and test oscillator.

Browsing through Part 2, I noticed methods for testing antenna and ground systems; a comparison of TRF and superheterodyne receiver designs; a very thorough discussion of automatic volume control and special tuning systems; troubleshooting schemes including making voltage-current and resistance checks; instructions for the testing and repairing of individual radio components and for the alignment and neutralization of TRF and superheterodyne receivers.

Part 3 has chapters on installing and servicing auto and marine receivers, special problems of allwave and high fidelity receivers, methods

for reducing electrical interference, and sales techniques for the radio service technician. In Part 4 are appendixes containing vacuum tube characteristics and basing diagrams.

Two companion books by Ghirardi should be touched on here. These are *Radio Physics Course*, Radio & Technical Publishing Co. New York, NY (mine is the Second Edition, Eighth Impression, of 1937) and *Radio Troubleshooter's Handbook*, Murray Hill books, New York, NY, (I have the Third Revised Edition of 1943).

Radio Physics course, subtitled "An Elementary Textbook on Electricity and Radio," contains all of the theory deliberately left out of *Modern Radio Servicing*. Approximately the first third of the 972-page book is devoted to classical electrical physics, while the second two-thirds deals with the application of this theory to practical radio devices. Several appendixes contain useful tables and charts.

More than half of the 743-page large-format (8 1/2" x 11") *Radio Troubleshooter's Handbook* is devoted to the correction of typical symptoms in specific models of radio receivers and record changers. According to the introduction, problems occurring in 4,820 different models are resolved.

The remainder of the book contains a wealth of useful reference material too varied to review here, but among the most important to today's restorers are the sections on i.f. transformer construction and repair and i.f. alignment that immediately follow the diagnostic section.

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AOR AR-Mini B

By Larry Van Horn, N5FPW

AOR has been out of the highly competitive small scanner market for some time now, so it is good to see they have returned with their new AR-Mini B. AOR has always produced a quality radio, and this unit is no exception.

The AOR AR-Mini, a compact hand-held unit, is similar in size to the Icom IC-R5 that has been so successful.

The AR-Mini handheld offers continuous frequency coverage from 100 kHz to 1299.995 MHz (except for the mobile and base cellular bands). Reception modes include AM, narrowband FM and wideband FM. This scanner is a conventional scanner, with no trunking capability.

What's in the Box

The AR-Mini box contains the following items: AC adapter, two AA NiMH batteries, SMA antenna, belt clip, hand strap, and a printed manual.

Features

The AR-Mini has a load of interesting features for such a small package. Some of these key features include:

- Water resistant (Meets JIS4 waterproof standards to protect against spray and splash)
- High stability TCXO (+/- 2.5 ppm)
- Long battery life (up to 22 hours)
- 1000 Alpha memories in 10 banks are supplied
- CTCSS and DCS Decode
- Preprogrammed bug detector (with level beep)
- Two VFOs
- RF Attenuator
- Built-in ferrite bar antenna (100-5000 kHz)
- Battery saver
- Backlit LCD with signal meter
- Voice inverter descrambler (not available for the U.S. domestic version)

Some of the other features that are included with this unit include: Priority channel watch; memory chan-

nel skip; earphone cord antenna capability; battery save functions; auto power off timer; automatic or selectable tuning steps; and a low battery indicator.

Optional Accessories

There are several optional accessories available for the AR-Mini. These options include: AA-Mini "A" plug type replacement AC adapter (100-240V to 6VDC, 500 mA supplied current); DC-Mini DC cable with cigarette lighter plug (6VDC, 500 mA supplied current for 12/24VDC socket); CO-Mini data cloning cable (AR-Mini to AR-Mini cloning); PC-Mini PC cable (USB only); SC-Mini soft carrying case; and a SMA to BNC adapter for the antenna socket.

There is also programming software available. The AR-Mini programming tool helps the user easily edit and upload memory channel data and adjust the unit's settings. This software is not available with the unit on a CD-ROM, but it can be downloaded free of charge from the AOR website at www.aorja.com/ar-mini/ar-mini.html. Downloading the software is strongly recommended, since the unit does not have a conventional keyboard and programming manually is a bit of a chore.

If you are interested in getting a closer look at the operation of this receiver, you can download an Adobe PDF copy of the manual from the AOR website at www.aorja.com/ar-mini/AR-Mini%20manual.pdf.

Additional downloads from the AOR website include:

- Color leaflet/sales brochure
- Manual amendments and corrections (as of November 28, 2008)
- Manual page 37 detailed explanation
- Manual page 44 detailed explanation
- USB driver (v5.3-July 15, 2008) (5.95MB)
- Free software "Programming Tool" v1.00 mentioned above (7.55MB)
- Driver install and quick guide (v. Oct.28, 2008) (751kB)



★★★★☆
Overall rating: 2 and 3/4 stars

TABLE 1: MISCELLANEOUS SPECIFICATIONS

- Frequency Range:** 100 kHz to 1299.995 MHz
(Cellular Blocked)
 - Receive Modes:** FM, WFM, AM
 - Tuning circuits:**
 - AM/Narrowband FM: Triple conversion super-heterodyne
 - Wideband FM: Double conversion super-heterodyne
 - Intermediate frequencies: 243.950 MHz, 21.7 MHz, and 450 kHz
 - Sensitivity:**
 - 200 kHz - 5.0 MHz
AM: 1.3µV (10dB S/N)
 - 5.0 MHz - 160 MHz
AM: 0.6µV (10dB S/N)
FM: 0.2µV (12dB SINAD)
WFM: 0.9µV (12dB SINAD)
 - 160 MHz - 370 MHz
AM: 0.6µV (10dB S/N)
FM: 0.2µV (12dB SINAD)
WFM: 0.8µV (12dB SINAD)
 - 520 MHz - 1300 MHz
AM: 0.7µV (10dB S/N)
FM: 0.35µV (12dB SINAD)
WFM: 1.0µV (12dB SINAD)
 - Selectivity:**
 - AM/Narrowband FM: More than 15 kHz (-6dB)
 - Wideband FM: More than 110 kHz (-6dB)
 - Memory channels:** 1000 (10 banks)
 - Scan Speed:** 8 steps per second
 - Tuning steps:** 5, 6.25, 8.33*, 9*, 10, 12.5, 20, 25, 30, 50, 100 kHz (* selectable depending on band)
 - Select channel scans:** 100
 - Priority channel:** 1
 - Pass frequencies:** 100
 - Frequency stability:** ± 2.5 PPM
 - Conducted spurious emissions:** Less than -54 dBm
 - AF Output Power:** 100mW at 10% distortion with an 8 ohm load
 - External speaker connection:** 3.5 mm mono jack
 - Power Consumption:** 110 mA (nominal), 65 mA (stand by), 20 mA (stand by saver),
 - Dimensions:** 2.4 wide (60 mm) x 3.7 high (95 mm) x 0.9 deep (24 mm) inches.
 - Weight:** 7.4 ounces (210 grams) with antenna and battery
 - Antenna Jack:** SMA
- Specifications are subject to change without notice.*

MTFIRSTLOOKRATING(0-10SCALE)

Audio Quality.....	6
Audio Levels.....	7
Backlight/Display.....	6
Ease of Use.....	5
Feature Set.....	5
Keyboard/Control Layout.....	5
Overall Construction.....	7
Overall Reception.....	5
Owners Manual.....	7
Sensitivity.....	5
Selectivity.....	5
Spectrum Usability.....	5

Bottom Line

Out of the box the AM/Shortwave reception using the stock rubber duck or the built-in bar antenna is poor. Add a good passive external antenna and shortwave reception improves considerably. However, even with an outdoor antenna, the AM broadcast band reception was still poor. Using an active antenna proved to be a disaster with the radio de-sensing due to

more signal than the radio could handle.

Unfortunately, there is no SSB/CW mode capability. This limits the utility of shortwave reception to only shortwave broadcast stations (about 15-20 percent of the shortwave frequencies covered by this unit).

I thought overall VHF/UHF reception was good. I was especially impressed with the FM broadcast band reception. I was able to hear several stations here in western North Carolina that I have not heard on several other scanners we have tested.

The big drawback to this radio is it has no trunking capability and it does not have an APCO-25 digital decoder. This limits scanner reception to conventional, analog scanning.

The LCD screen was easy to read, programming was easy to perform with the programming software, and the manual was well written.

List price for this unit is \$299, but you will find discounts at most dealers that carry the unit. It is available from several of the major amateur radio dealers in this country

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Kevin Carey
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and abroad.

If you live in an area that has not moved into the trunking/P-25 communications scene, and you don't use this radio as your primary shortwave radio, the AR-Mini is a nice scanner to carry with you for travel use.

Bugging Blagojevich

By Bob Grove

The December corruption arrest of Illinois Governor Rod Blagojevich brought to light the use of surveillance devices and techniques. In the governor's case, his campaign headquarters, home, and personal office were bugged for about two months.

Federal investigators are understandably reluctant to reveal how they gained access to the governor's facilities, but a recent ABC news article by Scott Michels (Dec. 11, 2008) revealed quite a bit.

"It's not something you do overnight. You have plenty of time to develop probable cause. You do a survey, figure out how to get in," according to Lee Flosi, a former FBI agent in Chicago's Organized Crime Task Force.

But the privacy aspects must be considered as well in federal wiretaps. First, probable cause that such a tap will detect ongoing criminal activity must be presented to the Department of Justice and a federal judge. For a phone tap, investigators don't need access to a home or office; they just work with the phone company.

But to actually place a bug in a suspect's home or office often requires "surreptitious entries," says ABC's Brad Garrett, a former FBI agent. He observes that the agent may have to pick the lock and disable the alarm in a manner that no one will know you've been there.

Lee Flosi adds that some agents will pose as repairmen, or even get a job with a night cleaning crew.

So how and where do you put the bug?

Flosi admitted in the ABC story that he once hid in an empty refrigerator box which agents delivered to the door of the suspect's house. Since the house was right across the street from the police station, they needed that cover to obscure the view of Flosi picking the lock from inside the box. The agents then retrieved the box and simply walked inside and planted the bug.

Long-time *MT* reader Kevin Murray, a well-known security consultant, also responded to ABC's story, noting how easy it is to get into most places, since locks and alarms rarely deter espionage. He added that modern listening devices are so small they can fit underneath a fingernail, and are often placed in walls, lamps, telephones, coasters and light fixtures.

But not all taps go as planned. One federal prosecutor, according to ABC, admitted that he has had people call him, saying, "Come pick up your equipment!" In another instance, a member of the Gambino crime family ostensibly took a sledge hammer to a parking meter outside a social club after learning that the police had bugged it.

The state of the art

It's probably safe to assume that for most routine law enforcement, wireless bugs are still the traditional, small transmitters emitting FM signals in the 150-174, 406-420 and 450-470 MHz ranges. Bumper beepers, used to track vehicles, have often been detected in the 30-50 MHz low band. These are all easily detected with a spectrum analyzer.

But high-level espionage, compromising governments and major syndicates, is more sophisticated. As such, they require more sophisticated detection techniques. For more information on the state of the art, visit Kevin Murray's informative website at www.spybusters.com/introduction.html.



“Time’s UP!”

By Carl Herbert, AA2JZ

Here’s a very simple project with a purpose. If your “ragchew” buddies are like mine, the “ten minute rule” for identifying your station is oftentimes not complied with.

Licensing requirements as dictated by the Federal Communications Commission require that stations using voice transmission identify themselves “at least” every ten minutes. That seems as though it would be an easy rule to comply with, but often stations become involved in conversation and inadvertently exceed the time limit.

Here’s a simple project that will help operators stay within legal requirements, and it’s a fun project to build. And NO, I didn’t design this circuit. More seasoned builders will attest that this circuit has been around for years. It’s available on a host of web sites and manuals. It’s not difficult to construct, which makes it great “training project” for the novice builder or someone wishing to have fun building something.

Theory

The heart of the project is an NE555 “timer-oscillator IC” (*Integrated Circuit*), a few external parts to regulate the timing section, and some LEDs (*Light Emitting Diodes*) to provide a visual result. The NE555, a “timer-oscillator” IC (*Integrated Circuit*) has been around since the early seventies. It is available in several configura-

tions such as CMOS (*Composite Metal Oxide Substrate*) which operates at a lower voltage, or the BiPolar variety that I’m using.

There is an excellent tutorial on the World Wide Web should you be so inclined to learn more about this amazing device (www.uoguelph.ca/~antoon/gadgets/555/555.html). Other circuits using this IC are available here, and an in-depth explanation of how the circuits perform their task. It is well worth reading.

This circuit functions in an astable environment, which means that the device is operating as a “free running” oscillator. When power is applied to the circuit from the 9 volt battery, the red LED attached to pin 3 is illuminated.

To begin the timing sequence, the “normally open” switch is depressed, momentarily grounding pins 2 and 4. This resets the timing sequence, the red LED is extinguished, and the green LED becomes illuminated. The IC is now running in the astable mode, continually producing pulses – the number of pulses being a product of the resistor/capacitor circuit. The time required for sequencing from an illuminated green LED to the illumination of the red LED (indicating that ten minutes has elapsed) is adjusted by variable resistor R1.

Construction

Melting solder is what I enjoy most, so let’s begin. I opted to use “Manhattan Style” (*super glue small circuit board pads on circuit board stock, and make connections on the top of the board*) of construction, but “thru-hole” methods (*using board stock having equally spaced perforations to place the part “legs” through*) work equally well. Use the method you’re happiest with. The associated schematic shows the parts needed, while the picture indicates parts placement. Placement of the parts is not critical, as it is in RF (*Radio Frequency*) design, and can be varied to meet your desires.

I like to use sockets for ICs not requiring short connecting leads. RF projects often require short lead length to avoid additional capacitance, but that’s not the case with this project. Using a socket eliminates the

need for removing a faulty component should you encounter one.

Another word of caution: I check each component prior to installation. It’s frustrating to insert an LED, only to find that it is faulty and must be replaced. This is especially true when using “reclaimed parts” as I do.

The case I used formerly contained a piece of my XYLs (*spouse*) costume jewelry. Drilling holes in these types of hard plastic can often lead to fractures and cracks. Work slowly when drilling holes to avoid this pitfall. Construction is straightforward; just make sure your circuit board and battery will fit into the case selected if you chose one before you began. Sounds dumb I know, but we all have our faults...

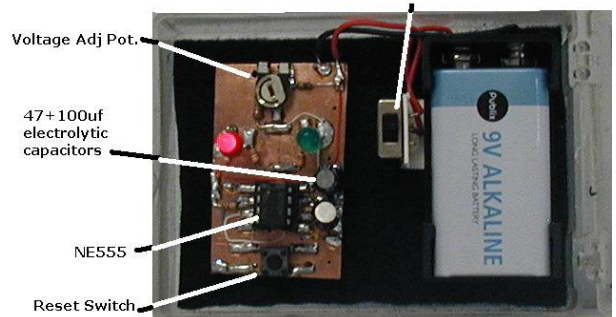
Useful on Many Levels

There, you’ve spent a happy hour or two gathering parts and putting it all together. Perhaps you used this time to “Elmer” (*teach a new builder*) a new “ham.” You’ve “tested” the circuit by connecting the power source, the red LED illuminates and the green LED illuminates when the normally open switch is pushed. All that remains is to adjust the variable resistor to trigger the red LED at the ten minute mark, and you’re ready to “Times UP” your fellow amateurs. (Or maybe you need it more than they do!)

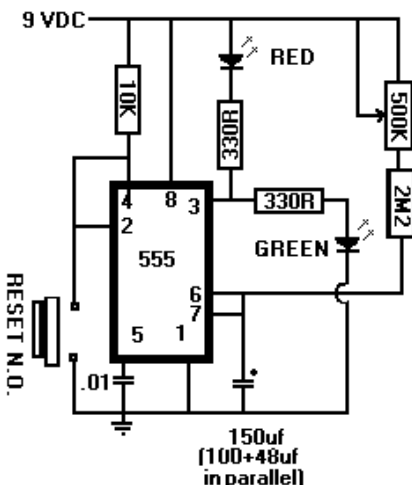
Often, the most rewarding projects can be the simplest ones. It’s not beyond the capabilities of most builders, new or old, and it’s rewarding to see your project function as it was intended.

Happy building!

I added an on/off switch, the battery holder doesn’t allow easy removal to deactivate the circuit.



NE555 Ten Minute Timer



TEN MINUTE TIMER

age to Grove Enterprises to buy it in person! I also picked up the WiNRADiO 9:1 longwire balun. The antenna currently consists of 50 feet of RG-59 coax attached to the 9:1 balun which is attached to 90 feet of Radio Shack hook-up wire, *all_laying on the ground*. The antenna points to the North-East.”

“I woke up early the other morning and started at 198 kHz tuning upwards. I’ve never seen, or heard, so many NDBs in all the hours I’ve spent searching for them! Most were two or three beacons coming in one on top of the other. The only down side was a lot of T-storm crashes in the background. A short list follows of what I heard” (See Table 1—Ed.)

“From the description of the antenna above, can you make a guess as to the directivity of the antenna for the 150 to 530 kHz band? Is it off the NE end, or, is it off the sides?”

John, thanks for the great report from Florida. I believe this is the first time we’ve heard from someone using a WiNRADiO receiver for longwave DXing. It appears they work well on LF! The antenna you described sounds somewhat familiar to what we used on our Miscou, NB DX-peditions a few years ago. We called them “BOG” antennas which is short for “Beverage on Ground.” Our antennas were over 1,000 feet long, and exhibited fairly sharp directivity off the ends, which were terminated to ground through resistors.

Your antenna is much shorter than what we were using, so it is difficult to say what kind of reception pattern it would provide. At

the higher end of the longwave band, you may begin to see some “end-fire” directivity with such an antenna, but it’s very difficult to predict how it would behave in general use. I would consider it to be a “random length” antenna with no predictable behavior on LW frequencies. By placing it on the ground, you’ve probably helped achieve a higher signal-to-noise ratio on the LW band, where noise can be a real problem. It would be interesting to see how this antenna would behave at a much longer length, either terminated or un-terminated.

Table 1. Selected LW Beacon Logs
By John Bishop (FL)

Freq.	ID	Location
198	DIW	Dixon, NC
216	CLB	Wilmington, NC
243	IAK	Palatka, FL
329	CH	Charleston, SC
450	PPA	Puerto Plata, DOM
423	OC	Nacogdoches, TX
420	TS	Timmins, ON
269	GN	Gainesville, FL
204	LCQ	Lake City, FL

❖ Up the Dial...

Want to try for beacons a little higher in the radio spectrum? Try the 10 Meter amateur beacons (28.115-28.200 MHz). You will find an extensive list of these stations on the 10-10 International website at www.ten-ten.org/. Many of these run quite low power, so they present an interesting challenge for beacon hunters. See you next month!

NASB National Association of Shortwave Broadcasters

Representing the privately-owned
shortwave stations in the USA

- Find links to all of our members at www.shortwave.org
- Subscribe to our free Newsletter: nasbmem@rocketmail.com
- Listen to “The Voice of the NASB” on the third Saturday of each month on HCJB’s DX Party Line: 12 midnight Eastern Time on 9955 kHz
- Come to our next annual meeting May 7-8, 2009 in Nashville, TN.
- More info at www.shortwave.org/meeting.htm

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Computer Password Security and Biometrics

Passwords. The word evokes a mixture of feelings from security to frustration. Just about everything of importance associated with a computer requires one. But some passwords are just a bother. For example, if you were the sole user of your home desktop, why would you ever need to use the Windows' sign on password? Most people I know don't use it. However, moving away from local use to a network or the Internet opens a whole world of security threats.

In fact, just getting on to the Internet or a network requires that you log on to an Internet Provider with your unique password. You might think, "I don't know what Catalano is talking about. I get on the Internet and network without a password!" Probably not true. Remember way back when you set up your Internet service? At that time you either created a password, or one was provided to you by the service. And if, at that time, you checked the "remember this information" box you have never entered it again ... manually.

When you initially checked the "remember box" the computer stored the password to a file on your hard drive. Then every time you access your service the password (and probably user name) are automatically entered for you by your computer.

❖ Lots of Passwords

Once on the Internet, how do we gain access to free accounts, such as Yahoo Groups? Via a password. And suppose you have paid on-line subscriptions to a number of publications, for example *MT Express*, and want to read them. I'd venture to say that each one requires a password.

Continuing down the password road, do you do on-line banking? Pay bills on line? Have an E-Trade account? Download music from iTunes? Participate in subject forums? Use Facebook? Use advanced Google search engine features? Buy or sell on eBay? The list goes on and on, and each requires a password. That's a lot of passwords to remember!

Surprisingly and foolishly, many people don't find this myriad of passwords a problem. Their "system" is to just use one password for all applications. That's like having one key that opens everything in your world: car, house, office, file cabinet, gym locker, storage shed, safe deposit box, wine cellar, boat, motorcycle, airplane, liquor cabinet...

Now just think of the havoc the loss of that one single key would create. Or worst yet, if

someone made a copy of the key without your knowledge, ALL your valuables would be at risk! (Especially that 50-year-old scotch!!) That's exactly the jeopardy you put your personal data in with the "one password for all" system.

Other vulnerable "systems" employ short, simple passwords.

❖ Passwords are Not New

Although the use of passwords on computers is less than 50 years old, the science of cryptography dates back almost to the moment when there were more than two people on Earth. References to cryptic words and phrases used as "tests" appear in the Bible and other religious works, as well as literature. Even some traditional children's stories carry this password theme: Rumpelstiltskin, to name one.

Egyptian and Roman leaders used passwords to authenticate information being passed via a courier. Roman legions challenged unknown soldiers entering their camp by demanding a password. And today, before we can buy that object of our desires on eBay, we are challenged for our user ID and password.

The strength or "breakability" of a password can be rated using statistical methods. There are a great number of parameters that determine the strength of a password. Three basic factors are length, randomness, and number of character sets used. Clearly, the larger the number of each of these factors integrated into the creation of a password, the harder it is to guess or break.

The problem is that with increased strength comes increased difficulty of remembering them, especially when the multitude of sites that require a unique password is considered. So how do we protect our eBay or stock trading passwords?

❖ Who Goes There?

Before I can tell you that information you have to give me the password. (Only kidding.) The answer is really two-fold. The first is in the careful creation of each password and the second in the secure storage of the passwords.

A good place to start creating passwords is at the Microsoft website www.microsoft.com/protect/yourself/password/create.mspx. Here you will get guidance on creating passwords. Follow the link on this page

to the password checker and it will assess the strength of your specific passwords.

❖ Ultimate protection with biometrics?

Since I spent a few years in the biometric industry you'll get an "insider's" view of the operation and effectiveness of the technology. Biometrics technology uses a unique body characteristic to identify a person. Most people are familiar with inked fingerprints used for many years by law enforcement agencies.

Each person has a unique set of ten fingerprints. Each fingerprint has a pattern of lines or ridges, which form "features" by intersecting, branching, and crossing each other. In addition, the ridges sometimes form loops and whorls. These result in a very complex pattern unique to the person's finger. See Figure 1.

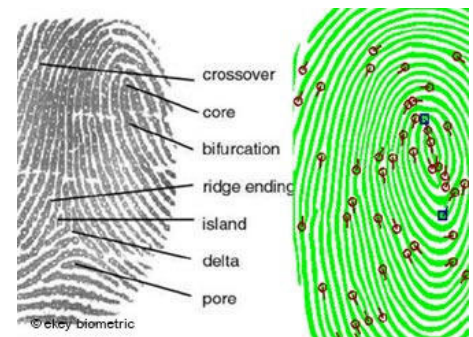


Figure 1 – A fingerprint image. Notice the ridges, branches, whorls and other features.

Electronic biometric fingerprint readers found on consumer products, such as safes and laptops, do not "key" off the whole finger pattern. Instead, they just look for a number of these features and map their relative location. The larger the number of features mapped, the greater the accuracy of the identification.

But consumer biometric products are notoriously simple, with usually less than five mapped features. This approach makes the product inexpensive and greatly reduces the required processing power and processing time. But the security then becomes little more than perceived. For example, it is quite possible that using these products, 12 people out of one hundred people could have their fingerprint identified as the owner's and unlock the safe. Not exactly secure!

Let's see how a fingerprint reader product from Microsoft works.

❖ Biometrics on the Cheap

A few years ago, after I left the biometrics business, I found a Microsoft Fingerprint Reader model 1033 that was selling for only \$32! My first thought was, “Glad I’m out of that loser business.” I knew that the cost of the silicon sensor alone was around \$14 in large quantities. That does not leave much for the three profits: parent company, assembler and retailer.

A closer look at the Microsoft product showed that a dedicated capacitive fingerprint sensor was not being used in the product. Instead an optical “camera” approach was being used. With the explosion of product development in the electronic camera sector in the past decade, high quality optical sensor costs have been sinking fast. Hence, the low selling price of this fingerprint reader.

Coming to my senses, I forced myself not to buy the Microsoft product back then. But last week I found one on eBay for under \$14 including shipping. Now this was a deal I could not pass up. For \$14 I could learn about its hardware and software, and now so can you.

As you can see in Figure 2, this device is quite compact, weighing only 7.5 ounces and with a footprint of only 9 x 6 inches. It connects to a PC via a USB port and is immediately recognized by Vista.

However, it does require a driver to be loaded. My \$15 “deal” did not come with drivers or software. A quick look around the Internet indicated that the product was actually a DigitalPersona product, badged as Microsoft (yet another profit mouth to feed).

The driver and software for Vista was found on the Microsoft website at www.microsoft.com/hardware/download/DownloadResult.aspx?category=MK&type=Fingerprint&name=pf_fr&os=WVista_32&lang=en.

❖ Starting the Process

After downloading and installation, Vista found the driver and the DigitalPersona Password Manager was up and running. It started by having me “register” my fingerprints. The program does a very good job leading the user through this process. Now we are ready to enter the world of biometric password protection.

Using biometrics, our goal should be to replace our manually produced passwords with “strong” passwords automatically created from our fingerprints. Well, quite frankly, using this product will NOT that! I was disappointed to discover that the product cannot create a password from a fingerprint. This is really a missed opportunity.

Instead, the user must still manually cre-

ate a password for each user account with all the pitfalls and “strength” issues we previously discussed. So all the Microsoft’s Fingerprint Reader using DigitalPersona software does is to recognize your fingerprint, identify the account, and retrieve the password you manually created.

Disappointed, but still interested, I continued with the “program.”

For each protected account the user must “train” the software. First, the user accesses and displays the account’s log-in screen and places a registered finger on the reader. Next, the user ID box is clicked and the user ID is manually entered. Then, the process is repeated for the password box. See Figure 3. The information for this log-in screen is now saved.

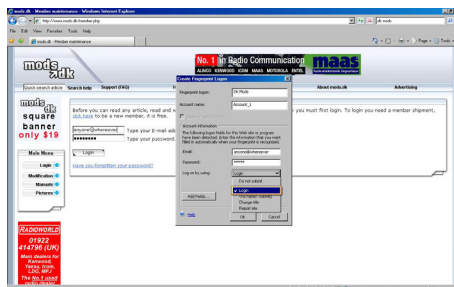


Figure 3 – Creating a password fingerprint log on in Internet Explorer

Next time you access this log-in screen, placing your finger on the reader will automatically enter your user ID and password. That’s all you have to do. It adds a great element of convenience. But is it more secure?

❖ Caveats

Before we answer the security question, a few particulars must be discussed. First, a factor that cost me about an hour of effort. The DigitalPersona software only works with (you guessed it) Microsoft’s Internet Explorer. But thanks to FingerFox, a free add-on, the DigitalPersona software will work with Firefox. See Figure 4. You can find FingerFox details and instructions at www.fingerfox.amews.dk/index.php?lang=en.

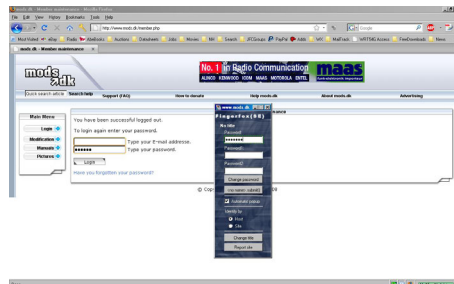


Figure 4 – If the Microsoft Reader recognizes your previously register fingerprint, Fingerfox will enter your password and you’re in!

Second, if the target website has more than one log-in screen, the software may not always work. You may have to “train” the software on each different log-in screen on the site.

Third, FingerFox can be annoying by popping up on any display with a log-in box, even when the fingerprint reader is not connected. In this case, a simple solution is to disable FingerFox via FireFox’s Tools and then Add-Ons menus.

Fourth, on my system, a 1.6 GHz Duo Core T2060 CPU, 1.4GB of RAM with a Vista Home Basic operating system, I was able to detect a slowdown in accessing the Internet when DigitalPersona software loaded.

And finally, remember that the Microsoft product takes a picture of the pattern of fingerprint ridges. Therefore, things that we touch, such as clay, grease and even soap, can modify what the camera sees. Then the entering fingerprint does not match the registered one. Sorry, no entry.

❖ Back to Security

We have seen that the Microsoft Fingerprint Reader is a convenient method of adding another level of security. However, this added level security is ONLY operational at the physical location of our PC. What do I mean?

Let’s say an evil Internet hacker tried to guess our password and get into one of our accounts. The fact that you had a biometric fingerprint reader on your PC would make no difference. In reality, our security against external attacks is still only as good as the password we manually created.

In fact, if you dig through the Security Information section of the DigitalPersona software’s Help file you’ll find this disclaimer, “The biometric (fingerprint reader) feature in this device is not a security feature and is intended to be used for convenience only....” So there you have it, straight from the horse’s mouth.

❖ If Only

So, using this product, we are back to creating a “strong” password as our best password security. However, if we were to capture a high quality, high-resolution fingerprint and couple it to a sophisticated image-mapping algorithm, a whole new level of security would be possible.

The resulting strong password would be a mathematical expression of our unique fingerprint image. This method is used for defense critical applications where cost is not a factor. Doing this for \$35 retail on a home PC would be a real technical bit of magic. Maybe someday. That’s why consumer applications, such as home safes, suffer from the same limitations that DigitalPersona so blatantly states, “It should not be used to access corporate networks or protect sensitive data, such as financial information.”

❖ Another Password Security Method

Next time we’ll take a look at password managers, and investigate the type and strength of the security they provide. Till next time... stay warm and strong.



Figure 2 - Microsoft’s fingerprint reader has been discontinued, but is still available on the internet and at some retailers for a low price!

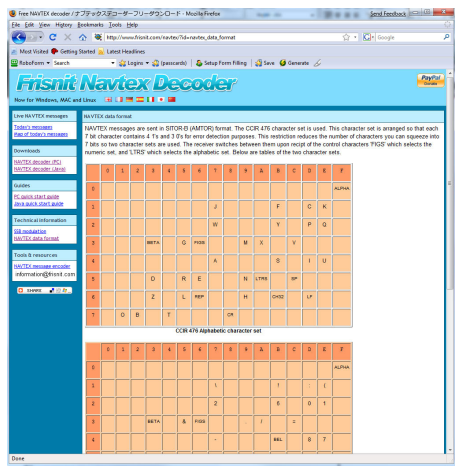
What's NEW

Tell them you saw it in Monitoring Times

Free NAVTEX

If you are interested in monitoring NAVTEX digital message traffic on 425 or 518 kHz and need a decoder, do I have a deal for you!

The Frisnit NAVTEX Decoder is exactly what it says it is – a software decoder for NAVTEX transmissions. All you need is a shortwave radio and a computer to begin decoding signals yourself. The author of this software has the program running continuously and uploading NAVTEX messages to an online database at www.frisnit.com/cgi-bin/navtex/view.cgi. The data is also available via WAP at <http://wap.frisnit.com> so you can view the messages while you are mobile.

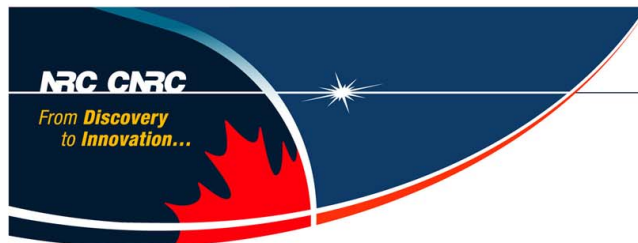


This free program is available for the following computer platforms: Windows XP, Sun Java version 1.6.0, MAC OS X (10.4.8), and Apple Java version 1.5.0_06 at the following URL www.frisnit.com/navtex/?id=decoder. You can get more information on the NAVTEX message format at www.frisnit.com/navtex/?id=navtex_data_format. If you need frequency and schedule information on NAVTEX broadcast in the U.S. go to www.weather.gov/om/marine/navtex.htm.

CHU has something new

If you are wondering where the 7335 kHz time signal from CHU went, it moved on January 1, 2009.

The National Research Council of Canada (NRC) shortwave radio station CHU shifted their 7 MHz time transmissions to 7850 kHz after 70 years of broadcasting on that frequency. The change went into effect on January 1, 2009, at 00:00 UTC. Time transmissions on 3330 and 14670 kHz were not affected and continue as before. For more



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Time to change your shortwave radio dial

After seventy years of broadcasting Canada's official time, NRC's shortwave station CHU will move the transmission frequency for the 7335 kHz transmitter to 7850 kHz. The change goes into effect on 01 January 2009 at 00:00 UTC.

CHU is a part of NRC's system for disseminating official time throughout Canada, broadcasting 24 hours a day from a location approximately 15 km south-west of downtown Ottawa. Listeners hear tones to mark the seconds, voice to announce the time in French and English, and digital data to set computers.

The atomic clocks at CHU are part of the ensemble of clocks in the time and frequency research laboratories in Ottawa, at the National Research Council Canada. The NRC clocks are used in conjunction with clocks in the time laboratories of other countries to construct the internationally accepted scale of time, UTC (Coordinated Universal Time), which is now the reference for official time used by all countries. UTC is the modern implementation of Greenwich Mean Time.

"Coincidentally, this frequency change comes at a time when NRC is investing resources to refurbish the aging transmitters at CHU in order to provide clear, dependable shortwave services as part of NRC's mandate to disseminate time to all Canadians," said Raymond Pelletier, Technical Officer at the NRC-Institute for National Measurement Standards, who oversees the CHU facility. "The shortwave time service is especially beneficial for those in remote locations where there is limited access to internet and telephone communication. CHU also provides a back up against failure of other services."

In April 2007, the International Telecommunications Union re-allocated the 7300-7350 kHz band from a fixed service to a broadcasting service. Since then, interference on the 7335 kHz frequency has come from many information broadcasters around the world.

CHU listeners in Canada and around the world who have for so long considered the 7335 kHz frequency exclusively for time signals, are very vocal about this interference. We have heard from amateur radio operators, watchmakers, astronomers, and navigators who use the tones and voice signals. As well, comments were received from those who use the carrier as a calibration source at a distance for their equipment.

To give notice to users, CHU will broadcast an announcement in both English and French. More information about CHU can be found at:

http://inms-ienm.nrc-cnrc.gc.ca/time_services/shortwave_broadcasts_e.html

Comments about the CHU change can be sent by e-mail to radio.chu@nrc-cnrc.gc.ca.



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information check out the links below.

http://inms-ienm.nrc-cnrc.gc.ca/common_files/stories/chu/communique_e.pdf

http://inms-ienm.nrc-cnrc.gc.ca/time_services/shortwave_broadcasts_e.html

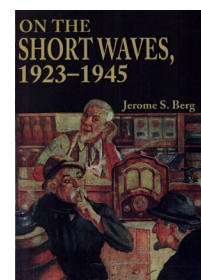
http://inms-ienm.nrc-cnrc.gc.ca/faq_time_e.html#Q2

In April 2007, the International Telecommunications Union reallocated the 7300-7350 kHz band from a fixed service to a broadcasting service. Since then, interference on the 7335 kHz frequency has come from many information broadcasters around the world.

New Shortwave Hobby History Books

Many radio enthusiasts are familiar with the name Jerry Berg – an enthusiastic and respected radio hobbyist for half a century, chairman of the Committee to Preserve Radio Verifications, and author of *On the Short Waves, 1923-1945: Listening in the Pioneer Days of Radio*.

Jerry has again combined his talent and



What's NEW

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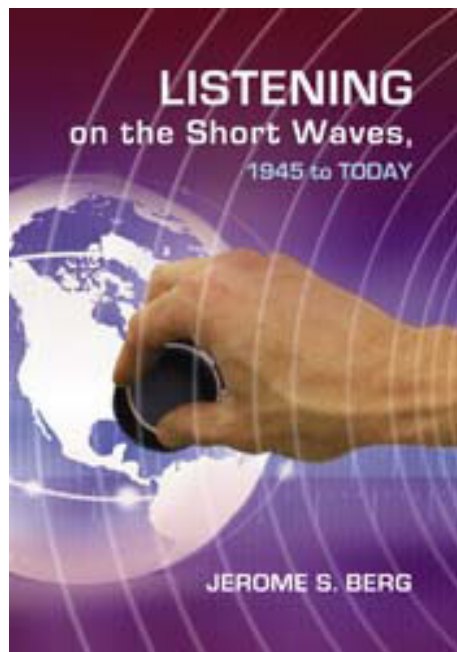
love of radio to author two new books in 2008.

Listening on the Short Waves, 1945 to Today

by Jerome S. Berg

Written from the perspective of the American radio listener, Jerry delves exclusively into the listening side of the hobby to focus on radio publications such as *Monitoring Times*, clubs, and the audience. The opening chapter, "Prelude to 1945," looks at early shortwave radio broadcasting days, followed by "The Shortwave Audience," making the distinction between the program listener and the shortwave DXer.

The chapter on "Clubs" presents in detail a nostalgic look at the histories of the major North American shortwave clubs, followed by a review of the professional and listener-generated shortwave literature of the era and DX programs on shortwave. Receivers are presented as a detailed historical review of the development of shortwave receivers from WW II to present, covering tabletops, portables and more.



The continuing debate whether to remain a listener or a QSL collector continues: however, Chapter 7 – "QSLing" – explains in detail the fascination for many of the ever changing world of collecting verifications cards and letters. Additional coverage is given to the verifiers and non-verifiers, station QSL policies, literature, contesting and awards, including the history of the WPE calls.

The final chapter, "Computers," discusses

the impact of the computer and the internet on the shortwave hobby of today. Hobbyists have witnessed amazing strides from the early days of word processing and bulletin board systems to the instant exchange of radio information with relation to DXing and program listening.

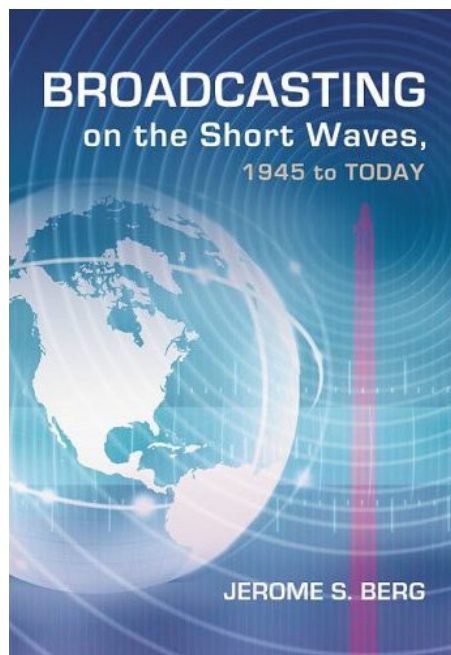
Indexed and fully illustrated, *Listening on the Short Waves, 1945 to Today*, resumes the shortwave story after 1945, and describes in detail the evolution of the hobby in the years since. It is an informative and fully-researched book, covering the early days of experimental radio transmissions to the high speed world of internet radio. I would highly recommend this book to the novice or veteran shortwave enthusiast. This is an excellent book, and for most of us, this history is *our* history!

Broadcasting on the Short Waves, 1945 to Today

by Jerome S. Berg

The companion to the above volume, *Broadcasting on the Short Waves, 1945 to Today*, focuses on the world's shortwave broadcast stations. This final edition completes the trilogy begun in 1999 with publication of *On the Short Waves, 1923-1945: Listening in the Pioneer Days of Radio*.

Written from the standpoint of the casual listener, the purpose of this third edition is to complete the post-1945 story by focusing on the shortwave broadcast stations. The heart of the book is a year-by-year description of the shortwave bands from 1945 and the major shortwave events of each year.



Beginning with "An Overview of Shortwave Broadcasting," Chapter 1 presents an historical overview of international, domestic, clandestine, religious, plus European and North American pirate broadcasting. Frequency allocation and management, power and jamming are included, as well as SSB, DRM and SWBCing.

Chapter 1-8, "Shortwave Year-by-Year," is a detailed examination of stations that were active on the shortwave bands, and gives a picture of what stations North American hobbyists were hearing. These chapters cover the period of 1945-2008 and identify the individual DX targets and the trends of this period. International stations, tropical band and other domestic shortwave broadcasting stations throughout the world are covered.

The last chapter, "The Changing Shortwave Environment," is a summary of the shortwave broadcasting scene since WW II, delving into factors that have impacted broadcasters and audiences before and after the Cold War, and the future of broadcasting.

This book, like its companion, is an informative and fully-researched book, covering the shortwave broadcast stations that many DXers began with early in their listening hobby, as well as those we continue to follow today.

Both books – *Listening on the Short Waves, 1945 to Today* and *Broadcasting on the Short Waves, 1945 to Today* – present an accurate portrayal of the shortwave medium and the shortwave listening experience in the United States. Both are detailed, concise and well researched, and include many observations on the hobby from the author's perspective, based on his years as an active DXer.

Jerry Berg has reminded all of us that, however dire the recurring predictions of its demise, shortwave radio retains its fascination for many of us. Congratulations to Jerry on a superb body of work!

Listening on the Short Waves, 1945 to Today, (ISBN 978-0-7864-3996-6) is a hardcover, 415 page book. *Broadcasting on the Short Waves, 1945 to Today*, (ISBN 978-0-7864-36 74-3) is also a hardcover, 488 page book, and both are available from McFarland Publications for \$65.95 each.

To order either book, go to the company website at www.mcfarlandpub.com or call 1-800-253-2187. Postal address: McFarland & Co., Inc., Box 611, Jefferson, NC 28640 USA

Reviewed by Gayle Van Horn W4GVH

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Larry's Monitoring Post
<http://monitor-post.blogspot.com/> - by Larry Van Horn

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AX-71C discone antenna	ANT01	\$89.95
AX-81S active HF antenna	ANT51	\$189.95
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WR-AX-31C	ANT58	\$139.95
AX-91M magnetic antenna base	ANT48	\$24.95
WR-LNA-3500 LOW NOISE AMPLIFIER	PRE03	\$199.95
Mounting Clamps for AX-71C	ACC71	\$14.95
USB Adaptor	ACC 2	\$49.95
Client Server Option-1000/1500 Series	ACC 14C	\$99.00
Client Server Option-3000 Series	ACC14B	\$399.00
Client Server Option-G313 Series	ACC14D	\$149.95
G303 Professional Demodulator	SFT20	\$179.95
G305 Professional Demodulator	SFT40	\$199.95
PCMCIA PC Card	ACC 28	\$89.95
FSK Decoder	DEC 1	\$349.95
WR-PPS portable power supply for external 1000/1500/3000 series receivers	PWR 5	\$189.95
Digital Suite	SFT 15	\$85.00
Advanced Digital Suite Upgrade	SFT 15U	\$85.00
Advanced Digital Suite	SFT 15A	\$179.95
World Radio Database Manager	SFT 16	\$85.00
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AX-37AM wide-band log-periodic antenna	ANT29	\$499.95
WR-G3E-WMB Wall-mount Bracket for G3	BRK02	\$19.95
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WR-3500 (Internal)	RCV49-I	\$2195.95
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WR-G303e	RCV46E	\$549.95
WR-G303e w/pro demodulator	RCV46EP	\$699.95
WR-G303i	RCV46	\$449.95
WR-G303i w/ pro demodulator	RCV46-P	\$549.95
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WR-G305i w/pro demodulator	RCV53P	\$619.95
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WR-G315 (External)	RCV64	\$CALL

Shipping/ Handling Charges

Total Order	Shipping Charges
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\$400-\$899.99	\$17.95
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"We were able to listen at all three races, including practice and qualifying without recharging!"

"The ability to select a channel by the car number made listening to the races even more fun!"

"We were able to see the car number, the driver's name, and the race type all at the same time!"