SCANNERS =
ONE STEP CLOSER
TO THE ACTION
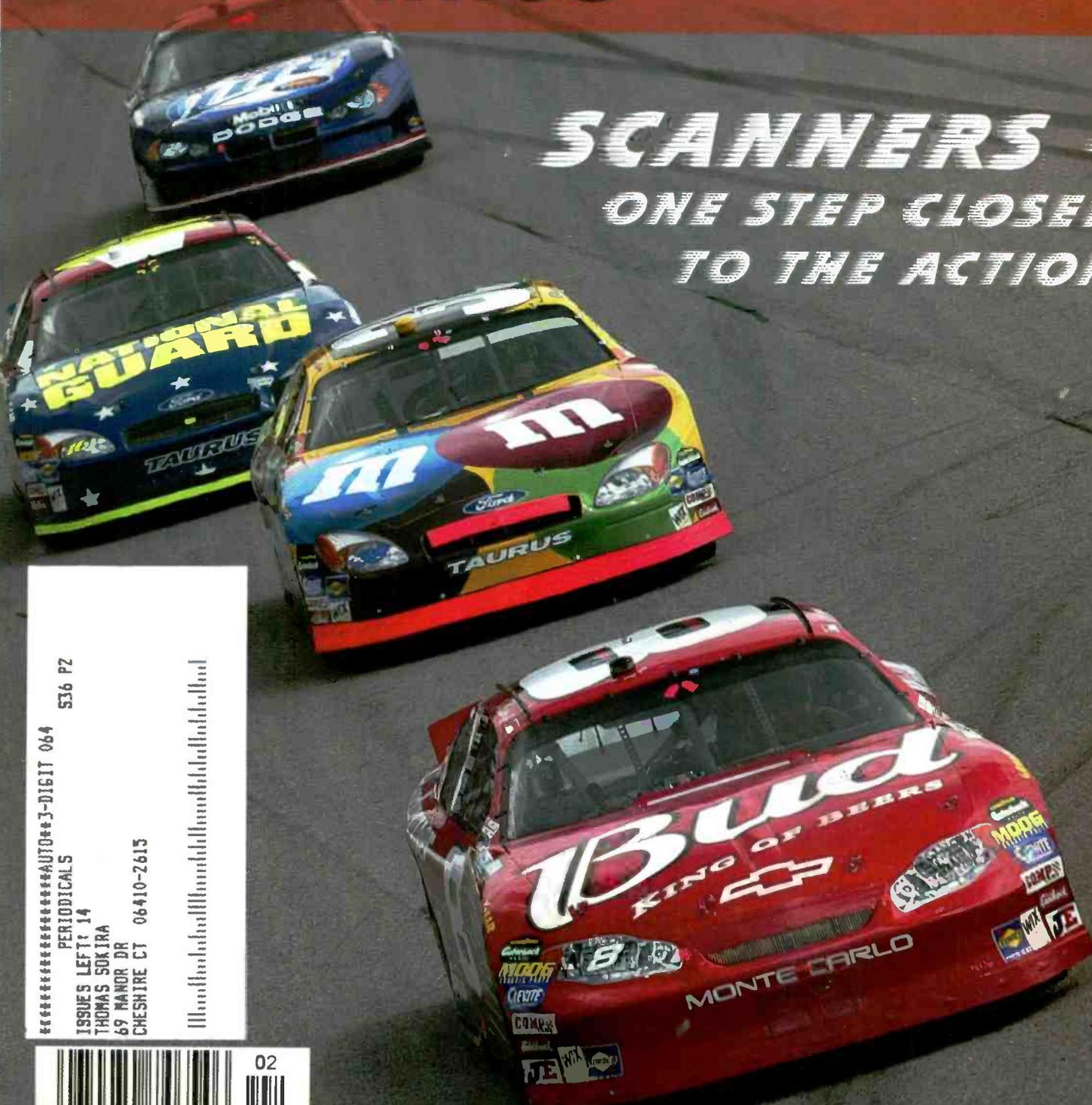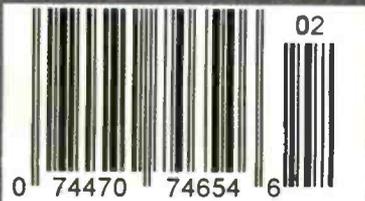
MT Reviews:
Uniden's SC230 NASCAR scanner
RF Space SDR-14 Software Radio
The DXceptional ReCall Pro

Cover Story

Scanners Bring Fans Closer to the Action
By Ron Lemasters

If there was ever a perfect match it would have to be scanners and the race track. For twenty years, scanners have brought fans one step closer to the action, and two companies helped promote it from the beginning – Racing Electronics and Racing Radios.

Whether you bring your own scanner or rent one at the track, it's time to get geared up to go, because race season kicks off this month with the Daytona 500. Check this article for the new schedules, frequencies, cars and drivers.

Cover photo: The Golden Corral 500 at Atlanta Speedway, Sherryl Creekmore / NASCAR.

CONTENTS

By Guy Atkins

There are a lot of ways to record radio signals for later listening, from using a simple tape recorder to digitally capturing an entire swath of spectrum (see Computers and Radio). Using a program like ReCall Pro falls somewhere in between the extremes. It is a sophisticated solution that will provide DXers with a UTC time-stamp for later verification requests, allow customized settings for different radios, or even simultaneous recording of more than one receiver. Best of all, you'll be able to find that special catch and listen to it again, years later.

By Richard Cuff

Radio tends to be a solitary pursuit – though not necessarily by choice. There are a lot of excellent reasons for getting together with other folks who share your passion, whether in a DXpedition, a club meeting, or an annual conference. Let's look at some of the benefits and some factors to be considered in setting up a gathering of your own.

By Glenn Hauser

Broadcasters, manufacturers, and other interested persons met last November to discuss the status of the DRM roll-out worldwide. As this brief summary shows, considerable progress has been made since our last report.

Reviews:

Race fans have an extra reason to buy a new scanner this year – the Uniden SC230! Not only does this handheld incorporate the new dynamically-allocated memory system and Close Call features, but you'll find cars and frequencies preprogrammed for you. Updating memories is easy using your computer or a second scanner. (See page 70.)

Last month, we introduced the RF Space SDR-14 software radio in a comparison with two other radios. This month, we review the SDR-14 on its own with a closer look at its operation, software, and performance (p.72).

Communications receivers don't usually come with a remote control, but SWL-Remotes aims to change that. Kevin Carey tries out an SWL IR Remote Control for his Drake R8 and finds it to be a significant enhancement to monitoring (p.68).

The new LF Engineering H-900 Gainprobe active antenna, with improved coverage from 10kHz to 60MHz, may make SWLs have second thoughts about erecting a wire antenna (p.69).

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EDITORIAL STAFF   Email first1last@monitoringtimes.com

Thanks for Your Input

We were extremely gratified by the response to our recent survey – nearly 1,000 responses arrived by mail and email. Though the survey was short, your feedback was enough to give us a general picture of our readers and what you do and don't like.

Some things haven't changed much since our inception: a majority of our readers are interested in *both* scanning and shortwave topics, and over fifty percent hold an amateur radio license. An overwhelming majority are interested in discovering new frequencies and in understanding new technologies and equipment. *Monitoring Times* will do all we can to continue to meet those needs.

We've also been redesigning the http://www. monitoringtimes.com website to make it more user-friendly. Check it out – and speaking of frequencies, how about contributing your local favorites for posting on the site for fellow hobbyists? Send items for posting to *editor@monitoringtimes.com*!

As promised, we held a prize drawing at the close of the survey. The lucky winners of three one-year subscriptions were: Mark AuBuchon, Corpus Christi, TX; William B. Van Lennep, Pepperell, MA; and Thomas Christopher, Pacific Grove, CA. Winner of a Grundig Porsche portable radio was Frank W. Heath of Carpinteria, CA. Congratulations!

Milcom Accountability

Soon after publication of our December issue, we received this courteous letter of concern regarding an item in the *Milcom* column on National Guard HF ALE addresses:

Morning Mr. Van Horn,

I would like to inform you that the information you're disclosing (Monitoring Times) about the NG HF Radio Net is considered FOUO [For Official Use Only – ed.] and should not be released without approval from NGB. This net is stood up in support of Homeland Security in case the unthinkable happens. By disclosing this info, you make our net unreliable during a crisis situation. I can't tell or make you do anything, but I hope you can understand the consequences of your actions. This is not a call to beat anyone up; this is a call for support.
God Bless
(name withheld by MT)

The *Monitoring Times* staff appreciates such expressions of concern, and we do hear from supervisory officers on occasion. We are encouraged to know that such officers are vigilant in their efforts to protect our country's security.

In this case, the National Guard bandplan has been in public domain for decades, and there is no possibility of classifying what is already in wide, public circulation. New listings, however, can be classified, although transmissions in the clear will still remain vulnerable to discovery and identification.

The details in our article were contributed by casual monitors of the spectrum, not by official sources, and point out the one gaping fallacy in an effort to curb the proliferation of such information: A radio system is only as secure as its operators make it. The old military adage, "Loose lips sink ships," is as valid as ever.

But if we felt that there was any danger in the publication of such information, it would not have appeared in print; *MT* is an informational, not a sensational, magazine. Because of its authority and accuracy, its subscribers include many levels of federal/military intelligence. Grove Enterprises (publisher of *Monitoring Times*) is continuously sought by these agencies for equipment recommendations.

Historically, government radio communications in the clear have had no expectation of privacy; that is the reason that radio systems that handle sensitive and tactical communications are equipped with encryption and scrambling capability. The lack of their use does not impose any restrictions on someone who happens to overhear that unguarded transmission. It is the responsibility of the sender to provide measures to protect its security.

Complete system disruption by deliberate interference is virtually impossible due to propagation characteristics, and government radio-direction-finding equipment sits ready to locate such miscreants.

We thank our concerned reader for contacting us, and hope that this response is reassuring.
– Bob Grove, Publisher

BPL in Cottonwood

"My name is Rod Rosenbarger and I am a Ham Radio operator in Cottonwood, Arizona. Cottonwood is one of over 80 BPL test sites in the U.S. Yesterday our BPL committee met with A.P.S. Arizona Power, and M.T.I. Mountain Telecommunications, Inc. To review the interference problems we are having in Cottonwood: They have notched out most of the Ham bands as well as certain Government bands.

"*But,* they have shifted much of the interference into the SWL and CB bands as well as low VHF. I have been filing interference complaints to the FCC for the CB band. Their feeling is that these bands will be casualties of progress. They do not realize that the CB band is protected by FCC Part 95 and that the SWL bands are protected by a World Wide Agreement. ... Our committee has made progress with our FCC complaints and the help of Ed Hare w1rfi@arrl.org with the ARRL. Our club has much of our website devoted to BPL http://www. vvara.org

"Please make your readers aware of what is going on for the sake of everyone interested in radio. We have had interference from the three sites in Cottonwood that registered S9 + 60 DB, you could hear nothing through the BPL. The three main players in the Cottonwood BPL test are Electric Broadband out of New York, Arizona Power, APS, and the Internet Provider in charge of all of the technical aspects of the system is MTI, Mountain Telecommunications."
– Rodney W. Rosenbarger, K16FH

Welcome to Jim Clarke NR2G

We're delighted to welcome Jim Clarke, whose review of the Uniden SC-230 scanner marks his *MT* debut this month. Jim has a wide background in radio and electronics and will be sharing the *First Look* review column with Lee Reynolds, KD1SQ. For a taste of Jim's background, here is what he wrote us to introduce himself.

"I was first introduced to radio, via my uncle, at the age of 12, and by 14 I had my own shortwave listening post. At 16 I was bitten by the CB radio bug and remained involved until I earned my novice amateur radio license at age 17. As a result, CB took a permanent back seat to ham radio. When I was 23, I decided to teach myself about computer hardware and software, a very frustrating, yet rewarding, experience. I held my novice license until age 25 when I decided to upgrade to extra class.

"Ironically, with this new license, I actually found myself talking less and listening more, going back to my roots in shortwave broadcast and utility monitoring. My fascination with computers and radio drove me to create ways of using the two technologies together. I wrote programs, and in some cases designed hardware, to control my radio, draw maps of continents, and keep track of station frequencies."

Jim earned a college diploma from the Rochester Institute of Technology's School of Applied Industrial Studies, and went to work for Scientific Radio Systems (SRS). He worked his way up from Test Technician to Quality Assurance (QA) to test engineer. "I took a great deal of pride in doing QA because, as a communications product consumer myself, I saw myself as the last stop to ensure the customer was receiving excellent product ... I was like a kid in a candy shop; here I was, an HF communications hobbyist, surrounded by HF communications/testing equipment." With a different company now, Jim designed and is responsible for its automated testing and test-data gathering system.

Over the years Jim has owned communications receivers/transceivers and scanners too numerous to mention. He critiques them as well. "When I buy a new radio, I scrutinize it for ergonomics (ease of use), construction (ruggedness), aesthetics (eye appeal), quality (attention to detail in manufacture), and of course, performance (both measured and observed)."

Reviews were a favorite topic among MT readers in our recent survey, and with our solid stable of reviewers – including Bob Grove W8JHD and Larry Van Horn N5FPW – we look forward to continuing to providing you with clear, objective assessments of equipment!

FEDERAL GOVERNMENT

Has the Dod FLIPed?

Milcom and aero hobbyists were startled to see an entry in the Federal Register in November announcing "Intent To Initiate the Process To Remove Aeronautical Information From Public Sale and Distribution." The National Geospatial-Intelligence Agency (NGA) proposed removing its Flight Information Publications (FLIP), Digital Aeronautical Flight Information File (DAFIF), and related aeronautical safety of navigation digital and hardcopy publications from public sale and distribution.

These products can currently be found at **https://164.214.2.62/products/digitalaero/index.cfm#flip**

Apparently there was an outcry, because shortly thereafter, the Federal Register carried this follow-up summary: "After initial feedback from the public on NGA's notice in Federal Register Volume 69, Number 222, pages 67546-67547, NGA has determined that a period of public comment will benefit the final decision on this policy issue. Therefore, NGA is inviting public comment on the proposed action to withdraw aeronautical data and products from public distribution. ...NGA will consider all comments when making the final decision to go forward with this proposed action, in part, in whole, or not at all."

The public comment period extends from December 17, 2004 to 30 June 2005. Proposed implementation date of final decision: 1 October 2005.

"Addresses: To make sure your comments and related material are entered only once in the docket please submit them by only one of the following means:

(1) By e-mail to aero.ocr@nga.mil; or

(2) By mail to: National Geospatial-Intelligence Agency, Mail Stop D-111, Attn: Public Release of Aeronautical Products, 4600 Sangamore Road, Bethesda, MD 20816-5003."

FCC Okayed to Reband 800 MHz

Sen. Frank Lautenberg (D-N.J.) requested the U.S. Government Accountability Office (GAO) issue a legal opinion whether the FCC overstepped its authority in its 800 MHz rebanding order in which funds received will compensate public safety agencies and others incurring rebanding expenses. Congress usually disperses the funds following FCC spectrum auctions.

The GAO opinion found that the FCC order to be unprecedented but said it does not violate federal law. Lautenberg said he is "satisfied" with the GAO opinion and is glad public safety will be able to realize the benefits of the rebanding order.

The decision clears the final major legal hurdle for Nextel Communications to pay for the rebanding process and receive 10 MHz of 1.9 GHz spectrum. At presstime, Nextel still had made no formal decision to accept the terms of the 800 MHz order, in which it will swap $4.8 billion in spectrum and cash for contiguous spectrum it needs to offer advanced wireless services. However, Nextel has only 75 days to announce its intentions now that the order has been published in the Federal Register.

Tom Swisher WA8PYR reported hearing at a recent rebanding conference that the project is to be completed 3 years and 2 months after the R&O appears in the Federal Register. The clock is now ticking ...

700 MHz Needed After All?

While Congress has been pushing initiatives to speed up the transfer of 24 MHz of spectrum in the 700 MHz band from television to public safety, the Federal Communications Commission has been tasked by the President to take a second look at whether first responder agencies need these additional allocations after all.

According to the Intelligence Reform and Terrorism Prevention Act of 2004, approved by Congress and signed by President Bush in mid December, the FCC must work with the Department of Homeland Security (DHS) and the Commerce Department's National Telecommunications and Information Administration (NTIA) to determine federal, state and local emergency responders' short- and long-term needs for more spectrum.

The legislation specifically directed the FCC to assess whether Congress should grant to public safety agencies an additional allocation of spectrum in the 700MHz band. DHS is also to conduct a parallel study with the FCC and NTIA to evaluate various first responder telecommunications needs, including the need for, and usefulness of, launching national interoperable communications networks.

The FCC and DHS are to report back to Congress within a year on the current state of communications networks and the greatest practicable use of commercial wireless technologies by the public safety community.

Spectrum Efficiency

Meanwhile, President Bush is not ignoring the need for spectral responsibility among his own executive agencies. The President's Spectrum Policy Initiative, begun in 2003, culminated in the Spectrum Policy for the 21st Century, released June 2004, which outlined the Department of Commerce recommendations. In December, Bush issued a memorandum which forces agencies to implement the recommendations.

Under the directive, the Office of Management and Budget has six months to provide guidance to agencies on how they can improve capital planning and investment control to better identify spectrum requirements and the cost of investments in spectrum-dependent programs and systems.

Other agencies, such as the Agriculture, Defense, Homeland Security, Interior and Transportation departments, the Office of Science and Technology Policy, OMB and the Attorney General, have a year to develop a comprehensive Spectrum Needs Plan to address issues related to communication spectrum used by the public safety community.

Commerce ultimately will integrate the agency plans into an overall Federal Strategic Spectrum Plan.

AMATEUR RADIO

Amateur Radio Service Enforcement Actions

Periodically we take a look at the efforts of Riley Hollingsworth and the Amateur Radio Enforcement Bureau. Over the past two or three months the bureau has averaged 16 -24 actions per month, ranging from warning notices for unlicensed two-meter and ten-meter operation and out-of-band operation on all bands, to interference to licensed amateurs on all bands. An inquiry was conducted in conjunction with the US Coast Guard into allegations of false distress signals transmitted on 20 meters.

A handful of Notices for Apparent Liability for Forfeiture were issued, most notably $125,000, issued to Pilot Travel Centers, L.L.C., Knoxville, TN for marketing radio transmitters without Commission authorization, and a $7,000 forfeiture to Paladen Communications, Inc., a/k/a/ CB Shop, North Jackson, OH, sale of external CB power amplifiers. A follow-up letter was also sent to Alliant Energy concerning power line hardware interference to an Amateur licensee in Cedar Rapids, IA.

HI TECHNOLOGY

DRM *SALE*SALE*SALE*

If you've been curious about Digital Radio Mondiale, now is a great time to get in on it. Most means of decoding the digital shortwave transmissions require purchase of the DRM software. Peter Jackson of VT Communications (formerly Merlin) announced that the DRM software project will end in March of 2005, and in January will be putting the DRM software on sale for 45 euros rather than the current 60 euros. This includes a copy of the Dream DRM software as well.

The **http://www.drmrx.org** website is also due to shut down, but VT will continue to underwrite it for another year. Meanwhile, the US DRM group has launched their own website – **http://www.usdrm.com**. This new website will have a U.S.-specific schedule of DRM transmissions, i.e. the ones that can really be heard by listeners in the United States. The two key questions that the website needs to answer are: "Where can I hear it?" and "Where can I buy it (DRM receivers and software)?"

BROADCASTING

Drive-By Audio Sampling

MobilTrak listens to hear what you're tuned in to. Its solar-powered units randomly pick up faint electronic signals emitted by car antennas

across six lanes of traffic up to 140 feet away in the same way a police officer measures car speeds by pointing a radar detector at traffic and repeatedly resetting it.

The aim is to get a real-time, accurate snapshot of which stations the driving public is listening to, so that advertising dollars can be more effectively targeted.

MobilTrak operates in Seattle, Los Angeles, New Jersey and Charlotte, and is being tested in Washington, D.C. Within 36 months, the company hopes to have a presence in 100 markets. One California company, Smart Sign Media, uses MobilTrak's sensors and changes the advertising on digital billboards, depending on which radio station people are listening to as they approach.

Right now, MobilTrak captures only FM stations, but it plans to introduce technology that picks up AM and satellite station signals this spring.

SATELLITE SHORTS

The Canadian Radio-television and Telecommunications Commission is considering two applications for satellite radio licenses (XM and Sirius) and one application for a digital radio license. At least one of the services should be up and running within a year.

Recognizing that the war against terrorism is going to be a drawn-out one, Discovery Communications International (DCI) will give the American public a front row seat by re-launching its six-year-old Discovery *Wings* Channel as the *Military* Channel.

Major changes to the world's satellite rescue systems (COSPAS-SARSAT) will be introduced between 2004 and 2009. The current "LEO" (low earth orbit) satellite system, which utilizes 121.5 MHz and 243 MHz frequency for distress emergency will be switched off in 2009 and will be replaced by a geo-stationary satellite system on 406 MHz to provide greater coverage of the earth's surface.

When it was decided that manned missions to fix the Hubble telescope were too risky to astronauts, the scientific community pleaded for consideration of a robotic repair mission. Now, however, an expert panel says the robotic mission is more risky than a shuttle mission. The committee warns that NASA must consider launching the mission "as early as possible after the space shuttle is deemed safe to fly again, because some of the telescope's components could degrade to the point where it would no longer be usable or could not be safely de-orbited."

Respond – a new consortium of European aid agencies – is using satellites to help deliver food and fuel to an estimated 1.5 million people in the Darfur region of Sudan. Agencies trying to deliver aid were extremely hampered by seasonal flooding, so the Respond project gathers crucial information about road and river conditions using data from nine separate spacecraft, including ESA's Envisat, the largest Earth-observation spacecraft ever built.

Accessing a wireless internet connection (wi-fi) that typically works within about 300 feet, four Ohio teens made a *55.1-mile* wireless connection using defunct satellite dishes. Ben Corrado, Andy Meng and Justin Rigling, all graduates of St. Xavier High School in Cincinnati, are amateur radio operators who competed in last summer's hacker's convention in Las Vegas and may have set a world record.

> *"Communications"* is compiled by Rachel Baughn, editor@monitoringtimes.com, from newsclippings provided by our readers. Many thanks for this month's reports from Anonymous, FJ Czubak, Alan Henney, Norman Hill, Rick Kissell, Sterling Marcher, Jerry None, Doug Robertson, Brian Rogers, Bill Siedsma, Thomas Sundstrom, Bryan Turner, Larry Van Horn, Ed Yeary, and the ARRL and MRT Bulletins.

Scanners bring fans one step closer to the action

By Ron Lemasters Jr.,
All photos by Sherryl Creekmore/NASCAR

The Daytona 500 opens the race season February 20

Today's racing fans are better informed, more technologically astute and much better students of the game than their counterparts from even one generation ago. Much of that has to do with the explosion of stock car racing into the mainstream, with 24/7 coverage afforded them by the Internet, cable television and even satellite radio.

One part of that explosion has been the rise of scanners at the racetrack. Race fans as few as 20 years ago had to rely mostly on the public-address system or the radio networks for coverage while the race was going on, and anyone who has been to the track knows how difficult it is to hear either one when 40-plus stock cars are getting busy just 100 feet away.

The advent of the scanner allowed fans to listen in on conversations between the driver and his crew, and even the spotters, and headphones enabled them to hear it with relative ease.

In NASCAR today, there are two primary companies in the NASCAR scanner market: Racing Electronics and Racing Radios. Between them, the scanner-buying public is remarkably well served.

The boom in the NASCAR scanner market started in the late 1980s, according to Bruce Silver, president and CEO of Rac-

ing Electronics. "We started commercially distributing to the scanner market in 1988," Silver said. "At that point, we were a very small, 1-2 person company distributing out of the small condo where I lived in New Jersey. It has grown significantly. It's grown to the point now where we have five tractor-trailers traveling all over the country to all the races and distributing the scanners. It's a pretty significant business at this point."

It's enough of a business for Racing Electronics to build its own building near the Concord Regional Airport, a few miles from Lowe's Motor Speedway. Many of the souvenir trailers will be based there, in the shadow of the NASCAR Research and Development Center, to save them having to haul all the way to Pleasantville, N.J. after each event.

Silver said that the decision to get involved in the scanner business in motorsports was a risky one, given that the CB radio craze of the mid-to-late 1970s had bottomed out fairly quickly. "One of my concerns in starting the company in 1988 was, are we going to see in the scanner business what we saw in the CB radio business in the 1970s, where it peaked and died?" Silver said.

"We really didn't see it happen. By the time we had all our ducks in a row, we had good solid relationships with the tracks, and we have contracts with them that keep us

in front of the public. Every Tom, Dick and Harry is not able to get into the scanner business."

One of the keys to the scanner business is the fact that the drivers talk, and some are
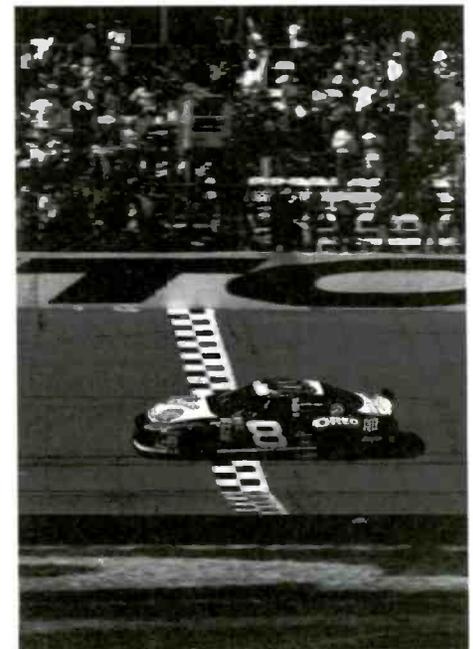
2005 NASCAR Nextel Cup Series Frequencies

Car	Driver	Primary	2nd	Alt 1	Alt 2
0	Mike Bliss	466.5000	469.1375		
1	Martin Truex, Jr.	466.6875	464.9250	451.3250	
2	Rusty Wallace	451.8250	452.6750	464.8250	453.6750
4	Morgan-McLure	468.8500	464.3000	461.7500	464.3875
5	Kyle Bush	468.2125	469.4875	467.0375	
6	Mark Martin	460.9500	466.7500	468.5625	463.4000
7	Robby Gordon	466.3375	461.8500		
8	Dale Earnhardt Jr.	464.8750	452.0500	467.0250	465.8875
9	Kasey Khane	451.8500	452.6500	462.7625	462.5875
10	Scott Riggs	457.1750	452.1250	457.2125	465.7125
11	Jason Leffler	466.0125			
12	Ryan Newman	464.8000	464.8500	465.9750	469.6625
13	Greg Sacks	469.3750			
14	John Andretti	462.7375	460.4875		
15	Michael Waltrip	464.9500	463.7250	453.7250	451.9000
16	Greg Biffle	468.4500	451.1375	461.3500	
17	Matt Kenseth	462.2000	462.4500	463.9500	463.7125
18	Bobby Labonte	451.3000	451.3500	451.9500	451.6000
19	Jeremy Mayfield	456.8500	452.4500	452.9750	465.9875
20	Tony Stewart	451.4000	451.5000	451.6000	451.9500
21	Ricky Rudd	463.6875	451.3750	452.2000	
22	Scott Wimmer	468.9375	462.8375		
23	Shane Hmiel	460.1625	464.1750		
24	Jeff Gordon	467.0625	468.2125	465.8625	
25	Brian Vickers	466.7875	462.0625	469.4625	465.0250
29	Kevin Harvick	469.0125	466.0250	462.0250	463.2250
31	Jeff Burton	468.5750	468.6000	464.0750	468.2500
32	Bobby Hamilton Jr.	463.3500	857.7875	860.8625	467.7500
36	Boris Said	452.1250			
37	Kevin Lepage	462.3375	457.5250		
38	Elliott Sadler	466.9500	466.4500		
40	Sterling Marlin	461.3750	462.1000	463.9375	
41	Casey Mears	458.0000	457.0250	460.9750	
42	Jamie McMurray	466.1000	452.7000		
43	Jeff Green	467.7750	464.4500	464.3250	
44	Terry Labonte	461.3375	466.3375	459.1000	457.8875
45	Kyle Petty	461.2250	464.4000	466.1750	
46	Carl Long	468.7125			
48	Jimmie Johnson	452.2375	451.9875	466.3375	
49	Ken Schrader	461.4125	466.2875	461.4175	
50	Arnold Motorsports	463.9750	468.7125		
51	Tony Raines	460.7625	467.8875		
72	Kirk Shelmerdine	467.8250			
77	Travis Kvapil	463.8875	468.8875	466.2625	
80	J.J. Yealey	451.9000			
88	Dale Jarrett	468.5250	466.4125	466.3750	
89	Morgan Shepherd	467.0125	466.3750b		
91	Bill Elliott	462.6750	462.5875		
97	Kurt Busch	465.9750	460.7250	469.4500	463.4250
98	Derrike Cope	466.1375	461.9500		
99	Carl Edwards	466.2750	466.8625		
00	Kenny Wallace	464.6625	463.2375		
01	Joe Nemechek	463.2875	461.3250	461.2175	461.2125
02	Hermie Sadler	452.0750	463.2125	461.1750	459.3625
04	Eric McClure	464.3000			
07	Dave Blaney	469.2375	464.4625	464.2125	469.4625
09	Johnny Sauter	460.7375	465.2125	469.2875	

2005 NASCAR Busch Series Frequencies

Car	Driver	Primary	2nd	3rd	4th
1	Johnny Sauter	468.3125	465.2125	460.7375	463.8875
2	Clint Bowyer	461.5125	469.6375	462.6000	462.1250
4	Ryan Hemphill	456.7875	456.4000	466.7875	
5	Hendrick Motorsports		457.8875	464.1125	
6	Paul Wolfe	462.4625	460.1625	462.8375	
8	Martin Truex Jr.	451.3250	468.2500	464.5875	464.9250
9	Roush Racing	466.2750	466.8625	451.1375	
11	Paul Menard	466.5250			
12	Tim Fedewa	466.7250	469.0000	464.1750	464.0000
14	David Stremme	464.6500	464.7000		
16	Justin Ashburn	464.8750	467.2875	463.2375	
17	Matt Kenseth	469.5125	463.7125		
18	J.J. Yealey	467.7625	466.0125	451.7250	
19	Bobby Labonte	451.3000	451.3500	451.9500	451.6000
20	Denny Hamlin	451.8500	451.9000	451.8000	
21	Brandon Miller	469.6375	461.5125	461.5875	469.9750
22	Kenny Wallace	463.9375	464.2750	452.3500	464.2625
24	Mike Harmon	461.8125	461.7125		
25	Ashton Lewis	469.5750	456.6250	451.4625	451.3875
26	Mark Green	458.4750	467.3375	461.9625	
27	David Green	469.9375	469.5500	467.4125	
28	?Travis Kvapil	468.5750			
31	Dave Blaney	465.0125	463.8875	465.2125	
32	Shane Hmiel	464.0375	460.3375		
33	Tony Stewart	456.4000			
36	Stanton Barrett	463.3125			
38	Kasey Kahne	463.1125	468.6375	463.4125	

Car	Driver	Primary	2nd	Alt 1	Alt 2
39	Robinson Racing	461.2750	466.4000	461.2500	
41	Reed Sorenson	458.0000	457.0250	460.9750	
43	Aaron Fike	457.2000			
44	Justin Labonte	452.4250	466.5000	461.3375	466.3375
47	Robert Pressley	464.3625			
49	Derrike Cope	457.1500	461.2750		
55	Robby Gordon	466.3375	461.8500		
59	Stacy Compton	457.5750	468.0875	468.4625	465.7625
60	Carl Edwards	451.1375	468.4500	461.3500	460.9500
61	Larry Gunselman	469.2375	452.6500		
62	Larry Hollenbeck	456.3750			
64	Jamie McMurray	467.0875			
66	Greg Biffle	467.4125	461.5625	469.5500	469.9375
67	C.W. Smith	459.9875			
71	Kevin Lepage	460.7625			
72	Randy McDonald	454.2000	452.6500		
74	Damon Lusk	469.8750			
75	Jay Sauter	462.0750	461.0000		
77	Donnie Neuenberger		467.5500	463.4125	463.8125
81	DEI	464.8750	452.0500	467.0250	465.8875
84	Brian Webber	464.1000			
86	Jeff Fultz	468.9250	468.7000		
87	Joe Nemechek	464.2875	468.8375	452.4125	458.1125
88	Jeff Fuller	457.4125	452.4125	458.1125	468.8375
90	Elliott Sadler	461.9500			
93	Bill Hoff	466.7000			
95	David Keith	456.8375			
96	Gus Wasson	468.4875	468.5375		
99	Michael Waltrip	464.6625	463.2375		
02	Hermie Sadler	463.2125	461.1750	459.3625	
07	Ken Schrader	461.0875	467.6875		

International Race of Champions (IROC) 461.6625

NASCAR Officials	Scoring	Broadcasting (search 450-460 MHz)
1. 461.2000	451.5750	Radio - 454.000
2. 464.7750	451.1750	N8C - 450.5875
3. 464.6000		TNT - 450.5875
4. 451.2250		FOX - 450.3000
5. 463.6250		FOX - 450.5250
6. 451.2750		FOX - 450.0375
7. 451.4250		
8. 451.4500		

Thanks to NASCAR and racefreqs.com for the information compiled in this sidebar.

NASCAR RACE SCHEDULE 2005

Date	Race	Venue
02/12/05	Budweiser Shootout	Daytona International Speedway
02/20/05	Daytona 500	Daytona International Speedway
02/27/05	TBA	California Speedway
03/13/05	UAW-Daimler Chrysler 400	Las Vegas Motor Speedway
03/20/05	Golden Corral 500	Atlanta Motor Speedway
04/03/05	TBA	Bristol Motor Speedway
04/10/05	TBA	Martinsville Speedway
04/17/05	TBA	Texas Motor Speedway
04/23/05	TBA	Phoenix International Raceway
05/01/05	TBA	Talladega Superspeedway
05/07/05	Carolina Dodge Dealers 500	Darlington Raceway
05/14/05	TBA	Richmond International Raceway
05/21/05	Nextel All-Star Challenge	Lowe's Motor Speedway
05/29/05	TBA	Lowe's Motor Speedway
06/05/05	TBA	Dover International Speedway
06/12/05	TBA	Pocono Raceway
06/19/05	TBA	Michigan International Speedway
06/26/05	TBA	Infineon Raceway
07/02/05	TBA	Daytona International Speedway
07/10/05	TBA	Chicagoland Speedway
07/17/05	TBA	New Hampshire International Speedway
07/24/05	TBA	Pocono Raceway
08/07/05	TBA	Indianapolis Motor Speedway
08/14/05	TBA	Watkins Glen International
08/21/05	TBA	Michigan International Speedway
08/27/05	TBA	Bristol Motor Speedway
09/04/05	TBA	California Speedway
09/10/05	TBA	Richmond International Raceway
09/18/05	TBA	New Hampshire International Speedway
09/25/05	TBA	Dover International Speedway
10/02/05	TBA	Talladega Superspeedway
10/09/05	TBA	Kansas Speedway
10/15/05	TBA	Lowe's Motor Speedway
10/23/05	TBA	Martinsville Speedway
10/30/05	Bass Pro Shops MBNA 500	Atlanta Motor Speedway
11/06/05	TBA	Texas Motor Speedway
11/13/05	TBA	Phoenix International Raceway
11/20/05	TBA	Homestead-Miami Speedway

Sherryl Creekmore/NASCAR

really entertaining to listen to while pursuing glory on the track. "You have the drivers still talking, and people want to listen to them, especially when you have guys out there who share their emotions with the race fans." Silver said. "That's pretty special."

Racing Electronics, which services many different series across the country as well as NASCAR, has recently begun distributing scanners for NHRA drag racing. Even though the races last less than five seconds on average, there is still plenty to hear, according to Silver. "You can listen to John Force and all those folks, and it makes the race a lot more exciting, plus it adds hearing protection, which is very important," he said.

While Silver said the market has grown,
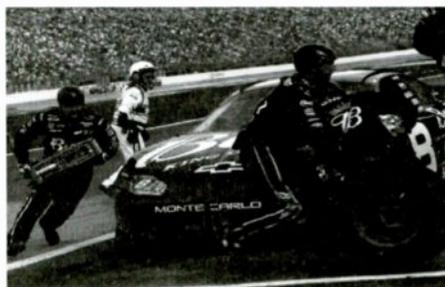
Copyright Sherryl Creekmore/NASCAR

and his own company with it, he would not reveal the size of the market in dollars, saying, "we don't really talk about that." He did say, however, that the number of race fans who actually own their own scanners is somewhat lower than you might imagine.

"We estimate that only about 10 percent of the race fans have scanners today. It's a very low number, so there is room for growth."

In light of the fact that not everyone wants to own their own scanner, Racing Electronics offers rental programs for those not willing to spend the money for a top-notch rig. Fans can rent for the day or the weekend, plus headsets. All it takes is a deposit and the promise to bring it back when the racing is finished. "That's pretty popular for the first-time user," Silver said.

Getting into the rental business turned on a conversation overheard at one of his trailers, said Silver. "The reason I got into the rental business was not so much as a revenue stream, although it has turned out to be a significant revenue stream. I was waiting on a couple one day, and the guy was trying to convince his wife he wanted to buy a scanner. The wife turned to her husband and said, 'why, so it can sit in the closet next to your bowling ball?'
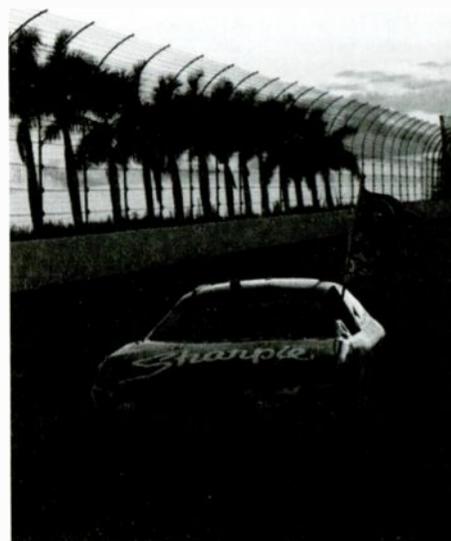
I thought that was pretty clever, so we came up with the idea of renting scanners.

"It's really taken off for the people who go to one or two races a year and really don't want to be bothered with owning the equipment. It's a good program. We rent to the same people race after race at the tracks they go to. Race fans are honest, basically, and just a phenomenal group of people, and I mean that from my heart. I don't think, in the last year, we've lost but three scanners. People bring them back."

Another aspect to the scanner business is the corporate program, whereby the companies will contract with a sponsor to provide a set number of scanners for use by guests, employees or the like. Racing Electronics does not do much with corporate programs, Silver said, preferring to market primarily to the average race fan.

Whether you own your own or rent by the weekend, having a scanner at a NASCAR race is a positive addition to the experience. You can hear MRN, the television feed, NASCAR race control or your favorite drivers, and the headsets filter out some of the noise, which is good for your ears over the long haul. In the information age, it's good to go armed with all you can find, and these scanners allow you to find quite a bit.

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Editor's Note:
Any scanner will do a good job at the race track, but the Uniden Sport Cat models have been especially popular. Now, the new Uniden SC-230, reviewed on page 70, comes with cars and frequencies already preprogrammed for NASCAR.

Also check out the headsets on page 74 - Don't bust an eardrum!

Are Your DX Recordings DXceptional?
Simple Steps to Archiving What You Hear

By Guy Atkins

I n any collecting activity, some want it all, and some want only the best. What's your approach to DX recordings? Either extreme can be more enjoyable and productive when you have a consistent approach and a few tricks up your sleeve.

DX Recording, 2005 Style

Computer-based recording has useful features unheard of in the reel-to-reel and cassette tape era. Benefits like multiple copies identical in sound quality to the original, highly flexible editing capability, time-date stamps, automatic file naming, VCR-like timed recordings, and virtually unlimited recording lengths are key features of today's software-based recorders.

The two top programs appealing to the DX recording enthusiast are Total Recorder Pro (High Criteria Inc., **http://www.highcriteria. com**) and RecAll Pro (Sagebrush Systems, **http://www.sagebrush.com**).

RecAll Pro has two unique, DXer-friendly features: "running" time-date stamps with Co-ordinated Universal Time (UTC) offset, and an annotation (text notes) capability. Jim Sells,

Figure 1: RecAll Pro's main window, showing text annotation and running time-date stamp in UTC

the author of RecAll Pro, is very responsive to support questions. Sagebrush Systems' web site also features a forum for user discussion about RecAll Pro and other software from the company.

Your Own DX Time Machine

Let's look at these two features more closely. Both Total Recorder Pro and RecAll Pro track and properly increment the local time and date a recording was made, but only RecAll Pro provides for a UTC adjustment. It's extremely handy to play back a recording and see the exact UTC date and time when program details, station identification, advertisements, and so on were heard originally. You *could* set your PC's internal clock to UTC, but numerous other programs expect the computer's clock to track with your local time.

QSL hunters love this ability – matching UTC time with program details is easy for later reception report writing and manual record keeping, when not DXing. The UTC time and date is shown in a small window within the RecAll Pro interface and updates continually as the playback progresses. If you collect recordings in place of QSLs, the UTC time-date stamp is the perfect time-based index of your DX activities – no more wondering what time it was when you heard a crucial detail!

You'll need to use *beta* version 1.4 or newer to access the UTC time offset feature of RecAll Pro. Otherwise, your recordings will display local time and date only, and you'll still need to do the mental gymnastics to convert to UTC.

Here are the steps to create a time-date stamp that displays in UTC: start the Windows *Registry Editor* by clicking: Start Button>>Run>>*Regedit*

Navigate through the "tree" file structure of Regedit to access the registry key

HKEY_CURRENT_USER\Software\Sagebrush\ RecAll

Note that the proper folder to access is the "RecAll" directory, not "RecAll-PRO."

Right-click on this key in the registry editor, and select "New string value." Enter a new value name of *TimeOffset* (case sensitive), and give the string data a value equal to the number of hours your local time is behind or ahead of UTC (a positive or negative number). Exit the Registry Editor to save the changes.

Example: TimeOffset "8" provides the correct offset to change Pacific Standard Time (PST) to UTC for West Coast DXers. You'll need to manually adjust the offset value one hour earlier for Daylight Time in your time zone when spring comes around.

Virtual Stickies

Text annotation is an even handier feature; think of it as yellow sticky notes for your DX recording. This one-of-a-kind RecAll Pro feature gives the DXer ability to "attach" *any* alphanumeric text or comments to *any* portion of a recording. A few one-line examples might be:

Wow! Best-ever level for Radio Outback!
Drifty signal, poor modulation; might be a pirate
Ad for Chocolate Milo drink... mmm!
ID at top of hour... finally
802 kHz - 2BL Sydney? Sounds Aussie

Your text notes are saved with the time-date stamp information as part of the file. This works with both WAV and MP3 audio formats in RecAll Pro, but the information only displays if RecAll Pro is used for playback. Other audio players ignore the extra data.

Of course, the most practical use of text annotation is to accurately identify what's being heard and recorded at the moment, or to make note of an educated guess of a language, station identification, or other DX clues. The information you enter into the annotation dialog box (via CTRL-A hotkey or menu choice
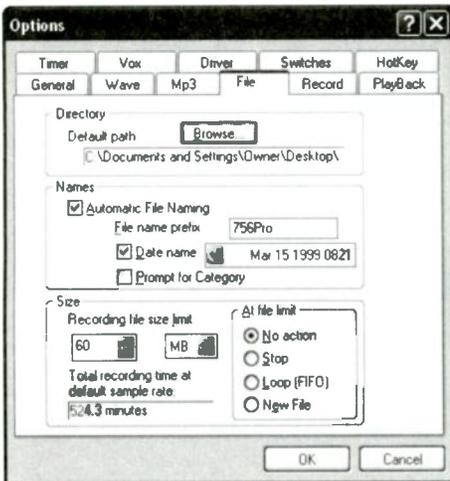
Figure 2: Automatic File Naming is a useful and time-saving feature

Figure 4: The TimeOffset key and value for RecAll Pro's UTC time-date stamp is added to the Windows Registry with the RegEdit utility

EDIT>>"Insert Annotation…") appears upon playback with the running time-date stamp at the exact point in the recording it was entered. Your note remains on the screen until the next annotation appears (or until a "blank" or empty annotation is encountered by RecAll Pro).

A blank annotation (a tap or two of the space bar will suffice) is useful to force cancellation of the text when it's no longer needed as the recording progresses. This method lets the DXer limit the text note to the duration of the recorded segment of interest.

Set It Once, Set It Right

You can simplify the repetitive task of adjusting recording parameters every time you launch RecAll Pro by creating a *settings* (.ini) file. After all aspects are configured (audio file type & format; automatic file naming conventions; default directory for file saving; sound card to be used; and others), save your settings under a unique name with RecAll Pro's FILE>>"Save Settings As…" menu choice. I like to name my settings file with the name of the receiver I'm going to use it with, such as "R75_Settings.ini". When you want to open and use a saved settings file, launch the program and choose FILE>>"Open settings file…" in RecAll Pro.

Figure 3: Select your desired sound cards for recording and playback with the Driver Tab of "Preferences"

For UTC time offset to work with a settings file, add a single parameter to the "[Setup]" section. (This is in addition to the Windows Registry entry described above.) Use a text editor such as Notepad to open the INI file, adding "TimeOffset=x", where "x" is difference in hours between your local time and UTC. Re-save the file and you are finished. You'll want to do this for each settings file you plan to use. Remember that you need the Beta 1.4 version (or later) of RecAll Pro to take advantage of the UTC time-date stamp feature.

Note that settings files do not save your choice of recording source (line-in, microphone, etc.) or the actual recording level. They need to be set manually if either one has been changed since the last use.

Take It Easy

Further simplify the use of RecAll Pro by automatically launching a settings file when the program loads. To do this, make a shortcut to RecAll Pro on the desktop. Right-click the shortcut, choose "Properties", and in the line that says TARGET, append the INI switch ("/i") and the path to the settings file. Mine looks like this:

"C:\Program Files\RecAllPRO\RecAllPRO.exe" /i "C:\Program Files\RecAllPRO\R75_settings.ini"

Note that the quotation marks are important and must be around the program path and the settings file path, as shown… NOT around the /i. You then need to click "OK" to save the modified shortcut properties.

One parameter group saved by the settings file is your choice of audio format. There are many possible combinations of bit-depth and sampling rates for MP3, the preferred electronic file format for DX audio recordings. A 16-bit, 16,000 Hz monaural (single channel) MP3 format gives more than adequate audio quality for DX purposes while keeping file sizes as small as possible. With these MP3 settings, hard drive space is consumed at the rate

of 0.114 megabytes (Mb) per minute. At this rate, an 8-hour continuous recording of a DX session or DXpedition uses less than 55 Mb. Hard drive storage is a bargain at today's prices and there's no reason a DXer shouldn't record an entire DX session from start to finish (even if just as a temporary master file before editing and saving the juicy parts). More on this DX recording strategy is discussed later.

Twice is Nice

OK, now we're getting serious! Recording audio from two or more receivers at the same time is entirely possible with hard drive recording, as long as a separate PC sound card is used for each radio.

My use of simultaneous recording is for two different situations I encounter, season after DX season:

1) Recording an enjoyable music or feature program with one radio, while actively DXing (and recording) with another, and

2) Recording two interesting DX frequencies with different receivers when reception conditions are exceptional.

A two-channel (stereo) MP3 recording is a simple solution to capture audio from two receivers at once. However, this method cannot use RecAll Pro's UTC time-date stamp and text annotation for each receiver. RecAll Pro provides for separate "instances" of the software to record multiple sources (FILE>>"New Instance").

Fortunately for the DXer, basic sound cards are very inexpensive now. The simplest 16-bit, "Sound Blaster" compatible sound card will perform well for our purposes. These are often $20 or less at computer discount stores and online vendors. Just make sure the sound card's form-factor matches your computer (typically PCI) and that your PC has an available slot. Alternatively, your computer's motherboard may have a built-in sound card available, so check your documentation for details.

Another good choice is an external USB sound card. The Sound Blaster MP3+ from Creative Corp. is a compact device retailing
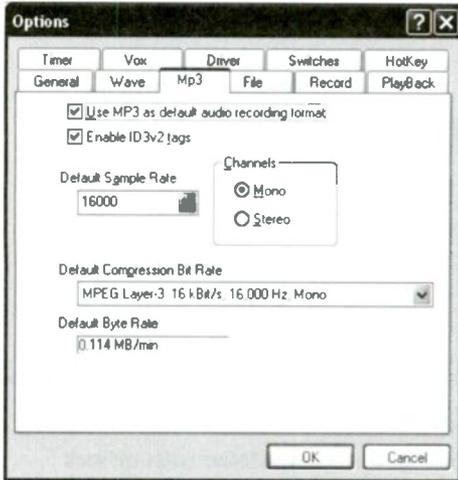
Figure 5: The MP3 Tab of "Preferences" allows a choice of various MP3 recording formats

for $39, hooks up easily, and works well with RecAll Pro on notebook and desktop computers.

RecAll Pro is configured for a particular sound card by accessing the "Driver" tab (OPTIONS>Preferences>>Driver). Choose your desired sound card in the "Wave In Device" section. You may leave the "Wave Out Device" as the default Microsoft Sound Mapper (which uses the next available sound card for playback), or you can select a specific sound card.

Neatness Counts

Fortunately, you don't need to remember a host of different settings for each instance of RecAll Pro. Instead, create another RecAll Pro shortcut and modify the "target" to load the matching INI (settings) file as described earlier. If you name your shortcuts after the receiver you plan to use with each program instance, there will be no confusion.

Notice that multiple shortcuts load the same application file. You don't need a duplicate in a different path or folder. Two or more INI files exist happily side-by-side since they load separate instances of the program.

Automatic file naming is a very useful feature in RecAll Pro and other programs such as Total Recorder. A bit of forethought here will save time in the future and keep your recordings organized with useful information in the file name. RecAll Pro's file naming setup is located on the OPTIONS>>Preferences>>File tab. I recommend using a file name prefix that includes the model number or name of your receiver, and choose a date/name convention to include the date and time the recording begins. For instance, a RecAll Pro recording with my ICOM IC-756Pro transceiver might have the automatic file name of:

756Pro Jan 15 2005 0821.mp3

It's a simple matter to rename the file later to reflect the DX contents if you wish; I recommend either deleting or adding to the receiver name, but leave the time and date intact. As an example:

4820 R Botswana Jan 15 2005 0821. mp3

Ready for the Marathon

Do you enjoy extended DXing sessions, "all-nighters," or DXpeditions? If so, the power and convenience of software-based audio recording will be of great benefit to you.

Archiving a long stretch of DX audio for future reference is very handy. If you keep a program like RecAll Pro running from start to finish, you'll capture any IDs or interesting program details that sneak up on you! If you're like me, you've had a DX station identify almost immediately after you tuned in, and you failed to start the recorder in time. With the "set it and forget it" nature of hard drive recording, remembering to flip over the cassette (or insert a fresh Minidisc into the MD unit) is just a quaint memory.

But how do you later navigate through the forest of hours of recorded DX? Leave a trail of digital breadcrumbs! As you scan the bands or seek out juicy frequencies, get in the habit of entering a brief text annotation (the CNTRL-A hotkey combination) anytime you stop on a signal of interest.

My quick text notes while actively DXing are on the order of "1134 Japanese?" Later, I'll delete it and add a more detailed note: "1134 kHz, JOQR Tokyo, time pips & NHK ID at 1400." Even if many hours of DX audio are saved to a single file, you can use the playback "slider" control to quickly preview numerous text notes. Consider them the table of contents to your DX audio "book."

RecAll Pro is not unique with its powerful and quick tools to edit, save, copy, paste, and delete sections of a file. Unfortunately, the running time-date stamp information is discarded when using the "paste to file..." command.

Typically I want to extract a short portion of audio surrounding an ID or interesting programming from a much larger file. The work-around is to make a copy of the entire file, delete everything *except* the desired section, and resave the file under a new name. I then copy the original file again and work on the copy to strip away everything but another segment worth saving. This technique creates concise audio files with the desired snippet of DX, an intact UTC time-date stamp, and text notes to help identify the content.

Whether you archive the large master file of continuous DX audio or just save the best, short segments depends on your personal style. Consider saving the master file on a CDROM for long term storage if your hard drive space is tight.

Thanks for the Memories

If you begin now with a consistent strategy of recording audio to your PC's hard drive, you'll quickly build an organized – and accessible – library of your DXing activities. RecAll Pro's helpful features prevent your files from becoming the digital equivalent of cassette tapes jumbled in an old shoebox. Years from now when your grandkids ask "What *was* DXing anyway, Grandpa?" you'll be able to bore them to tears with detailed, carefully noted, and time-stamped examples of your best recordings!

The Social Side of DXing

By Richard Cuff

Radio has often been called the theatre of the mind; as a result, it tends to be a solitary pursuit – rarely do most of our family members join us out in the shack when we're surfing the airwaves – no matter where in the spectrum interests us.

However, if you ask veteran DXers / SWLs, you'll find that the highlights of their listening calendar are the times they spend with other listeners – either at DXpeditions, picnics, or at conferences such as the Winter SWL Fest or the European DX Conference. This article will outline why people enjoy these social gatherings of shortwave listening, and offer some suggested approaches for arranging your own shortwave gathering, and how to develop a listening strategy for those get-togethers that actually involve radio listening!

In this article, I'll use the term DXpedition to refer to a gathering where the most important activity is radio listening to distant / difficult-to-hear stations, even though the gathering itself might be called a radio camp or something similar.

Why get together at all?

Some of the reasons to participate in a radio-related get-together are listed below:

You can learn from each other while DXing:

None of us are identical in our listening habits and in our specialties; at a typical DXpedition or radio camp, you'll come across a mix of interests – medium wave, tropical bands, Indonesian regionals, et cetera, and you can listen to the catches other DXers are hearing.

Ed Mauger, who regularly participates in DXpeditions organized by Rich D'Angelo at Pennsylvania's French Creek State Park, enjoys the rapid sharing of information that happens during a DXpedition: "DXing tends to be a solitary activity, so it's nice to enjoy DXing with others who also are used to DXing by themselves. You call DXing tips and help each other identify stations. You also can find out sooner which bands or regions are particularly 'hot' at a given time."

You can compare radios and antennas:

It can be difficult to compare radios side-by-side unless you visit one of the few stores that has radios connected to decent antennas. Reviews in *Monitoring Times, Passport to World Band Radio*, and various club publications can help, but there is no substitute for real world experience in good listening environments.
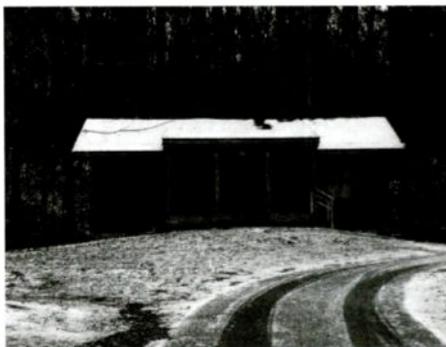
Typical cabin used for DXpedition at French Creek State Park, Elverson, PA. Photo by Richard Cuff.

For example, at our French Creek DXPedition, Bob Montgomery brought along a home-built, externally mounted active antenna; Rich D'Angelo had one 500-foot and another 200-foot wire antenna; Ed Mauger had hundreds of feet of wire strung out for his antenna; John Figliozzi and I each had only a couple hundred feet of wire strung on the trees. I was able to compare antennas and radios this way, comparing Bob Montgomery's active antenna to my 100 feet of wire.

You can learn about radios, radio history, programming, pirate broadcasting, DXing, and other topics:

At listener conferences like the Winter SWL Fest in Kulpsville, Pennsylvania, there are two days of technical sessions and forums hosted by people who are expert and experienced in particular areas of knowledge. At the 2003 SWL Fest we were treated to a panel discussion by members of the US IBB monitoring staff on their radio listening environment around the

John Figliozzi, Ian McFarland, Alan Heil (background), Michael Murray and Harold Sellers (foreground) discussion radio topics at the 2004 ODXA Radio Fest. (Photo by Brian Smith)

world, with speakers from all continents except Antarctica.

You get to sympathize with others over the fact that no one at home understands your hobby.

Let's face it – our spouses, children, co-workers, and neighbors rarely seem to appreciate our enthusiasm for radio listening. As a result, we are relegated to our shacks to enjoy our listening in solitude. However, when you're together with other radio enthusiasts, you find kindred spirits who appreciate your listening at odd hours of the night, struggling to tune out heterodynes and listen to strange languages embedded in the static and fading.

What can you expect to hear?

First off, you are dependent on seasonal and geomagnetic propagation conditions. A recent French Creek DXpedition was held on the heels of the recent solar storms that brought about visible auroras that could be seen in the Mid-Atlantic region. The following weekend still saw below-average shortwave conditions to Latin America, Indonesia, India and Southeast Asia, but we did have unusually good medium-wave openings to Latin America.

One of the other reasons you're able to even attempt to hear such variety is that you aren't being distracted by chores, work, errands, the children, or the dog while you're on a DXpedition, and you can get up early (or stay up late) to listen to target areas when propagation conditions – such as the sunrise/sunset "gray line" – are in your favor.

Here are some of Rich D'Angelo's logs from the November French Creek weekend:

ARMENIA 9965, Public Radio of Armenia/Voice of Armenia, 1926-1947 Nov 15, caught end of opening English program announcements by a man followed by a woman announcer with news. After some music and special features, the man returned with ID ("Dear listeners, you are listening to Public Radio of Armenia."), postal and e-mail address for reports. The next program appeared to be in Armenian. Poor to fair with deep fades.

BOLIVIA 4902.5, Radio San Miguel, 2232-2301 Nov 15, man announcer with Spanish talks hosting a program of local music. Nice ID and time check at 2300. Poor signal.

BRAZIL 5035.1, Rádio Aparcedia, 2248-2302 Nov 14, Portuguese talks by a man and a woman with soft vocals. Time pips and ID at
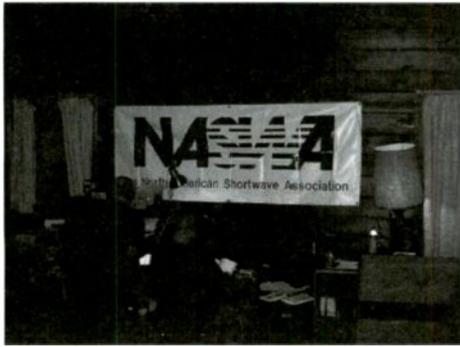
Ed Mauger (l) and John Figliozzi listening at French Creek DXpedition. Photo by Richard Cuff.

2300. Poor to fair but //6134.8 was good.

CHAD 6165, Radiodiffusion Nationale Tchadienne-N'djamena, 2044-2138 Nov 15, nice program of hilife vocals hosted by a man announcer with occasional long talks in French. ID at 2053. Fair to good until another station began to dominate the channel blocking opportunity to stay with them until sign off.

CHINA 4460, China National Radio 1, 1120-1128 Nov 15, man with talk in Chinese noted in passing. Poor with utility traffic.

CHINA (Tibet) 4905, Xizang PBS, 2236-2316 Nov 15, program of traditional music and Tibetan talks. Fair with //4920 poor and //5240 very poor.

CLANDESTINE (Sudan) 12060, Radio Nile via Madagascar, *0425-0457* Nov 15, open carrier followed by a woman with Arabic "Radio Nile" ID and announcements followed by opening English announcements. Quick Arabic program mentioning Sudan and Colin Powell followed by English program about lack of education opportunities for woman in the Sudan. Sudanese music from 0445. Fair to good //15320 poor to fair.

CONGO 6985, Radio Congo, 2052-2103 Nov 14, hilife vocals with French speaking male host. ID and news at 2100. Poor mixing with WYFR in Spanish.

ECUADOR 4869.2, La Voz del Upano, 1046-1106 Nov 15, man announcer with Spanish talk and ID followed by lively Latin vocal. Another ID at 1100 followed by brief religious talk and soft inspirational music. Poor to fair.

GUYANA 3291.2, Voice of Guyana, 0220-0236 Nov 15, English language religious program followed by a local male announcer with "Voice of Guyana" ID at 0230. Poor to fair.

HONDURAS 3240.6, Radio Luz y Vida, 0240-0401* Nov 15, English religious program about youth baseball. Unshackled program from Pacific Garden Mission in Chicago at 0327. Closing announcements from Don Moore asking for reception reports. Poor to fair.

JAPAN 6055, Radio Nikkei, 1156-1216 Nov 16, music to brief conversation between a man and a woman in Japanese before tone at top of the hour and station ID. News read by a man. Poor.

LIBERIA 4760, ELWA, 2151-2232* Nov 15, man

with religious talks in English with some choir music. New program segment at 2200. Sign off ID and announcements by a man at 2230 followed by orchestra National Anthem. Poor with very deep fades.

MADAGASCAR 5010, Radio Nationale Malagasy, *0257-0320 fade out Nov 16, choral National Anthem opening followed by a man at 0301 with ID and opening announcements in Malagasy. Some singing but mainly long talk by a woman announcer. Poor to fair at tune in but deteriorating rapidly.

MALAYSIA 15295, Voice of Malaysia, 1159-1230* Nov 15, multiple IDs by a man and a woman announcer prior to one short and one long time pip. A man followed with news in Chinese. After the news non-stop traditional music to 1229. Dead air for about a minute before carrier was terminated. Fair.

MALI 4783, Radiodiffusion Télévision Malienne, 2200-2226 Nov 14, man with French language talks, brief musical selections between phone calls from listeners, ID and Time checks. Poor to fair but // 4835 was very poor and // 5995 was fair to good.

MYANMAR 5040.4, Radio Myanmar, 1108-1152 Nov 16, nice program of vocals and flutes hosted by a woman with talks in Myanmar language. Weak signal but steadily improving.

PERU 4835.4, Radio Marañon, 1047-1103 Nov 16, program of OA vocals hosted by a man with Spanish talk, ID and announcements. Poor.

4955, Radio Cultural Amauta, 2320-0010 Nov 14, program of spiritual vocals and long religious Spanish talks. ID at 2333 and again at 0002. Poor signal.

5019.9, Radio Horizonte, 1016-1048 Nov 15, program of lively OA vocals hosted by a man with Spanish talk, ID and TC at 1043. Fair signal but not much else coming in.

5939.4, Radio Melodia, 2305-2322 Nov 14, Man announcer with long talk with frequent mentions of "Radio Melodia" during talks. Poor with deep fades.

RWANDA 6055, Radio Rwanda, 2032-2100 Nov 15, program of French talks by a woman announcer and French pop vocals. Nice signal but covered by Romania at 2100.

SURINAME 4990, Radio Apintie (tentative), 0417-0515 Nov 15, program of continuous vocals including Elvis singing "In the Ghetto." Poor with deep fades.

VIETNAM 12019.9v, Radio Voice of Vietnam via Son Tay, 1234-1248 Nov 15, English program direct with local news followed by ID and world news. After a commentary there was traditional Vietnamese music. Fair signal but very deep fades.

By comparison, my own listening goals were different: I focus solely on English language broadcasts, and I spend more time listening to the programming, since that's my primary enjoyment in shortwave listening. I was able to listen to Channel Africa's 0300 broadcast from South Africa on 7390 kHz, something I would rarely have time to listen to at home with all its distractions and electrical noise.

How to arrange your own shortwave gathering

Your first questions needs to be why you want to set up a gathering – Is it for a DXpedition, where the primary focus is listening to the radio, with a secondary focus of sharing with fellow enthusiasts? Or is it for education and socializing – such as the Winter SWL Fest? Or is it strictly social – such as the summertime "family reunions" or picnics that happen around the country? Arranging a social gathering that involves radio would likely have one necessary ingredient: a pavilion or other similar covered area so you can still use your radios even if inclement weather arises.

Setting up a DXpedition, where the emphasis is more on listening to faint, distant signals, requires, as its primary ingredient, a favorable listening environment. You can obtain this environment by choosing an electrically quiet location; for many, a cabin located in a state park is an inexpensive arrangement, especially since the prime DX season is the off season for most state parks. Unfortunately, many state parks close down their cabin operations just when the DX season heats up in November. Here in Pennsylvania, though, most of our state parks keep their cabin operations open all year.

State park cabins can be rustic – meaning no electricity or heat – which might be more work than you'd enjoy – or they can be modern – meaning they have heat and electricity. Another nice feature of state park cabins is that the cabins are generally separated, allowing room to run true longwire antennas in the woods, and also reducing the potential for electrical noise from neighboring cabins.

Visit your state's state park website to see what their cabin arrangements are; you might want to speak with park staff or pay a visit to a nearby park to see if their cabin facilities would lend themselves to a DXpedition.

My own investigation of privately-run campgrounds suggests these are probably less optimal for a DXpedition because these campgrounds tend to have everything packed in more closely together, meaning it would likely be more difficult to run antenna wires or avoid electrical noise.

Another possible setting for a DXpedition is a recreation or camp facility that has a lodge or similar group cabin setting. The Ontario DX Association has utilized two facilities in recent years for Radio Camps they have sponsored: the Shadow Lake Centre, in Stouffville, Ontario (see http://www.shadowlakecentre.ca/ for more details) and the Lake St. George Conservation Centre, near Richmond Hill, Ontario (see http://www.interlog.com/~stgeorge/). Both of these facilities have lodge settings that feature a large room where participants set up their listening posts, along with a dormitory environment with bunk beds for sleeping arrangements. Places like these, unlike state park environments, are likely to be open during the winter months; the downside is that you may need to set up a larger group (10 to 20 or more) in order to make the event economically feasible. Local Boy Scout and Girl Scout organizations might have suitable camp setups.

I know of no single Internet site that would list facilities such as these, though a Google search for "camp rental hall" and your state name should yield several possibilities.

Setting up a gathering or festival: If your gathering involves anything more than a same-day activity, the first thing to pick is a date and a venue. One of the lessons I've learned over the years is that you should select a venue that can be inspected in advance, if you aren't familiar with it. A facility should have sufficient banquet facilities / meeting rooms to accommodate discussion sessions as well as a dining or other central gathering location. Most hotels that have meeting facilities have someone on staff that is specifically responsible for arranging meetings, and these folks can be a big help in setting up your get-together.

What to bring to a shortwave gathering

Planning ahead is most critical for a DXpedition, since a DXpedition is all about actual radio listening, not talking about radio listening. Ed Mauger, for one, has a permanent packing list so he doesn't forget anything. Typical items for a DXpedition packing list are shown in the sidebar. Several of us who regularly head out to French Creek State Park in Pennsylvania keep plastic storage tubs in a semipermanently packed state – so we don't have to go looking for things when it's time to get ready for a DXpedition trip.

While many of the radios you see at DXpeditions are high-end receivers such as the Drake R8B or the Ten-Tec DX340, you don't need to have a high-end radio to have a good time at a DXpedition. A Sony ICF-2010 or another radio with decent sensitivity makes a perfectly good DX rig. While these high-end rigs, coupled with high-end antennas, are obviously going to be the best at digging out the weakest signals, a good-quality portable can yield plenty of good signals.

You'll also want to pack other listening references such as frequency lists and guides (for example, *Monitoring Times, Passport to World Band Radio, World Radio TV Handbook*) and a DX Edge if you are trying to take particular advantage of gray line propagation.

Food arrangements for DXpeditions can be simple – everyone brings their own food – or they can involve group cooking activities. Cooking facilities can vary widely at DXpedi-

tion sites, and you probably won't be right next door to a fast food restaurant – after all, you are hopefully at an electrically quiet location – so the best strategy is to bring simple-to-prepare foods that allow you to maximize your radio listening time. A tradition at Rich D'Angelo's French Creek DXpeditions is a spaghetti dinner on the last night of the gathering, with several folks contributing items to the dinner. Who knows; perhaps you'll create your own culinary tradition!

At group camping activities, the emphasis is still likely to be actual radio listening, so the DXpedition packing list also would be a useful resource. Food arrangements might be part of the rental package offered by the camp facility; extensive independent cooking arrangements might not be allowed.

At social outings such as picnics, or "family reunions," the emphasis is probably more on dining and drinking than on radio listening; depending on the distances people are driving from, it may fall upon one or two event organizers to make food arrangements locally, asking those from distant areas to contribute financially more than in-kind contributions.

Conclusion

There are many ways you can get together with fellow shortwave listeners and share the fun of radio listening; hopefully this article has given you some ideas for setting up your own DXpedition or similar gathering; be sure to pass along logs and reports of your gathering to *Monitoring Times!*

Special thanks to Rich D'Angelo, Ed Mauger and Brian Smith for their contributions to this article.
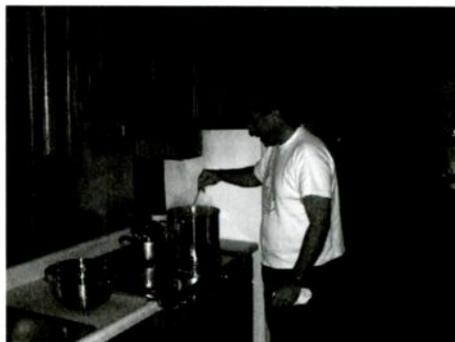
Rich D'Angelo preparing traditional pasta dinner at French Creek DXpedition. Photo by Richard Cuff

Left to right: Ed Mauger, Tracy Wood, John Figliozzi, Rich D'Angelo, Richard Cuff gather for a group photo at a recent French Creek DXpedition. Photo by Richard Cuff

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Digital Radio Mondiale Symposium

By Glenn Hauser

On November 12 I attended a Digital Radio Mondiale (DRM) Symposium in Dallas, Texas, to find out the latest news about implementing digital shortwave broadcasting. Many luminaries in the DRM movement were present, having held their own private meetings on previous days.

Peter Senger of Deutsche Welle, chairman of the group, opened the all-day meeting about DRM's Success and Global Implementation. DRM membership includes broadcasters (26%), and manufacturers of transmitting equipment (7%) and receiving equipment (7%).

The Spread of DRM

A graphic showed a steady increase in DRM transmission hours per day, projected to rise from 350 in 2004 to 700 in 2006 and 1600 in 2008 (not just on shortwave, but also on mediumwave). John Sykes of BBC said it has been agreed that, in the chicken-and-egg situation, broadcasters must take the lead in providing DRM transmissions, even if there are very few listeners at first.

Key DRM markets, from the most to least important are: Europe and the Near/Middle East; North America; Asia/Australia/NZ; China; Latin America; Africa. The USA has the second most DRM software in use, after Germany.

It has been proposed to promote DRM not only up to 30 MHz, but to 120 MHz, making it an option on the OIRT (International Radio and Television Organization) and western FM bands. Don Messer of the International Broadcasting Bureau and DRM Technical Committee Chairman, pointed out that the OIRT FM band in Eastern Europe, which is going into disuse, would be a good place for DRM. Also portions of the VHF TV bands being abandoned in Germany.

BBC World Service is adding DRM for Europe to supplement local FM relays. India will test DRM on MW and tropical SW, says Peter Senger. India might adopt DRM instead of analog FM.

Michel Penneroux of TDF (the French communications company), and DRM Commercial Committee Chairman, spoke on DRM's commercial roll-out. DRM will launch soon in the Persian Gulf, and later in the USA, Mexico, Brazil, Chile and Ecuador. Ordinary listeners will not need to know that DRM signals are reaching them by SW or MW frequencies, and may think of it as FM. TDF plans to add DRM from French Guiana, perhaps by February.

Fernando Borjón from the Secretaría de Comunicaciones y Transportes hopes that DRM will be tested in Mexico, along with IBOC (In Band On Channel) and Eureka 47 digital modes. No decision has been made yet; however, IBOC may not work in México DF, since it spreads too wide for the 30-kHz station spacings on AM.

Receivers

Until 2000, DRM receivers were mostly software; there are a few hundred Mayah receivers now in circulation. Senger could not yet disclose who will be the first with a stand-alone DRM receiver on the consumer market, but it should be in time for Christmas 2005. By the end of the following year, 2006, the number of receivers on the market should be 1 million; by 2008, 4 million.

DRM in Vehicles

Michel Penneroux of TDF and the DRM Commercial Committee Chairman, said there are discussions with Peugeot about putting DRM receivers in their cars, but there will be a lag of 5 or 6 years in implementation.

Paul Linnarz, of the Konrad-Adenauer-Foundation Media-Programme for Latin America, said those promoting DRM in cars should not forget Japan: there are lots of used Toyotas in Peru, Guatemala, and other countries.

Some German car manufacturers are DRM members and are considering including it, but their plans are not made public for competitive reasons, says Peter Senger. Note that VW sells more cars in China than in Germany, so if China adopts DRM for domestic broadcasting, that could be an impetus.

DRM is Flexible

Senger said music in stereo can be transmitted at 24 kbps; news needs only 4 kbps; so a station could run music at 24, and then split into as many as six different speech channels or individual languages. News can also be displayed automatically from the Internet.

Don Messer explained that simulcasting DRM with analog in a transitional period is possible with 20 kHz bandwidth; the DRM power would be only 1/40 of the power of an unmodulated analog signal.

FM mono quality can be transmitted on a 10 kHz channel, with an option for stereo at 20 kHz bandwidth. This can be squeezed down from 1.5 Mbps into a 10 kHz channel. And it's fade-free in the reception area. However, long-distance MW by skywave sacrifices robustness, as demonstrated by the 1296 kHz broadcasts from Orfordness, UK. Depending on the circumstances, a greater or lesser fraction of the bandwidth can be assigned to error-correction.

Hans Linkel, manager of the Bonaire relay station, talked about what percentage of errors are acceptable in DRM; audio quality of 98% is "almost perfect." When more transmitters are available, two DRM frequencies may run at once to cover dropouts, with automatic switching.

The Mayah 2010 receiver

DRM the Savior of Shortwave?

John Sykes of the BBC World Service said its SW audience of 150 million may decline drastically by as much as 50 million in the next four years. So there is a need to replace the lost audience with a new medium, i.e. DRM, and not just on SW. In the UK, DRM hopes to be added to the existing domestic DAB system, which is now catching on. Ideally there should be receivers capable of receiving DAB, DRM, FM and AM.

Jeff White, now head of the DRM USA group, reported that the FCC will now give temporary licenses to US SW stations for DRM. A new website should be up now at http://www.usdrm.com

Domestic DRM Shortwave Broadcasting

DRM on SW could cover half the US, much like XM or Sirius satellite radio. Or coverage of an entire smaller country can be done with near-vertical incidence signals on tropical bands. Since these bounce between ground and ionosphere two or three times, there can be unacceptable Doppler echoes (6 ms, says Sykes), unless increased error correction is introduced. DRM on tropical SW could also be an efficient means of feeding audio to a far-flung national network of stations in countries such as Ecuador and Peru, replacing expensive satellite feeds, according to Paul Linnarz. Charles Jacobson of HCJB added that DRM could revitalize the AM band in Ecuador, filling in gaps in FM coverage due to terrain problems in the Andes, but stations adopting DRM would have to relinquish their analog AM.

New Community Radio Band?

The little-used 25 and even 21 MHz bands could carry DRM broadcasts intended for local groundwave coverage; extremely low powers in the tens of watts would have a range similar to FM, says Messer. This
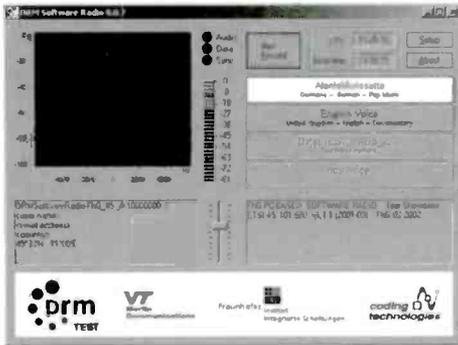
The DRM Software Receiver screen

was demonstrated by an experimental transmitter at the DRS Continental plant in Dallas on 25950 kHz, picked up clearly several miles away at the symposium hotel; however, it was running 750 watts, per Jeff White.

This new band and mode could alleviate the congestion and demand in major cities for LPFM.

World's first USB receiver for DRM – The Digital World Traveller

stations if FCC would authorize it. John Sykes of BBC pointed out that although there is no such thing as FM subcarriers in Europe, DRM could be run on 67 kHz SCAs in the US with 10 kHz bandwidth.

Public Relations with the Analog Community

During a Q&A session, I identified myself as speaking for the SW listening community, and pointed out complaints of DRM spreading beyond its 10 kHz bandwidth, bad PR at the very least to the huge majority of SWLs who are still doing so in analog; would it not be better to segregate all DRM transmissions into separate sub-bands?

Messer replied that doing that "would kill DRM"! Unfortunately, I did not get a chance to follow up on that.

Jacques Boulaine of RCI acknowledged that there had been some bandwidth problems with the Sackville transmitter originally used for DRM, since the DRM module was physically located at some distance from the unit, causing unwanted radiation. A different transmitter closer to the DRM unit is now used.

Monitoring DRM

Since I am not one of the handful of North Americans with their own DRM receiving equipment, I finally had a chance to hear some DRM transmissions, but conditions were far from ideal, during a noisy coffee break with lots of people crowding around the tables. HCJB on 15250 was indeed coming in nicely, via a Mayah Radio, reportedly only 3 kW with 30 dB gain from the steerable antenna about to
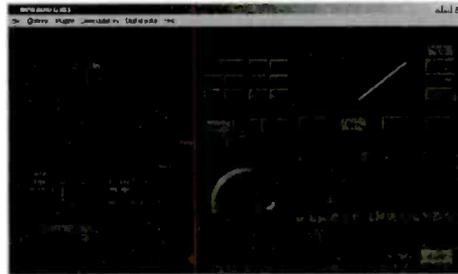
WinRadio's g303 screen with DRM enabled

be dismantled to make way for Quito's new airport; so was Voz Cristiana all the way from Chile on 21500, heard via a computer-hosted software receiver. Indeed, I was reminded of listening to webcasts, except these are ionospherically propagated.

I asked if we could hear the TDF test from France on 17875, but was told only a bit of text was being received. There were extensive dipole and longwire antennas on the roof of the conference room by the multi-story hotel. Successful demonstrations inside the building would have been unlikely using portable equipment with built-in antennas.

The entire event was hosted by DRS Broadcast Technology (formerly Continental Electronics), who manufacture DRM and analog SW transmitters at their Metroplex plant. Much more detailed info about DRM was in the handouts, such as the Broadcasters' User Manual, also available in pdf via http://www.drm. org/BUM/globbum.htm

Editor's note: to locate DRM broadcasts in English, check the frequency listings on pages 40-51 and look for DRM in the second column or go to http://www.usdrm.com.

How are the Bands? Check the Beacons!

Scraping along at the bottom of the solar cycle it often seems that the high frequency (HF) bands are dead. Just tuning around and listening to the wall-to-wall dead air would seem to confirm that. But, what if the bands are in fact wide open and it's just another case of "everybody's listening"? The best way to find out is to scan the beacon bands for the hundreds of radio beacons located around the world. You just have to know where to look.

❖ The Beacon Networks

The condition of the various shortwave bands varies so widely from day to day, week to week, and year to year, that it seems like some kind of black magic is at work.

With the vagaries of the solar cycle, seasonal fluctuations and effects induced by weather and atmospherics, it's nearly impossible to accurately predict how the bands will be functioning from day to day. But, monitoring the HF beacons from 1.800 to 28.300 MHz gives you instant information about how the propagation is between your receiver the beacon station. If you're trying to hear a particular region of the world, you can look up the frequency of a beacon in that area and try to tune it in.

HF beacon stations are licensed, unmanned stations which typically transmit a tone and an ID in Morse code (CW) which tells you where the beacon is located. They can be owned and operated by individual amateur radio operators, club stations, DX organizations or a public service utility such as an airport. Transmissions are repeated 24/7.

What's interesting about these stations is that they transmit anywhere from a few milliwatts to 100 watts, typically using only a omni-directional vertical antenna. Now, there are few on-air operators using such small output and minimal antennas, so if you can hear these beacon stations then you know that the band is indeed open!

❖ Northern California DX Foundation

One such DX organization is the North California DX Club (NCDXC), which is world renowned for its funding of DXpeditions to exotic locations around the world, in addition to providing scholarships to young hams on their way to college and grants for various related projects.

The NCDXC also runs a Foundation (NCDXF), which maintains a network of beacons around the world known as the International Beacon Project (IBP). Each station operates on the same set of frequencies 14.100, 18.110, 21.150, 24.930 and 28.200. The stations are built exactly the same, using identical Kenwood TS-50 transceivers and identical antennas in order to take out the variations which come from using different radios and antennas. Each is equipped with a special interface unit, designed and built by NCDXC members, which controls the transceivers in a precise sequence. The beacons transmit for ten seconds on each of the above frequencies and in a prescribed order. Each station sends its call sign (see list below) in CW at 22 words per minutes at 100 watts output. Then you'll hear four one-second dashes at 100 watts, 10 watts, 1 watt and .1 watt, in that descending order. This ingenious set-up allows you to check propagation between you and the target beacon on the HF DX bands.

The stations in this network are also stations of note, for example: 4U1UN is at the United Nations in New York City; VE8AT is the Northern Alberta Radio Club station; W6WX is the NCDXF HQ station; KH6WO is the Honolulu Amateur Radio Club; VK6RBP is the Wireless Institute of Australia's Western Australia Division; VR2HK is the club station for the Hong Kong Amateur Radio Transmitting Society; 4X6TU is Tel Aviv Univer-

List of IBP/NCDXF Beacon Stations
(Courtesy: NCDXF)
On These Frequencies: 14.100 18.110 21.150 24.930 28.200
Listen for these Call Signs:

Country	Call Sign
United Nations	NY 4U1UN
Northern Canada	VE8AT
Northern California	W6WX
Hawaii	KH6WO
New Zealand	ZL6B
Western Australia	VK6RBP
Japan	JA2IGY
Siberia	RR9O
China	VR2HK
Sri Lanka	4S7B
South Africa	ZS6DN
Kenya	5Z4B
Israel	4X6TU
Finland	OH2B
Madeira Island	CS3B
Argentina	LU4AA
Peru	OA4B
Venezuela	YV5B
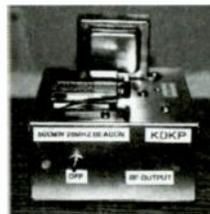
Here's the K0KP 28.212 MHz beacon from Fredenberg, MN. Rex Greenwell built this tiny beacon on a 4" x 5" chassis which has an output of 500 mW. (Courtesy Rex Greenwell K0KP)
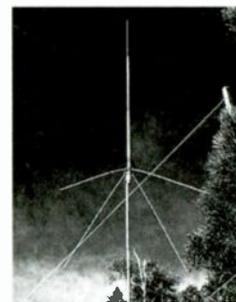
K0KP's ½ wave vertical ground plane with radials at about 35'. He's received reception reports from all over the world. For more info visit his web site: http://www.qsl.net/k0kp/hbrew/10m_bcn.html (Courtesy Rex Greenwell K0KP)

Selected 10 Meter Beacons from Ten-Ten International

Freq.	Call	Location	Notes (Power & antenna type)
28.1750	VE3TEN	Ottawa, Canada	10 W groundplane
28.1890	XE1SRF	Mexico City	20 W 5/8 wave vertical
28.2010	WA4SZE	Manchester, TN	15 W vertical groundplane
28.2060	N3NIA	Brampton, Ontario	2 W vertical
28.2100	VE4TEN	Winnipeg, Manitoba	3 W groundplane
28.2125	K0KP	Fredenberg, MN	1/2 W vertical
28.2130	PT7BCN	Forteleza, Brazil	5 W groundplane
28.2280	ZL3TEN	Christ Church, New Zealand	10 W 1/2 wave vertical
28.2375	LA5TEN	Oslo, Norway	15 W 5/8 wave vertical
28.2420	W2IK	San Antonio, TX	10 W vertical
28.2400	WA6APQ	Long Beach, CA	30 W vertical
28.2500	KP4SQ	Ceiba, Puerto Rico	5 W Inverted V
28.2500	Z21ANB	Bulawayo, Zimbabwe	25 W groundplane
28.2570	DK0TEN	Konstanz, Germany	20 W. groundplane
28.2620	VK2RSY	Sydney, Australia	25 W 1/2 vertical
28.2667	LN1TEN	Bulgaria	1W to 1 mW vertical
28.2740	9K2RA	Safat, Kuwait	10 W vertical
28.2750	ZS1LA	Still Bay, South Africa	20 W 3 element Yagi
28.2820	LA6TEN	Kirkenes, Norway	10 W, 1 W, .1 W
28.2900	VR2TEN	Hong Kong, China	5 W whip
28.2980	V73TEN	Marshall Island	25 W vertical

The IBP/NCDXF Beacon Stations. (Courtesy: NCDXF)

sity; CS3B is the Association of Radio Amateurs of Medeira Island in the Atlantic off the Northwest Coast of Africa; and LU4AA is the HQ station for Radio Club Argentino, Buenos Aires.

❖ The "10-10" 10 Meter Beacons

The amateur radio organization known as Ten-Ten International has a system of beacons, all of which operate in what's known as the "10 meter beacon band" from 28.100 to 28.300 MHz. 10-10, as they like to be known, was started in the early 1960's with a mission to keep the ten meter band active and, with luck, discourage the FCC from turning it over to commercial interests. 10-10 maintains a list of some 250 beacon stations (http://www.ten-ten.org/beacons.html).

Unlike the NCDXF network, these stations are all operated by individuals and transmit between 100mW to 50 watts, with most transmitting 10 watts or less and using mostly 1/4 or 1/2 wave vertical antennas. Transmissions are in Morse code and typically consist of a series of "V's" followed by the call sign of the station and a long dash. Code speeds vary from beacon to beacon. The 10-10 list gives the frequency, call sign, location, and notes concerning each station. Most of these beacons operate continuously.

One great example of such a beacon station is from Rex Greenwell, K0KP, who built a small 10 meter beacon on a 4" x 5" chassis (see photo), which feeds a ground plane vertical antenna, cut for 10 meters, at about 40 feet above the ground (see other photo). Output is only 500 mW, using about the same power as a flashlight battery. Reception reports have come in from all over the world. He has a full description of this beacon on this web site: http://www.qsl.net/k0kp/beacons/10mbcn.html. And, you'll find one of the most strikingly colorful QSL cards on his web page at QRZ.com.

The 10 meter band is particularly noted as a DX band when it's open, because modest power output will get you half-way around the world even with a simple dipole antenna. Ten meter transceivers such as the Uniden 2510 and 2600 or the Radio Shack HTX-10 have no more than 25 watts output, are small enough to fit in anyone's car, and, using a mag-mount 10 meter whip antenna, can work the world as a mobile station.

With a 100 watt transceiver and a beam antenna you can become a "powerhouse" station on 10 meters putting out a very potent signal. February and March are particularly good months to work 10 meters with band openings to Europe and Africa in the mornings, the Caribbean and South America in the afternoons, and Asia and the South Pacific in the evenings before the band goes completely dead. Of course, it'll be a little tougher to work the Pacific and Asia if you're on the East Coast and it'll be just as hard to work Europe and Africa if you're on the West Coast.

Finding any of the above-mentioned 10 meter transceivers is not hard, even though they've long been out of production, because many thousands were sold and they're found at just about any hamfest or on e-Bay.

❖ Copying CW Beacons: It's Easy!

You may not be comfortable copying CW; or maybe you've never even studied the code. But, it's still possible for you to "read" the beacons. Here's how: Thanks to the ceaseless repetition, you'll have as long as you need to figure out which code character is which. Secondly, with any of the lists mentioned here in front of you and knowing which frequency you're listening to, you will be able to match up what you're hearing with what's on the list.

Of course, the easiest way to read these IDs is to use a Morse reader device or other program for your computer. Chances are, you already have some equipment for copying digital transmissions on HF, so reading these stations will be a snap. If you don't have such a device, stay tuned to this same space next month when I'll introduce you to a number of low cost digital readers for the HF band.

Getting Started

Q. *Can a standard TV balun transformer be used for transmitting? How much power? Over what frequency range? (Numerous inquiries)*

A. The larger VHF/UHF-TV balun transformers (approximately 1" diameter) supplied with TV antennas (and the Grove Scanner Beam and OMNI) can be used for transmitting 10-20 watts intermittently, but the smaller cylinders (approximately 1/2" diameter) used for cable services have a very restricted frequency range. If you can accept some losses due to SWR, the larger types will actually work from about 2-3 MHz all the way up through 470 MHz or so, assuming you have an antenna that matches its 300 ohm output impedance.

Q. *Why is it that while I'm holding a portable AM/FM radio in my hand, I can get decent reception, but when I set it down the weak signals fade? Is there some electronic duplicate of my body that will allow good reception without my hand being on it? (Bob Compton, email)*

A. That's a neat question, Bob. I'm sure many of our readers have noted the same phenomenon and wondered why their presence increased signal strengths. The simple answer is that your body acts like an antenna element, capturing signal voltage and capacitively and/or resistively coupling that signal voltage to the radio.

On FM, you are also emulating the missing half of a dipole antenna known as a counterpoise, the extended whip being the other half.

A good antenna for FM band is a center-fed dipole four feet in length, attached to a length of coax. Since typical AM/FM portables have no external antenna jack, you will need to collapse the whip and connect the center conductor of the coax to the base of the whip, and the shield to a grounding point, like the rim of an unused jack on the radio.

AM reception utilizes an internal, ferrite-rod, loop antenna. The commercial Select-A-Tenna from Grove Enterprises will make a boomer out of a weak signal, yet doesn't even need a connection. Alternatively, you can make an external AM antenna yourself.

Stretch 20-50 feet of wire out as a random antenna, and wrap the radio, top to bottom, with about four turns of the wire, connecting the end

to a grounding point as with the FM antenna above. The coil acts like the primary of a large RF transformer, coupling the received antenna voltage to the internal loop as the secondary.

Q. *RG-8/U coaxial cable is designed for communications, yet you recommend RG-6/U for scanners when it's designed for TV. Why? (Andrew, email)*

A. RG-8/U foam-dielectric is excellent, low-loss, coaxial cable. It's also large, heavy, expensive, stiff, requires large connectors, and is designed for transmitting.

RG-6/U is just as low-loss, smaller, lighter, more flexible, cheaper, adaptable to a wide array of connectors, and is designed for receiving VHF/UHF signals.

Q. *Apparently, after more than 60 years, oil still continues to leak from the sunken USS Arizona at Pearl Harbor. How much oil is on a ship like this?*

A. Mark, you ask some interesting questions! I'd love to try to impress you by saying I knew than answer right off the top of my head, but this one required a little research!

Seven ships were sunk by the Japanese invasion, but six were raised and put back into action. Only the *Arizona* remained on the bottom. Approximately 1-2 quarts a day of black fuel oil leak to the surface where it spreads into a colored sheen as it drifts into the Pacific. Assuming that rate back some 60 years, that's about 10,000 gallons, and it's estimated that more than half a million gallons remain.

Some day the hull will collapse, an ecological disaster that will release the remaining oil. There have been suggestions to pump out the remaining oil, but the *Arizona* is a sacred, national shrine, and only 1% of its interior has been explored since it sank. Out of respect for the families of the entombed sailors, that decision has not yet been made.

Q. *I've heard that if you get cut by a broken fluorescent lamp tube, the powder delays the healing process. Is that true? (Mark Burns, Terre Haute, IN)*

A. The powdery phosphor which coats the inside of fluorescent bulbs is relatively harmless, although before 1987 it contained cadmium, a cumulatively-poisonous element. The real problem, however, is the presence of mercury which is vaporized by the hot filament. Mercury is quite poisonous to the nervous system and kidneys when absorbed into the system.

Although I've also heard the assertion that getting the powder into a cut would slow the healing process, I know of no factual basis for that. If you do get cut by a broken fluorescent tube, wash it as quickly as possible (or let it bleed to cleanse the wound) to remove any mercury, then treat the cut normally.

Q. *I have a 1989-vintage Kenwood R-2000 receiver with a 30-ft wire antenna. Will the MFJ 1020C amplified preselector improve reception? (Joseph R. Davis, South Lyon, MI)*

A. Preamps are not recommended for shortwave receivers as long as you already have a reasonable-size outdoor antenna. A preamplifier amplifies both signal and noise, so the only thing you will notice will be the S-meter rising higher – not because the signal is better, but because the entire noise floor has been amplified.

That said, a tunable preselector may help because it narrows the bandwidth of the signal coming into the receiver. The MFJ 1020C can do that, but don't expect miracles; the R2000 is a pretty good receiver as it is. You can, however, improve your listening by moving up to a better, modern receiver like the ICOM R75 or Drake R8B.

Your antenna can be improved by its location and feedline. *Always* use coax transmission line to reduce household electrical interference, and place the antenna as far from your home and power lines as practical.

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

Bright Ideas
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I have just received my order for *Police Call 2005* from Grove Enterprises. Living on the Idaho-Washington border, I needed to order both Volume 9 (Washington, Oregon, and California), and the combined Volumes 5&8, which covers Idaho and the other 14 western states. Each comes with the version 6 CD ROM. In the past, I have mentioned that I could pass the extra CD to a friend. I did so again this year. *Police Call* seems to get bashed by many radio enthusiasts. Perhaps they don't know how to extract the full potential of the book, and/or the CD. There are several resources on the CD that are *not* in the book. Let's get ready to protect, and maximize our new frequency book resource.

6 All softbound reference books such as *Police Call* have a "ridge" about a quarter of an inch from the center spine. Fold the cover back, and press it down hard along this ridge. Same for the back. I used clear Scotch tape to reinforce the top and bottom cover edges and along the spine. Now cut a clear plastic sheet protector about half an inch inside the left three-hole side. Slip it on to the book cover, and secure with clear scotch tape. This effort keeps much used reference materials looking new. Note: the cheap, thin protectors will not last. Buy the best, thickest, heavy duty sheet protectors available.

7 There are about a dozen key pages that I use most often. For quick reference, I mark them with Post-It® Note/Flag markers. I also use a fluorescent highlight pen if I find some interesting. You can also use the highlight pen to mark the outer edge of a page. I simply apply the pen to the very outside edge of the page, and let the ink absorb into the page. A visual thumb shortcut!

8 Don't throw away your old *Police Call* books. They have some important information that the new ones *do not* have. An example is the Listener's Guide that shrunk from 26 pages in the 2001 edition to only 16 pages in the 2005 edition. Those first pages of *Police Call* were a clear, succinct introduction and review of radio communications. The Consolidated Frequency List has completely disappeared from the printed 2005 issue, but it is on the CD. I printed it out, as a quick reference. Note the new VHF 7.5 kHz, and UHF 6.25 kHz frequency spacing.

9 In the 2005 edition, the FCC Radio Services have been modified, deleting the Automotive Emergency Service, Business Radio Service, Forest Products, Manufacturers, Motor Carrier, Petroleum Power Utilities, Special Industrial, Taxicab, Telephone Maintenance, and Wireless Microphones. Granted, these are not really popular monitoring bands, but they help track down new signals. To the editor's credit, this section now features a new EMS UHF section *with* the new channel spacing! These EMS Paramedic frequencies (462-463 MHz) are used throughout the U.S.

10 Don't overlook the obvious. Read the inside front cover. Memorize the types of systems, and types of radios, i.e. MOB (mobile or handheld radios), or MR (a repeater output). Read the Listener's Guide, and How to use PC. The first chapter, Listener's Guide, contains great information that enhances your knowledge of radio systems. Even if you have already read it, it may be time to go back and reread these first pages. Don't cheat; take your time and read every word in every paragraph. When you understand the material so well you can explain it to others, you have finally mastered the material. *Police Call* also includes an excellent glossary in the back of the book. When was the last time you read it to update your knowledge of radio terms?

11 The book is organized into several sections; the first major part is the listings by state. Find your state, then your city, and/or county. When you look up an agency, there are two key patterns to look for as you begin to do your research. The first key information to look for is the callsign. Look for every frequency that has the same callsign. This is a tip-off that the frequencies are related, probably used for the same function. Now look for the same number of mobiles (Mob) licensed. Ah, do we see a pattern here? If the fire department has 50 mobiles on the "F" channels, look for the same number under other headings, especially the "L" listings.

I make a photocopy, just one for my own use, of the pages containing the information for my favorite agencies. On this photocopy, I draw lines from one frequency to others that are linked by virtue of a common callsign, or number of MOB's. I literally "map" out the system in use. Of course you can also print out this information from the CD. Once you use your bright highlight pen on all frequencies with the same callsign and a common number of mobiles, a pattern begins to emerge. Connect the dots.

Now look and see which ones are licensed only as mobiles, and which are also licensed as MR, CO, TR or BR. This might give a clue as to which channels are simplex, or repeater inputs, and their outputs. Simplex usually means car to car or tactical frequencies, but some agencies use it as car to base. Part of the fun is figuring out which channels are used for what purpose, and what repeater input or link is used. Look under the "Name" column and you will often see the channel's use in parenthesis. If this listing is incorrect, and you can add new information, be sure to contact the *Police Call* folks as listed in the front of the book.

When you discover a new frequency in use, you can quickly look it up in the second major part, the "Listings by Frequency." If you hear signals from this new agency, perhaps you can hear others from the same city. Check for the oddball listings under 72-76, and 451-452 MHz. Ah, probably just links, but yet more new frequencies to explore.

12 *Police Call* also has the "Beyond" section with many lists presented by type of business. This can produce some real gems. This section is worthy of a page by page inspection. Look under the heading for Ambulances & Rescue Crews. College security/police departments can be found under the heading; Colleges & Universities. The local mall security or school district may be listed here. Oh yeah, those tow trucks are listed here, too.

Try this experiment by searching with your CD: Select your state, type in your city or county name for licensee, all classes, and select "Beyond Police Call," and then search. For my results, I found three new Spokane government frequencies, including one for the County Parks, one for City Utilities, and one for the Spokane International Airport. You can also search by changing your city name from Licensee to transmitter location, and do a new search. Many more listings! A few more tricks for using your *Police Call* in next month's column.

Police Call 2005 – read it, know it, use it. Grove Enterprises (1-800-438-8155) can put one in your mailbox in few days.

Scanning San Bernardino and Beyond

With the complexity of modern radio systems it's sometimes difficult to figure out what's happening when your scanner doesn't seem to follow the action. This month we answer some questions from readers about how their local public safety radios are working and update you on some other systems in Indiana and Maryland.

❖ Darien, Connecticut

Dan,

It is my understanding that the Darien, Connecticut, Police Department is now using digital transmission. Can you confirm?

Thanks, Bob in Connecticut

Darien is located in Fairfield County, along the Long Island Sound in southwest Connecticut. It is primarily a bedroom community for the New York metropolitan area and home to about 18,000 residents.

The Darien Police Department is licensed for four frequencies, all of which are carrying conventional (non-trunked) APCO-25 digital traffic: 460.1625, 460.3125, 476.750 and 477.000 MHz. The FCC database lists several repeater sites for these frequencies, including locations on Hollow Tree Ridge Road, Hecker Avenue, and Bost Post Road. You'll need an APCO-25-capable scanner, such as the Uniden 296D or the Radio Shack PRO-96, or an external decoder like the AOR ARD25 in order to hear these transmissions.

Darien Fire is still operating analog on two frequencies, 470.850 MHz (primary) and 476.375 MHz. Emergency Medical Services can be heard on 476.775 MHz in analog. Public Works is reported to operate on 453.650 MHz.

The nearby town of Stamford operates a pair of trunked radio systems, North and South, that are set up to broadcast the same traffic on both systems ("simulcast"). Each of these systems uses EDACS (Enhanced Digital Access Communication System) equipment, manufactured by a company called M/A-Com.

The South system uses the following frequencies, in Logical Channel Number (LCN) order:

01	866.3875
02	866.6625
03	867.0875
04	867.3375
05	867.8125
06	868.0875

Since the traffic on the North system is simulcast on the South, programming just these six channels will get you all of the traffic from both systems. However, if you're in a location that doesn't receive the South signals very well, the recommended way to monitor the North system is to enter the following frequencies in a new bank as channels 7 through 10:

07	866.1125
08	866.7675
09	867.7875
10	868.3375

Outside of the trunked systems, fire activity in Stamford is simulcast on 154.130 MHz while fireground can be heard on 868.9875 MHz.

Within Fairfield County, the Connecticut State Police operate a pair of Motorola Type II trunked radio systems, each carrying analog and APCO-25 voice traffic.

Fairfield County (North):
866.2750, 866.6375, 867.1375, 867.7000, 868.3125
Fairfield County (South):
866.7125, 867.2000, 867.5875, 868.2000, 868.7500

Here are three talkgroups on the state system that should be worth checking:

Decimal	Hex	Description
16016	3E9	Statewide Common 1
16048	3EB	Statewide Common 2
16080	3ED	Statewide Common 3

❖ EDACS LCN Ordering

Dan:

My question is, just what defines the Logical Channel Number order for the EDACS systems? I always thought it was in ascending frequency order (lowest to highest), but, in your column in the December issue of MT, there is a listing on page 31 for 20 frequencies, noted in LCN order but differing greatly in frequencies. Just what gives?

John in Minnesota

There is no technical reason for Logical Channel Numbers (LCNs) to be in any particular order. The manufacturer of EDACS equipment, M/A-Com, does not make any specific recommendations on how the channels should be ordered, and the equipment will work just as well regardless of which way the frequencies are listed.

It is true that many systems are in simple ascending order, straight off the FCC license:

1 - 854.8125
2 - 855.8125
3 - 856.8125
4 - 857.8125
5 - 858.8125

Other systems may put them in random (non-sequential) order, like this:

1 - 856.8125
2 - 858.8125
3 - 857.8125
4 - 854.8125
5 - 855.8125

No matter how it comes out, it has always been up to the EDACS system owner to decide how they wish to order their frequencies.

❖ Upland, California

Hi,

I live in California and have a Uniden BC 780XLT. The county sheriff's trunking system that I programmed in to my scanner is catching only bits and pieces of radio transmissions - it is almost as if it is not trunking at all. Do you know what might be wrong? I checked the FCC's web site hoping to determine what type of trunking type system they have. I already know that it is Motorola but fear they might have ASTRO Spectra radios and requiring me to get a APCO card and APCO Scanner.

Any help you can provide would be greatly appreciated.

Thank You, Kevin in Upland

Before we get to the sheriff, let's do a quick rundown on the fire department. Kevin is writing from the city of Upland, which is covered by four fire stations. Equipment for the town includes three pumpers and a "quint" apparatus, which is basically a pumper with a 75-foot aerial ladder. Generally, the stations are staffed by three firefighters, including a paramedic. In 2003 the Upland Fire Department responded to more than 5,000 fire calls and more than 3,600 emergency medical calls. Their 2004-2005 budget is about $5.75 million.

Upland Fire uses the San Bernardino 800 MHz system, described below. Each fire department ve-

hicle is also equipped with a VHF radio in order to communicate with mutual aid units that aren't on the county system and to provide coverage when operating outside the range of the county system.

San Bernardino County, California

San Bernardino County is part of California's "Inland Empire" in the southeastern part of the state. Geographically, it is largest county in the United States, covering more than 20,000 square miles, most of which is desert. The 1.7 million residents are located primarily on the western side of the county, bordering the counties of Los Angeles, Orange and Riverside. The county is also home to a number of military facilities, including Edwards Air Force Base, China Lake Naval Weapons Center, Twentynine Palms Marine Corps Base and part of the United States Army's National Training Center (NTC) at Fort Irwin. The historic Route 66 highway also passes through the county on its way to Santa Monica.

As you might expect, such a large county requires an equally large radio system. When installation of the San Bernardino County network was completed in 1991 it had more than 20 repeater sites using 94 frequencies, all tied together at the County Communications Center in the city of Rialto. All of the sites and frequencies are organized into a dozen smaller networks that cover the county, and each network is a Motorola Type II analog trunked radio system.

Specific to Kevin's question, my first guess would be that the scanner is not programmed with all of the frequencies assigned to that system. I've tried to compile all of the information I have in the lists below, but in many cases I have conflicting reports on frequencies that are actually in use. Also, I do not have any reports of APCO-25 or other digital transmissions. However, given the size and complexity of the systems, it's also possible that things have

changed and some of the information is out of date.

That being said, here's what I have for San Bernardino County. As always, updates are welcome! Although the frequencies are different, many talkgroups are identical from system to system. The following list contains a few of the more common talkgroups that are the same in more than one system:

Decimal	Hex	Description
944	03B	Area Tactical 1
976	03D	Area Tactical 2
2032	07F	Fireground 3
2064	081	Fireground 4
2160	087	Countywide Tactical 1
2192	089	Countywide Tactical 2
2224	08B	Pursuit
2480	09B	Air Support ("King 40")

The following is a frequency listing for each system, along with the most common Sheriff and Fire talkgroups.

Victorville (1):
855.475, 856.725, 857.950, 858.450, 859.450, 859.950, 860.250, 866.1375, 866.4125, 866.8625

Decimal	Hex	Description
304	013	Victor Valley/Adelanto Sheriff Dispatch
336	015	Victor Valley/Adelanto Sheriff Tactical
368	017	Hesperia Sheriff Dispatch
400	019	Hesperia Sheriff Tactical
432	01B	Apple Valley Sheriff Dispatch
464	01D	Apple Valley Sheriff Tactical
496	01F	Victorville Sheriff Dispatch
528	021	Victorville Sheriff Tactical
1904	077	Fire Dispatch
1936	079	Fire Secondary
1904	077	Central Valley Fire Dispatch
1936	079	West Valley Fire Dispatch
1968	07B	East Valley Fire Dispatch

Barstow (2):
855.225, 856.450, 857.450, 857.975, 858.950, 859.4750, 859.975, 860.450

Decimal	Hex	Description
304	013	Barstow Sheriff Dispatch
336	015	Barstow Sheriff Tactical

| 17200 | 433 | Barstow Police Dispatch |
| 17232 | 435 | Barstow Police Tactical |

Lucerne (3):
854.975, 856.225, 857.225, 858.250, 858.750

Decimal	Hex	Description
304	013	Lucerne Valley Sheriff Dispatch
336	015	Lucerne Valley Sheriff Tactical

Morongo (4):
856.475, 857.475, 858.225, 858.250, 858.725, 859.725, 860.225, 860.250, 860.475, 860.950

Decimal	Hex	Description
304	013	Morongo Basin Sheriff Dispatch
336	015	Morongo Basin Sheriff Tactical
368	017	Twentynine Palms Sheriff Dispatch
400	019	Twentynine Palms Sheriff Tactical
432	01B	Yucca Valley Sheriff Dispatch
464	01D	Yucca Valley Sheriff Tactical

Needles (5):
855.225, 856.450, 857.975, 858.250, 858.950, 859.975, 860.250

Decimal	Hex	Description
304	013	Sheriff Dispatch
336	015	Sheriff Tactical

Valley (6 and 7):
854.8375, 855.1875, 855.4125, 855.4375, 855.5875, 855.6125, 855.6625, 855.8625, 856.8125, 857.8125, 859.8375, 860.8125, 866.3375, 866.3875, 866.6125, 866.8375, 866.8875, 867.1625, 867.3625, 867.4125, 867.6375, 867.6875, 867.8875, 868.1625, 868.3375, 868.3875, 868.6125, 868.6625

Decimal	Hex	Description
304	013	Rancho Cucamonga Sheriff Dispatch
336	015	Chino Hills/Fontana Sheriff Dispatch
368	017	West Valley Backup Sheriff Dispatch
464	01D	Grand Terrace/Highland/Loma Linda Sheriff Dispatch
496	01F	Yucaipa Sheriff Dispatch
528	021	East Valley Backup Sheriff Dispatch
624	027	Rancho Cucamonga Sheriff Tactical
656	029	Chino Hills/Fontana Sheriff Tactical
784	031	Grand Terrace/Highland/Loma Linda Sheriff Tactical
816	033	Yucaipa Sheriff Tactical
1904	077	Central Valley Fire Dispatch
1936	079	West Valley Fire Dispatch (simulcast on 154.190 MHz)
1968	07B	East Valley Fire Dispatch (simulcast on 151.145 MHz)
2000	07D	Wrightwood/Mountain Fire (Patch)
18224	473	Ontario Airport Police 1
18256	475	Ontario Airport Police 2
18480	483	Ontario Airport Fire 1
18512	485	Ontario Airport Fire 2

Mountain (8):
857.3625, 859.3875, 859.8125, 860.8375, 866.1875, 866.6875, 867.1125, 867.3375, 867.8375, 868.1125, 868.6875

Decimal	Hex	Description
304	013	Twin Peaks Sheriff Dispatch

336	015	Big Bear City/Big Bear Lake Sheriff Dispatch
624	027	Twin Peaks Sheriff Tactical
656	029	Big Bear City/Big Bear Lake Sheriff Tactical
1904	077	Fire Dispatch (simulcast on 159.120 MHz)
1936	079	Big Bear Fire Dispatch (simulcast on 154.190 MHz)
2000	07D	Wrightwood Fire Dispatch

West End (9):
851.500, 859.925, 860.325, 861.200, 861.850, 862.200, 862.850, 863.850, 864.850, 865.850, 866.1375, 866.3625, 866.4125, 866.6375, 866.8625, 866.9125, 867.1375, 867.1875, 867.3875, 867.6125, 867.6625, 867.8625, 867.9125, 868.1375, 868.1875, 868.3625, 868.4125, 868.8375

Decimal	Hex	Description
2288	08F	Ontario Fire 1
2384	095	Chino Fire 1
2352	093	Upland Fire Tactical 1
2448	099	Ontario Fire 2
2512	09D	Upland Fire Tactical 2
2544	09F	Chino Fire 2
2768	0AD	Ontario Fire (Hazmat)
2832	0B1	Upland Fire (Hazmat)
2864	0B3	Chino Fire (Hazmat)
4208	107	Ontario Police Dispatch
4272	10B	Upland Police Dispatch
4304	10D	Chino Police Dispatch
4336	10F	Ontario Police
4400	113	Upland Police Secondary
4432	115	Chino Police
4464	117	Ontario Police Tactical 1
4528	11B	Upland Police Tactical 1
4560	11D	Chino Police Car-to-Car
4592	11F	Ontario Police Tactical 2
4656	123	Upland Police Tactical 2
4688	125	Chino Police Tactical
4720	127	Ontario Police Narcotics
4848	12F	Ontario Police Detectives
5104	13F	Ontario Police Special Operations

San Bernardino City (10):
856.275, 856.850, 858.275, 859.425, 860.250, 866.475, 866.975, 867.475, 867.975, 868.475

Decimal	Hex	Description
20784	513	San Bernardino Police Dispatch
22896	597	San Bernardino Fire Dispatch

East Valley (12):
866.4375, 866.575, 866.950, 867.075, 867.575, 867.950, 868.075

Decimal	Hex	Description
336	015	Sheriff Dispatch
624	027	Sheriff Tactical

In case you're wondering, System 11 is designated as a second "Mountain" system to be put in operation at some future date.

❖ Terra Haute, Indiana

Public officials in Terre Haute, Indiana, are blaming ongoing radio system problems on a poor specification in their Request for Proposal (RFP) when they were shopping for a radio system several years ago. Terre Haute is a town of 60,000 in Vigo County, near the Illinois border about 200 miles south of Chicago.

The city spent more than $1 million on radios and dispatch equipment in 2002, but police officers and firefighters have complained about poor coverage. Numerous "dead spots," especially inside buildings, prevent portable and mobile radios from reaching the repeater, leaving users out of touch with dispatchers and unable to call for help or assistance. The system has a single repeater site located just south of where Route 40 joins Interstate 70, less than two miles from the Illinois border. That puts it more than five miles west of downtown Terre Haute.

A radio consulting company hired by the city presented their results last November and outlined three options to address the problems – expand the existing system, create a larger and more capable system, or join the radio network already being used by the Vigo County Sheriff's Department and Indiana State Police. All of these options would require the construction of at least three repeater sites inside city limits.

While the city works things out, the current system is EDACS with both analog and digital trunked traffic on the following frequencies:

LCN	Frequency
1	856.4375
2	857.4375
3	858.4375
4	859.4375
5	860.4375

Decimal	AFS	Description
Digital Groups		
272	02-020	Police Dispatch
273	02-021	Police Channel 2
274	02-022	Police Car-to-Car
275	02-023	Police Tactical 1
276	02-024	Police Tactical 2
287	02-037	Detectives
304	02-060	Narcotics Task Force
320	02-080	Traffic Enforcement
322	02-082	Stolen Car Recovery
352	02-120	Detectives
368	02-140	Police Tactical
Analog Groups		
384	03-000	Vigo County Sheriff (simulcast on 155.5650 MHz)
432	03-060	West Terre Haute Police
1552	12-020	Fire Dispatch
1568	12-040	Fireground 1
1584	12-060	Fireground 2
1600	12-080	Fireground 3

The Vigo County Fire and Emergency Medical Services operate on 154.310 MHz with analog voice and a CTCSS ("Private Line") tone of 186.2.

❖ Harford County, Maryland

Harford County in northeastern Maryland has completed testing on their new Motorola public safety trunked radio system. A reader wrote in with the following frequencies and background information:

Dan,

800 MHz Trunk systems are being installed all over Maryland, Cecil and Kent Counties excepted.

The new Harford County system has the following frequencies: 866.2500, 866.2875, 866.7750, 867.2875, 867.3625, 867.7875, 868.3750, 868.7750 and 868.8125 MHz. It will

be a Motorola digital system using APCO-25 standards. It will be operational for voice this year and for computers next year.

Planning	$118,000
Phase I (2001-2002)	$9.9 million
Phase II (2002-2003)	$8.5 million
Phase III (2003-2004)	$4.6 million

Total cost is $23,118,000 and counting.

Testing on the system began in March of 2004 and it is expected to be in use in September 2004.

Tower Sites are located in or near Joppa, Lapidum, Bel Air, Hickory, Medonna, Kingsville, Stoney Forest, Conowingo, Whiteford and possibly Norrisville.

As of August, Fire Dispatch can be heard in analog from a simulcast on 460.600 MHz.

Lewis in Maryland

Other frequencies of interest for Harford County include Mutual Aid for Fire/EMS on 154.2800, 154.2950 and 154.2650 MHz with dispatch on 460.6000. Fireground frequencies are listed as 460.5750 and 460.6250 MHz.

The Sheriff's Department has a northern dispatch on 460.0750 and a southern dispatch on 460.3750. Car-to-car activity can be heard on 460.1250 MHz.

❖ Radio Shack PRO-96 Upgrade

As we mentioned in the December column, there is a hardware upgrade available for the PRO-96 scanner that fixes a reported problem in the reception of some Motorola Type II analog talkgroups. The upgrade to CPU version 1.3 involves the replacement of a logic board and must be performed at Radio Shack's Fort Worth service center.

You can bring your scanner into your local Radio Shack store and have them send it in for the upgrade. The clerk you speak with will probably not be familiar with the process that must be followed, so explain that the scanner must be sent to the Fort Worth service center (04-0804), since it is the only facility equipped to do this particular upgrade. You should also make note of your scanner's serial number to be sure you can track the repair progress and confirm that you get your own scanner back. (There have been stories about difficulties in the upgrade process, and of customers getting the wrong scanner back.)

I recently took advantage of a special rebate offer and ordered a new PRO-96 from the Radio Shack website. It arrived in early December and does have a CPU version of 1.3. If you're buying a new one in the store you can check the version by pressing the '3' key when the unit is first powered on.

That's all for this month. Keep those e-mails coming to danveeneman@monitoringtimes.com and check my web site at **http://www. signalharbor.com** for more radio-related information. Until next month, happy scanning!

HD2IOA: Time from Ecuador

Occasionally we get reports of a weird beeping in the middle of the 75 meter amateur band, on 3810 kilohertz (kHz). This is a standard time station in Ecuador, and its beeps mark seconds from an atomic clock. The callsign is HD2IOA; "2" is the only numeral, although the capital letters "I" and "O" are frequently mistaken for the digits one and zero in print. "IOA" is a Spanish-language acronym for "Instituto Oceanografico de la Armada," translated as "Naval Oceanographic Institute."

As time stations go, this one is regarded as a fairly tough catch. It's an even tougher QSL (written verification of reception report), though a few people got very nice cards in the 1990s. Its 1000 watts from the Pacific port city of Guayaquil are faintly heard up here in Los Angeles. Most of the time, though, only the carrier gets through.

Yes, there is a carrier. HD2IOA is invariably reported as lower sideband emission (LSB), and indeed it has no upper sideband at all, but signal checks from different radios in many locations show an emission best described as lower-sideband full-carrier, also known as "H3E" in its arcane, international designation.

One of the ways to distinguish HD2IOA (which, by the way, is operating legally in the amateur band), is that it omits the 29th beep of each minute, and silences beeps during a male Spanish voice announcement which is often hard to pick out of the amateur interference. "He" announces the time of the upcoming minute, and also identifies the station on the 59th minute of the hour.

By way of radio trivia, this voice is Ezequiel Suarez Avendanyo, who also did the Spanish announcements used by time station YVTO in Venezuela. He died in early 2004. Like WWVH's late Jane Barbe, he has thus achieved an odd sort of immortality.

Most Internet sites list a full schedule for HD2IOA, but recently it has only been reported on 3810 kHz between 0000 and 1200 Coordinated Universal Time (UTC). Other listed frequencies are 5000 between 1200 and 1300, 7600 between 1300 and 2400, and 1510 kHz medium wave all the time. None of these other frequencies or times can be confirmed here.

❖ More Cuban Numbers Changes

There's never a dull moment with the "numbers" broadcasts from Cuba. The amplitude-modulated (AM) voice station, which uses a machine-spliced female in Spanish, has yet another new format, in addition to its older ones.

Superficially, this format is like the rest, in which a rather mushy sounding Spanish female voice calls "Atencion!" ("Attention!") followed by a number-group callup, for 20 repetitions. There are then six repetitions of "Grupo" ("Group") with the group count for the coded message that follows. The difference is that we hear a 3-second pause in the message after every tenth group, perhaps to give the spies time to write.

If you are really into "numbers," this kind of thing is very significant, allowing the tracking of different broadcasts. Therefore, ENIGMA 2000, the online offshoot of the European Numbers Intelligence Gathering and Monitoring Association, has given it the designator "V2c" to separate it from older formats. The full ENIGMA Control List is on this column's web site, and it is essential for the proper classification of "numbers" intercepts.

V2c has been heard at various times including 1000, 1800, 1900, 2000, 2100, and 2200 UTC. Recent frequencies have included 6797, 6855, 7520, 7887, 7985, and 8097 kHz. It's a good idea to tune around before the hours, when there's usually an open carrier marking the frequency. Broadcasts begin on the hour and last 40-50 minutes, typically followed by a few more minutes of carrier.

In keeping with the general strangeness of Cuban numbers, Radio Havana Cuba interval signals and occasional program snippets are heard on the open carriers. This has actually gone on sporadically for several years. Nobody is sure if it's some kind of mix, or just sloppy studio engineering. There's plenty of both to go around with these stations.

❖ New Google Radio Resource

Most people have heard of Google, the slick Internet search engine, which plows through billions of World Wide Web pages in microseconds to return many thousands of "hits" on anything one asks for. Recently, Google also added a "Group" mode, which searches nearly a billion more items. These come from around 20 years of postings to an older information system called Usenet.

The radio hobby was one of the first major users of this venerable message posting network, which actually got to many people before true Internet access did. Old-timers, therefore, tend to refer to Usenet as "news," going back to the original nomenclature where dialup university-mainframe programs called "news readers" found text-based "articles" posted to radio "news groups" in the "rec" (recreational) section. These often came via arcane routings called "bang paths," and even the occasional ham radio.

Therefore, we now have a search of two decades of utility radio, going all the way from the gradual disappearance of Morse telegraphy from the maritime service, through the many US Air Force changes, the growth of Automatic Link Establishment, and finally the digital e-mail era. Keep in mind, though, that Usenet was never fact-checked, and must be taken with the same grain of salt as the World Wide Web. Like most old information, it will often be wrong. However, users who know what they are doing now have another fast way to answer specific questions.

Finally, it's just a great look at history, as communications satellites changed what we hear, and computers replaced "snail mail" for a lot of our correspondence about it. One more thing: Usenet has never been censored, and many groups outside the radio ones were always rather bad neighborhoods. Therefore we also get to trace the evolution of today's most common abuses such as "spamming" (indiscriminate wide posting of copies), "trolling" (deliberate provocation of arguments), and "flaming" (trading elaborately written insults).

Google is at "http://www.google.com." See you next month!

Utility Logs

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UTILITY LOGS

Abbreviations used in this column

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
AMC	Air Mobility Command
CAMSPAC	Communication Area Master Station, Pacific
CAMSLANT	Communication Area Master Station, Atlantic
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
DSC	Digital Selective Calling
EAM	Emergency Action Message
EOC	Emergency Operations Center
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
FEMA	US Federal Emergency Management Agency
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communications System
ICE	US Immigration and Customs Enforcement
JSTARS	Joint Surveillance Target Attack Radar System
LSB	Lower Sideband
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
MWARA	Major World Air Route Area
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SHARES	SHAred RESources, US Federal net
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States

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

1743.0 Stornoway Coast Guard-UK Coast Guard, Isle of Lewis, Scotland, with a weather broadcast announced first on 2182, at 2110. (Patrice Privat-France)

2182.0 US Coast Guard Group Ft Macon, NC, with urgent navigation warnings at 0013. (Ron Perron-MD) *Caribe Star*-Vessel working US Coast Guard Group Eastern Shore, requesting a medical evacuation at 0456. (Rick Baker-OH)

2187.5 FPFN-Ship *Amphitrite*, sending multiple DSC distress calls, at 2351. (Day Watson-UK)

3280.0 CIP77-Canadian Forces, calling CIP36 in ALE, at 0222. (Watson-UK)

3291.0 OWF-Danish Air Force, Skrystrup, working OWI in ALE, at 0225. (Watson-UK)

4036.5 90TL-Dutch Military, calling 90V1, ALE at 1206 and 1236. (Watson-UK)

4235.5 Kilo Whiskey-US Navy battle group, tracking net with November, at 0001. (Baker-OH) Kilo Charlie-US Navy, working Kilo, Echo, and November, at 0204. (Mark Cleary-SC)

4264.5 7DL7-Unknown CW station with encrypted 5-figure-group traffic for GRIX, at 2008. (Watson-UK)

4372.0 Franchise-US Navy, link coordination with "5-X-T", "9-Z-A," "R-9-W," and "7-E-F", operating in Virginia Capes area of responsibility, at 0039. (Cleary-SC)

4426.0 CAMSLANT-US Coast Guard, setting radio guard and taking position from Cutter *Shamal* (WPC-13), at 0315. (Cleary-SC)

4700.0 TA7158-US Army, TX, ALE sounds at 1014, 1114, and 1144. (Glenn Blum-TX)

4721.0 Reach 0456-US Air Force AMC, patch via Andrews HF-GCS to Meteo at 2153. (Cleary-SC)

4739.0 Fiddle-US Navy, calling Omni 06, no joy at 0036. (Cleary-SC)

5007.0 TWLV-Spanish Guardia Civil, Vizcaya, calling TXXX in ALE, at 0201. (Watson-UK)

5120.0 OWE-Danish Air Force, Karup, calling OWK in ALE, at 0105. (Watson-UK)

5135.0 WPFJ 625-NH Emergency Management, ALE sound at 0302. MA1NC-Manchester, NH, EOC, ALE sound at 0444. (Watson-UK)

5251.0 DIAMANTE-Albanian Ministry of Information, calling DRINI, ALE at 0449. (Watson-UK)

5295.0 EH31-Unknown station calling HN32 on the "L1xx" net. ALE at 2334, 2352, and 2356. (Watson-UK)

5352.0 TWLV-Spanish Guardia Civil, Vizcaya, calling TXXX in ALE, at 0800. (Watson-UK)

5360.0 HR-Algerian Sonatrach oil/gas field net, Hassi R'mel, ALE sound at 2350. (Watson-UK)

5365.0 CHM723A-Canadian Forces, calling CHM728A, ALE at 0127. (Watson-UK)

5379.0 TWLA-Spanish Guardia Civil, Vitoria, calling 111, in ALE at 0712. (Watson-UK)

5406.0 CLC-Venezuelan Army command, calling PCR in ALE, at 0116. (Watson-UK)

5422.5 Mooresville-US Coast Guard Auxiliary net control, checking in stations at 0003. (Cleary-SC)

5595.0 Unid-Moroccan Air Force, Guelmim, with periodic French traffic to Laayoune, at 1700. (Watson-UK)

5696.0 Coast Guard 1712-US Coast Guard HC-130, working CAMSLANT, VA, at 0040. (Cleary-SC) Sector San Juan-US Coast Guard, PR, working Coast Guard Rescue 2113, at 0528. (Baker-OH)

5711.0 AAT3BFMARS-US Army MARS, DE, acting as SHARES Digital Coordination Station, East, ALE sounding at 1516. (Perron-MD)

5717.0 Tusker 323-Canadian Forces CC-130H, passing time of departure to Rescue Coordination Centre via Halifax Military, at 0402. (Cleary-SC)

5732.0 Panther-US DEA, Bahamas, working 03C on a contraband seizure at 0017. Juliet 19-possible US Coast Guard, on a search and rescue operation with CAMSLANT, VA, at 0327. (Cleary-SC)

5800.0 parnujyp-Estonian Army, Parnu, calling YSP in ALE, at 0003. (Watson-UK)

6449.7 PWZ-Brazilian Navy, Rio de Janeiro, RTTY weather in Portuguese, also 12710.5, at 1005. (Bob Hall-RSA)

6491.4 LOR-Argentine Navy, Puerto Belgrano, RTTY news in Spanish, at 0030. (Hall-RSA)

6697.0 Grandville-US military, with a 28-character EAM simulcast on 11244 and 13155, at 0210. (Haverlah-TX)

6715.0 CROSPR-US Air Force Secure Internet Protocol Routing Network entry point, Croughton, UK, ALE sound at 0012. ADWSPR, Andrews AFB, MD, sound at 0311. IKFSPR, Keflavik, Iceland, sound at 0312. PLASPR, Lajes, Azores, sound at 0423. OFFSPR, Offutt AFB, NE, sound at 0756. HAWSPR, Ascension Island, sound at 0622. JNRSPR, Salinas, PR, sound at 2244. (Watson-UK)

6721.0 Sentry 51-US Air Force E-3, ALE-initiated patch to unknown Metro office, at 0036. (Baker-OH)

6739.0 American 2165-Unknown aircraft calling "MacDill Radio," no joy at 0017. (Jeff Haverlah-TX) *[MacDill Global is many years gone, but the calls just keep coming. -Hugh]*

6809.0 453FEMAUX-FEMA Auxiliary Station, ALE sound on the SHARES net at 2200. (Perron-MD)

6870.0 JUFAN3-Venezuelan National Guard, calling CUF in ALE, at 0305. (Watson-UK)

6888.0 64B-Venezuelan Navy vessel *Los Llanos*, calling CGA in ALE, also using 6985, at 0055. (Watson-UK)

6900.0 CWE42-French MFA, Paris, working AMM, Amman, Jordan embassy, ALE at 0308. (Watson-UK)

6985.0 USAIS1012-US Army, VA, ALE message to USANG2409, Army National Guard, VA, at 1633. (Perron-MD)

7475.0 FREDGAS-Washington Gas & Electric Co., Frederick, MD, LSB ALE sound at 2022. (Perron-MD)

7527.0 Coast Guard 1720-US Coast Guard, working Panther (DEA, Bahamas) at 1912. (Cleary-SC)

7535.0 USS *Ramage*-US Navy warship, radio check with Norfolk at 1555. (Perron-MD)

8125.0 KIT88-US Federal Aviation Administration Eastern Region Net Control, checking in stations at 1545. (Perron-MD)

8191.7 9MR-Malaysian Navy, RTTY traffic to Sarawak, at 1746. (Hall-RSA)

8413.0 360-Georgian Border Guards, sending ALE message to 305, at 1627. (Watson-UK)

Utility World MT

8416.5 NMC-US Coast Guard CAMSPAC Point Reyes, CA, SITOR-B weather at 1800. (Jeff Seale-KY)

8467.5 JJC-Tokyo Radio, Japan, with Kyodo News FAX (60/576), also on 17069.7 and 12745.5, at 1915. (Hall-RSA)

8783.5 HEB01-Bern Radio, Switzerland, testing new data mode with CW identifier every 3 minutes, at 1615. (Watson-UK)

8834.0 SA205-South African Airways A340E, working Johannesburg in HFDL, at 1503. (Hall-RSA)

8891.0 Arctic Radio-North Atlantic MWARA, handing UA 883 to Magadan, at 0033. (Perron-MD)

8906.0 New York-North Atlantic MWARA, position from Navy RY 780, at 2155. (Perron-MD)

8912.0 Hammer-US ICE,CA, working aircraft 62M, on a surveillance at 0023. (Perron-MD)

8965.0 537999-US Air Force tanker, contacting the Hickam AFB, HI, non-secure data gateway, in ALE at 0030. (Perron-MD)

8971.0 Quartet 712-US Navy P-3C, working Fiddle (US Navy, FL), clear and secure at 1911. Fiddle, working Jaguar (the one in Florida), at 2117. (Cleary-SC)

8980.0 Coast Guard 1712, patch via CAMSLANT, VA, to Clearwater Air, at 2021. (Cleary-SC)

8983.0 Coast Guard 1713-US Coast Guard HC-130, working CAM-SPAC, CA, enroute to a search and rescue near Hawaii, at 0207. (Cleary-SC) Coast Guard 1720-US Coast Guard aircraft leaving Panama, with ops-normal for CAMSLANT Chesapeake, at 1733. (Blum-TX)

8992.0 Slip 28-US Air Force, patch via Offutt HF-GCS to Ellsworth AFB and Griffin, at 0108. Omni 02-US joint task force, patch to New Orleans via Offutt HF-GCS, at 2244. (Haverlah-TX) Goose 21-US Air Force, patch via Offutt to Elmendorf AFB Meteo, at 2217. Army 24422-US Army, patch via Offutt to National Guard in Seattle, WA, at 2306. (Cleary-SC)

9025.0 Coast Guard 1706-US Coast Guard HC-130, ALE-initiated patch (identified as "706") to Miami Ops, leaving scene of a migrant interception at 2337. (Cleary-SC)

9031.0 JGN64-Unknown aircraft getting weather from Architect, UK Royal Air Force, at 1020. (Privat-France)

9050.0 AAR1FP-US Army MARS Net Control, MA, checking in stations at 1702. (Perron-MD)

9106.0 WGY9900-American Red Cross, Arlington VA, ALE sound at 1854. (Perron-MD)

10100.8 DDK9-Hamburg Meteo, Germany, RTTY announcements at 1806. (Hall-RSA)

10242.0 CAMSLANT-US Coast Guard, VA, working Coast Guard 1717, an HC-130, at 1446. (Baker-OH)

10534.0 CFH-Canadian Forces Meteo, Halifax, NS, with Atlantic RTTY airport observations at 0025. (Seale-KY)

10555.3 VMW-Wiluna Meteo, Australia, clear FAX weather chart at 1915. (Hall-RSA)

10780.0 Peach 22-US Air Force E-8 JSTARS, patch to Peachtree via Cape Radio, FL, at 1756. (Cleary-SC)

10993.6 "S-1-X"-US joint task force, with position of distressed vessel for Sector Key West at 2239. (Cleary-SC)

11087.0 GYA-UK Royal Navy, Northwood, clear FAX weather chart at 1918. (Hall-RSA)

11175.0 Bee Bread-US military, with a very long (approximately 216 characters) EAM in a special repeating format, then a 163-character EAM, both simulcast on 8992, at 0804. Offutt-US Air Force HF-GCS, working Anderson 01 at 1425. (Haverlah-TX) Ascot 5134-UK Royal Air Force, patch via Puerto Rico HF-GCS for Caribbean weather at 1606. (Cleary-SC)

11205.0 Romeo 177-US Joint Task Force, working Smasher, FL, at 2051. (Cleary-SC) Halifax Military-Canadian Forces, NS, working Pathfinder 19, at 2104. (Perron-MD)

11226.0 Force 01-US Air Force AMC tanker, ALE-initiated call to Hilda Meteo, IL, at 1823. (Cleary-SC)

11232.0 Peach 66-US Air Force E-8 JSTARS, patch via Trenton Military to Peachtree for weather, at 1656. (Cleary-SC) Halifax Military-Canadian Forces, working Pathfinder 20 at 2222. (Perron-MD)

11243.0 N4071SR-Unknown US aircraft, calling "New York on 11243," no joy at 2119. (Haverlah-TX)

11300.0 Air Force 5023-Possible US Air Force, position for Tripoli MWARA, at 0227. (Baker-OH)

11309.0 Santa Maria-Atlantic MWARA, working Aeromexico 002, at 1550. (Privat-France)

11336.0 LDI 197-Lauda Air, position for Shanwick at 1611. Santa Maria-Atlantic MWARA, position check with Iberia 6703, at 1640. (Privat-France)

11494.0 TSC-US ICE, calling USDAEOC2, US Department of Agriculture EOC, ALE at 1522. LNT-US Coast Guard CAMSLANT, VA, calling J32, ALE, also 5732 and 8912, at 2102. (Perron-MD) Omaha 558-US ICE, moved by Service Center to the "West Circuit," then working Hammer, CA, clear and secure at 1820. (Cleary-SC)

12579.0 NMC-US Coast Guard CAMSPAC keying NMO, Hawaii, with SITOR-B weather at 0825. (Hall-RSA)

12667.0 RFFMEA-French Navy, La Regine, RTTY test loop at 1912. (Hall-RSA)

13153.5 3AC-Monaco Radio, traffic list at 1548. (Watson-UK)

13155.0 Show Piece-US military, with a 6-character EAM simulcast on 11244, at 2252. (Haverlah-TX)

13165.5 HEB02-Bern Radio, data test and CW identifier, with a spurious emission on 13167, at 1650. (Watson-UK)

13257.0 Trenton Military-Canadian Forces, ON, working Canforce 1502, at 1426. (Perron-MD)

13500.0 61B-Venezuelan Navy vessel Capana, calling GC12, patrol vessel *Almirante Moran*, ALE at 2246. (Perron-MD)

13510.0 CFH-Canadian Forces Meteo, Halifax, NS, with a FAX weather chart at 1910, then RTTY airport observations at 1937. (Hall-RSA)

13907.0 X52-US ICE, calling OPB (OPBAT; Operations, Bahamas and Tortugas), in ALE, also 10242 and 18594, at 1449. (Perron-MD)

13927.0 Reach 9502-US Air Force AMC tanker, patch via MARS AFN2AC, FL, to Nordic Control, ND, at 1619. (Cleary-SC)

13957.0 JMH-Tokyo Meteo, clear satellite image FAX at 1919. (Hall-RSA)

14780.0 ERMRIO-Brazilian Navy Radio Station, Rio de Janeiro, calling FDEFEN, frigate *Defensora*, ALE at 2158. (Perron-MD)

15016.0 All State-US military, with a 33-character EAM simulcast on 11175, at 2102. (Haverlah-TX)

15025.0 Reach 917-US Air Force AMC tanker, course for Smasher, FL, at 1519. (Cleary-SC)

15031.0 Canforce1501-Canadian Forces aircraft, calling St. John's Military, no joy at 1610. (Privat-France)

15867.0 Service Center-US Customs Service, radio check with Razorback, PR, at 1538. PAC-US Coast Guard CAMSPAC, CA, ALE-initiated secure contact, at 2230. (Perron-MD)

16333.0 Unid-Two males discussing shipping fees and documents in Caribbean accented English, at 1536. (Perron-MD)

16806.5 NRV-US Coast Guard, Guam, SITOR-B Pacific gale warning at 1540. NRV, SITOR-B Indian Ocean warnings at 1945. (Hall-RSA)

16904.5 FUV-French Navy, Djibouti, RTTY test loop at 1554. (Hall-RSA)

17147.0 CBV-Valparaiso Radio, Chile, FAX weather chart at 1855. (Hall-RSA)

17273.5 HEB03-Bern Radio, data test and CW identifier at 1016. (Watson-UK)

17441.5 5YE-Nairobi Meteo, Kenya, RTTY weather at 1730. (Hall-RSA)

17487.0 AAR6HXMARS-US Army MARS, TX, sounding on SHARES net in ALE, also on 15094, at 1510. (Perron-MD)

18529.4 Unid-Algerian Embassy, Moscow, traffic in French at 0927. (Watson-UK)

18571.5 Unid-Tunisian MFA Tunis, 5-letter-group encrypted SITOR-B message, also on 13956.5, at 1715. (Hall-RSA)

18594.0 502-US ICE, ALE contact with EST, Eastern Regional Communications Node, switched to voice to work Kokomo (US Joint Task Force, Key West, FL), at 1545. (Perron-MD)

18944.5 AAT7WE-US Army MARS, NE, working AAR1FP at 1710. (Perron-MD)

20890.0 D14-US ICE, ALE contact with EST (East), then with CNT (Central), followed by clear and secure voice with Kokomo, FL, at 1436. (Perron-MD)

22447.0 FUV-French Navy, Djibouti, RTTY test loop at 1010. (Hall-RSA) FUV, RTTY "Voyez le brick" test loop at 1430. (Privat-France)

25350.0 D45-US ICE, ALE sound at 1404. (Perron-MD)

Digital Intruders

This month we look at a those digital utility signals that stray into places they shouldn't. We also update the Brazilian Army and Navy networks, and take a look at the various systems from Rohde & Schwarz that can be heard on the air.

❖ Digital Intruder Watch

Like most other parts of the radio spectrum, HF is divided into various regions or allocations into which signals belonging to a certain kind of service are placed. We have bands devoted to broadcast, maritime, mobile, aeronautical and other services and each region is allocated to that service as a primary, secondary or tertiary basis. Amateur radio is no different and many (though not all) of the ham bands are allocated to radio amateurs as a primary user. This means that amateurs have a right to ensure that intruders straying into their protected bands are identified and notified of their interference.

The International Amateur Radio Union has a voluntary organization called Intruder Watch which monitors these incursions and works with national telecommunications authorities like the FCC here in the US to track these rogue signals down, and if possible ensure that they don't return.

Of course, digital utility signals are frequent intruders and the IW's efforts to hunt these signals down provides an interesting place to find some new signals. Here's a rundown of recent activity from the IW logs and some personal monitoring:

kHz	Signal
21116.60	Unidentified Military ALE: HORSE, PAROT, HQ1, etc
10140.60	Israeli Air Force ALE: AA1, BB1, AAA
14001.35	Australian Army: 300bd, 300Hz shift encrypted RTTY
14001.60	Algerian Diplo ALE: ADDIS, BRU, LIB
14320.00	Russian Navy: 50bd, 250Hz shift T600 aka BEE RTTY
14300.00	Russian Military: MS5 12 tone modem
7070.00	Russian Military: MS5 12 tone modem

The last of these caused some interest among the WUN Internet listeners group and apparently resulted in an FCC direction finding exercise "pinpointing" the rogue modem to somewhere in Arizona!

❖ System Profile: Rohde & Schwarz

The Munich-headquartered German communications firm of Rohde & Schwarz (R&S) has a long history of innovation in HF, VHF and UHF radio. High-quality HF radios and fast, secure modems have made their equipment a long-time favorite among military, government and diplomatic organizations.

ROHDE & SCHWARZ

The oldest proprietary system still heard on the air today was dubbed RS-ARQ because much research failed to turn up an official R&S name for the system, other than that it appeared to be generated by the R&S GR856 modem. RS-ARQ was often referred to as ALIS, but strictly speaking, this is just the automatic link management (ALE) part of the system. RS-ARQ is an FSK system running at 228.7bd with a 170Hz shift and it was used by the German, Italian and Turkish Diplomatic services in addition to German Forces and Italian Finance Guard units. It is seldom heard these days. Even rarer was a 225bd, 170Hz shift packet radio version of the system.

Many of the diplomatic users of the early RS-ARQ system upgraded to a new modem, the GM2000, and a message handling system called MERLIN. The waveform from this modem was an 8 tone MFSK signal with a speed of 240.1bd. Each tone is spaced 240Hz.

The Turkish Diplomatic Service can still be heard sometimes using this modem. Here are some frequencies to look out for:

4684, 5301, 6724, 8195, 10254, 10810, 11016, 11149, 12226, 14619, 14961kHz

The 240bd signal has an unmistakable sound like a honking donkey! The newly updated GM2000 modem also supports MIL-188-110A and STANAG4285-type high-speed waveforms in addition to R&S's proprietary waveform, which is claimed to achieve up to 5400 bit per second data transfer rates. The French Diplomatic service, for example, appear to be using this new equipment.

Some involved detective work by longtime monitor Leif Dehio in Germany also appears to have discounted another signal – long attributed to R&S – as ALIS-2000 instead. This signal, which did appear at around the same time that the first GM2000 modems arrived, runs at 250bd, 170Hz with a very fast repetition rate. This signal is now believed to be generated by the CHX200 modem from rival German manufacturer Siemens.

I always find CHX200 signals to be very "weak and watery" whenever I've heard them over the past years, suggesting that they are mostly in use by Asian and Southern Hemisphere users. Here are some places to look out for the CHX200's characteristic "zip-zip-zip" sound:

5126.6 6671.6 6816.6 9051.6 10278.4 11158.6 12197.6 13323.6 14354.6 15957.6 16479.6 18236.6 20386.6kHz

❖ Brazilian Navy and Army Update

Since the printing of the article covering the Brazilian Navy's weather and shipping network (November 2004), two more frequencies have come to light. These are 8623 and 13189.8 kHz. Activity appears to be the same as that on the frequency mentioned in the original article, 12255 kHz, and once again, provides a great utility catch for just about anyone, as standard SITOR-B is used.

Some reader feedback on that Navy article also prompted me to remind readers of another Brazilian network, which is operated by the Army and appears to have units in most administrative regions of the country.

6933 7943 8035 9062 9117 10711 10932 11452 11530 12132 13490 13942 14582 14600 14705 16333 18218 19677 20535kHz USB

Identifiers follow the military region abbreviations as used by the Brazilian Army and include:

BR1	Districto Federal (HQ Brasilia)
RS1	Rio Grande do Sul (HQ Porto Alegre)
RJ1	Rio de Janeiro (HQ Rio de Janeiro)
MS1	9th Military Region, Matta Grosso do Sul (HQ Campo Grande)
CE1	10th Military Region, Ceara (HQ Fortaleza)
PE1	7th Military Region, Pernambuco (HQ Recife)
PA1	8th Military Region, Para (HQ Belem)
PR1	5th Military Region, Parano (HQ Curitiba)
BA1	6th Military Region, Bahia (HQ Salvador)
SP1	2nd Military Region, Sao Paulo (HQ Sao Paulo)

The ALE has been heard triggering encrypted voice, plain voice and MIL-188-110A high-speed data modem. Interestingly, 13490 and a number of other frequencies also carry AX.25 Packet Radio traffic using the same identifiers.

Resources:

IARU Intruder Watch	http://www.iarums.com
Rohde & Schwarz	http://rohde-schwarz.com
Brazilian Army	http://www.exercito.gov.br

Global Forum

Shortwave Broadcasting

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Shortwave, the Medium for World Music

Shortwave is a wonderful medium to hear the widest possible diversity of music from all over the world. Random tuning will lead you to unexpected pleasures, and who cares if you don't understand the language?

Since Radio Exterior de España removes *Nuestro Sello*, classical music from its morning schedule every winter (1405 UT in summers), I was happy to run across *La Zarzuela*, at 2230-2300* Sundays on 17850 via Costa Rica, not in the posted schedule, which shows instead *La Bañera de Ulises* – "Ulysses' Bathtub" – what in the world is that about? This may also be on 15125, 9765, 9630.

Another nice musical show, from Radio Habana Cuba, is *Cancionero Iberoamericano*, Sat 1430-1445, one week playing a calypso song in English, "Everybody Loves Banana", the singer accompanied by La Orquesta Costeña de Bluefields, Nicaragua. This assuaged to a minor degree our thirst for English in the morning from RHC – why have they never had any English before 2030? Excellent on 9550, 11760, 11800 and 12000, also audible on 6000, and buried by China-via-Canada on 15230.

Música del Ecuador was a favorite when presented in English on HCJB, and I would tell you when to listen in Spanish, but I could not find a simple SW program schedule on HCJB's website **http://www.**

vozandes.org – however, the show does have a two-week (10 program) archive of the one-hour version in Spanish with Jorge Zambrano on the national service. I listened to one, and really enjoyed the music, playing at 21 kbps, so not exactly hi-fi, and lacking the true SW sound of selective fading, but good enough. They did not miss a chance to promote creationism, which seems to be the prime purpose of HCJB, unlike more rational Christians who do not reject the scientific method. What's that got to do with Ecuadorian music? Skip forward two minutes.

Hmong Lao Radio, Wed & Fri only at 0100-0200 6040 for B-04, via Rampisham UK, must be the most exotic broadcast to North America; in case you don't speak Hmong, it includes some traditional music, often with good reception.

VOA is filling time with more music, less news; might as well enjoy it. At 1500 M-F, *Border Crossings* is on some frequencies, such as 13600, Special English lessons on others such as 9760. But aren't they overdoing *Jazz America* a bit? Hope they have plenty of different episodes. It's M-F at 1000, and alternating with other music shows at 2100; Sat 05, 08, 10, 13, 21, 23; Sun same except 13. *Music Time in Africa* still airs Sundays at 1730 and 1930; now also Saturday at 0430. *World of Music*: Mon, Tue, Thu, Fri, Sat 1830, also Saturday 0330. More below.

ALASKA KNLS staff list includes Fred Osterman of Universal Radio and DXing.com doing monthly features about equipment and DX; and Doug Poling, who has forsaken CBS News journalism for evangelism. Mike Osborne, who produced and hosted the English hour for 20 years, has left to join Mercy Ships International, but some of his features will continue to be heard (KNLS website)

ALBANIA On 28 November 2004, a Chinese minister inaugurated six new 150 kW SW transmitters in Cërrik, for exclusive use of CRI; two of them are backups. Tests started to be heard during the previous week. More under CHINA [non]

ANDAMAN & NICOBAR ISLANDS For reasons unknown, some All India Radio stations occasionally shift 5 kHz. Such was the case with Port Blair, Dec 11 only at 1530, using 4765 instead of 4760, on this brief occasion not co-channel to AIR Leh (via Jose Jacob, dx_india)

ANTIGUA On numerous mornings in November and December, BBC's 15190 transmitter was audible on its second harmonic 30380 in the 1330-1630 UT period (Jack Sullivan, NJ, harmonics yahoogroup)

ARGENTINA [non] R. Cimarrona, via Germany 9480 at 2200 on Sunday Dec 5 was very strong; had the same flavor as the old R. Magallanes clandestine for Chile from the USSR: fascinating programming denouncing banks and international investors for having pillaged Argentina. Played the national anthem of Argentina, sung by a massive open-air crowd (Adán Mur, Paraguay, *Conexión Digital*) See also URUGUAY [non]

BELGIUM Re last month's lead story about RVi ceasing non-Dutch SW broadcasts at the end of March: I received this reply to my complaint. It seems the huge response from listeners has at least been noted by the Minister:

Dear Sir, Just like you, I have a problem with the abolition of the non-Dutch language broadcasts of RVi, for it is unmistakably the responsibility of the national channel to put Flanders on the map of the world. In my capacity as Minister for Foreign Policy as well as Media, I would strongly deplore the possible disappearance of this window of the world on Flanders. Already I am deluged with e-mails and letters from all over the world in which both Flemings and foreigners beg me to maintain the non-Dutch language broadcasts of RVi. I therefore wish to consult with the VRT about the possibility to maintain RVi as the best access to Flanders for both Dutch-speaking people and foreigners." (Geert Bourgeois, Flemish Minister for Administrative Affairs, Foreign Policy, Media and Tourism via Jonathan Murphy, Ireland, World DX Club, and Mike Terry, DX LISTENING DIGEST)

BIAFRA [non] 7380, *2100 in English "Voice of Biafra from Washington DC," Sat only (Dave Kenny, Sheigra, Scotland DXpedition, BDXC-UK Communication) Via South Africa, Voice of Biafra International, another Sat 2130 about the history of the struggle for native rights in Africa. "Wait until fundamental Islam takes over, then the shit will hit the fan. God bless Biafra and all those who fight for her." 2149 full ID, all in English (Harold Frodge, MI, DXPedition, MARE *Tipsheet*)

CANADA On Tuesday, Feb. 8, 2005, we would value your prayers as we work with Frank Drown of Unevangelized Field Mission in setting up a short wave radio station to reach First Nation peoples across Northern Ontario and Manitobo (Galcom International prayer bulletin)

Unidentified on 3219.83, faint music at 2240, barely audible (Liz Cameron, MI, *DXLD*) The new 1610 in Toronto, CHSL, is about that much on the low side, fits for second harmonic! (gh) On 3219.84 three mornings from *1059 to 1133, weak talk in Spanish // 1609.92; HCJB 3220 faded by 1115 (Mark Mohrmann, VT, *DXLD*)

[non] Looking for Myanmar on 5985.9 at 1450, I found instead Quebecois on 5985, RCI science show; and at 1455 the RCI IS started – underneath the French, from a second, weaker transmitter, and then French closed at 1459. Here's what happened: French to Asia/China at 1430 via Yamata Japan, 300 kW, 290 degrees. The second RCI was via Kimjae, ROK, 100 kW, 270 degrees, warming up for an English hour to India. But imagine the clash in Asia – hello!? Meanwhile, a tiny het was audible, no doubt the only trace of Myanmar, with RCI blocking its entire sesquihour in English at 1430 not only in North America but Asia, 7 days a week (gh)

No doubt sparked by the continuing electoral controversy in Ukraine, RCI decided not to cancel its Ukrainian service Nov. 30 as planned; it was extended at least until the end of January, as announced on *Maple Leaf Mailbag* (via Will Martin, *DXLD*) 1630-1700 on 9555, 11935 via Skelton, UK (gh)

CHAD Radiodiffusion Nationale, 6165 heard as early as 2002 UT in mid-Nov, in French, with African news, xylophone with primitive melody (Roger Chambers, NY, *DXLD*) Fair signal with good music audio, but muddy vox audio and co-channel Croatia bleeding through at 2110, dominating by 2130 (Scott R. Barbour, NH, *ibid*.) AWR Bonaire in Spanish starts up at 2159 (gh) 6165 reactivated, at 2211 French talks, modern songs, closing with anthem until 2232*, strong, but heavy QRM from Croatia (Carlos Gonçalves, Portugal, radioescutas)

CHINA [and non] See ALBANIA, new CRI relay inaugurated Nov 28, targeted at Europe, Africa and North America. So CRI is on even

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

more frequencies to us, besides relays via Spain, French Guiana, Cuba, Canada, and 7405 direct (gh) Many of the new transmissions from Albania were registered in HFCC as from some sites in China, quite impudent fakes, but showing azimuths fitting Albania (Kai Ludwig, Germany, *DXLD*) CRI engineers were quietly registering frequencies for Albania disguised as some other site. That explains all those 150 kW transmitters which don't exist at Kashi and Urumqi! (Noel R. Green, UK, *BC-DX*)

CRI via Cërrik schedule includes English: 0500-0557 17505, 7220; 0600-0657 11750, 17505; 0700-0757 17490; 0700-0857 11855; 1100-1257 13665; 2000-2157 5960, 7285; 0000-0157 6020, 9570 (*Observer*, Bulgaria) The last four hours fairly well heard here (gh, OK) 17505 above is not Albania but Kashi, China; the audio feed to Albania is a quarter second ahead of Kashi or Urumchi; many other language transmissions are using both Albania and China sites (Wolfgang Büschel, *BC-DX*)

CRI, 11720 at 2130 on two days in November was extremely strong, but with huge audio feed problems, a mixture of several languages, really crazy, jumping among languages and programs (Adan Mur, Paraguay, *Conexión Digital*) That's the new relay via Voz Cristiana, Chile; maybe they were searching for the right feed, Portuguese (gh)

COLOMBIA R. Popular, HJJF, Cali, heard on 5399.62, fifth harmonic of 1080, both mornings and evenings, regular for a week, fair signal and distorted sound (Björn Malm, Ecuador, **http://www.malm-ecuador.com**)

CROATIA [and non] V. of Croatia English schedule: 0300-0330 7285, 0700-0705 9470, 1905-1915 6165 13830, 2315-2330 7285 (Mike Barraclough, England, *World DX Club Contact*) 7285 and 9470 being via Germany

CUBA RHC English includes 6060 to the East Coast 0500-0700. 6000 at 0000-0700 split between 0000-0500 to East Coast and 0500-0700 antenna change to Pacific Coast of North America. 9820 to Great Lakes 0500-0700 (Arnie Coro, ODXA) I noticed 6060 staying on past 0700 with R. Reloj (gh)

4690, Radio Rebelde spur here noted at 1215 // 5025 (Hans Johnson, FL, *Cumbre DX*) Really 7 x 670 kHz harmonic! (gh)

[non] The International Broadcasting Bureau (IBB), Office of Cuba Broadcasting (OCB), intends to solicit, negotiate, and award a firm-fixed-price Purchase Order contract on a competitive basis. The Contractor shall advise and assist OCB with the further development, implementation, monitoring, and improvement of programming for both Radio and TV Marti for the period starting on January 3, 2005, and ending on September 30, 2005. The Contractor is expected to assist OCB in the development of specific programming that will appeal to Cuba's younger generation, programming that meets the needs of the Cuban people in the transition from communism to democracy, and programming targeting specific groups within Cuba that may have influence in the future transition to democracy (FedBizOpps via *Media Network* blog)

DENMARK Stig Hartvig Nielsen – aged 46 and GM of the consulting company Hartvig Media ApS and World Music Radio (WMR) in Denmark – has been appointed as a member of the board of directors for the public service station, DR - Danmarks Radio (Danish Broadcasting Corporation), effective January 1st 2005. With this appointment the future for WMR looks a bit uncertain. For the time being WMR will continue testing weekends (from Friday 1600 UT till Monday 0700) on 5815 (Stig Hartvig Nielsen, *DXLD*) Congratulations! Maybe you can get DR back on SW (gh)

ECUADOR A week after the DRM tests to Dallas on 15250 [see separate story], *DX Partyline* announced that the steerable antenna used for that was about to be dismantled to make way for the new airport; or rather the tower suspending the reflective grid curtains behind the steerable antenna; it's being dismantled carefully instead of destroyed, in case an opportunity to use it somewhere else arises.

HCJB does have an evening English broadcast to North America, *Spotlight*, English lessons in the Spanish service at 2345-2400 on 11700, heard on a Friday, probably M-F (gh)

La Voz del Upano is not a new station, but the transmitter on 5999.29 is, at Lago Agrio, Sucumbios province, in the northeast, heard in early Dec, first with open carrier, and then relaying FM 99.3, to begin regular service Dec 15. The town has another name, Nueva Lojo since many people have moved in from the original Loja in southern Ecuador (Björn Malm, Quito, *DXLD*)

EGYPT As word spread among R. Cairo's language sections that they were about to be axed, some of them appealed for support from listeners. The Hindi section wrote to Harjot Singh Brar that the authorities thought Urdu would be sufficient, not just for Pakistan, but also India! (via Globe Radio DX Club) The Brazilian section was also appealing for support to keep it from being closed December 31 (via Célio Romais, @tividade DX)

The Egyptian media minister was having a brain operation in Paris, France. He's the one who would make the decision by end of December! A major magazine here reported, "Voice Of Egypt is in Danger!" The article said 71.5 transmission hours per day would be reduced to 20, and languages from 37 to 12. A number of rare African languages would be casualties, including Somali and others in the Nile Valley, and even Hausa to Nigeria, which has been getting tremendous response. In the Mideast/Asia department, only Persian, Pashtu and Urdu would remain, with one of R. Cairo's first languages, Indonesian, cancelled, along with Malay, Bengali and Turkish. Despite having received an award as the best station in Italian, that language would go. Arabic is being taught in eleven languages, many of which would be cancelled.

Staff from many of the threatened services were quoted, but anonymously for fear of reprisals. Dr. Hassan Ali Hassan, the Director of the overseas section of Radio Cairo, spoke for the record: "If the reception is poor from a technical point of view in some parts of the world, I think we should fix these problems as soon as possible, not cease the whole thing." (Thanks to Tarek Zeidan for translation.)

There certainly are reception problems, which could be solved by better engineering and frequency management. Spanish at 0045-0200 on 9415 is totally blocked here by Portugal (gh) English to North America at 2300-0030 on 7115, where it should not be, in the 40m hamband, also is blocked by RFE/RL in Serbo-Croatian, from Morocco to Europe, so 41m is OK for the latter. 7260 at 0200 clashes with Golos Rossii; and on top of all this: perpetually poor modulation by Cairo itself (gh) English until 0330 heard on 6970, // 7260 (George Maroti, NY, *DXLD*) Turns out that is a mixing product between 7260 and 7115, 145 kHz separation; matching 7405 would be blocked by IBB (gh)

Furthermore, Cairo in English at 2330-2400 heard weakly on 4935 (Christoph Ratzer, Austria, *A-DX* via *BC-DX*) And in Russian at 1800 on 4930 (Zacharias Liangas, Greece, *DXLD*) Both these are mixing with the General Arabic program on 12050, minus the Russian frequency 7120, and minus the English frequency 7115! (gh and Wolfgang Büschel)

EQUATORIAL GUINEA R. Nacional de G.E., reactivated Dec 1 on 5005 at 0500 until 0600 fade but not in evenings (Jarmo Patala, Hyvinkää, Finland, *dxing.info*) 5004 from Bata, with religious program in Spanish at 0544 (Célio Romais, *Panorama*, @tividade DX)

FRANCE Of 1014 workers at RFI, 541 of them replied to an inquiry on whether they had confidence in management. Of those, 507 said they did not. This might make a strike more likely. The labor unions were disturbed that RFI strategy calls for broadcasting in French, English, Arabic, Chinese and Spanish, but no future for the other languages, especially these seven whose audience has declined the most: Polish, Albanian, Kriyol, Turkish, Russian, German and Lao. However, this does not mean they will be eliminated, said André Sarfati, RFI director of communication (Satellifax and AFP via Jean-Michel Aubier) RFI intends to close down Portuguese to Africa, which is no longer a priority with the Angolan civil war over (*Jornal de Notícias*, Portugal, via Fernando C. Ferreira, DSWCI *DX Window*)

GABON RTVG reactivated 4777, strong Dec 11 at 2205 (Roberto Scaglione, Sicily, *BCLNews.it*) And then reported widely

GREECE [non] V. of Greece's morning relay via Delano 11750 at 1200-1500 was inaudible at first, and not strong until 1400, so on Dec 11 it was replaced by 9775; by Feb it could be back on 11750 (John Babbis, MD, *DXLD*)

GUAM On another stop here, I visited KSDA; new transmitters are to be commissioned in Feb with AWR dignitaries present. Electricity bill runs $40 to $45K per month. At KTWR they told me a system cuts their electricity bill in half to $22K monthly (Larry Fields, N6HPX, swl@qth.net)

HONDURAS 3340, HRMI reactivated at end of November, 0315-0337 (Scott R Barbour Jr, NH, *DXLD*) 0235-0507* Spanish Christian music, 0506 closing with R. Misiones Internacionales ID; poor-fair in noise (Brian Alexander, PA, *DXLD*)

INDIA If I did not know better, I would think All India Radio has a North American service in English, for at 2335-2340 I ran across news in English on 9425, 500 kW from Bangalore, VG signal on domestic service (Glenn Hauser, OK, *DXLD*) More news in English on home service at 1530-1545 heard on regional stations 4760, 4775, 4970, 4990, 9425; 1545 *Spot Light* discussion on some of them (Ron Howard, CA, *DXLD*)

ISRAEL In late Nov, two Kol Israel antennas fell down during a storm, and would not be repaired if SW was going to close at yearend (Doni Rosenzweig, *DXLD*) Closing SW has been postponed to 30 March 2005 (Moshe Oren, Bezeq, via monitor George Poppin, *DXLD*) Have they heard about crying wolf? (John Figliozzi, ibid.)

KOREA NORTH Voice of Korea, new schedule from Dec 1, English; 3560 and 4405 are considered internal feeders; * = to N or CAm: 0100 3560 7140 9345 9730 *11735 *13760 *15180; 0200 4405 13650 15100; 0300 3560 7140 9345 9730; 1000 3560 6185 6285 *9335 *9850; 1300 & 1500 4405 7570 *9335 *11710 12015; 1600 3560 9975 11535; 1900 & 2100 4405 7570 12015 (via Nagoya DXC, Olle Alm, Noel R. Green, Wolfgang Büschel, *BC-DX*) 6285 is new, on the air 1000-2100 (gh) And 7100 at 1800-2100; DARC Intruder Watch has protested invasion of hamband. VOK Russian at 0700-0857 moved from 15245 to 15260v, with numerous spurs about 16.6 and 33.2 kHz apart one day; another day 60.1 kHz apart (Wolfgang Büschel, *BC-DX*) English at 0100 bubble-jammed on 13760, that stray Cuban jammer? (gh)

LIBYA A new 100-kW DRM transmitter is being installed here (Jeff White, *NASB Newsletter*)

MADAGASCAR Kevin Chambers, Director of Engineering and World Christian Broadcasting representative Earl Young have signed papers to complete transfer of property from the government of Madagascar to World Christian Broadcasting. The site contains 42 hectares, which is slightly more than the desired 100 acres, near Mahajunga [on the NW coast]. Plans are to begin fundraising for the Madagascar Project once the additional facility in Alaska is completed [KNLS-2] (WCBC website)

MALDIVE ISLANDS [non] Minivan Radio, 11810 via Germany, 1600-1700 in Maldivian-Divehi, jammed by the National Security Service (NSS) in Male with a pulsing tone, as if someone is hand-keying. Jamming is quite strong in Male, but not outside the main island (Victor Goonetilleke, Sri Lanka, *ADXN*)

MÉXICO R. Insurgente website claims the Zapatista clandestine has a SW broadcast audible overseas, Fri 2100-2200 on 6.0 MHz; I dutifully searched for it between 5800 and 6055 one Friday, but no trace (gh, OK) I heard from someone who said it may be two hours later (Thorsten Hallmann, DXLD)

MYANMAR See CANADA [non]

NIGERIA As of early Dec, VON was on 9690 around 1835 past 1900 in English (Brian Alexander, PA, DXLD) English until 2100; also using 9690 instead of 7255 in mornings 0800-1000, but clashing with DW Antigua (Thorsten Hollmann, Germany, WORLD OF RADIO)

NORTHERN MARIANA ISLANDS Rome Research Corporation (RRC), a sub-sidiary of PAR Technology Corporation, New Hartford, NY, announced award of a $1.8 million one-year contract from IBB to operate the Robert E. Kamoso Transmitting Station (REKTS) on Saipan and Tinian, transmit-ting VOA, RFA and others. RRC hoped to compete effectively for a further 5-year contract. At **http://pargovernment.com/RRC** it says RRC is also operating among others the SW transmitters for AFRTS relays in Guam, Puerto Rico (via Bernd Trutenau, Lithuania, DXLD)

PERÚ New station began testing in mid-Nov on 5544.65, heard from before 0130 to close at 0400, R. San Andrés, Municipalidad de San Andrés, Provincia de Cutervo, Dpto. de Cajamarca, with frequent IDs. At least 75% of the music was from Ecuador; says they open at 1800.

On 6329.11, a station not heard since last March, LV de Faique, Faique, Cajamarca. And reactivated on 6520.33, R. Paucartambo, at 0030. Comments and recordings at: **http://www.malm-ecuador.com** (Björn Malm, Quito, DXLD) Its SW license was supposedly withdrawn last July (Henrik Klemetz, dxing.info)

On 5070.7 at 0127, R. Ondas del Suroriente, Cuzco, huaynos, 0221 ads and ID mentioning 1400, 5070 and 96.5 FM (Rogildo Aragão, Quillacollo, Bolivia, HCDX) Stable frequency but irregular, also IDs as R. Suroriente (Björn Malm, Ecuador, DXLD) I wonder if anyone in NAm can hear at least a 700 Hz het on WWCR when it fades down (gh)

PHILIPPINES PBS, English at 0200 on new 12015, ex 11885 // 15120 and 15270 (Roland Schulze, Philippines, DSWCI DX Window) At 1730-1930 PBS is now registered on 11730, 11890 and 15190, given as English in some references but in Tagalog when I check (Mike Barraclough, England, World DX Club Contact)

ROMANIA RRI changed 9690 to 9615 in English at 0100; a secondary site at Saftitza with 50 kW on 7130 in Aromanian at 1800 clashes with English from the main site, also at 1800 on 7130! (Observer, Bulgaria)

RUSSIA Kamchatka Rybatskaya, UT Sun at 0000 caught fishing broadcast on both 5910 to Okhotsk Sea, and 11975 serving Bering Sea. Modulation leaves much to be desired on both (Igor Ashikhmin, Primorskiy kray, Russia, open_dx via Signal)

SAUDI ARABIA BSKSA Main program in Arabic via Riyadh, 500 kW, all 400 Hz high, 295 degrees except the last, 320: 0600-0855 on 17730.4, 0900-1155 on 17805.4, 1200-1455 on 21505.4, 1500-1755 on 15435.4 (Observer, Bulgaria)

SRI LANKA [non] IBC Tamil via Tashkent at 0000-0100 on 7450 ex-7460, 100 kW, 165 degrees (Observer, Bulgaria)

SUDAN 4750, R. Peace at 0312 in unID language, music. Excellent signal (Liz Cameron, MI, DXLD) Excellent? Wonder if they have increased power from one kW (gh) Could be; nearly as strong as WWCR 3210. What language? Did not seem Arabic (Liz Cameron, MI, ibid.) Clear English ID at 0345. SIO=333. Is this Christian program really from Sudan? (Harold Frodge, MI DXPedition, MARE Tipsheet) At New Site, extreme southern Sudan, the predominantly Christian area, and surely the central government has no control over it; but it's really remote so I wonder if they then bought time on a major transmitter elsewhere? (gh) Horn of Africa, R. Peace received for the first time in Sofia, 0245-0415 in English, vernaculars (Rumen Pankov, R. Bulgaria DX Program via John Norfolk)

TIBET [non] V. of Tibet in Tibetan/Chinese via Tashkent, 100 kW, 131 degrees, 48-minute broadcasts jump among three frequencies to avoid Chinese music jammer: 1212 on 17545, 17525 or 17560; 1302 on 15535, 15525 or 15540; 1430 on 7520, 7505 or 7480 (Observer, Bulgaria) Added another at 1100 on 17515, but clashed with Vatican, so moved to 17525 (Victor Goonetilleke, Sri Lanka, Australian DX News)

TURKEY VOT took Joe Hanlon's suggestion and moved from 7275 to 5960 in English to NAm at 2300-2350 (George J. Poppin, CA, DXLD) In the clear, sometimes good here (gh, OK) 555 here (Joe Hanlon, NJ) But inaudible here (Poppin, San Francisco)

U S A VOA News output has indeed been cut, but English is actually on SW 24 hours a day, on fewer frequencies, much of it filled by musical program-ming, as above. The B-04 schedule shows specific targets except for an overlap at 1500-1700: 0900-1200 ME; 1200-1500 As; 1500-1700 As/ME/Af; 1700-2200 Af; 2200-0300 As; 0300-0900 Af. Africa World Tonight is on twice at 1700 and 2000, but here in the UK, the best frequency, 15240 from Morocco, starts to fade out after 1800 (Marc Cawthorne, Norwich, DXLD) A PDF program schedule shows Talk to America, live at 1600 M-F, now repeated at 0900 and 1100 (via John Kopinos).

AFRTS schedule shows 7812.5-USB from Key West replacing 7507 (Gordon Hagewood, via Daniel Sampson, Prime Time Shortwave) Very weak to often inaudible here (gh, OK)

From at least Nov 19 thru 30, KOA 850 Denver was heard daily on a 25950 NBFM relay, usually fading in around 1500, out around 2100 (Alan Roberts, St.-Lambert, QC, WORLD OF RADIO) Around 1600-2200 here (François Arpin, QC, ibid.) A mobile remote pickup unit with 75 watts, licensed as KB99696, S9 peak at 1700 (Rafman, VA, DXLD) Remote broadcast cueing relay of KOA-850, local talk show 1900-1930, local quality on peaks (Brock Whaley, GA, ibid.)

Appears that KAIJ Dallas is about to break away from all-Gene-Scott-all-the-time. One could easily believe the station is owned by him, but per **http://www.kaij.org** "The FCC license to operate KAIJ is held by Two If By Sea Broadcasting Corporation, which is owned by experienced broadcasters Mike and Kim Parker." Strangely, the station history does not reveal that it began as KCBI, Criswell Bible Institute. The rudimentary website indicates KAIJ wants to concentrate on Christian programming in Spanish, especially to Cuba, and one of their staff actually went to an evangelism conference there. Just send them $70 a week for an hour of programming, and they'll put something in Spanish on, even your own program, or something from the library.

Graphics include an illegible predicted coverage map, and replac-ing the star on the Cuban flag with a cross. Keep an ear on 5755 night, 13815 day for signs of change – but DGS is occasionally in Spanish. One thing for sure: 13815 is no place to broadcast to Cuba, 5 kHz from Marti and jamming!

One reason KAIJ is looking toward cutting back the hours of Dr Gene Scott is that we have reports that he has terminal cancer. Puffing on all those cigars cannot have helped. However, if his heirs want to continue the University Network ministry, they could do so playing DGS' old tapes 24 hours a day for seven years without repeating any of them, but we can hope that KAIJ won't be the only outlet to try some other programming (gh)

WMLK measured on 9265.53, at *1600-2100* Nov 24, sign-on giving wrong sked and still announcing "9465" (Brian Alexander, PA, DXLD) Audible at 2048 with anti-gay Yahweh stuff until 2100*, under-modulated and hard to follow (Robin L. Harwood VK7RH, Tasmania, DXLD)

The Restoration folks sure haven't restored KVOH's transmitter they bought, from putting out horrible spurs at plus and minus multiples of 147 kHz from 17775. At 2222 on 17922, 20 over 9 carrier which dipped at modulation peaks, as two preachers were talking; between words, the carrier level went back up. Then found more, progressively weaker after the match at 17628: 18069 & 17481, 18216 & 17334. At least seven frequencies for the price of one! But I'd sure hate to be trying to make air-to-ground emergency contact around 17922 (gh, OK)

On WRMI's program schedule page **http://www.wrmi.net/pag-es/714011/index.htm** they have added live streaming, but **http://www.wrminet.us:8000** seems to work only with latest WM player. A chance to hear Cuban exile programs on 9955 which are jammed and beamed away from NAm; Vivo Miami, DX Portyline and WORLD OF RADIO on weekends (gh)

New on WBCQ from late November is Michael Ketter's World Microscope, UT Wed-Sat 0200-0300 on 7415 and 5105; this should help change the face of shortwave radio (Allan Weiner, WBCQ) And on the Think Radio Network, not the awful, abusive voices heard on mainstream AM and FM radio. WM Looks at serious things in long-term context (Michael Ketter, WBCQ)

Radio Free New York, the original WHOT pirate crew on 1620 in the late '70s, returns to WBCQ, Sundays 2100-2200 on 7415. Additional temporary times for WORLD OF RADIO: Fri 2200 on 7415, UT Sat 0030 on 9330-CLSB (Allan Weiner, WBCQ)

VOA 7415 clashing with WBCQ, heard signing on at 0300 (John Carver, IN, DXLD) Completely covering WBCQ here at 0330 (Alan John-son, N4LUS, NV, DXLD) Missing from some versions of VOA schedule, but still Botswana on 7415 at 0300-0500 (gh)

Kennebunk address is no longer valid; all mail to WBCQ RADIO, 274 Britton Road, Monticello, ME 04760 (**http://www.wbcq.com**)

[non] AWR Wovescan production in London ceased at yearend, moving to Singapore, but on hiatus until expected resumption at end of March with A-05 schedule (Adrian Peterson via Jeff White, WRMI)

URUGUAY [non] R. Cimarrona, Sun & Mon 2200-2300 on 9480 via Germany: The interval signal is from the theme La Llamorodo, by Daniel Viglietti, an Uruguayan protest author. Cimarrona refers to those who refused to be slaves, and the station opposes domination by multimedia transna-tionals (Horacio Nigro, Uruguay, DXLD) R. Cimarrona [see ARGENTINA] may desire an international audience and get logistical support from the Allerweltshaus in Cologne, but that does not imply that the program could not have been broadcast from any station sharing their ideology inside Uruguay or other countries; it is not proscribed, so doesn't qualify as clandestine. And I have not seen any answers by e-mail (Horacio Nigro, Uruguay, condiglist) Walter Brodowsky, of transmission provider DTK at Jülich, however, did verify an e-mail report for R. Cimarrona, and would forward the report to them (Rich D'Angelo, PA, DSWCI DX Window)

VIETNAM [non] New clandestine via Tashkent is Radio Quê M , 1200-1230 on 15385 (Observer, Bulgaria) Heard announcing webpage **http://www.queme.net** (Mauno Ritola, Finland, HCDX) Page is in English, French, Vietnamese, by Action for Democracy in Vietnam and the Vietnam Committee on Human Rights, Quê M , B.P. 63, 94472 Boissy Saint Léger cedex, France; queme@free.fr – Could find nothing about SW or any broadcasts, but a lot about Buddhist dissidents (gh) Heard on Saturdays only (Jerry Berg, NASWA Flashsheet)

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

0000 UTC on 9700
BULGARIA: Station interval signal to identification and national news. (William McGuire, Cheverly, MD) 11700, 2130 with *International Day of the Elderly* //9700; 15700 // 11700, 1145. (Bob Fraser, Belfast, ME) 7500 at 2123. (Harold Frodge, Midland, MI)

0013 UTC on 6090
ANGUILLA: University Network. Aretha Franklin bumper music to University Network ID at 0015. Dr. Gene Scott program with WYFR interference on 6085. (Frodge, MI)

0030 UTC on 6536
PERU: Radio Emi Huancabamba. Spanish. Personal messages to criollo music. Local time check and clear identification, "Radio Emisora Huancabamba," closing at 1130. Peruvians monitored; **Radio Ilucan** 5678, 0045; **Radio Imperio** 4386.5, 0857; **La Voz del Guaviari** 6035, 0930; **Radio Cultura Amauta** 4955, 930; **Radio Altura** 5014.7, 1000; **Radio Melodia** 5939.5, 2330; **Radio Santa Monica** 4964.9, 2300; (Fernando Garcia, Baltimore, MD) **Radio Union** 6115, 0655. (Scott Barbour, Intervale, NH)

0110 UTC on 7260
EGYPT: Radio Cairo. Spanish program *Arabic Literature* to book reviews and news. English service commencing at 0200. (Garcia, MD) 9080 on 2210 with *Letterbox* program and commentary on Syria. (David Weronka, Benson, NC) 7115, 0140-0200 (Tom Banks, Dallas, TX) 6970, 0320-0330 (George Maroti, Mount Kisco, NY/NASWA) 7260, 0110. (Garcia, MD.(Frank Hillton, Charleston, SC) (Sam Wright, Bolixi, MS)

0134 UTC on 15375
CHILE: La Voz Cristiana. Spanish religious music and text.(Alvin Mirabal, Puerto Rico) Chile's Radio Esperanza 6090, 0912-0918. (Arnaldo Slaen, Buenos Aires, Argentina)

0155 UTC on 13820
USA: Radio Marti. Spanish. Rendition of Castro imitator being interviewed. (Mirabal, PR) 6080 at 1000. (Garcia, MD)

0221 UTC on 6040
BRAZIL: Radio Clube Paranaense. Portuguese chat and ads at 0242, followed by sports program. Poor to fair until mixing with TWR Swaziland at 0300, and blown away by Monte Carlo via Sackville at 0300. (Rich D'Angelo, PA/Cumbre Flash Sheet) **Radio Conhongas** 4775 at 2230. **Radio Rio Mar** 9695.9, 2230; **Radio Transmundial** 9530, 2300; **Radio Educacao Rural** 4754.2 at 0000. (Garcia, MD) **Radio Marumby** 11750, 1325-1400. (Slaen, ARG) **Radio Nacional de Amazonia** 11780, 0330. (Wereonka, NC) **Radio Educadora** 4825, 0830-0850. (Banks, TX)

0318 UTC on 13675
UNITED ARAB EMIRATES: Emirates Radio. Arabic text and music; 12005, 0339. (Mirabal, PR) **Radio UNMEE** 21460, 0935-0955. Vernaculars and English with ID/kHz into news on humanity activities. (Slaen, ARG)

0321 UTC on 13665
RUSSIA: Voice of. *Those Were the Days* tune in Russian to ID. (Mirabal, PR) 9890 at 1745. (Fraser, ME)

0345 UTC on 11675
KUWAIT: Radio Kuwait. Arabic conversations with occasional music breaks. Station identification and anthem at 0400. Fair signal for resumed Arabic programming. (Larry Van Horn, NC)

0425 UTC on 12060
CLANDESTINE: (Sudan) Radio Nile via Madagascar. Open carrier to "Radio Nile" identification and Arabic announcements, and English opening announcements. Arabic mentions of Sudan and Colin Powell to English text on lack of women's education in Sudan. Sudanese music from 0445. Fair to good // 15320 poor to fair. (D'Angelo, PA)

0917 UTC on 4845
BOLIVIA: Radio Municipal. Spanish/Aymara/Quecha. *Hora de Salvacion* religious program to identification to PSA. Bolivian's- **Radio Centenario** 4869, 0950; **Radio San Gabriel** 6078.5, 0930. **Radio Juan XXIII** 6054.34, 2153-2205; **Radio Fides** 4755, 2145-2150 (Slaen, ARG)

1100 UTC on 4835
AUSTRALIA: ABC Alice Springs. ID to *Hit Parade* program. ABC/107.3 FM identifications. (Garcia, MD) **Radio Australia** 9580, 1145. (Fraser, ME) 11880, 2009-2017. (Frodge, MI)

1102 UTC on 6600
CLANDESTINE-KOREA REP.: Voice of the People. Lady announcer's Korean text to 1111. Music ballads to male's text. Fair copy //3912 buried under USB chatter. (Barbour, NH)

1111 UTC on 3905
PAPUA NEW GUINEA: Radio New Ireland. Pidgin/English. Announcer's talk to local pops and ballads. Tentative ID at 1128 followed by Bryan Adams tune *I Need Somebody*. Fair at tune-in to fading under static by tune-out. (Barbour, NH)

1300 UTC on 12005
ECUADOR: HCJB. *Unshackled* program. (Fraser, ME) Ecuador's **Radio El Buen Pastor** 4815, 0955-1033. (David Turnick, Sinking Springs, PA/NASWA) 9745, 0130. (Garcia, MD)

1430 UTC on 17515
FRANCE: Radio France Int'l. Program on Baroque music. 11615 at 1600 // 15605, 17605. (Fraser, ME) 4890, 0400. (Garcia, MD)

1611 UTC on 15475
GABON: Africa # 1. French. News report with remotes to station ID. SIO 333. 9580 at 1949-2001. 15475 not detected at 1823 the next day. (Frodge, MI)

1740 UTC on 15190
PHILIPPINES: Radyo Pilipinas. Tentative. Pacific news items in Tagalo and recognizable items in English and Spanish. Sports at 1750 and chit-chat segment at 1755. No break for ID at 1800. (Frodge, MI)

1945 UTC on 11865
PORTUGAL: Deutsche Welle relay. Feature on German and Austrian music. Abruptly off at 1957. 2000 Arabic service sign-on. (Frodge, MI; McGuire, MD)

2000 UTC on 11750
IRAN: VOIRI. News and commentaries on Iraq. Station ID at 2013. (Fraser, ME) 6110, 2025-2040. (Banks, TX)

2015 UTC on 11600
CZECH REP.: Radio Prague. Report on the new Central European Center for Women Researchers. (Fraser, ME)

2020 UTC on 15290
SPAIN: REE. *Sports News* shaw on the King's Cup soccer match. (Fraser, ME) 21610 Spanish at 1606. (Mirabal, PR) 9630, 2230; 6125, 2300. (Garcia, MD)

2035 UTC on 7285
CHINA: China Radio Int'l. *Life in China* program on green consumption. CRI promo at 2038. (Frodge, MI)

2050 UTC on 7345
SLOVAKIA: Slovak Radio. French. Interval signal to "Slovak Radio" identification and Brataslava address. (Frodge, MI)

2055 UTC on 4976
UGANDA: Radio. Afro pops at tune to vernaculars text to English identification. Sign-off routine including national anthem to 2102*. (Van Horn, NC)

2133 UTC on 6070
CANADA: CFRX. "CFRB News" and "News-Talk 1010 traffic and weather together" promos. Two more for Sky-Watch and "CFRB Market Update." Montreal headlines including the headline, "Booze Keeps Fruitcake Moist." SIO 4+44 // 1010 AM fair. (Frodge, MI)

2200 UTC on 9480
GERMANY: Radio Cimarrona via Julich. Spanish. Transmission for Uruguay and region. Interval signal and many IDs plus frequency. SINPO 43443. (Slaen, ARG) Station ID 9480, 2200-2300. (Garcia, MD)

2220 UTC on 4746.42
PERU: Radio Huanta 2000. Spanish from announcer to local ad, "Agrosemillas...en la ciudad de huanta." Identification "en Radio Huanta 2000" with 24432 SINPO. Peru's **Radio Tacna** 9504.84, 2220-2248 Spanish interview; **Radio Altura** 5014.62, 2230-2235. (Slaen, ARG) **Radio Victoria** 6020.25, 2337-0010. (Frodge, MI)

2300 UTC on 11760
VENEZUELA: Radio Nacional. Spanish. Station interval signal to clear station identification. National and regional news. (McGuire, MD)

Thanks to our contributors — Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gaylevanhor
n@monitoringtimes.com)
English broadcast unless otherwise noted.

What is it about France?
(and other sundry tales)

Recent geopolitical events have brought to the fore a recognition to all but the truly dense that the governments of France and the United States do not always see eye to eye. Disagreements among nations, even between those that are relatively friendly with one another, are not unusual. But this particular "friendly" dispute seems to be nastier than most at times and replete with unhelpful and sometimes childish insults that only seem to magnify inaccurate stereotypes at both ends. If you listen to the talk around the water cooler, it also seems to have drawn in more of the "everyday people" than is usually the case with these things.

My first reaction is that much of this is due – more than anything else – to a lack of understanding on both sides. Those unfamiliar with and prone to be suspicious of "the other" will more readily accept and adhere to broad, usually negative generalizations that owe more to preconceived biases than verifiable facts.

How does one address such a dearth of real information? The answer will not appear strange to readers of this magazine – more and better communication; and preferably, more opportunities for dialogue.

❖ Where has RFI been?

Which brings us to the subject of international broadcasting. ("Ah", I can hear you saying. "I was wondering when he was going to get to the point!") When things started getting particularly ugly, I composed what I thought was a fairly cogent message to the management of the English Service at **Radio France Internationale (RFI)** suggesting that now might be a good time to re-inaugurate a daily program targeting North American (especially U.S.) listeners. I even allowed the observation that a shortwave service might be too expensive; so I suggested the use of the **World Radio Network** (and, through it, **Sirius Satellite Radio**) as a cost-effective means of doing so.

This fit of pure genius (at least from *my* perspective) was met with silence, as were follow-up messages in subsequent months. (To be fair, **RFI**'s well known host of *Club 9516*, David Page, who I copied on one such message, said he thought that this was an excellent and timely idea and was "passing it up the line." But that was the end of it.)

France's broadcast approach toward communicating directly with North Americans can be described as, at best, indifferent. For many years, **RFI** didn't even have much of an English Service; and, when it did, it seemed to intentionally not target North America (or even the UK, for that matter). It did have a French service beamed this way for a while, but that is hardly helpful when the target population is not correspondingly fluent.

A worthy, though very short-term effort involved a half-hour daily bilingual (French/English) program. This was an innovative approach that seemed to marry the long-held French concern about preservation of the national language with the desire to communicate effectively with an important audience. It was well received by listeners, too. Unfortunately, it was short-lived and was never tried again.

Language policy does appear to have been a significant barrier historically. French is a beautiful language that remains in wide use in many areas of the globe. Unfortunately, other than in Quebec and some pockets of Canada, it is not commonly spoken in North America. Promoting the national language appears to have too often trumped the effort at getting the country's message out.

Today, the lack of a robust service to North America may have to do more with expense, technology and service priorities than pursuing the French language's rivalry with English. **RFI** now broadcasts in English for five and a half hours a day on weekdays and three hours on weekends – the most in its long history. But, unfortunately, it remains one of the hardest services to hear reliably on shortwave in North America. (Even its service in French only targets our region on shortwave for about an hour a day and is available via local AM or FM in only a relative handful of cities.) To my mind, it shouldn't be that way; and the fact that it is, gives France a much lower profile in our part of the world than it deserves.

To be fair, *the VOA does not broadcast to France either!* Both countries seem satisfied to allow commercial broadcast interests to have the last (and only) word.

All that said, it is worth your effort to dig out **RFI** on your radio. Here is the broadcast schedule and targets for the English Service (times UTC):

0400-0430	M-F to Africa on 9805, 9555 or 11995
0500-0530	M-F to Africa on **11850**, 11995 or 15155
0600-0630	M-F to Africa on **9595**, 15155, 17800
0700-0730	M-F to Africa on 11700, 11725 or 15605
1200-1230	D to Asia & Africa on **15275**, 21620
1400-1500	D to Asia on 7180 or 9580, 17620
1600-1700	D to Asia on 9730, 15160, 17850
1600-1730	D to Africa on 11615, **15605**

(The frequencies set in bold are the best observed for reception in North America. While these transmissions concentrate mostly on reporting the news in the targeted regions, they do offer some perspective on France's approach toward international issues as well as some limited background on day to day life in France.)

Like many other broadcasters of late, **RFI** is encouraging more technologically advanced countries to access its programs via streaming audio and audio on demand on the internet. (Go to *http://www.rfi.fr*) Judging from international usage patterns, the internet is still seen by most listeners as an adjunct medium that supports the efforts of radio stations which are still generally accessed with radios. The internet does not yet function as the kind of primary medium that an increasing number of international broadcasters seem determined to make it.

Whether audiences will follow the stations' lead in this regard is still an open question, but the early returns are not at all convincing (at least to me). Too much needs to be done technologically to make the internet as ubiquitous, inexpensive and easy to use as a plain ordinary old radio.

❖ The End of "BBC On Air"

It is one of those aforementioned "adjunct" uses for the internet that has, at least in part, caused an end to over almost six decades of history. Over that period, the **BBC World Service** has continuously published a monthly, printed guide to its programs and frequencies. In December the latest incarnation of that practice, *BBC On-Air*, was discontinued in favor of e-mail distribution and internet availability of schedule information and program background.

In the future, the **BBC** will send a biannual printed guide to program schedules and key frequencies on request. You can write to P.O Box 76, London WC2B 4PH, UK. Or you can access the same information and much more by going to *http://www.bbcworldservice.com*

Finally, you can subscribe to a monthly e-mail newsletter offering information and numerous direct links to more by visiting *http://www.bbconair.com* and registering your e-mail address and details.

❖ The SWL Winterfest

Face-to-face discussions on vexing issues like these, as well as an opportunity to rub elbows with some 200 other radio enthusiasts, some of your favorite *MT* writers, and a few broadcasters, too, is afforded by the **18th annual SWL Winterfest**, sponsored by NASWA and being held **March 11-12** at The Inn at Towamencin in Kulpsville, Pennsylvania – less than an hour's drive north of Philadelphia. All of the details – including the program (check out *The Listening Lounge*), a registration form, pricing and hotel information – can be had by going to *http://www.swlfest.com*

Yes, we too have succumbed to the internet. But if that proves inaccessible for you, send an SASE to SWL Winterfest, P.O. Box 4153, Clifton Park, NY 12065 and request a registration form. The deadline for pre-registration is March 1; but you can register on-site at a slightly increased latecomer price. We hope to see you in Kulpsville.

Until March, good listening!

THE LIST:

February can be a tough month. The long football season has ended and, for much of the country, the pervasive chill of winter persists now well beyond its welcome. Consequently, many are experiencing an antsy mix of cabin fever and NFL withdrawal symptoms. So this month, *The List* is dedicated to those looking for something to do on...

Sundays Without Football

To assist those experiencing major withdrawal, we highlight the period of time from the usual pregame shows to the end of the afternoon's second game. (Those needing a bit of the "hair of the dog," see the BBC(me) listing at 1706. It includes second half play-by-play commentary of the second half of an English Premier League match.)

The station names should be self-explanatory for the most part; VOA(af) = VOA Africa, BBC(eaf) = BBC East Africa stream, BBC(waf) = BBC West Africa stream, BBC(me) = BBC Mideast stream, BBC(am) = BBC Americas stream.

Check the frequency pages elsewhere in this magazine for where to tune. Since many of these programs are not specifically targeted to North America, an enhanced antenna suitable for your receiver will help with reception. Nothing fancy is necessary, mind you – often just 20 or 30 feet of thin, insulated wire tossed outside into a nearby tree will do wonders.

1700	BBC(eaf)(me)	News
	ChAfrica	News
	RAustralia	News
	RJapan	News
	VOA(af)	Africa News Now
1705	RAustralia	Sound Quality (innovative music)
1706	BBC(eaf)	Focus on Africa
	BBC(me)	Sunday Sportsworld
1710	RJapan	Pop Joins the World
1715	ChAf	Africa This Week
1717	VOA(af)	Point of View (issue analysis)
1720	BBC(eaf)	British News
1730	VOA(af)	Music Time in Africa
1732	BBC(eaf)	Instant Guide (background-er)
1745	AllIndiaR	Devotional Music
	BBC(eaf)	Sports Roundup
1800	AllIndiaR	News & Commentary
	BBC(eaf)(me)	News
	RAustralia	News
	VOA(af)	Africa News Now
1805	RAustralia	Pacific Beat (regional magazine)
1806	BBC(eaf)(me)	From Our Own Correspondent
1815	AllIndiaR	Hindustani Classical Vocal Music
1830	AllIndiaR	Sports Round-up (1st); Feature (2nd); Film Story (3rd); Discussion (4th)
	VOA(af)	Encounter (experts debate)
1832	BBC(eaf)(me)	Global Business (trends)
1900	AllIndiaR	News & Press Review
	BBC(eaf)	News
	BBC(waf)	World Briefing
	DW	News
	RAustralia	News
	RNetherlands	Documentary
	VOA(af)	Africa News Now
1905	DW	Hard to Beat (sports stories)
	WHRI	The Pat Boone Show
1906	BBC(eaf)	Top of the Pops
1910	AllIndiaR	Women's World
	RAustralia	Pacific Beat (regional magazine)
1915	DW	Inspired Minds
1920	AllIndiaR	Film Songs
	BBC(waf)	Sports Roundup
1930	DW	Hits in Germany
	RNetherlands	News
	VOA(af)	Music Time in Africa
1932	BBC(waf)	The Interview
1935	RNetherlands	Wide Angle (news analysis)
1952	RNetherlands	The Week Ahead (on RN)
2000	BBC(eaf)(waf)	Newshour
	DW	News
	RAustralia	News
	RCanadaInt	News
	RNetherlands	Vox Humana (culture, broadly)
	VOA(af)	Nightline Africa (news magazine)
2005	DW	Mailbag
	RCanadaInt	Tapestry (spiritual matters)
2010	RAustralia	Pacific Beat (regional magazine)
2030	RNetherlands	News
2035	RNetherlands	Wide Angle (news analysis)
2045	AllIndiaR	Press Review
2050	AllIndiaR	Instrumental Music
2052	RNetherlands	The Week Ahead (on RN)
2100	AllIndiaR	News & Commentary
	BBC(am)	Newshour
	BBC(waf)	News Summary
	DW	News
	RAustralia	News
	RCanadaInt	News
	RJapan	News
	VOA(af)	Jazz America
	WBCQ	Radio Weather (on 9330) Radio Free New York (on 7415)
2101	BBC(waf)	Play of the Week
2105	DW	Hard to Beat (sports stories)
2110	RCanadaInt	Cross Country Checkup (national call-in)
	RAustralia	AM (morning news magazine)
	RJapan	Pop Joins the World
2111	AllIndiaR	Regional Film Songs
2115	DW	Inspired Minds
2120	AllIndiaR	Sports Round-up (1st); Feature (2nd); Film Story (3rd); Discussion (4th)
2130	DW	Hits in Germany
	RAustralia	Pacific Dateline (RNZI news magazine)
	RRomaniaInt	Radio Newsreel
	WBCQ	Northern Lights (on 9330)
	WHRI	DXing with Cumbre
2140	RRomaniaInt	Sunday Studio
2150	AllIndiaR	Karnatak Vocal Music
2200	AllIndiaR	News & Commentary
	BBC(am)(waf)	News
	RAustralia	News
	RCanadaInt	The World This Weekend
	RVi Belgium	Radio World
	WBCQ	Radio Legion (on 7415)
2206	BBC(am)	Everywoman (magazine)
	BBC(waf)	Documentary
2208	RVi Belgium	Tourism in Flanders
2210	RAustralia	AM (morning news magazine)
2214	RVi Belgium	Brussels 1043 (listener letters)
2215	AllIndiaR	Women's World
2225	AllIndiaR	Film Tune
2229	BBC(am)	Westway (two episodes)
2230	RCanadaInt	Maple Leaf Mailbag
	WBCQ	Science Rocks (on 9330)
2232	BBC(waf)	Light Entertainment (game, quiz, comedy)
2240	RAustralia	Talking Point (topical interview)
2254	RAustralia	Perspective (informed commentary)
2300	BBC(am)	The World Today
	ChinaRInt	News & Reports
	RAustralia	News
	RNewZealand	Midday Report
	RRomaniaInt	News
	VofTurkey	News & Press Review
2305	RAustralia	Asia Pacific (regional magazine)
2310	RRomaniaInt	Sunday Studio
2315	VofTurkey	Tunes Spanning Centuries
2330	ChinaRInt	People in the Know
	RPrague	News
2332	RAustralia	Verbatim (Australian oral histories)
2335	RPrague	Mailbox
	RRomaniaInt	Tourist Itineraries
	VofTurkey	Turkish History Series
2340	RPrague	The ABCs of Czech
	RRomaniaInt	All That Jazz
2345	RPrague	Encore (classical) [ar] Magic Carpet (world music) [ar] Czech Books
2350	RRomaniaInt	Cookery Show

Postal Alternatives

Once in a while, you're likely to see references to sending a reception report via registered mail. Letters to most countries can be sent using this route, which normally requires that the addressee or his agent sign for the letter prior to accepting delivery.

This alternative, though a bit pricey, is often valuable in calling attention to your letter. In some countries, a registered letter is often signed by someone at the local postal authority, not necessarily presented to the addressee for signature.

Registered letters should be sealed securely; however, do not seal with adhesive tape along the length of the flap. Space is needed here for the postal clerk to place rubber stamp imprints along this length. Currently it costs $7.50 (USA) plus postage to send a registered letter to most overseas countries.

For an additional $1.75, you can request a return receipt for your registered letter. The receipt is returned to you by the delivering post office, signed by the addressee or his agent, and ensures that your letter arrived. One advantage of a return receipt is that you can include it, should you require a follow-up report, to remind the station that your letter did indeed arrive!

You bet it's pricey, and I would only use this method if you're determined to verify a particular station, particularly if it is one considered "rare DX." Of course, this may be a last effort to verify some stations, but I do see it used successfully quite often. Using these postal alternatives might be your solution.

AMATEUR RADIO

Italy-Planosa Island (EU-28) 20 meters SSB. Full data picture QSL card. Received in three years, three months, six days from I5ZUF via ARRL bureau. (Larry Van Horn, N5FPW, NC)

Pantelleria-African Italy IH9P (IOTA AF-018). 15/20 meters SSB. Full data picture QSL card. Received in 83 days via ARRL bureau. (Van Horn, NC)

Outer Hebrides GM3PPG/P (IOTA 010) 15 meters SSB. Full data picture QSL card. Received in six months via ARRL bureau. (Van Horn, NC)

Wales GW0ARK 20 meters SSB. Full data QSL card. Received in two years, one month, nine days via ARRL bureau. (Van Horn, NC)

ANTARCTICA

LRA-36 Arcangel San Gabriel-Base Esperanza.15476 kHz. Personal form letter with date of acknowledgment signed by Nestor Arguello-Director LRA-36. Broadcasting schedule, telephone and email contact info lra36@infovia.com.ar, plus a *Esperanza Antartida Argentina* postcard with station seals on the reverse. Received in 88 days for one US dollar and an English report. Nice stamps on the envelope commemorating *Base Esperanza 1952-2002*, stamped with a sharp looking Base Esperanza postmark. Very pleased with this one. (Scott Barbour, Intervale, NH)

LRA 36
RADIO NACIONAL
"ARCANGEL SAN GABRIEL"
OTH
QTH 94TI Base ANTARTICA ESPERANZA
TERRITORIO ANTARTICO ARGENTINO
REPUBLICA ARGENTINA
UBICACION GEOGRAFICA
Lat 63° 24' Sur
Long 56° 59' Oeste

ARMENIA

Friendensstimme Mission 15225 kHz. Station broadcast via T-Systems, Wertachtal, Germany. Station logged via a Russian transmission. Full data QSL card signed by N. Berg. Received in one month. Station address: P.O. Box 100638, D-51606 Gummersbach, Germany. (Arnaldo Slaen, Buenos Aires, Argentina)

BONAIRE

AWR 6165 kHz. Full data Noah's Ark card unsigned. Transmitter site noted, plus stickers and calendar. Received in 93 days for an English report and one IRC. Station address 12501 Old Columbia Pike, Silver Spring, MD 20904. **http://www.awr.org** (Tom Banks, Dallas, TX; Brian Bagwell, St. Louis, MO)

BRAZIL

Radio Guiaba, 6000 kHz. No data computer graphics card unsigned. Station logo sticker and bumper sticker enclosed. Received in 87 days for a Portuguese/English report, one US dollar and a SASE (not used for reply). Station address: Rua Caldas Junior 219, 90019-900 Porto Alegre RS, Brazil. Website http://www.radioguaiba.com.br (Frank Hillton, Charleston, SC)

ETHIOPIA

Radio Fana, 6210 kHz. Full data green card signed by General Manager. Received in 63 days for an English report, two US dollars, and SAE. Station address: P.O. Box 30702, Addis Ababa, Ethiopia. (Thomas M. Gibson, Spokane, WA)

FRENCH GUIANA

Swiss Radio Int'l relay, 15220 kHz. Full data scenery card unsigned. Goodie package of station souvenirs, a nice touch since they've closed their shortwave service. Received in 62 days for an English report from 2004, plus one IRC. Station address: Giacomettistrasse 1, CH-3000 Bern 15, Switzerland. (Duane Hadley, Bristol, TN)

MEDIUM WAVE

DYHP Philippines, 612 kHz AM. Verification letter signed by Cynthia L. Barte-Acting Station Manager. Received in 50 days for an AM report. Station address: Gold Palace Bldg., 2nd Floor, Osmena Blvd., Cebua City. Philippine QSL # 22. (Patrick Martin, Seaside, OR)

KKDD, 1290 kHz AM. QSL card with "it was us" notation on the back by Mike Escarcega-Operations Manager-Clear Channel, plus T-shirt, business card and other station goodies. Received in 14 days for an AM follow-up report. Station address: 2001 Iowa Ave., #200, Riverside, CA 92507. (Martin, OR)

KSLD, 1140 kHz AM. Verification letter signed by Mary McCubbins-Secretary, plus two stickers. Received in 12 days for an AM report. Station address: 40960 K-Beach Rd., Kenai, AK 99611. Alaska QSL # 55. (Martin, OR)

KVNS, 1700 kHz AM. Verification letter signed by John Munoz-Asst. Engineer. Received in 20 days for an AM report. Station address: 901 E. Pike Blvd., Weslaco, TX 78596. (Martin, OR)

WWAA, 1690 kHz AM. Friendly full data letter signed by Gil Moor-Bromo Communications. Received in five days for a taped report. Station address: P.O. Box 191747, Atlanta, GA 3117-1747. (Martin, OR)

RUSSIA

Radio Rossii. Full data red, white and blue logo card unsigned, plus RS logo sticker. Received in 93 days for one US dollar and an English report. Station address: GRK Radio Rossii, Yamskogo Polya 5-YA ul., 125040 Moscow, Russia. (Barbour, NH)

SOUTH AFRICA

Radio France International relay, 15160 kHz. Full data card signed by Kathy Otto. Received in 29 days for an English report and one IRC. Station address: Boite Postal 9516, F-75016 Paris Cedex 16, France (or) 116 Avenue du president Kennedy F-75016 Paris, France. (Sam Wright, Biloxi, MS; Banks, TX)

VIETNAM

Voice of. 5925 kHz. Full data logo card, without notation of transmitter site. Wheel watering-Cao Bang picture postcard enclose and broadcast schedule. Received in 139 days for one IRC and an English report. (Barbour, NH)

HOW TO USE THE SHORTWAVE GUIDE

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

Convert your time to UTC.

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

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

Find the station you want to hear.

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

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

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

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

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

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

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

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

Target Areas
af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager
gaylevanhorn@monitoringtimes.com

Daniel Sampson
danielsampson@monitoringtimes.com

Shortwave Broadcast Bands

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

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

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

Start	End	Code	Station	Freq	Freq	Freq	Freq
0000	0007	vl	Sierra Leone, SLBS	3316do			
0000	0015	vl	Cambodia, National Radio	11940as			
0000	0015	vl	Croatia, Croatian Radio	7285so			
0000	0015		Japan, Radio	13650as	17810as		
0000	0030		Egypt, Radio Cairo	7115na	11725na		
0000	0030		Thailand, Radio	9680va	13695va		
0000	0030		UK, BBC World Service	3915as	5970as		
			9410me	9740os	11945as	11955as	
			15280as	15310as	15360as	17615as	
			17790as				
0000	0030		USA, Voice of America	7215va	9890vo		
			11760va	11995va	15185vo	15290va	
			17740va				
0000	0045		India, All India Radio	9705as	9950as	11620as	
			11645as	13605as			
0000	0057		Canada, Radio Canada Intl	9880as			
0000	0059		Germany, Deutsche Welle	6030as	7290as		
0000	0059		Spain, Radio Exterior Espana	6055na			
0000	0100		Anguilla, Caribbean Beacon	6090am			
0000	0100		Australia, ABC NT Alice Springs	2310rr	4835do		
0000	0100		Australia, ABC NT Katherine	5025do			
0000	0100		Australia, ABC NT Tennant Creek	4910do			
0000	0100		Australia, HCJB	15525as			
0000	0100		Australia, Radio	9660as	12080as	13630pa	
			15240pa	17715as	17750pa	17775pa	
			17795as				
0000	0100		Bulgaria, Radio	7400na	9700na		
0000	0100		Canada, CBC Northern Service	9625do			
0000	0100		Canada, CFRX Toronto ON	6070do			
0000	0100		Canada, CFVP Calgary AB	6030do			
0000	0100		Canada, CKZN St John's NF	6160do			
0000	0100		Canada, CKZU Vancouver BC	6160do			
0000	0100		China, China Radio Intl	6020al	6075as		
			7180as 7345eu	11770as			
0000	0100		Costa Rica, University Network	5030va	6150va		
			7375va 9725va				
0000	0100		Guyana, Voice of	3290do			
0000	0100		Japan, Radio	6145na			
0000	0100		Malaysia, RTM	7295as			
0000	0100		Namibia, Namibian BC Corp	3270af	3290af		
			6060af				
0000	0100		Netherlands, Radio	9845na			
0000	0100		New Zealand, Radio NZ Intl	17675pa			
0000	0100		Sierra Leone, Radio UNAMSIL	6137af			
0000	0100		Singapore, Mediocorp Radio	6150do			
0000	0100	vl	Solomon Islands, SIBC	5020do	9545do		
0000	0100	DRM	UK, BBC World Service	6010na			
0000	0100		UK, BBC World Service	5975ca	6010na		
			12095ca				
0000	0100		USA, AFRTS	4319usb	5446usb	5765usb	
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
0000	0100		USA, KAIJ Dallas TX	5755na			
0000	0100		USA, KTBN Salt Lake City UT	7505na			
0000	0100		USA, KWHR Naalehu HI	17510as			
0000	0100		USA, WBCQ Kennebunk ME	5105na	7415na		
			9330na				
0000	0100		USA, WBOH Newport NC	5920am			
0000	0100		USA, WEWN Birmingham AL	5825va	7425va		
			11530va				
0000	0100		USA, WHRA Greenbush ME	7580na			
0000	0100		USA, WHRI Noblesville IN	7315na	7535am		
0000	0100		USA, WINB Red Lion PA	9320am			
0000	0100		USA, WJIE Louisville KY	13595am			
0000	0100		USA, WRMI Miami FL 6870am	9955am			
0000	0100		USA, WRMI Miami FL 6870am	9955am			
0000	0100		USA, WTJC Newport NC	9370na			
0000	0100		USA, WWCR Nashville TN	3210na	5070na		
			5935na 7465na				
0000	0100		USA, WWRB Manchester TN	5050na	5085na		
			5745na 6890na				
0000	0100		USA, WYFR Okeechobee FL	6065na	9505na		
			11720sa				
0000	0100		Zambia, Radio Christian Voice	4965af			
0005	0030	sm	Austria, Radio Austria Intl	7325sa			
0015	0030	twhfa	Austria, Radio Austria Intl	7325sa			
0030	0100		Australia, Radio	9660as	12080as	13630pa	
			15240pa	15415pa	17715as	17750pa	
			17775as	17795as			
0030	0100	sm	Austria, Radio Austria Intl	7325am			
0030	0100	mtwhf	Germany, Bible Voice Broadcasting	7105as			
0030	0100	s	Germany, Pan American 8C	5945va			
0030	0100		Lithuania, Radio Vilnius	9875na			
0030	0100		Lithuania, Radio Vilnius	9875na			
0030	0100		Sri Lanka, SLBC	6005as	11905as	15745as	
0030	0100		Thailand, Radio	5890na	13595na		
0030	0100		UK, BBC World Service	5970as	6195os		
			9740as 11955as	15280as	15310as	15360as	
			17615as	17790os			
0030	0100		USA, Voice of America	7215va	9890va		
			15185va	15290va	17740va		

0045 UTC (continued)

Start	End	Code	Station	Freq	Freq
0045	0100	twhfa	Austria, Radio Austria Intl	7325am	
0045	0100		Pakistan, Radio	9340as	11565as
0055	0100		Italy, RAI	11800na	

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

Start	End	Code	Station	Freq	Freq	Freq	Freq
0100	0115		Italy, RAI Intl	11800na			
0100	0115		Pakistan, Radio	9340as	11565as		
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na		
0100	0128		Vietnam, Voice of	6175am			
0100	0130		Australia, Radio	9660as	12080as	13630pa	
			15240pa	15415pa	17715as	17750pa	
			17775as	17795as			
0100	0130	s	Germany, Universol Life	7145as			
0100	0130	twhfas	Serbia & Montenegro, Intl Radio	7115va			
0100	0130		Slovakia, Slovak Radio	7230am	9440am		
0100	0130		Uzbekistan, Radio Tashkent	5975as	6165as		
			7160as				
0100	0156		Romania, Radio Romania Intl	6140na	9510na		
			9615na 11740na				
0100	0157		China, China Radio Intl	6005na	9580na		
0100	0157	DRM	Netherlands, Radio	15525na			
0100	0157		Netherlands, Radio	9845na			
0100	0200		Anguilla, Caribbean Beacon	6090am			
0100	0200		Australia, ABC NT Katherine	5025do			
0100	0200		Australia, ABC NT Tennant Creek	4910do			
0100	0200		Australia, HCJB	15560as			
0100	0200		Canada, CBC Northern Service	9625do			
0100	0200		Canada, CFRX Toronto ON	6070do			
0100	0200		Canada, CFVP Calgary AB	6030do			
0100	0200		Canada, CKZN St John's NF	6160do			
0100	0200		Canada, CKZU Vancouver BC	6160do			
0100	0200		Canada, Radio Canada Intl	6190am	9755am		
			9810am				
0100	0200		Costa Rica, University Network	5030va	6150va		
			7375va 9725va				
0100	0200		Cuba, Radio Havona	6000na	9820na		
0100	0200		Guyana, Voice of	3290do			
0100	0200		Indonesia, Voice of	9525as	11785pa	15150al	
0100	0200		Japan, Radio	6030va	15325as	17560va	
			17685pa	17825na	17835sa	17685pa	
			17810as	17845as			
0100	0200		Malaysia, RTM	7295as			
0100	0200		Namibia, Namibian BC Corp	3270af	3290af		
			6060af				
0100	0200		New Zealand, Radio NZ Intl	17675pa			
0100	0200		North Korea, Voice of	3560as	7140as		
			9345am	9730as	11735am	13760as	
			15180as				
0100	0200		Sierra Leone, Radio UNAMSIL	6137af			
0100	0200		Singapore, Mediocorp Radio	6150do			
0100	0200	vl	Solomon Islands, SIBC	5020do	9545do		
0100	0200		Sri Lanka, SLBC	6005as	11905as	15745as	
0100	0200		UK, BBC World Service	5975ca	6195os		
			9825ca 11955ca	12095as	15310as	15360as	
			17790as				
0100	0200		Ukraine, Radio Ukraine Intl	7440na			
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb	
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
0100	0200		USA, KAIJ Dallas TX	5755na			
0100	0200		USA, KTBN Salt Lake City UT	7505na			
0100	0200		USA, KWHR Naalehu HI	17510as			
0100	0200		USA, Voice of America	7200va	11705va		
			11820va	17740va			
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na		
			9330na				
0100	0200		USA, WBOH Newport NC	5920am			
0100	0200		USA, WEWN Birmingham AL	5825va	7425va		
			11530va				
0100	0200		USA, WHRA Greenbush ME	7580na			
0100	0200		USA, WHRI Noblesville IN	5835am	7315am		
			7535am				
0100	0200		USA, WINB Red Lion PA	9320am			
0100	0200		USA, WJIE Louisville KY	13595am			
0100	0200		USA, WRMI Miami FL 6870am	9955am			
0100	0200		USA, WTJC Newport NC	9370na			
0100	0200		USA, WWCR Nashville TN	3210na	5070na		
			5935na 7465na				
0100	0200		USA, WWRB Manchester TN	5050na	5085na		
			5745na 6890na				
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na		
0100	0200		Zambia, Radio Christian Voice	4965af			
0105	0115	vl	Croatia, Croatian Radio	7285va			
0130	0200		Australia, Radio	9660as	12080as	13630pa	
			15240pa	15415pa	17715as	17750pa	
			17795as				
0130	0200		Australia, Voice Intl	17775as			
0130	0200		Iran, Voice of the Islamic Rep	6120na	9580am		
0130	0200		Sweden, Radio	11550va			
0130	0200	twhfa	USA, Voice of America	7405va	9775va		
			13740va				

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

Start	Stop	Days	Station	Freq	Freq	Freq
0200	0227		Czech Rep, Radio Prague Intl	6200na	7345na	
0200	0227		Iran, Voice of the Islamic Rep	6120am	9580am	
0200	0228		Hungary, Radio Budapest	9775na		
0200	0230		Australia, HCJB	15560as		
0200	0230		Austria, AWR Europe	6175me		
0200	0230	mtwfa	Belarus, Radio	5970eu	7210eu	
0200	0230		Serbia & Montenegro, Intl Radio	7130va		
0200	0257		China, China Radio Intl	13640as	11770as	
0200	0259		Canada, Radio Canada Intl	6190am	9755am	
			9810am			
0200	0300		Anguilla, Caribbean Beacon	6090am		
0200	0300	twhfa	Argentina, RAE	11710na		
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835da	
0200	0300		Australia, ABC NT Katherine	5025do		
0200	0300		Australia, ABC NT Tennant Creek	4910do		
0200	0300		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	15515as	17750pa
			21725pa			
0200	0300		Canada, CBC Northern Service	9625do		
0200	0300		Canada, CFRX Toronto ON	6070do		
0200	0300		Canada, CFVP Calgary AB	6030do		
0200	0300		Canada, CKZN St John's NF	6160da		
0200	0300		Canada, CKZU Vancouver BC	6160do		
0200	0300		Costa Rica, University Network	5030va	6150va	
			7375va 9725va			
0200	0300		Cuba, Radio Havana	6000na	9820na	
0200	0300		Egypt, Radio Cairo	7260na		
0200	0300		Guyana, Voice of	3290do		
0200	0300		Malaysia, RTM	7295as		
0200	0300		Myanmar, Radio	7185do		
0200	0300		Namibia, Namibian BC Corp	3270af	3290af	
			6090af			
0200	0300		New Zealand, Radio NZ Intl	17675pa		
0200	0300		North Korea, Voice of	4405as	13650as	
			15100as	11845as	15230as	
0200	0300		Philippines, Radio Pilipinas	12015as	15120pa	
			15270as			
0200	0300		Russia, Voice of	7180na	7350na	15425na
			15475na	15595na	17695as	
0200	0300		Sierra Leone, Radio UNAMSIL	6137af		
0200	0300		Singapore, Mediacorp Radio	6150da		
0200	0300	vl	Solomon Islands, SIBC	5020do	9545da	
0200	0300		South Korea, Radio Korea Intl	9560na	11810na	
			15575na			
0200	0300		Sri Lanka, SLBC	6005as	11905as	15745as
0200	0300		Taiwan, Radio Taiwan Intl	5950na	9630na	
			11875as	15465va		
0200	0300		UK, BBC World Service	5975ca	6195as	
			9525ca 9750af	9825ca	11955as	12095ca
			15310as	15360as	17790as	
0200	0300		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13355usb
0200	0300		USA, KAIJ Dallas TX	5755na		
0200	0300		USA, KJES Vado NM	7555na		
0200	0300		USA, KTBN Salt Lake City UT	7505na		
0200	0300		USA, KWHR Naalehu HI	17510as		
0200	0300	mtwhf	USA, Voice of America	7200va	11705va	
			11820va	17740va		
0200	0300		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0200	0300		USA, WBOH Newport NC	5920am		
0200	0300		USA, WEWN Birmingham AL	5825va	7425va	
			11530va			
0200	0300		USA, WHRA Greenbush ME	7580na		
0200	0300		USA, WHRI Noblesville IN	5835am	7315am	
			7535am			
0200	0300		USA, WINB Red Lion PA	9320am		
0200	0300		USA, WJIE Louisville KY	13595am		
0200	0300		USA, WRMI Miami FL	6870am	9955am	
0200	0300		USA, WTJC Newport NC	9370na		
0200	0300		USA, WWCR Nashville TN	3210na	5070na	
			5935na 7465na			
0200	0300		USA, WWRB Manchester TN	5050na	5085na	
			5745na 6890na			
0200	0300		USA, WYFR Okeechobee FL	5985na	6065na	
			9505na 11855ca			
0200	0300		Zambia, Radio Christian Voice	4965af		
0205	0215	vl	Croatia, Croatian Radio	7285na		
0215	0230		Nepal, Radio	3230as	5005as	6100as
			7165as			
0230	0258		Vietnam, Voice of	6175am		
0230	0300	s	Belarus, Radio	5970eu	7210eu	
0230	0300		Sweden, Radio	6010na		
0245	0300	twhfos	Albania, Radio Tirana	6115eu	7160eu	
0245	0300		UK, BBC World Service	11865af		
0250	0300		Vatican City, Vatican Radio	7305am	9605am	
0250	0300		Zambia, Radio	4910do		

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

Start	Stop	Days	Station	Freq	Freq	Freq
0300	0330	vl	Croatia, Croatian Radio	7285na		
0300	0330		Egypt, Radio Cairo	7260na		
0300	0330		Philippines, Radio Pilipinas	15120as	15270pa	
0300	0330	s	Swaziland, TWR	3200af		
0300	0330		Thailand, Radio	5890na	15460na	
0300	0330	a	UK, Wales Radio Intl	9795va		
0300	0330		USA, KJES Vado NM	7555na		
0300	0330		USA, Voice of America	6035af	6080af	
			7290af 7340af	9885af		
0300	0330		Vatican City, Vatican Radio	7360af		
0300	0355		South Africa, Channel Africa	3345af	7390af	
0300	0357		China, China Radio Intl	7190na	9690na	
			9790na 11770na	15110as		
0300	0359		New Zealand, Radio NZ Intl	17675pa		
0300	0400		Anguilla, Caribbean Beacon	6090am		
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do	
0300	0400		Australia, ABC NT Katherine	5025do		
0300	0400		Australia, ABC NT Tennant Creek	4910da		
0300	0400		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	15515as	17750pa
			21725pa			
0300	0400		Bulgaria, Radio	9400na	9700eu	
0300	0400		Canada, CBC Northern Service	9625do		
0300	0400		Canada, CFRX Toronto ON	6070do		
0300	0400		Canada, CFVP Calgary AB	6030do		
0300	0400		Canada, CKZN St John's NF	6160do		
0300	0400		Canada, CKZU Vancouver BC	6160do		
0300	0400		Costa Rica, University Network	5030va	6150va	
			7375va 9725va			
0300	0400		Cuba, Radio Havana	6000na	9820na	
0300	0400	vl	Guatemala, Radio Cultural	3300sa		
0300	0400		Guyana, Voice of	3290do		
0300	0400		Japan, Radio	21610pa		
0300	0400		Malaysia, RTM	6175as	7295as	9750as
			15295as			
0300	0400		Namibia, Namibian BC Corp	3270af	3290af	
			6090af			
0300	0400		North Korea, Voice of	3560as	7140as	
			9345as 9730as			
0300	0400		Oman, Radio	15355as		
0300	0400		Russia, Voice of	7150na	7180na	7350na
			12010na	15425na	15475na	15595na
			17695as			
0300	0400		Sierra Leone, Radio UNAMSIL	6137af		
0300	0400		Singapore, Mediacorp Radio	6150da		
0300	0400	vl	Solomon Islands, SIBC	5020do	9545do	
0300	0400		Sri Lanka, SLBC	6005as	11905as	15745as
0300	0400		Taiwan, Radio Taiwan Intl	5950va	15125va	
			15320vc			
0300	0400	vl	Uganda, Radio	4976da	5026do	7196do
0300	0400		UK, BBC World Service	3255af	6005af	
			7160af 9605as	9750af	11760va	11765af
			12035af	15280as	15310as	15360as
			15575va	17760as	17790as	21660as
0300	0400	vl/ mtwhf	UK, Sudan Radio Service	9625va		
0300	0400		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13355usb
0300	0400		USA, KAIJ Dallas TX	5755na		
0300	0400		USA, KTBN Salt Lake City UT	7505na		
0300	0400		USA, KWHR Naalehu HI	17510as		
0300	0400		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0300	0400		USA, WBOH Newport NC	5920am		
0300	0400		USA, WEWN Birmingham AL	5825va	7425va	
			11530va			
0300	0400		USA, WHRA Greenbush ME	7580na		
0300	0400		USA, WHRI Noblesville IN	5835am	7315am	
			7535am			
0300	0400		USA, WINB Red Lion PA	9320am		
0300	0400		USA, WJIE Louisville KY	13595am		
0300	0400		USA, WRMI Miami FL	6870am	9955am	
0300	0400		USA, WTJC Newport NC	9370na		
0300	0400		USA, WWCR Nashville TN	3210na	5070na	
			5770na 5935na			
0300	0400		USA, WWRB Manchester TN	5050na	5085na	
			5745na 6890na			
0300	0400		USA, WYFR Okeechobee FL	6065na	9505na	
			9985na 11740na			
0300	0400		Zambia, Radio	4910do		
0300	0400		Zambia, Radio Christian Voice	4965af		
0300	0400	vl	Zimbabwe, ZBC Corp	5975do		
0330	0358		Hungary, Radio Budapest	9775na		
0330	0358		Vietnam, Voice of	6175am		
0330	0400	twhfas	Albania, Radio Tirana	6115eu	7160eu	
0330	0400		Sweden, Radio	6010na		
0330	0400		UAE, Emirates Radio	12005na	13675na	15400na
0330	0400		UK, BBC World Service	3255af	6005af	
			6190af 7160af	9750af	11760af	11765af

Start	End	Notes	Station	Freq	Freq	Freq	Freq
0330	0400			12035af	15420af	15575af	
			USA, Voice of America			6035af	6080af
			7290af 9885af				
0345	0400		Tajikistan, Radio	7245irr			

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

Start	End	Notes	Station	Freq	Freq	Freq	Freq
0400	0427		Czech Rep, Radio Prague Intl	6200na	7345na		
0400	0430		Australia, Radio	9660as	12080as	13630pa	
			15240pa	15515pa	17750pa	21725pa	
0400	0430		France, Radio France Intl	9555af	9805af		
0400	0430		Sri Lanka, SLBC	6005as	11905as	15745as	
0400	0430		USA, Voice of America	4960af	6080af		
			7290af 9575af	9775af	9885af		
0400	0450		Turkey, Voice of	6020va	7240me		
0400	0456		Romania, Radio Romania Intl	6125va	9515va		
			11870va	15250va			
0400	0457		China, China Radio Intl	6190na	9560na		
			9755na				
0400	0457		Netherlands, Radio	6165na	9590na		
0400	0457	DRM	Netherlands, Radio	15400au			
0400	0459		Germany, Deutsche Welle	6180af	9545as		
			9710as				
0400	0500		Anguilla, Caribbean Beacon	6090am			
0400	0500		Australia, ABC NT Alice Springs	2310irr	4835do		
0400	0500		Australia, ABC NT Katherine	5025da			
0400	0500		Australia, ABC NT Tennant Creek	4910da			
0400	0500		Canada, CBC Northern Service	9625do			
0400	0500		Canada, CFRX Toronto ON	6070do			
0400	0500		Canada, CKZN St John's NF	6160do			
0400	0500		Canada, CKZU Voncouver BC	6160do			
0400	0500		Costa Rica, University Network	5030va	6150va		
			7375va 9725va				
0400	0500		Cuba, Radio Havana	6000na	9820no		
0400	0500		Guyana, Voice of	3290do			
0400	0500		Malaysia, RTM	6175as	7295as	9750as	
			15295as				
0400	0500		Namibia, Namibian BC Corp	3270af	3290af		
			6090af				
0400	0500		New Zealand, Radio NZ Intl	15720pa			
0400	0500		Russia, Voice of	7150na	7180no	7350na	
			12010na	15595na	17695as		
0400	0500		Sierra Leone, Radio UNAMSIL	6137af			
0400	0500		Singapore, Mediacorp Radia	6150do			
0400	0500	vl	Solomon Islands, SIBC	5020do	9545do		
0400	0500		South Africa, Channel Africa	3345af			
0400	0500	vl	Uganda, Radio	4976do	5026da	7196da	
0400	0500	DRM	UK, BBC World Service	6010na			
0400	0500		UK, BBC World Service	3255af	5975am		
			6005af 6135am	6190af	7160af	11760of	
			11765of	12035of	15420af	15575af	
0400	0500	vl/ mtwhf	UK, Sudan Radio Service	9625va			
0400	0500		Ukraine, Radio Ukraine Intl	7440na			
0400	0500		USA, AFRTS	4319usb	5446usb	5765usb	
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
0400	0500		USA, KAIJ Dallas TX	5755na			
0400	0500		USA, KTBN Salt Lake City UT	7505na			
0400	0500		USA, KWHR Naalehu HI	17780as			
0400	0500		USA, WBCQ Kennebunk ME	5105na	7415na		
			9330na				
0400	0500		USA, WBOH Newport NC	5920am			
0400	0500		USA, WEWN Birmingham AL	5825va	7425va		
			11530va				
0400	0500		USA, WHRA Greenbush ME	7580no			
0400	0500		USA, WHRI Noblesville IN	5835am	7315am		
			7535am				
0400	0500		USA, WINB Red Lion PA	9320am			
0400	0500		USA, WJIE Louisville KY	13595om			
0400	0500		USA, WMLK Bethel PA	9265eu	9955eu		
0400	0500		USA, WRMI Miami FL	6870am	9955am		
0400	0500		USA, WTJC Newport NC	9370na			
0400	0500		USA, WWCR Nashville TN	3210na	5070na		
			5770na 5935na				
0400	0500		USA, WWRB Manchester TN	5050na	5085na		
			5745na 6890na				
0400	0500		USA, WYFR Okeechobee FL	6065va	6855va		
			7355va 9505va	9715va			
0400	0500		USA, WYFR Okeechobee FL	6855va	7355va		
0400	0500		Zambia, Radio	4910do			
0400	0500		Zambia, Radio Christian Voice	6065af			
0400	0500	vl	Zimbabwe, ZBC Corp	5975do			
0405	0415	vl	Croatia, Croatian Radio	7285na	9480au		
			12105au		12110au		
0430	0445		Uzbekistan, Radio Tashkent	5025eu	7185eu		
			11905eu				
0430	0457		Czech Rep, Radio Prague Intl	9865as	11600va		
0430	0500		Australia, Radio	9660as	12080as	13630pa	
			15240pa	15415pa	15515va	17750pa	
			21725pa				
0430	0500		Nigeria, Radio/Ibadan	6050do			
0430	0500		Nigeria, Radio/Kaduna	4770do	6090do		
0430	0500		Nigeria, Radio/Lagos	3326do	4990da		
0430	0500	mtwhf	Swaziland, TWR	4775af	6120af		
0430	0500		USA, Voice of America			4960af	6080af
			7290af 9575af	9775af			
0445	0500		Italy, RAI Intl	5965af	6000af	7230af	

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

Start	End	Notes	Station	Freq	Freq	Freq
0500	0530		Australia, Radio	9660as	12080as	13630pa
			15160pa	15240pa	15515va	17750pa
0500	0530		Belgium, Radio Vlaanderen Intl	9590na		
0500	0530		France, Radia France Intl	11850af	11995af	
0500	0530		UK, BBC World Service	9605as	11955as	
			15280as	15310as	15360as	15575as
			17760as	17790as	21660as	
0500	0530		Vatican City, Vatican Radio	7360af	9660af	
			11625af			
0500	0555		South Africa, Channel Africa	7240af	11875af	
0500	0557		China, China Radio Intl	6190as	9560na	
			11770as	11770as	11880as	15350as
			15465as	17505al	17540as	
0500	0559		Germany, Deutsche Welle	7285af	9565af	
			12035af	15410af		
0500	0600		Anguilla, Caribbean Beacon	6090am		
0500	0600		Australia, ABC NT Alice Springs	2310irr	4835da	
0500	0600		Australia, ABC NT Katherine	5025do		
0500	0600		Australia, ABC NT Tennant Creek	4910do		
0500	0600		Canada, CBC Northern Service	9625do		
0500	0600		Canada, CFRX Toronto ON	6070do		
0500	0600		Canada, CKZN St John's NF	6160do		
0500	0600		Canada, CKZU Vancouver BC	6160do		
0500	0600		Costa Rica, University Network	5030va	6150va	
			7375va 9725va			
0500	0600		Cuba, Radio Havana	6000na	6060na	9550na
			11760am			
0500	0600	vl	Greece, Voice of	5865eu	7475eu	9420eu
0500	0600		Guyana, Voice of	3290do		
0500	0600		Japan, Radio	5975eu	6110na	7230eu
			15195as	17810as	21755pa	
0500	0600		Malaysia, RTM	6175as	7295as	9750as
			15295as			
0500	0600		Namibia, Namibian BC Corp	6060af	6175al	
0500	0600		New Zealand, Radio NZ Intl	15720po		
0500	0600		Nigeria, Radio/Ibadan	6050do		
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do	
0500	0600		Nigeria, Radio/Lagos	3326do	4990do	
0500	0600		Nigeria, Voice of	15120af		
0500	0600		Sierra Leone, Radio UNAMSIL	6137af		
0500	0600		Singapore, Mediacorp Radio	6150do		
0500	0600	vl	Solomon Islands, SIBC	5020do	9545do	
0500	0600	mtwhf	Swaziland, TWR	6120af		
0500	0600	as	Swaziland, TWR	4775af		
0500	0600		Swaziland, TWR	9500af		
0500	0600	vl	Uganda, Radio	4976do	5026do	7196do
0500	0600		UK, BBC World Service	6135ca	6195eu	
			9410eu 11760me	15565eu		
0500	0600	vl/ mtwhf	UK, Sudan Radio Service	11795va		
0500	0600		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13855usb
0500	0600		USA, KAIJ Dallas TX	5755na		
0500	0600		USA, KTBN Salt Lake City UT	7505na		
0500	0600		USA, KWHR Naalehu HI	11565as	17780as	
0500	0600		USA, Voice of America	6035af	6105af	
			7295af 13710af			
0500	0600		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0500	0600		USA, WBOH Newport NC	5920am		
0500	0600		USA, WEWN Birmingham AL	5825va	7425vo	
			7570vo			
0500	0600		USA, WHRA Greenbush ME	7580na		
0500	0600		USA, WHRI Noblesville IN	5970am	7315om	
0500	0600		USA, WJIE Louisville KY	13595am		
0500	0600		USA, WMLK Bethel PA	9265eu	9955eu	
0500	0600		USA, WRMI Miami FL	6870am	9955am	
0500	0600		USA, WTJC Newport NC	9370na		
0500	0600		USA, WWCR Nashville TN	3210na	5070na	
			5770na 5935na			
0500	0600		USA, WWRB Manchester TN	5050na	5085na	
			6890na			
0500	0600		USA, WYFR Okeechobee FL	6855va	7520na	
0500	0600		Zambia, Radio Christian Voice	6065af		
0500	0600	vl	Zimbabwe, ZBC Corp	5975do		
0505	0515	vl	Croatia, Croatian Radio	7285na	9470au	
			12105au		12110au	
0515	0525		Rwanda, Radio	6005do		
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do	
0530	0545		UK, BBC World Service	6010eu	9815eu	
0530	0600		Australia, Radio	9660as	11750as	12080as
			13630pa	15160va	15240as	15415pa
			15515as	17750as		
0530	0600		Thailand, Radio	13780eu		

Start	Stop	Days	Station				
0530	0600		UAE, Emirates Radio	15435va	17B30va	21700va	
0530	0600	mtwhf	UK, BBC World Service	6005af	6190af		
			7160af 11765af	11940af	15420af	17640af	
			17885af				
0530	0600		UK, BBC World Service	9605as	11955as		
			15310as	15360as	15575as	17760cs	
			17790as	21660as			

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

Start	Stop	Days	Station				
0600	0605	as	South Africa, TWR	11640af			
0600	0620		Vatican City, Vatican Radio	4005eu	5890eu		
			7250eu				
0600	0630		France, Radio France Intl	9595af	15155af		
0600	0630	as	UK, BBC World Service	6005af	6190af		
			11765af	11940af	17640af	17885af	
0600	0630		USA, Voice of America	6035af	6080af		
			6105af 7295af	11835af	13710af		
060C	0630	mtwhf	USA, Voice of America	11995af			
060C	0635	mtwhf	South Africa, TWR	11640af			
060C	0657		China, China Radio Intl	6115na	7385al		
			11770na	11880as	15140as	15350as	
			15465as				
060C	0659		Germany, Deutsche Welle	6140eu	7225af		
			11785af	15410af			
060C	0700		Anguilla, Caribbean Beacon	6090am			
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835do		
0600	0700		Australia, ABC NT Katherine	5025do			
0600	0700		Australia, ABC NT Tennant Creek	4910do			
0600	0700		Australia, Radio 9660as	11880as	12080as		
			13630pa	15160va	15240as	15415pa	
			15515va	17750as			
0600	0700		Canada, CFRX Toronto ON	6070do			
0600	0700		Canada, CFVP Calgary AB	6030do			
0600	0700		Canada, CKZN St John's NF	6160do			
0600	0700		Canada, CKZU Vancouver BC	6160do			
0600	0700		Costa Rica, University Network	5030va	6150va		
			7375va 9725va	11870va			
0600	0700		Cuba, Radio Havana 6000na	6060na	9550na		
			11760am				
0600	0700	DRM	Germany, Deutsche Welle	21675af			
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do		
0600	0700	vl	Greece, Voice of 5865eu	9420eu	15630eu		
0600	0700		Guyana, Voice of 3290do				
0600	0700		Japan, Radio 7235eu	11690as	11740as		
			11760as	15195as	17870pa	21755pa	
0600	0700		Liberia, ELWA 4760do				
0600	0700		Malaysia, RTM 6175as	7295as	9750as		
			15295as				
0600	0700		Namibia, Namibian BC Corp	6060af	6175al		
0600	0700		New Zealand, Radio NZ Intl	15720pa			
0600	0700		Nigeria, Radio/Ibadan	6050do			
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do		
0600	0700		Nigeria, Radio/Lagos 3326do	4990do			
0600	0700		Nigeria, Voice of 15120af				
0600	0700		Russia, Voice of 17665pa	21790pa			
0600	0700		Sierra Leone, Radio UNAMSIL	6137af			
0600	0700		Singapore, Mediacorp Radio	6150do			
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do		
0600	0700		South Africa, Channel Africa	7240af	15220af		
0600	0700	as	Swaziland, TWR 4775af				
0600	0700		Swaziland, TWR 6120af	9500af			
0600	0700		UK, BBC World Service	9605as	11955as		
			15310as	15360as	17760as	17790as	
			21660as				
0600	0700		USA, AFRTS 4319usb	5446usb	5765usb		
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
0600	0700		USA, KAIJ Dallas TX 5755na				
0600	0700		USA, KTBN Salt Lake City UT	7505na			
0600	0700		USA, KWHR Naalehu HI	9930as	11565as		
0600	0700		USA, WBCQ Kennebunk ME	5105na	7415na		
0600	0700		USA, WBOH Newport NC	5920am			
0600	0700		USA, WEWN Birmingham AL	5825va	7425va		
			7570va				
0600	0700		USA, WHRA Greenbush ME	7580na			
0600	0700		USA, WHRI Noblesville IN	7315na	7535am		
0600	0700		USA, WJIE Louisville KY	13595am			
0600	0700		USA, WMLK Bethel PA 9265eu	9955eu			
0600	0700		USA, WRMI Miami FL 6870am	9955am			
0600	0700		USA, WTJC Newport NC	9370do			
0600	0700		USA, WWCR Nashville TN	3210na	5070na		
			5770na 5935na				
0600	0700		USA, WYFR Okeechobee FL	5850eu	7355eu		
			9680eu 11530na	11580va			
0600	0700	vl	Vanuatu, Radio 4960do				
0600	0700		Yemen, Rep of Yemen Radio	9780me			
0600	0700		Zambia, Radio Christian Voice	6065af			
0600	0700	vl	Zimbabwe, ZBC Corp 5975do				
0605	0615	vl	Croatia, Croatian Radio	9480au	12105au		
			12110au				
0605	0630	as	Austria, Radio Austria Intl	17870me			

Start	Stop	Days	Station			
0630	0645	as	UK, BBC World Service	9875eu		
0630	0656		Romania, Radio Romania Intl	9565eu	11710eu	
0630	0700	vl	Georgia, Radio Georgia	11805eu		
0630	0700		UK, BBC World Service	6005af	6190af	
			11765af	11940af	15400af	17640af
			178851af			
0630	0700		USA, Voice of America	6080af	7295af	
			11B35af			
0630	0700		Vatican City, Vatican Radio	9660af	11625af	
			13765af			
0635	0700	as	Austria, Radio Austria Intl	17870me		
0645	0700	mtwhf	Austria, Radio Austria Intl	17870me		

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

Start	Stop	Days	Station				
0700	0715	vl	Croatia, Croatian Radio	9470au	12105au		
			12110au				
0700	0720	as	UK, BBC World Service	6190af	11765af		
			11940af	15400af	17885af		
0700	0730		Slovakia, Slovak Radio	13715au	15460au		
0700	0730	a	Tibet, Xizang PBS 6110as	9490as	9580as		
0700	0759		New Zealand, Radio NZ Intl	15720pa			
0700	0800	s	Albania, TWR 11865eu				
0700	0800		Anguilla, Caribbean Beacon	6090am			
0700	0800		Australia, ABC NT Alice Springs	2310irr	4835do		
0700	0800		Australia, ABC NT Katherine	5025do			
0700	0800		Australia, ABC NT Tennant Creek	4910do			
0700	0800		Australia, HCJB 11750as				
0700	0800		Australia, Radio 9660as	11880as	12080as		
			13630pa	15160va	15240as	15415pa	
			17750pa				
0700	0800		Canada, CFRX Toronto ON	6070do			
0700	0800		Canada, CFVP Calgary AB	6030do			
0700	0800		Canada, CKZN St John's NF	6160do			
0700	0800		Canada, CKZU Vancouver BC	6160do			
0700	0800		China, China Radio Intl	11855as	11880as		
			15350as	15465as	17540as	17490al	
0700	0800		Costa Rica, University Network	5030va	6150va		
			7375va 9725va	11870va			
0700	0800		Eqt Guinea, Radio Africa	15184af			
0700	0800		France, Radio France Intl	11700af	11725af		
0700	0800		Germany, Deutsche Welle	6140eu			
0700	0800	DRM	Germany, Deutsche Welle	21675af			
0700	0800		Germany, Overcomer Ministries	6110eu			
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do		
0700	0800	vl	Greece, Voice of 9420eu	11645eu	15630eu		
0700	0800		Guyana, Voice of 3290do	5950do			
0700	0800		Liberia, ELWA 4760do				
0700	0800		Malaysia, RTM 6175as	7295as	9750as		
			15295as				
0700	0800		Myanmar, Radio 9730do				
0700	0800		Nigeria, Radio/Ibadan	6050do			
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do		
0700	0800		Nigeria, Radio/Lagos 3326do	4990do			
0700	0800		Russia, Voice of 12005pa	12060pc	17665pa		
			21790pa				
0700	0800	DRM	Russia, Voice of 15780na				
0700	0800		Sierra Leone, Radio UNAMSIL	6137af			
0700	0800		Singapore, Mediacorp Radio	6150da			
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do		
0700	0800		South Africa, Channel Africa	11825af			
0700	0800		Swaziland, TWR 6120af				
0700	0800		Swaziland, TWR 9500af				
0700	0800		Taiwan, Radio Taiwan Intl	5950na			
0700	0800		UK, BBC World Service	9605as	11955as		
			15310as	15360as	17760as	17790as	
			21660as				
0700	0800		USA, AFRTS 4319usb	5446usb	5765usb		
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
0700	0800		USA, KAIJ Dallas TX 5755na				
0700	0800		USA, KTBN Salt Lake City UT	7505na			
0700	0800		USA, KWHR Naalehu HI	9930as	11565as		
0700	0800		USA, Voice of America	5995af	11655af		
0700	0800		USA, WBCQ Kennebunk ME	5105na	7415na		
0700	0800		USA, WBOH Newport NC	5920am			
0700	0800		USA, WEWN Birmingham AL	5825va	7425va		
			7570va				
0700	0800		USA, WHRA Greenbush ME	7580na			
0700	0800		USA, WHRI Noblesville IN	7315am	7535am		
0700	0800		USA, WMLK Bethel PA 9265eu	9955eu			
0700	0800		USA, WRMI Miami FL 6870am	9955am			
0700	0800		USA, WTJC Newport NC	9370do			
0700	0800		USA, WWCR Nashville TN	3210na	5070na		
			5770na 5935na				
0700	0800		USA, WYFR Okeechobee FL	6855va	5985va		
			9495va 9715va	9985va			
0700	0800	vl	Vanuatu, Radio 4960do				
0700	0800		Zambia, Radio Christian Voice	9865af			
0700	0800		USA, WJIE Louisville KY	13595am			
0720	0800	as	UK, BBC World Service	6190af	11765me		
			11940af	15400af	17885af		
0730	0800		Bulgaria, Radio 11600eu	13600eu			

0730	0800		Georgia, Radio Georgia	11910eu	
0730	0800	s	Germany, Bible Voice Broadcasting	5945eu	
0730	0800	as	Guam, TWR/KTWR	15255as	
0740	0800	mtwhf	Guam, TWR/KTWR	15225as	
0745	0800	s	Albania, TWR	11865eu	
0745	0800	s	Monaco, TWR	9870eu	

0830	0900		Australia, ABC NT Katherine	2485do	
0830	0900		Australia, ABC NT Tennant Creek	2325do	
0830	0900		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	15415pa
			17750pa			
0830	0900		Geargia, Radio Geargia	11910eu	

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

0800	0827		Czech Rep, Radio Prague Intl	7345eu	9880eu
0800	0830		Australia, ABC NT Katherine	5025do	
0800	0830		Australia, ABC NT Tennant Creek	4910do	
0800	0830		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	17750pa
0800	0830		Belgium, Radio Vlaanderen Intl	5965eu	
0800	0830		Myanmar, Radio	9730do	
0800	0857		China, China Radio Intl	11855al	11880as
			15350as	15465as	17540as	17490al
0800	0900	mtwhfs	Albania, TWR	11865eu	
0800	0900		Anguilla, Caribbean Beacon	6090am	
0800	0900		Australia, ABC NT Alice Springs	2310irr	4835do
0800	0900		Australia, HCJB	11750au	
0800	0900		Canada, CFRX Toronto ON	6070do	
0800	0900		Canada, CFVP Calgary AB	6030do	
0800	0900		Canada, CKZN St John's NF	6160do	
0800	0900		Canada, CKZU Vancouver BC	6160do	
0800	0900		Costa Rica, University Network	5030va	6150va
			7375va 9725va	11870va	
0800	0900		Eqt Guinea, Radio Africa	15184af	
0800	0900	as	Germany, Bible Voice Broadcasting	5945eu	
0800	0900		Germany, Deutsche Welle	6140eu	
0800	0900	DRM	Germany, Deutsche Welle	21675af	
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915da
0800	0900	vl	Greece, Voice of	9420eu	11645eu	15630eu
0800	0900		Guam, TWR/KTWR	15225as	
0800	0900		Guyana, Voice of	3290do	5950da
0800	0900		Indonesia, Voice of	9525as	11785po	15150al
0800	0900	vl/os	Italy, IRRS 13840eu		
0800	0900		Liberia, ELWA	4760do	
0800	0900		Malaysia, RTM	6175as	7295as	9750as
			15295os			
0800	0900	mtwhf	Monaco, TWR	9870eu	
0800	0900		New Zealand, Radio NZ Intl	9885pa	
0800	0900		Nigeria, Radio/Ibadan	6050do	
0800	0900		Nigeria, Radio/Koduna	4770do	6090do
0800	0900		Nigeria, Radio/Lagos	3326do	4990do
0800	0900	vl	Pakistan, Radio	15100eu	17835eu
0800	0900		Papua New Guinea, Cotholic Radio		4960va
0800	0900		Papua New Guinea, NBC	4890do	
0800	0900	DRM	Russia, Voice of	15780eu	
0800	0900		Russia, Voice of	12005pa	12060pa	17495pa
			17525pa	17570pa	17665pa	21790pa
0800	0900		Sierra Leone, Radio UNAMSIL	6137af	
0800	0900		Singapore, Mediacorp Radio	6150do	
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do
0800	0900	s	South Africa, SW Radio League	9750af	17700af
0800	0900		South Korea, Radio Korea Intl	9570os	9640eu
0800	0900	as	Swaziland, TWR	6120af	
0800	0900		Swaziland, TWR	9500af	
0800	0900		Taiwan, Radio Taiwan Intl	9610ou	
0800	0900		UK, BBC World Service	9605os	11955as
			15310as	15360as	17760as	17790as
			21660as			
0800	0900	as	UK, BBC World Service	11760me	15575as
0800	0900		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755na	
0800	0900		USA, KNLS Anchor Point AK	9615os	
0800	0900		USA, KTBN Salt Lake City UT	7505na	
0800	0830		USA, KWHR Naalehu HI	11565as	17780os
0800	0900		USA, Voice of America	5995af	11655of
0800	0900		USA, WBCQ Kennebunk ME	5105na	7415na
0800	0900		USA, WBOH Newport NC	5920am	
0800	0900		USA, WEWN Birmingham AL	5825na	7425na
			11875na			
0800	0900		USA, WHRI Noblesville IN	5860am	7315am
0800	0900		USA, WJIE Louisville KY	13595am	
0800	0900		USA, WMLK Bethel PA	9265eu	9955eu
0800	0900		USA, WRMI Miami FL	6870am	9955am
0800	0900		USA, WTJC Newport NC	9370na	
0800	0900		USA, WWCR Nashville TN	3210na	5070na
			5770na 5935na		
0800	0900		USA, WYFR Okeechobee FL	5950af	6855af
			7455af 9985af		
0800	0900	vl	Vanuatu, Radio	4960do	
0800	0900		Zambia, Radio Christian Voice	9865af	
0805	0815	vl	Croatia, Croation Radio	12105au	12110au
0815	0845	wf	Germany, Bible Voice Broadcasting	5945eu	
0815	0850	o	Albania, TWR	11865eu	
0815	0850	o	Monaco, TWR	9870eu	
0815	0900		Guam, TWR/KTWR	11840as	

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

0900	0915	a	Germany, Bible Voice Broadcasting	5945eu	
0900	0915	vl	Ghana, Ghana BC Corp	3366do	4915da
0900	0920	mtwhfs	Albania, TWR	11865eu	
0900	0920	mtwhf	Monaco, TWR	9870eu	
0900	0930		Australia, Radio	9580as	9590as	11880as
			15240pa			
0900	0930		Guam, TWR/KTWR	11840as	
0900	0945	s	Germany, Bible Voice Broadcasting	5945eu	
0900	0957		China, China Radio Intl	15210pa	17490eu
			17690pa		
0900	0959	DRM	Germany, Deutsche Welle	21675af	
0900	1000		Anguilla, Caribbean Beacon	6090am	
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr
0900	1000		Australia, ABC NT Katherine	2485do	
0900	1000		Australia, ABC NT Tennant Creek	2325do	
0900	1000		Australia, HCJB	11750au	
0900	1000		Australia, Voice Intl	11955as	
0900	1000		Canada, CFRX Toronto ON	6070do	
0900	1000		Canada, CFVP Calgary AB	6030do	
0900	1000		Canada, CKZN St John's NF	6160do	
0900	1000		Canada, CKZU Vancouver BC	6160do	
0900	1000		Costa Rica, University Network	5030va	6150va
			7375va 9725va	11870va	13750va
0900	1000		Eqt Guinea, Radio Africa	15184af	
0900	1000		Germany, Deutsche Welle	6140do	
0900	1000	vl	Greece, Voice of	9375eu	9420eu	11645eu
			15630eu			
0900	1000		Guyana, Voice of	3290do	5950do
0900	1000	vl/as	Italy, IRRS 13840eu		
0900	1000		Malaysia, RTM	7295as	15295as
0900	1000		New Zealand, Radio NZ Intl	9885po	
0900	1000		Nigeria, Radio/Ibadan	6050do	
0900	1000		Nigeria, Radio/Koduna	4770do	6090do
0900	1000		Nigeria, Radio/Lagos	3326do	4990do
0900	1000	vl	Pakistan, Radio	15100eu	17835eu
0900	1000		Papua New Guinea, Catholic Radio		4960va
0900	1000		Papua New Guinea, NBC	4890do	
0900	1000	DRM	Russia, Voice of	15780eu	
0900	1000		Russia, Voice of	17495pa	17525pa	17570va
			17665po			
0900	1000		Singapore, Mediacorp Radio	6150do	
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do
0900	1000	s	UAE, Radio UNMEE	21460af	
0900	1000		UK, BBC World Service	6190af	6195as
			9605as 11940af	12095eu	15190co	15310os
			15360os	15400af	15485eu	15565os
			17640eu	17760os	17790as	17830af
			17885af	21470af	21660as	
0900	1000	s	UK, BBC World Service	11760me	15575me
0900	1000		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755na	
0900	1000		USA, KTBN Salt Lake City UT	7505na	
0900	1000		USA, KWHR Naalehu HI	11565as	17780os
0900	1000		USA, Voice of America	15615me	17555me
0900	1000		USA, WBCQ Kennebunk ME	5105na	7415na
0900	1000		USA, WBOH Newport NC	5920am	
0900	1000		USA, WEWN Birmingham AL	5825na	7425na
			11875no		
0900	1000		USA, WHRA Greenbush ME	7580no	
0900	1000		USA, WHRI Noblesville IN	5860am	7315om
0900	1000		USA, WJIE Louisville KY	13595am	
0900	1000		USA, WRMI Miomi FL	6870am	9955am
0900	1000		USA, WTJC Newport NC	9370na	
0900	1000		USA, WWCR Nashville TN	3210na	5070na
			5770na 5935na		
0900	1000		USA, WYFR Okeechobee FL	5950af	6855af
			6890af 7455af	9450af	
0900	1000	vl	Vanuatu, Radio	4960do	
0900	1000		Zambia, Radio Christian Voice	9865af	
0905	0915	vl	Crootio, Croatian Radio	12105au	12110ou
0930	1000		Australia, Radio	9580as	9590as	11880os
			15240po	15415po		
0930	1000		Georgia, Radio Georgia	11910me	

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

1000	1029		Czech Rep, Radio Prague Intl	21745vo	
1000	1030		Guam, AWR/KSDA	11870os	11900os
1000	1030	vl	Libya, Voice of Africa	21695af	

Start	End	Days	Station	Freq1	Freq2	Freq3	Freq4
1000	1030		Mongolia, Voice of 12085as				
1000	1030		UK, BBC World Service	6195as	7320eu		
			9605as 9740as	12095eu	15310as	15360as	
			15485eu	15565eu	17640eu	17760as	
			17790as	21660as			
1000	1057		China, China Radio Intl		15210pa	17490pa	
			17690pa				
1000	1057		Netherlands, Radio 7315as		9790as	12065as	
			13820au				
1000	1059		New Zealand, Radio NZ Intl	9885pa			
1000	1100		Anguilla, Caribbean Beacon	11775am			
1000	1100		Australia, ABC NT Alice Springs	2310do	4835irr		
1000	1100		Australia, ABC NT Katherine	2485do			
1000	1100		Australia, ABC NT Tennant Creek	2325do			
1000	1100		Australia, HCJB 11750au				
1000	1100		Australia, Radio 9580as	9590as	11880as		
			15240pa	15415pa			
1000	1100		Australia, Voice Intl 11955as				
1000	1100		Canada, CFRX Toronto ON	6070do			
1000	1100		Canada, CFVP Calgary AB	6030do			
1000	1100		Canada, CKZN St John's NF	6160do			
1000	1100		Canada, CKZU Vancouver BC	6160do			
1000	1100		Costa Rica, University Network	5030va	6150va		
			7375va 9725va	11870va	13750va		
1000	1100		Eqt Guinea, Radio Africa	15184af			
1000	1100		Guyana, Voice of 3290do	5950do			
1000	1100		India, All India Radio 7510pa	13710pa	15020cs		
			15235as	15260as	17800pa	17895pa	
1000	1100	vl/cs	Italy, IRRS 13840eu				
1000	1100		Japan, Radio 6120na	9695as	11730as		
			17585eu	17750va	21755pa		
1000	1100		Malaysia, RTM 7295as	15295as			
1000	1100		Nigeria, Voice of 11770af	15120al			
1000	1100		North Korea, Voice of	3560as	6185as		
			6285as 9335as	9850co			
1000	1100		Papua New Guinea, Catholic Radio		4960va		
1000	1100		Papua New Guinea, NBC	4890do			
1000	1100		Singapore, Mediacorp Radio	6150do			
1000	1100	vl	Solomon Islands, SIBC	5020do	9545do		
1000	1100		South Africa, Channel Africa	11825af			
1000	1100	as	UK, BBC World Service	11940co	15190ca		
			15400af	17830af	17885af 21470af		
1000	1100	s	UK, BBC World Service	15575as			
1000	1100		USA, AFRTS 4319usb	5446usb	5765usb		
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
1000	1100		USA, KAIJ Dallas TX 5755na				
1000	1100		USA, KTBN Salt Lake City UT	7505na			
1000	1100		USA, KWHR Naalehu HI	9930as	11565as		
1000	1100		USA, Voice of America	15615me	17555me		
1000	1100		USA, WBCQ Kennebunk ME	5105na			
1000	1100		USA, WBOH Newport NC	5920am			
1000	1100		USA, WEWN Birmingham AL	5825na	7425na		
			11875na				
1000	1100		USA, WHRI Noblesville IN	5860am	9495am		
1000	1100		USA, WRMI Miami FL 6870am	9955am			
1000	1100		USA, WTJC Newport NC	9370na			
1000	1100		USA, WWCR Nashville TN	5070na	5770na		
			5935na 9985na				
1000	1100		USA, WYFR Okeechobee FL	5950na	6855na		
			6890na 7455na	9450na			
1000	1100		Zambia, Radio Christian Voice	9865af			
1030	1045	mtwhf	Ethiopia, Radio 5990af	7110af	9704af		
1030	1058		Vietnam, Voice of 9840as	12020as			
1030	1100		Iran, Voice of the Islamic Rep	15460as	15480as		
1030	1100		UAE, Emirates Radio 13675va	15370va	15395va		
			21605va				
1030	1100	t	UAE, Radio UNMEE 21550af				
1030	1100		UK, BBC World Service	6195as	9605as		
			9740as 11945as	15285as	15310as	17760as	
			17790as	21660as			
1030	1100	mthfa	Vatican City, Vatican Radio	5885eu			

Start	End	Days	Station	Freq1	Freq2	Freq3	Freq4
1100	1104	vl	Pakistan, Radio 15100eu	17835eu			
1100	1127		Iran, Voice of the Islamic Rep	15460as	15480as		
1100	1128		Vietnam, Voice of 7285as				
1100	1130		Australia, Radio 5995as	6020as	9475as		
			9560as 9580as	9590as	11880as	12080as	
			15240pa				
1100	1130	vl	Libya, Voice of Africa 17695af	21675af	21695af		
1100	1130		Tibet, Xizang PBS 4920as	6110as	9490as		
1100	1130	t	UAE, Radio UNMEE 21550af				
1100	1130		UK, BBC World Service	6190af	11940af		
			15400af	17830af	17885af	21470af	
1100	1157		China, China Radio Intl	5960na	13665al		
			17490na				
1100	1200		Anguilla, Caribbean Beacon	11775am			
1100	1200		Australia, ABC NT Alice Springs	2310do	4835irr		
1100	1200		Australia, ABC NT Katherine	2485do			
1100	1200		Australia, ABC NT Tennant Creek	2325do			
1100	1200		Australia, HCJB 15425as				

Start	End	Days	Station	Freq1	Freq2	Freq3	Freq4
1100	1200		Australia, Voice Intl 13685as				
1100	1200		Canada, CFRX Toronto ON	6070do			
1100	1200		Canada, CFVP Calgary AB	6030do			
1100	1200		Canada, CKZN St John's NF	6160do			
1100	1200		Canada, CKZU Vancouver BC	6160do			
1100	1200		Costa Rica, University Network	5030va	6150va		
			7375va 9725va	11870va	13750va		
1100	1200		Ecuador, HCJB	12005am	21455am		
1100	1200	vl	Greece, Voice of 9375eu	9420eu	9775eu		
			15630eu	15650eu			
1100	1200	vl/as	Italy, IRRS 13840eu				
1100	1200	vl/f	Italy, IRRS 15665va				
1100	1200		Japan, Radio 6120na	9695as	11730as		
1100	1200		Malaysia, RTM 7295as	15295as			
1100	1200		New Zealand, Radio NZ Intl	15530pa			
1100	1200		Nigeria, Voice of 11770af	15120al			
1100	1200		Papua New Guinea, Catholic Radio		4960va		
1100	1200		Papua New Guinea, NBC	4890do			
1100	1200		Singapore, Radio Singapore Intl	6080as	6150as		
1100	1200		South Africa, Channel Africa	11825af			
1100	1200		Taiwan, Radio Taiwan Intl	7445as			
1100	1200	s	UK, BBC World Service	15575as			
1100	1200		UK, BBC World Service	6195va	7320eu		
			9740as 12095eu	15310as	15485eu	15565eu	
			17640as	17790as			
1100	1200	mtwhf	UK, BBC World Service	17830af			
1100	1200		USA, AFRTS 4319usb	5446usb	5765usb		
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
1100	1200		USA, KAIJ Dallas TX 5755na				
1100	1200		USA, KTBN Salt Lake City UT	7505na			
1100	1200		USA, KWHR Naalehu HI	9930as	11565as		
1100	1200		USA, Voice of America	15615me	17555me		
1100	1200		USA, WBCQ Kennebunk ME	5105na			
1100	1200		USA, WBOH Newport NC	5920am			
1100	1200		USA, WEWN Birmingham AL	5825na	7425na		
			11875na				
1100	1200		USA, WHRI Noblesville IN	7535am	9495am		
1100	1200		USA, WINB Red Lion PA	9320am			
1100	1200		USA, WJIE Louisville KY	7490am			
1100	1200		USA, WRMI Miami FL 6870am	9955am			
1100	1200		USA, WTJC Newport NC	9370na			
1100	1200		USA, WWCR Nashville TN	5070na	5770na		
			5935na 15825na				
1100	1200		USA, WYFR Okeechobee FL	5950am	6890am		
			7355am	9555am	11725am	11830am	
1100	1200		Zambia, Radio Christian Voice	9865af			
1130	1145		UK, BBC World Service	7135as	11920as		
1130	1157		Czech Rep, Radio Prague Intl	11640va	21745va		
1130	1200		Australia, Radio 5995as	6020as	9475as		
			9560as 9580as	9590as	11880as	12080as	
1130	1200		Belgium, Radio Vlaanderen Intl	9945va			
1130	1200	as	Germany, Bible Voice Broadcasting	5945as			
1130	1200		Guam, AWR/KSDA 15260as				
1130	1200		UK, BBC World Service	6190af	11940af		
			17830af	17885af	21470af		
1130	1200		Vatican City, Vatican Radio	11625af	13765af		
			15570af				
1145	1155		Rwanda, Radio 6055do				

Start	End	Days	Station	Freq1	Freq2	Freq3	Freq4
1200	1215	vl	Cambodia, National Radio	11940as			
1200	1230		Australia, HCJB 15425as				
1200	1230		France, Radio France Intl	15275af	21620af		
1200	1230	vl	Libya, Voice of Africa 17695af	21675af	21695af		
1200	1230		Malaysia, RTM 7295as	15295as			
1200	1230		UAE, AWR Africa 15135as				
1200	1230		Uzbekistan, Radio Tashkent	5060as	5975as		
			6025as 9715as				
1200	1245	w	Germany, Bible Voice Broadcasting	5945as			
1200	1257		China, China Radio Intl	9730as	9795pa		
			11980as	11760pa	13665al		
			13790eu	17490eu			
1200	1257		Netherlands, Radio 11675na				
1200	1257	as	Netherlands, Radio 15725na				
1200	1259		Canada, Radio Canada Intl	9670as	11730as		
1200	1259	s	Germany, Universal Life	6045me			
1200	1259		New Zealand, Radio NZ Intl	15530pa			
1200	1300		Anguilla, Caribbean Beacon	11775am			
1200	1300		Australia, ABC NT Alice Springs	2310do	4835irr		
1200	1300		Australia, ABC NT Katherine	2485do			
1200	1300		Australia, ABC NT Tennant Creek	2325do			
1200	1300		Australia, Radio 5995as	6020as	9475as		
			9560as 9580as	9590as	11880as		
1200	1300		Australia, Voice Intl 13685as				
1200	1300		Canada, CBC Northern Service	9625do			
1200	1300		Canada, CFRX Toronto ON	6070do			
1200	1300		Canada, CFVP Calgary AB	6030do			
1200	1300		Canada, CKZN St John's NF	6160do			
1200	1300		Canada, CKZU Vancouver BC	6160do			
1200	1300		Costa Rica, University Network	9725va	11870va		
			13750va				
1200	1300		Ecuador, HCJB	12005am	21455am		

Left column

Start	Stop		Station				
1200	1300		Nigeria, Voice of 11770af	15120al			
1200	1300		Papua New Guinea, Catholic Radio		4960va		
1200	1300		Papua New Guinea, NBC	4890do			
1200	1300		Singapore, Radio Singapore Intl	6080as	6150as		
1200	1300		South Korea, Radio Korea Intl	9650va			
1200	1300		Taiwan, Radio Taiwan Intl	7130as			
1200	1300		UK, BBC World Service	6190af	11940af		
			17830af	17885af	21470af		
1200	1300	mtwhf	UK, BBC World Service	17830af			
1200	1300		Ukraine, Radio Ukraine Intl	15620eu			
1200	1300		USA, AFRTS 4319usb	5446usb	5765usb		
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
1200	1300		USA, KAIJ Dallas TX 5755na				
1200	1300		USA, KTBN Salt Lake City UT	7505na			
1200	1300		USA, KWHR Naalehu HI	9930as	11565as		
1200	1300		USA, Voice of America	6110vo	9645va		
			9760vo 11705va 11715va	15665va			
1200	1300		USA, WBCQ Kennebunk ME	5105na	9330na		
			17495na				
1200	1300		USA, WBOH Newport NC	5920am			
1200	1300		USA, WEWN Birmingham AL	5825na	7425na		
			11875na				
1200	1300		USA, WHRI Noblesville IN	7535am	9495am		
1200	1300		USA, WINB Red Lion PA	9320am			
1200	1300		USA, WJIE Louisville KY	7490am			
1200	1300		USA, WRMI Miami FL 6870am	9955am			
1200	1300		USA, WTJC Newport NC	9370na			
1200	1300		USA, WWCR Nashville TN	5070na	5770na		
			5935no 15825na				
1200	1300		USA, WYFR Okeechobee FL	6890na	7355no		
			11530na	11970na			
1200	1300		Zambia, Radio Christian Voice	9865af			
1215	1300		Egypt, Radio Cairo 17670as				
1230	1245		UK, BBC World Service	15425eu			
1230	1245		UK, BBC World Service	17780af	21640af		
1230	1258		Vietnam, Voice of 9840os	12020as			
1230	1259	o	Germany, Universal Life	6045me			
1230	1300		Australia, HCJB 15405as				
1230	1300		Bangladesh, Bangla Betar	7185as	9550as		
1230	1300		Bulgaria, Radio 11700eu	15700eu			
1230	1300	h	Germany, Bible Voice Broadcasting	5945as			
1230	1300	vl	Libya, Voice of Africa 21675af	21695af			
1230	1300		Malaysia, RTM 7295os				
1230	1300		Sri Lanka, SLBC 6005as	11930os	15745as		
1230	1300		Thailand, Radio 9810va				

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

Start	Stop		Station				
1300	1315	f	Germany, Bible Voice Broadcasting	5945as			
1300	1329		Canada, Radio Canada Intl	9670as	11730as		
1300	1330		Ecuador, HCJB 12005am	21455am			
1300	1330		Egypt, Radio Cairo 17670as				
1300	1330	vl	Libya, Voice of Africa 21675af	21695af			
1300	1356		Romania, Radio Romania Intl	15105eu	17745eu		
1300	1357		China, China Radio Intl	7250va	9795po		
			11760va	11900as	11885na	11980os	
			15180os	15230na	17625na		
1300	1357	DRM	China, China Radio Intl	11810vo			
1300	1359		Poland, Radio Polonia 9525eu	11850eu			
1300	1400		Anguilla, Caribbean Beacon	11775am			
1300	1400		Australia, HCJB 15405as				
1300	1400		Australia, Radio 5995as	6020as	9475as		
			9560as 9580os	9590as			
1300	1400		Australia, Voice Intl 13685as				
1300	1400		Canada, CBC Northern Service	9625do			
1300	1400		Canada, CFRX Toronto ON	6070do			
1300	1400		Canada, CFVP Calgary AB	6030do			
1300	1400		Canada, CKZN St John's NF	6160do			
1300	1400		Canada, CKZU Vancouver BC	6160do			
1300	1400	mtwhf	Canada, Radio Canada Intl	9515am	13655am		
			17820am				
1300	1400		Costa Rica, University Network	9725va	11870va		
			13750va				
1300	1400		Germany, Deutsche Welle	6140eu			
1300	1400		Germany, Overcomer Ministries	6110eu	13810eu		
1300	1400		Malaysia, RTM 7295as				
1300	1400		New Zealand, Radio NZ Intl	9870pa			
1300	1400		Nigeria, Voice of 11770af	15120al			
1300	1400		North Korea, Voice of	4405eu	7570eu		
			9335na11710na 12015eu				
1300	1400		Papua New Guinea, Catholic Radio		4960va		
1300	1400		Papua New Guinea, NBC	4890do			
1300	1400		Singapore, Radio Singapore Intl	6080as	6150as		
1300	1400		South Korea, Radio Korea Intl	9570as	9770as		
1300	1400		Sri Lanka, SLBC 6005as	11930as	15745as		
1300	1400		UK, BBC World Service	6190af	11940af		
			15420af	17830af	17885af	21470af	
1300	1400	mtwhf	UK, BBC World Service	17830af			
1300	1400		USA, AFRTS 4319usb	5446usb	5765usb		
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
1300	1400		USA, KAIJ Dallas TX 5755na				

Right column

Start	Stop		Station				
1300	1400		USA, KNLS Anchar Point AK	9615as			
1300	1400		USA, KTBN Salt Lake City UT	7505na			
1300	1400		USA, KWHR Naolehu HI	9930as	11565os		
1300	1400		USA, Voice of America	6110va	9645va		
			9760va 11705va				
1300	1400		USA, WBCQ Kennebunk ME	5105na	7415na		
			9330na17495na				
1300	1400		USA, WBOH Newport NC	5920am			
1300	1400		USA, WEWN Birmingham AL	7425na	9955na		
			15745na				
1300	1400		USA, WHRA Greenbush ME	17560na			
1300	1400		USA, WHRI Noblesville IN	9840am	15105om		
1300	1400		USA, WINB Red Lion PA	13570om			
1300	1400		USA, WJIE Louisville KY	7490am			
1300	1400		USA, WRMI Miami FL 6870am	15725om			
1300	1400		USA, WTJC Newport NC	9370na			
1300	1400		USA, WWCR Nashville TN	5935na	7465na		
			9985na15825no				
1300	1400		USA, WWRB Manchester TN	9320na	12170na		
1300	1400		USA, WYFR Okeechobee FL	7355va	7580va		
			11830va	11855va	11970vo		
1300	1400		Zambia, Radio Christian Voice	9865af			
1305	1330	as	Austria, Radio Austria Intl	6155eu	13730eu		
			17855va				
1315	1330	mtwhf	Austria, Radio Austria Intl	17855vo			
1315	1330	a	Russia, TWR 7535eu	7560as			
1330	1400		Guam, AWR/KSDA 11980as				
1330	1400	mtwhfa	Guam, AWR/KSDA 15660as				
1330	1400		India, All India Radio 9690as	11620as			
1330	1400		Laos, National Radio 7145as				
1330	1400	mtwhf	Serbia & Montenegro, Intl Radio	11835pa			
1330	1400		Sweden, Radio 7420eu	11550va	15240va		
			18960ol				
1330	1400	DRM	Sweden, Radio 7240vo				
1330	1400		Turkey, Voice of 15155va	15195eu			
1330	1400		UAE, Emirates Radio 13630vo	13675va	15395va		
			21605va				
1330	1400		UK, BBC World Service	15105af	17810af		
1330	1400	a	UK, Wales Radio Intl 17745va				
1330	1400		Uzbekistan, Radio Tashkent	5060as	5975as		
			6025as 9715as				
1335	1400	os	Austria, Radio Austria Intl	6155eu	13730eu		
			17855va				
1345	1400	mtwhf	Austria, Radio Austria Intl	6155eu	13730eu		
			17855vo				

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

Start	Stop		Station				
1400	1415	h	Germany, Bible Voice Broadcasting	7485as			
1400	1415		Russia, FEBA 9445as				
1400	1415	mtw	UK, BBC World Service	15420af	21490eu		
1400	1420		Turkey, Voice of 15155va	15195eu			
1400	1429		Czech Rep, Radio Prague Intl	21745vo			
1400	1430		Australia, Radio 5995as	6080os	7240as		
			9590as 11750pa				
1400	1430	DRM	Canada, Radio Canada Intl	7240eu			
1400	1430	mtwhf	Germany, Deutsche Welle	15725na			
1400	1430	a	Germany, Pan American BC	13820me			
1400	1430	vl	Libya, Voice of Africa 21675af				
1400	1430		Thailand, Radio 9725os				
1400	1457		China, China Radio Intl	7405na	9560as		
			9700eu 9795eu 11675eu	13675as	13685af		
			17630af				
1400	1500		Anguilla, Caribbean Beacon	11775om			
1400	1500		Australia, Voice Intl 13685os				
1400	1500		Canada, CBC Northern Service	9625do			
1400	1500		Canada, CFRX Toronto ON	6070do			
1400	1500		Canada, CFVP Calgary AB	6030do			
1400	1500		Canada, CKZN St John's NF	6160do			
1400	1500		Canada, CKZU Vancouver BC	6160do			
1400	1500		Canada, Radio Canada Intl	9515am	13655as		
			17820am				
1400	1500	DRM	China, China Radio Intl	9610va			
1400	1500		Costa Rica, University Network	9725va	11870va		
			13750va				
1400	1500		France, Radio France Intl	7180va	17620va		
1400	1500	as	Germany, Bible Voice Broadcasting	7485as			
1400	1500		Germany, Deutsche Welle	6140eu			
1400	1500		Germany, Overcomer Ministries	6110eu	13810eu		
1400	1500		India, All India Radio 9690as	11620as			
1400	1500		Japan, Radio 7200as	9875as	11840pa		
1400	1500		Jordan, Radio 11690na				
1400	1500		Malaysia, RTM 7295os				
1400	1500		Netherlands, Radio 9345as	12080as	15595as		
1400	1500		New Zealand, Radio NZ Intl	9870pa			
1400	1500		Nigeria, Voice of 11770af	15120ol			
1400	1500		Oman, Radio 15140as				
1400	1500		Singapore, Mediacorp Radio	6150do			
1400	1500		South Africa, Channel Africa	11825af			
1400	1500		Sri Lanka, SLBC 6005as	11930as	15745as		
1400	1500		Taiwan, Radio Taiwan Intl	15265as			
1400	1500		UK, BBC World Service	6190af	11940af		
			17830af	21470af	21660af		

Start	End	Days	Station	Freq	Freq	Freq	Freq
1400	1500	mtwhf	UK, BBC World Service	17830af			
1400	1500		USA, AFRTS	4319usb	5446usb	5765usb	
				6350usb	7590usb	7812usb	10320usb
				12133usb	12579usb	13362usb	13855usb
1400	1500		USA, KAIJ Dallas TX	13815na			
1400	1500		USA, KJES Vado NM	11715na			
1400	1500		USA, KTBN Salt Lake City UT	7505na			
1400	1500		USA, KWHR Naalehu HI	9930as	11565as		
1400	1500		USA, Voice of America	6110va	7125va		
				9645va 9760va	11705va	15425va	
1400	1500		USA, WBCQ Kennebunk ME	5105na	7415na		
				9330na 17495na			
1400	1500		USA, WBOH Newport NC	5920am			
1400	1500		USA, WEWN Birmingham AL	9955na	11530na		
1400	1500		USA, WHRA Greenbush ME	17560na			
1400	1500		USA, WHRI Noblesville IN	9840am	15105am		
1400	1500		USA, WINB Red Lion PA	13570am			
1400	1500		USA, WJIE Louisville KY	7490am			
1400	1500		USA, WRMI Miami FL 6870am	15725am			
1400	1500		USA, WTJC Newport NC	9370na			
1400	1500		USA, WWCR Nashville TN	7465na	9985na		
				13845na	15825na		
1400	1500		USA, WWRB Manchester TN	9320na	12170na		
1400	1500		USA, WYFR Okeechobee FL	7580vo	11615va		
				11855va	13695va	17760va	
1400	1500		Zombio, Radio Christian Voice	9865of			
1415	1430		Nepal, Radio	3230os	5005as	6100os	
				7165os			
1430	1458	mtwhf	Belgium, Radio Vlaanderen Intl	15725na			
1430	1500		Australia, HCJB	15390as			
1430	1500		Myanmar, Radio	5040do	5985do		
1430	1500	DRM	South Korea, Radio Korea Intl	9770eu			
1430	1500		Sweden, Radio	15240eu	18960al		
1445	1500	as	Germany, Pan American BC	13820me			
1445	1500	mtwhfo	UK, BBC World Service	6140os	7205os		
				15245os			

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

Start	End	Days	Station	Freq	Freq	Freq
1500	1515	s	Germany, Pan American BC	13820os		
1500	1528	mwhf	Romania, Radio Romania Intl	15725no		
1500	1528		Vietnam, Voice of	9840as	12020as	
1500	1530		France, Radio France Intl	9875eu		
1500	1530		Mongolia, Voice of	9720eu		
1500	1530		Sri Lanka, SLBC	6005os	11930os	15745as
1500	1530		UK, BBC World Service	6190of	11860af	
				11940af	15400af	15420af	21470af
				21490af	21660of		
1500	1557		Canada, Radio Canada Intl	5985as	9635os	
				11730as	11975os	
1500	1557		China, China Radio Intl	7160eu	7405na	
				9435eu 9525eu	9785os	13675os	17730na
1500	1557		China, China Radio Intl	13685of	17630of	
1500	1557		Netherlands, Radio	9345os	12080os	15595os
1500	1600		Anguilla, Caribbean Beacon	11775am		
1500	1600		Australia, HCJB	15390as		
1500	1600		Australia, Radio	5995os	6080os	7240as
				9590as 11750pa		
1500	1600		Australia, Voice Intl	11840os		
1500	1600		Canada, CBC Northern Service	9625do		
1500	1600		Canada, CFRX Toronto ON	6070do		
1500	1600		Canada, CFVP Calgary AB	6030do		
1500	1600		Canada, CKZN St John's NF	6160do		
1500	1600		Canada, CKZU Vancouver BC	6160do		
1500	1600	DRM	China, China Radio Intl	9610va		
1500	1600		Costa Rica, University Network	9725va	11870va	
				13750va		
1500	1600	o	Germany, Bible Voice Broadcasting	12005os		
1500	1600		Germany, Deutsche Welle	6140eu		
1500	1600	vl/ as	Greece, Voice of	9420eu	9775eu	15485eu
				15630eu	15650eu	
1500	1600		Guam, TWR/KTWR	12105os		
1500	1600		Japan, Radio	6190va	7200os	9505na
				9875os		
1500	1600		Jordan, Radio	11690na		
1500	1600		Malaysia, RTM	7295os		
1500	1600		Myanmar, Radio	5040do	5985do	
1500	1600		New Zealand, Radio NZ Intl	9870po		
1500	1600		North Korea, Voice of	4405eu	7570eu	
				9335na 11710na	12015eu	
1500	1600		Russia, FEBA	7340os		
1500	1600		Russia, Voice of	5945os	6205os	7260os
				7315as 7350os	7415os	9900os	11500cs
				12025os		
1500	1600	as	Russia, Voice of	12060eu		
1500	1600		Singapore, Mediacorp Radio	6150do		
1500	1600		South Africa, Channel Africa	11825af	17770af	
1500	1600	DRM	Taiwan, Radio Taiwan Intl	9770eu		
1500	1600		UK, BBC World Service	5975os	6195os	
				7160os 9740os	12095eu	15190co	15310os
				15485eu	15565eu	17790os	
1500	1600	mtwhf	UK, BBC World Service	17830af		
1500	1600	vl/ mtwhf	UK, Sudan Radio Service	15530va		
1500	1600		USA, AFRTS	4319usb	5446usb	5765usb

Start	End	Days	Station	Freq	Freq	Freq	Freq
				6350usb	7590usb	7812usb	10320usb
				12133usb	12579usb	13362usb	13855usb
1500	1600		USA, KAIJ Dallas TX	13815na			
1500	1600		USA, KJES Vado NM	11715na			
1500	1600		USA, KTBN Salt Lake City UT	15590na			
1500	1600		USA, KWHR Naalehu HI	9930as	11565as		
1500	1600		USA, Voice of America	6110va	9685va		
				9795va 9825va	11835va	13865va	15255va
				15460va	17715af	17895af	
1500	1600		USA, WBCQ Kennebunk ME	5105na	7415na		
				9330na 17495na			
1500	1600		USA, WBOH Newport NC	5920am			
1500	1600		USA, WEWN Birmingham AL	9955na	11530na		
1500	1600		USA, WHRA Greenbush ME	17560na	17650na		
1500	1600		USA, WHRI Noblesville IN	9840am	15105am		
1500	1600		USA, WINB Red Lion PA	13570am			
1500	1600		USA, WJIE Louisville KY	7490am			
1500	1600		USA, WRMI Miami FL 6870am	15725am			
1500	1600		USA, WTJC Newport NC	9370na			
1500	1600		USA, WWCR Nashville TN	7465na	9985na		
				13845na	15825na		
1500	1600		USA, WWRB Manchester TN	9320na	12170na		
1500	1600		USA, WYFR Okeechobee FL	11615va	11855va		
				15210va	17760vo		
1500	1600		Zombio, Radio Christian Voice	9865of			
1530	1545		India, All India Radio 7255va	9820va	9910vo		
				11740vo			
1530	1545		UK, BBC World Service	9600os	11685as		
1530	1600	mwh	Germany, Bible Voice Broadcasting	12005as			
1530	1600		Iran, Voice of the Islamic Rep	9610as	9940as		
1530	1600	mtwhf	South Korea, Radio Korea Intl	15725no			
1530	1600		UAE, AWR Africa	15225os			
1530	1600		UK, BBC World Service	6190af	11940af		
				15400af	17830of	21470of	21660af
1545	1600	t	Germany, Bible Voice Broadcasting	9460me			
1545	1600	s	Germany, Pan American BC	13820me			

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

Start	End	Days	Station	Freq	Freq	Freq	Freq
1600	1615		Pakistan, Radio	9390vo	11570va	11850va	
				15725va			
1600	1627		Iran, Voice of the Islamic Rep	9610as	9940as		
1600	1628	s	Hungary, Radio Budapest	6025eu	9580eu		
1600	1628		Vietnam, Voice of	7220va	7280va	9550vo	
				11630va			
1600	1629	s	Germany, Universal Life	9495me			
1600	1630	s	Germany, Pan American BC	13820me			
1600	1630		Guam, AWR/KSDA	15480as	15495as		
1600	1630	as	Guam, TWR/KTWR	12105os			
1600	1630	vl	Libya, Voice of Africa	15220af	17840af		
1600	1630	as	Swaziland, TWR	6070of			
1600	1630		UK, BBC World Service	6190af	11940of		
				15400af	17830of	21470af	21660af
1600	1635		UAE, Emirates Radio 13630va	13675va	15395va		
				21605vo			
1600	1650		New Zealand, Radio NZ Intl	9870pa			
1600	1657		China, China Radio Intl	7255eu	9435eu		
				9525af 9570af	11900af	17730na	
1600	1657		China, China Radio Intl	7255eu	9435eu		
				9525eu 9570af	11900af	17730na	
1600	1659	as	Canada, Radio Canada Intl	9515am	13655am		
				17820am			
1600	1659		Germany, Deutsche Welle	6170os	7225os		
				11695os			
1600	1700		Anguilla, Caribbean Beacon	11775am			
1600	1700		Australia, HCJB	15390os			
1600	1700		Australia, Radio	5995as	6080os	7240os	
				9475os 9710os			
1600	1700		Australia, Voice Intl	11840os			
1600	1700		Canada, CBC Northern Service	9625do			
1600	1700		Canada, CFRX Toronto ON	6070do			
1600	1700		Canada, CFVP Calgary AB	6030do			
1600	1700		Canada, CKZN St John's NF	6160do			
1600	1700		Canada, CKZU Vancouver BC	6160do			
1600	1700	DRM	China, China Radio Intl	17510va			
1600	1700		Costa Rica, University Network	11870vo	13750vo		
1600	1700		Ethiopia, Radio	5990of	7110of	7165af	
				9560af 9704of	11800af		
1600	1700		France, Radio France Intl	9730of	11615af		
				15160af	15605af		
1600	1700	t	Germany, Bible Voice Broadcasting	9460me			
1600	1700	vl	Greece, Voice of	15485na			
1600	1700		Jordan, Radio	11690na			
1600	1700		Malaysia, RTM	7295os			
1600	1700		North Korea, Voice of	3560me	9975af		
				11535af			
1600	1700		Russia, Voice of	4940va	4965va	4975va	
				6005me	6130eu	7260os	7290eu
				7415os 9470me			
1600	1700		South Korea, Radio Korea Intl	5975vo	9870vo		
1600	1700		Taiwan, Radio Taiwan Intl	11550as	11815ol		
1600	1700		UK, BBC World Service	3915as	5975as		
				6195os 7160os	9410eu	11750os	15190co
				15310os	15485eu	15565eu	17790os

Start	Stop	Days	Station			
			17820eu			
1600	1700	mtwhf	UK, BBC World Service	17830af		
1600	1700	vl/ mtwhf	UK, Sudan Radio Service	15530va		
1600	1700		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13855usb
1600	1700		USA, KAIJ Dallas TX	13815na		
1600	1700		USA, KJES Vado NM	11715na		
1600	1700		USA, KTBN Salt Lake City UT	15590na		
1600	1700		USA, KWHR Naalehu HI	9930as	11565as	
1600	1700		USA, Voice of America	6160va	7125va	
			9645va 9760va	11835va	13600af	15240af
			15445af	15460af	17715af	17895af
1600	1700		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na 17495na			
1600	1700		USA, WBOH Newport NC	5920am		
1600	1700		USA, WEWN Birmingham AL	11530va	13615va	
			15695va	15745va	17595va	
1600	1700		USA, WHRA Greenbush ME	17650na		
1600	1700		USA, WHRI Noblesville IN	9840am	15105am	
1600	1700		USA, WINB Red Lion PA	13570am		
1600	1700		USA, WJIE Louisville KY	7490am		
1600	1700		USA, WMLK Bethel PA 9265eu			
1600	1700		USA, WRMI Miomi FL 9955om	15725am		
1600	1700		USA, WTJC Newport NC	9370na		
1600	1700		USA, WWCR Noshville TN	9985na	12160na	
			13845na	15825na		
1600	1700		USA, WWRB Manchester TN	9320na	12170no	
1600	1700		USA, WYFR Okeechobee FL	6085va	11830va	
			13695vo	17690va	18980vo	21455va
1600	1700		Zambia, Radio Christian Voice	9865af		
1605	1630	as	Austria, Radio Austria Intl	13675na		
1610	1625	mtwhf	Austria, Radio Austria Intl	13675na		
1615	1700	as	UK, BBC World Service	11860af	15420af	
			21490af			
1630	1700		Egypt, Radio Cairo 9855af			
1630	1700	s	Germany, Bible Voice Broadcasting 9460me			
1630	1700		Guam, AWR/KSDA 11980as			
1630	1700		UK, BBC World Service	6190af	11940af	
			15400af	15420af	17783af	21470af
			21660af			
1635	1700	as	Austria, Radio Austria Intl	13675na		
1640	1650		Turkmenistan, Turkmen Radio	4930as		
1640	1655	mtwhf	Austria, Radio Austria Intl	13675na		
1645	1700	mwhfa	Germany, Bible Voice Broadcasting 9460me			
1645	1700		Tajikistan, Radio 7245irr			
1651	1700		New Zealand, Radio NZ Intl	9870pa		

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

Start	Stop	Days	Station			
1700	1710	mtwh	Moldova, Radio PMR 5960eu			
1700	1715	mwf	Germany, Bible Voice Broadcasting 9460me			
1700	1720	f	Moldova, Radio PMR 5960eu			
1700	1727		Czech Rep, Radio Prague Intl	5930eu	15710af	
1700	1730		Azerbaijan, Voice of 6110me			
1700	1730	DRM/ a	Canada, Voice of NASB	11900sa		
1700	1730		France, Radio France Intl	11615af	15605af	
1700	1730		Jordan, Radio 11690na			
1700	1730	vl	Libya, Voice of Africa 11715af	11860af	15220af	
			15615af	15660af		
1700	1730		UK, BBC World Service	6195eu	9410eu	
			12095eu	15565eu	17820eu	
1700	1745	DRM	China, China Radio Intl	12080va		
1700	1745	h	Germany, Bible Voice Broadcasting 9460me			
1700	1745		UK, BBC World Service	3255af	6005af	
			6190af 9630af	15400af	15420af	17830af
			21470af			
1700	1750		New Zealand, Radio NZ Intl	9870pa		
1700	1755		South Africa, Channel Africa	15285af		
1700	1757		China, China Radio Intl	6100va	7255eu	
			9570af 11900af			
1700	1800		Anguilla, Caribbean Beacon	11775am		
1700	1800		Australia, HCJB 15390as			
1700	1800		Australia, Radio	5995as	6080as	7240as
			9475as 9710as	11880pa		
1700	1800		Australia, Voice Intl 11840as			
1700	1800		Canada, CBC Northern Service	9625do		
1700	1800		Canada, CFRX Toronto ON	6070do		
1700	1800		Canada, CFVP Calgary AB	6030do		
1700	1800		Canada, CKZN St John's NF	6160do		
1700	1800		Canada, CKZU Vancouver BC	6160do		
1700	1800	DRM	China, China Radio Intl	17510va		
1700	1800		Costa Rica, University Network	11870va	13750va	
1700	1800		Egypt, Radio Cairo 9855af			
1700	1800		Eqt Guinea, Radio Africa	7189af	15184af	
1700	1800	as	Germany, Bible Voice Broadcasting 9460me			
1700	1800		Germany, Overcomer Ministries	17550na		
1700	1800	vl	Greece, Voice of 15485na			
1700	1800		Japan, Radio	9535na	11970eu	15355af
1700	1800		Malaysia, RTM 7295as			
1700	1800		Nigeria, Voice of 7255af			
1700	1800		Russia, Voice of	5910as	5945as	7415as

Start	Stop	Days	Station			
			9470me	9830me		
1700	1800		Swaziland, TWR 3200af			
1700	1800	mtwhf	UK, BBC World Service	17830af		
1700	1800	vl/ mtwhf	UK, Sudan Radio Service	11715va		
1700	1800		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13855usb
1700	1800		USA, KAIJ Dallas TX 13815na			
1700	1800		USA, KTBN Salt Lake City UT	15590na		
1700	1800		USA, KWHR Naalehu HI	9930as		
1700	1800		USA, Voice of America	13710af	15240af	
			15455af			
1700	1800		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na 17495na			
1700	1800		USA, WBOH Newport NC	5920am		
1700	1800		USA, WEWN Birmingham AL	11530va	13615va	
			15695vo	15745va	17595va	
1700	1800		USA, WHRA Greenbush ME	17650na		
1700	1800		USA, WHRI Noblesville IN	9840am	15105am	
1700	1800		USA, WINB Red Lion PA	13570am		
1700	1800		USA, WJIE Louisville KY	7490am		
1700	1800		USA, WMLK Bethel PA9265eu	15265eu		
1700	1800		USA, WRMI Miami FL 9955am	15725am		
1700	1800		USA, WTJC Newport NC	9370na		
1700	1800		USA, WWCR Noshville TN	9985na	12160na	
			13845na	15825na		
1700	1800		USA, WWRB Manchester TN	9320na	12170na	
1700	1800		USA, WYFR Okeechobee FL	13695va	17510va	
			18980va	21455va	21680va	
1700	1800		Zambia, Radio Christion Voice	4965af		
1715	1800		China, China Radio Intl	12080vo		
1730	1745	f	Russia, FEBA 9840as			
1730	1745		UK, BBC World Service	3390af	7230af	
			9685af			
1730	1745	mtwhf	UK, United Nations Radio	7170af	9565me	
			17810af			
1730	1800		Guam, AWR/KSDA 11560as			
1730	1800		Liberia, ELWA 4760do			
1730	1800	vl	Philippines, Radio Pilipinas	11730as	11890as	
			15190pa			
1730	1800		Slovakia, Slovak Radio	5915eu	6055eu	
1730	1800		Swaziland, TWR 9500af			
1730	1800		UK, BBC World Service	5875eu	6015eu	
			6195eu 7190eu	9410eu	12095eu	15565eu
			17820eu			
1730	1800		USA, Voice of America	11975af	17895af	
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa		
1745	1800		Bangladesh, Bangla Betar	7185as	9550as	
1745	1800		India, All India Radio 7410au	9445af	9950af	
			11620au	11935af	13605af	15075af
			15155af	17670af		
1745	1800		UK, BBC World Service	3255af	6190af	
			15400af	15420af	17830af	21470af
1751	1800		New Zealand, Radio NZ Intl	11980pa		

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

Start	Stop	Days	Station			
1800	1810		Zanzibar, Voice of Tanzania	11734do		
1800	1815	DRM	China, China Radio Intl	12080va		
1800	1815	a	Germany, Bible Voice Broadcasting	7210as		
1800	1827		Czech Rep, Radio Prague Intl	5930va	9415va	
1800	1828		Vietnam, Voice of	5955eu	7280eu	11630as
1800	1830		Austria, AWR Europe 9530af			
1800	1830		Egypt, Radio Cairo 9855af			
1800	1830	s	Germany, Bible Voice Broadcasting 6015va			
1800	1830	s	Germany, Universal Life	11840af		
1800	1830	vl	Libya, Voice of Africa 9485af	11635af	11715af	
			11860af			
1800	1830		South Africa, AWR Africa	3215af	3345af	
			11925af			
1800	1830		UK, BBC World Service	3255af	6190af	
			15400af	15420af	17830af	21470af
1800	1850		New Zealand, Radio NZ Intl	11980pa		
1800	1856		Romania, Radio Romania Intl	5965eu	7130eu	
1800	1857		Netherlands, Radio 6020af	9895af	11655af	
1800	1859		Canada, Radio Canada Intl	5850af	7185af	
			9770af 11875af	15140af		
1800	1859		Poland, Radio Polonia 7265eu	7270eu		
1800	1900		Anguilla, Caribbean Beacon	11775am		
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu	
1800	1900		Australia, Radio	6080as	7240as	9475as
			9580as 9710as	11880pa		
1800	1900		Australia, Voice Intl 11685as			
1800	1900		Bangladesh, Bangla Betar	7185as	9550as	
1800	1900		Canada, CBC Northern Service	9625do		
1800	1900		Canada, CFRX Toronto ON	6070do		
1800	1900		Canada, CFVP Calgary AB	6030do		
1800	1900		Canada, CKZN St John's NF	6160do		
1800	1900		Canada, CKZU Vancouver BC	6160do		
1800	1900		China, China Radio Intl	6100eu	12080va	
1800	1900	DRM	China, China Radio Intl	17510va		
1800	1900		Costa Rica, University Network	11870va	13750va	

Start	End	Days	Station	Freq 1	Freq 2	Freq 3	Freq 4
1800	1900		Eqt Guinea, Radio Africa	7189af	15184af		
1800	1900	as	Germany, Bible Voice Broadcasting	9460me			
1800	1900	as	Germany, Bible Voice Broadcasting 9730me	6015as	7210as		
1800	1900		Germany, Overcomer Ministries	17550na			
1800	1900	vl	Greece, Voice of 7430eu	15485eu			
1800	1900		India, All India Radio 7410eu 11620eu 11935af 15155af 17670af	9445af	9950eu	13605af	15075af
1800	1900		Liberia, ELWA	4760dc			
1800	1900		Malaysia, RTM	7295as			
1800	1900		Nigeria, Voice of	7255af			
1800	1900	vl	Philippines, Radio Pilipinas 15190pa	11730as	11890cs		
1800	1900		Russia, Voice of 5910as 7415as 9830me 11510af	5945as	7290eu		
1800	1900	as	Russia, Voice of 5950eu	6175eu			
1800	1900		Sierra Leone, Radio UNAMSIL	6137af			
1800	1900		Swaziland, TWR 3200af	9500af			
1800	1900		Taiwan, Radio Taiwan Intl	3965eu			
1800	1900	mtwhf	UK, BBC World Service	17830af			
1800	1900		UK, BBC World Service 12095eu 13700eu	6195eu	9410eu		
1800	1900		USA, AFRTS 4319usb 6350usb 7590usb 7812usb 10320usb 12133usb 12579usb 13362usb 13855usb	5446usb	5765usb		
1800	1900		USA, KAIJ Dallas TX	13815na			
1800	1900		USA, KTBN Salt Lake City UT	15590na			
1800	1900		USA, KWHR Naalehu HI	9930as			
1800	1900		USA, Voice of America 13710af 15240af 17895af	6035af	11975of		
1800	1900		USA, WBCQ Kennebunk ME 9330na 17495na	5105na	7415na		
1800	1900		USA, WBOH Newport NC	5920am			
1800	1900		USA, WEWN Birmingham AL 15695va 15745va 17595va	11530va	13615va		
1800	1900		USA, WHRA Greenbush ME	17650na			
1800	1900		USA, WHRI Noblesville IN	9840om	15105am		
1800	1900		USA, WINB Red Lion PA	13570am			
1800	1900		USA, WJIE Louisville KY	7490am			
1800	1900		USA, WMLK Bethel PA 9265eu	15265eu			
1800	1900		USA, WRMI Miami FL 9955am	15725am			
1800	1900		USA, WTJC Newport NC	9370na			
1800	1900		USA, WWCR Nashville TN 13845na 15825na	9985na	12160na		
1800	1900		USA, WWRB Manchester TN	9320na	12170na		
1800	1900		USA, WYFR Okeechobee FL 15115eu 17510eu 17535eu 18980eu	7240eu	13695eu		
1800	1900		Yemen, Rep of Yemen Radio	9780me			
1800	1900		Zambia, Radio Christian Voice	4965af			
1830	1845	mt	UK, BBC World Service 7105eu	6050eu	6130eu		
1830	1900		Belgium, Radio Vlaanderen Intl	7490eu	5910eu		
1830	1900		Bulgaria, Radio	5800eu	7500eu		
1830	1900		South Africa, AWR Africa	11925af			
1830	1900	mtwhfa	Sweden, Radio	6065eu			
1830	1900		UK, BBC World Service 6005af 6190af 9630af 17830af 21470af	3255af	5975af	15400af	15420af
1840	1854		Rwanda, Radio	6055do			
1845	1900		Congo, RTV Congolaise	4765af	5985af		
1851	1900		New Zealand, Radio NZ Intl	15265pa			

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

Start	End	Days	Station	Freq 1	Freq 2	Freq 3	Freq 4
1900	1915		Congo, RTV Congolaise	4765af	5985af		
1900	1928		Vietnam, Voice of 7280eu	11630as			
1900	1930	s	Germany, Bible Voice Broadcasting	6015va			
1900	1930	s	Germany, Universal Life	7105me			
1900	1930	vl	Libya, Voice of Africa 11635af	11715af			
1900	1930		Lithuania, Radio Vilnius	9710eu			
1900	1930	vl	Philippines, Radio Pilipinas 15190pa	11730as	11890as		
1900	1945	DRM	China, China Radio Intl	12080va			
1900	1945		India, All India Radio 7410eu 11620eu 11935af 15155af 17670af	9445af	9950eu	13605af	15075af
1900	1957		China, China Radio Intl 9440af 9585af	6100eu	7295af		
1900	1959		Germany, Deutsche Welle 13780af 17800af	6180af	11865af		
1900	2000		Anguilla, Caribbean Beacon	11775am			
1900	2000		Australia, Radio 9580as 9710as 11880pa	6080as	7240as	9500as	
1900	2000		Australia, Voice Intl	11685as			
1900	2000		Canada, CBC Northern Service	9625do			
1900	2000		Canada, CFRX Toronto ON	6070do			
1900	2000		Canada, CFVP Calgary AB	6030do			
1900	2000		Canada, CKZN St John's NF	6160do			
1900	2000		Canada, CKZU Vancouver BC	6160do			
1900	2000		Costa Rica, University Network	11870va	13750va		
1900	2000		Eqt Guinea, Radio Africa	7189af	15184af		

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

Start	End	Days	Station	Freq 1	Freq 2	Freq 3	Freq 4
1900	2000	as	Germany, Bible Voice Broadcasting 9470al	6015va	9460me		
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do		
1900	2000	vl	Greece, Voice of 7430eu	15485eu			
1900	2000		Liberia, ELWA	4760do			
1900	2000		Malaysia, RTM	7295as			
1900	2000		Namibia, Namibian BC Corp 6060af	3270af	3290af		
1900	2000		Netherlands, Radio 7120af 17810af	9895af	11655af		
1900	2000	as	Netherlands, Radio 15315na	17725na	17875na		
1900	2000		New Zealand, Radio NZ Intl	15265pa			
1900	2000		Nigeria, Radio/Ibodan	6050do			
1900	2000		Nigeria, Radio/Koduna	4770do	6090do		
1900	2000		Nigeria, Radio/Lagos 3326do	4990do			
1900	2000		Nigeria, Voice of	7255af			
1900	2000		North Korea, Voice of 4405eu	7570eu	12015eu		
1900	2000		Papua New Guinea, Catholic Radio	4960va			
1900	2000		Papua New Guinea, NBC	4890do			
1900	2000		Russia, Voice of 7335eu 7400eu 11510af	6175eu	6235eu	7290eu	
1900	2000		Sierra Leone, Radio UNAMSIL	6137af			
1900	2000	vl	Sierra Leone, SLBS 3316do				
1900	2000	vl	Solomon Islands, SIBC	5020do	9545do		
1900	2000		South Africa, Channel Africa	3345af			
1900	2000	m	South Africa, SW Radio League	3215af			
1900	2000		South Korea, Radio Korea Intl	5975eu	7275eu		
1900	2000	a	Sri Lanka, SLBC	6010eu			
1900	2000		Swaziland, TWR	3200af			
1900	2000		Thailand, Radio	9840eu			
1900	2000	vl	Uganda, Radio 4976do	5026do	7196do		
1900	2000	mtwhf	UK, BBC World Service	17830af			
1900	2000		UK, BBC World Service 6005af 6190af 9630af 17830af	3255af	5975af	12095af	15400af
1900	2000		USA, AFRTS 4319usb 6350usb 7590usb 7812usb 10320usb 12133usb 12579usb 13362usb 13855usb	5446usb	5765usb		
1900	2000		USA, KAIJ Dallas TX	13815na			
1900	2000		USA, KJES Vado NM	15385na			
1900	2000		USA, KTBN Salt Lake City UT	15590na			
1900	2000		USA, Voice of America 9785va 11975af 12015me 13640af 13710af 15240af 15580af 17895af	4940af	6035af		
1900	2000		USA, WBCQ Kennebunk ME 9330na 17495na	5105na	7415na		
1900	2000		USA, WBOH Newport NC	5920am			
1900	2000		USA, WEWN Birmingham AL 15695va 15745va 17595va	11530va	13615va		
1900	2000		USA, WHRA Greenbush ME	17525na	17650na		
1900	2000		USA, WHRI Noblesville IN	9840am	15665am		
1900	2000		USA, WINB Red Lion PA	13570am			
1900	2000		USA, WJIE Louisville KY	7490am			
1900	2000		USA, WMLK Bethel PA 9265eu	15265eu			
1900	2000		USA, WRMI Miami FL 9955am	15725am			
1900	2000		USA, WTJC Newport NC	9370na			
1900	2000		USA, WWCR Nashville TN 13845na 15825na	9985na	12160na		
1900	2000		USA, WYFR Okeechobee FL 6085va 13695va 15565va 17510va 18980va	3230va	6020vo		
1900	2000		Zambia, Radio Christian Voice	4965af			
1900	2000	vl	Zimbabwe, ZBC Corp 5975do				
1905	1915	vl	Croatia, Croatian Radio	6165na	13830na		
1915	1925		Rwanda, Radio 6005do				
1915	1930		UK, BBC World Service	15105af	17885af		
1915	1945	f	Germany, Bible Voice Broadcasting	7295af			
1915	2000		China, China Radio Intl	12080va			
1925	1945		Armenia, Voice of 4810eu	9965as			
1930	2000	mthf	Belarus, Radio 7105eu	7340eu			
1930	2000		Iran, Voice of the Islamic Rep 9855af 11695af	6110eu	7320eu		
1930	2000		Serbia & Montenegro, Intl Radio	6100eu			
1930	2000		Slovakia, Slovak Radio	5915eu	7345eu		
1930	2000		Turkey, Voice of 6055eu				
1935	1955		Italy, RAI Intl	6035eu	9760eu		
1945	2000	mtwhfa	Albania, Radio Tirana 6115eu	7210eu			
1945	2000	f	Germany, Bible Voice Broadcasting	7220af			
2000	2015	fs	Germany, Bible Voice Broadcasting 7220af	9470me			
2000	2020		Turkey, Voice of 6055eu				
2000	2027		Iran, Voice of the Islamic Rep 9855af 11695af	6010af	7320eu		
2000	2028		Hungary, Radio Budapest	3975eu	6025eu		
2000	2030	vl	Libya, Voice of Africa 11635af	11715af			
2000	2030		Mongolia, Voice of 9720eu				
2000	2030		Papua New Guinea, Catholic Radio	4960vo			
2000	2030		Swaziland, TWR 3200af				
2000	2030		USA, Voice of America 11975af 13710af 15240af 15580af	4940af	6035af		
2000	2030		Vatican City, Vatican Radio	7365af	9755af		

Start	End		Station	Freq 1	Freq 2	Freq 3
				11625af		
2000	2050		New Zealand, Radio NZ Intl	15265pa		
2000	2057	as	Netherlands, Radio 15315na	17725na		
2000	2059		Germany, Deutsche Welle	12025af	13780af	
			15205af 15410af			
2000	2059	mtwhf	Spain, Radio Exterior Espana	9595af	9680eu	
2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, ABC NT Alice Springs	2310do	4835irr	
2000	2100		Australia, ABC NT Katherine	2485do		
2000	2100		Australia, ABC NT Tennant Creek	2325do		
2000	2100	as	Australia, Radio 6080pa	7240as		
2000	2100		Australia, Radio 9500as	9580as	11650as	
			11880po 12080pa			
2000	2100		Australia, Voice Intl 11685as			
2000	2100		Canada, CBC Northern Service	9625do		
2000	2100		Canada, CFRX Toronto ON	6070do		
2000	2100		Canada, CFVP Calgary AB	6030do		
2000	2100		Canada, CKZN St John's NF	6160do		
2000	2100		Canada, CKZU Vancouver BC	6160do		
2000	2100		Canada, Radio Canada Intl	15180am		
2000	2100		China, China Radio Intl	6100eu	5960al	
			7190al 7285al 7295eu	9440eu	9600eu	
			9855eu			
2000	2100	DRM	China, China Radio Intl	12080va		
2000	2100		Costa Rica, University Network	13750va		
2000	2100		Eqt Guinea, Radio Africa	7189af	15184af	
2000	2100	vl	Ghana, Ghana BC Corp 3366do	4915do		
2000	2100	vl	Greece, Voice of 15485va	17565va		
2000	2100		Indonesia, Voice of 9525as	11785po	15150al	
2000	2100	vl	Italy, IRRS 5775eu			
2000	2100		Liberia, ELWA 4760do			
2000	2100		Malaysia, RTM 7295os			
2000	2100		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
2000	2100		Nigeria, Radio/Ibadan	6050do		
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do	
2000	2100		Nigeria, Radio/Lagos 3326do	4990do		
2000	2100		Nigeria, Voice of 7255af	9690al		
2000	2100		Papua New Guinea, NBC	4890do		
2000	2100		Russia, Voice of 6145eu	6235eu	7290eu	
			7300eu 7330eu			
2000	2100		Sierra Leone, Radio UNAMSIL	6137af		
2000	2100	vl	Sierra Leone, SLBS 3316do			
2000	2100	vl	Solomon Islands, SIBC	5020do	9545do	
2000	2100		South Africa, AWR Africa	15295af		
2000	2100	vl	Uganda, Radio 4976do	5026do	7196do	
2000	2100	mtwhf	UK, BBC World Service	17830af		
2000	2100		UK, BBC World Service	3255af	6005af	
			6190af 9630af 12095af	15400af	17830af	
2000	2100		USA, AFRTS 4319usb	5446usb	5765usb	
			6350usb 7590usb	7812usb	10320usb	
			12133usb 12579usb	13362usb	13855usb	
2000	2100		USA, KAIJ Dallas TX 13815na			
2000	2100		USA, KJES Vado NM 15385na			
2000	2100		USA, KTBN Salt Lake City UT	15590na		
2000	2100		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na 17495na			
2000	2100		USA, WBOH Newport NC	5920am		
2000	2100		USA, WEWN Birmingham AL	11530va	13615va	
			15695va 15745va	17595va		
2000	2100		USA, WHRA Greenbush ME	17525na	17650na	
2000	2100		USA, WHRI Noblesville IN	9840am	15665am	
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WJIE Louisville KY	7490am		
2000	2100		USA, WMLK Bethel PA 9265eu	15265eu		
2000	2100		USA, WRMI Miami FL 9955am	15725am		
2000	2100		USA, WTJC Newport NC	9370na		
2000	2100		USA, WWCR Nashville TN	9985na	12160na	
			13845na	15825na		
2000	2100		USA, WWRB Manchester TN	9320na	12170na	
2000	2100		USA, WYFR Okeechobee FL	3230va	5820va	
			6020va 7360va 7580vo	15115va	15195va	
			17510vo	17535vo	17575va	
2000	2100		Zambia, Radio Christian Voice	4965af		
2000	2100	vl	Zimbabwe, ZBC Corp 5975do			
2005	2100		Syria, Radio Damascus	12085eu	13610eu	
2015	2100		China, China Radio Intl	12080va		
2025	2045		Italy, RAI Intl 6040af	11880af		
2030	2045		Thailand, Radio 9535eu			
2030	2058		Vietnam, Voice of 5955va	7220vo	7280va	
			9550vo 11630va			
2030	2100		Belgium, Radio Vlaanderen Intl	7490eu		
2030	2100		Cuba, Radio Havana 9505va	11760va		
2030	2100		Egypt, Radio Cairo 15375af			
2030	2100	vl	Libya, Voice of Africa 11635af			
2030	2100		Sweden, Radio 6065eu	7240eu	9415al	
2030	2100		USA, Voice of America 6035af	11835as		
			11975af	13710af	15240af	15580af
2030	2100	as	USA, Voice of America 4940af			
2045	2100		India, All India Radio 7410eu	9445eu	9910eu	
			9950eu 11620pa	11715pa		
2050	2100		Vatican City, Vatican Radio	4005eu	5885eu	
			7250eu			
2051	2100		New Zealand, Radio NZ Intl	17675pa		

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

Start	End		Station	Freq 1	Freq 2	Freq 3
2100	2110		Vatican City, Vatican Radio	4005eu	5885eu	
			7250eu			
2100	2130		Australia, ABC NT Katherine	2485do		
2100	2130		Australia, ABC NT Tennant Creek	2325do		
2100	2130		Australia, Radio 9500as	9660as	11650as	
			11695pa 12080pa	13630pa	15515pa	
2100	2130	s	Belarus, Radio 7105eu	7340eu		
2100	2130		Cuba, Radio Havana 9505va	11760vo		
2100	2130	vl	Italy, IRRS 5775eu			
2100	2130	vl	Libya, Voice of Africa 11635af			
2100	2130		South Korea, Radio Korea Intl	3955eu		
2100	2145	DRM	China, China Radio Intl	12080va		
2100	2145		Nigeria, Radio/Ibadan	6050do		
2100	2157		China, China Radio Intl	7190eu	5960al 7285al	
			9600eu 9855af 11640af	13630eu	13630af	
			13660eu			
2100	2157	DRM	Czech Rep, Radio Prague Intl	5930va	9430vo	
2100	2157	DRM	Netherlands, Radio 15150eu			
2100	2159		Canada, Radio Canada Intl	5890eu	9770eu	
			15180am			
2100	2159		Germany, Deutsche Welle	9615af	13780af	
			15410af			
2100	2200		Anguilla, Caribbean Beacon	11775am		
2100	2200		Australia, ABC NT Alice Springs	2310do	4835irr	
2100	2200		Austria, AWR Europe 9830af			
2100	2200		Canada, CBC Northern Service	9625do		
2100	2200		Canada, CFRX Toronto ON	6070do		
2100	2200		Canada, CFVP Calgary AB	6030do		
2100	2200		Canada, CKZN St John's NF	6160do		
2100	2200		Canada, CKZU Vancouver BC	6160do		
2100	2200		Costa Rica, University Network	13750va		
2100	2200		Egypt, Radio Cairo 15375af			
2100	2200		Eqt Guinea, Radio Africa	7189af	15184af	
2100	2200	vl	Ghana, Ghana BC Corp 3366do	4915do		
2100	2200	vl	Greece, Voice of 15485va	17565va		
2100	2200		Guyana, Voice of 3290do	5950va		
2100	2200		India, All India Radio 7410eu	9445eu	9910eu	
			9950eu 11620pa	11715pa		
2100	2200		Japan, Radio 6035pa	6090eu	6180eu	
			11855af	17825na	21670pa	
2100	2200		Liberia, ELWA 4760do			
2100	2200		Malaysia, RTM 7295os			
2100	2200		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
2100	2200		New Zealand, Radio NZ Intl	17675pa		
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do	
2100	2200		Nigeria, Radio/Lagos 3326do	4990do		
2100	2200		North Korea, Voice of 4405eu	7570eu	12015eu	
2100	2200		Papua New Guinea, NBC	4890do		
2100	2200		Sierra Leone, Radio UNAMSIL	6137af		
2100	2200	vl	Sierra Leone, SLBS 3316do			
2100	2200		South Africa, Channel Africa	3345af		
2100	2200		Syria, Radio Damascus	12085eu	13610eu	
2100	2200		UK, BBC World Service	3255af	3915as	
			5965as 5975ca 6005af	6110os	6190af	
			6195va 9410eu 9605af	12095ca	15400of	
2100	2200		USA, AFRTS 4319usb	5446usb	5765usb	
			6350usb 7590usb	7812usb	10320usb	
			12133usb 12579usb	13362usb	13855usb	
2100	2200		USA, KAIJ Dallas TX 13815na			
2100	2200		USA, KTBN Salt Lake City UT	15590na		
2100	2200		USA, Voice of America 6035af	11975af		
			13710af	15580af		
2100	2200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na 17495na			
2100	2200		USA, WBOH Newport NC	5920am		
2100	2200		USA, WEWN Birmingham AL	11530va	13615va	
			15695va 15745va	17595va		
2100	2200		USA, WHRA Greenbush ME	7570na	9455na	
			17525na	17650na		
2100	2200		USA, WHRI Noblesville IN	9840am	15665am	
2100	2200		USA, WINB Red Lion PA	13570am		
2100	2200		USA, WJIE Louisville KY	7490am		
2100	2200		USA, WMLK Bethel PA 15265eu			
2100	2200		USA, WRMI Miami FL 9955am	15725am		
2100	2200		USA, WTJC Newport NC	9370na		
2100	2200		USA, WWCR Nashville TN	7465na	9985na	
			12160na	13845na		
2100	2200		USA, WWRB Manchester TN	9320na	12170na	
2100	2200		USA, WYFR Okeechobee FL	5820va	7360va	
			7580va 15565va 17510va	17535va	17575va	
2100	2200		Zambia, Radio Christian Voice	4965af		
2100	2200	vl	Zimbabwe, ZBC Corp 5975do			
2110	2130	mtwhf	UK, BBC World Service	11675ca	15390ca	
2115	2157		China, China Radio Intl	21080va		
2115	2200		Egypt, Radio Cairo 9990eu			
2130	2145	tf	UK, BBC World Service	11680ca		
2130	2156		Romania, Radio Romania Intl	6015eu	6055eu	
			7145eu 9540na			
2130	2200		Australia, ABC NT Katherine	5025do		
2130	2200		Australia, ABC NT Tennant Creek	4910do		
2130	2200		Australia, Radio 9660as	11650as	12080as	

Start	End	Flag	Station	Freq1	Freq2	Freq3	Freq4
				13630pa	15515pa		
2130	2200		Guam, AWR/KSDA	11980as	12010as		
2130	2200	vl/f	Italy, IRRS 5775eu				
2130	2200		Turkey, Voice of	9525as			
2130	2200	f	UK, Wales Radio Intl	7150eu	7325eu		
2130	2200		Uzbekistan, Radio Tashkent	5025eu	7185eu		
			11905eu				

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

Start	End	Flag	Station	Freq1	Freq2	Freq3	Freq4
2200	2205		Syria, Radio Damascus	12085eu	13610eu		
2200	2220		Turkey, Voice of	9525as			
2200	2228		Hungary, Radio Budapest	6025eu	12010af		
2200	2230		Belgium, Radio Vlaanderen Intl	11730na			
2200	2230		India, All India Radio	7410eu	9445eu	9910eu	
			9950eu 11620pa	11715pa			
2200	2230		Liberia, ELWA	4760do			
2200	2230		Papua New Guinea, NBC	4890do			
2200	2230		Serbia & Montenegro, Intl Radio	6100eu			
2200	2230		USA, Voice of America	11835as			
2200	2245		Egypt, Radio Cairo	9990eu			
2200	2257		China, China Radio Intl	7170eu			
2200	2257	DRM	Netherlands, Radio	15525na			
2200	2259		Canada, Radio Canada Intl	15180om			
2200	2259	DRM	Canada, Radio Canada Intl	9800na			
2200	2259		Germany, Deutsche Welle	6180as	6225as		
2200	2259	as	Spain, Radio Exterior Espana	9595af	9680eu		
2200	2300		Anguilla, Caribbean Beacon	6090am			
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr		
2200	2300		Australia, ABC NT Katherine	5025do			
2200	2300		Australia, ABC NT Tennant Creek	4910do			
2200	2300		Australia, Radio	13620as	13630pa	15230pa	
			15240pa	15515pa	21740pa		
2200	2300		Bulgaria, Radio	5800eu	7500eu		
2200	2300		Canada, CBC Northern Service	9625do			
2200	2300		Canada, CFRX Toronto ON	6070do			
2200	2300		Canada, CFVP Calgary AB	6030do			
2200	2300		Canada, CKZN St John's NF	6160do			
2200	2300		Canada, CKZU Vancouver BC	6160do			
2200	2300		Costa Rica, University Network	13750va			
2200	2300		Eqt Guinea, Radio Africa	7189af	15184af		
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do		
2200	2300		Guyana, Voice of	3290do			
2200	2300		Malaysia, RTM	7295as			
2200	2300		Namibia, Namibian BC Corp	3270af	3290af		
			6060af				
2200	2300		New Zealand, Radio NZ Intl	17675pa			
2200	2300		Nigeria, Radio/Ibadan	6050do			
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do		
2200	2300		Nigeria, Radio/Lagos 3326do	4990do			
2200	2300		Sierra Leone, Radio UNAMSIL	6137af			
2200	2300	vl	Sierra Leone, SLBS	3316do			
2200	2300	vl	Solomon Islands, SIBC	5020do	9545do		
2200	2300		Taiwan, Radio Taiwan Intl	9355eu			
2200	2300		UK, BBC World Service	5965eu	6195va		
			7105as 9605af	9740as	11955as	12095ca	
			15400af				
2200	2300		Ukraine, Radio Ukraine Intl	5B40eu			
2200	2300		USA, AFRTS	4319usb	5446usb	5765usb	
			6350usb	7590usb	7812usb	10320usb	
			12133usb	12579usb	13362usb	13855usb	
2200	2300		USA, KAIJ Dallas TX	13815na			
2200	2300		USA, KTBN Salt Lake City UT	15590na			
2200	2300		USA, KWHR Naalehu HI	11565as	17510as		
2200	2300		USA, Voice of America	7215va	9890va		
			15185va	15290va	15305va	17740va	
2200	2300		USA, WBCQ Kennebunk ME	5105na	7415na		
			9330na 17495na				
2200	2300		USA, WBOH Newport NC	5920am			
2200	2300		USA, WEWN Birmingham AL	9975va	11530va		
			15695va	15745va			
2200	2300		USA, WHRA Greenbush ME	7570na	9455na		
			17650na				
2200	2300		USA, WHRI Noblesville IN	7535am	9455am		
2200	2300		USA, WINB Red Lion PA	13570am			
2200	2300		USA, WJIE Louisville KY	13595am			
2200	2300		USA, WRMI Miami FL 9955am	15725am			
2200	2300		USA, WRMI Miami FL 9955am	15725am			
2200	2300		USA, WTJC Newport NC	9370na			
2200	2300		USA, WWCR Nashville TN	5070na	7465na		
			9985na 13845na				
2200	2300		USA, WWRB Manchester TN	9320na	12170na		
2200	2300		USA, WYFR Okeechobee FL	9690va	11740va		
			21525va				
2200	2300		Zambia, Radio Christian Voice	4965af			
2205	2230		Italy, RAI Intl	11895as			
2230	2257		Czech Rep, Radio Prague Intl	5930va	7345va		
2230	2259		Canada, Radio Canada Intl	6160as	7195as		
			9730as				
2230	2300	mtwhfa	Albania, Radio Tirana 7120eu				
2230	2300	os	Australia, HCJB	15525as			
2230	2300		Guam, AWR/KSDA	11850as	15320as		
2230	2300		Papua New Guinea, NBC	9675do			
2230	2300		Sweden, Radio	6065eu			

Start	End	Flag	Station	Freq1	Freq2	Freq3
2230	2300		USA, Voice of America	9545va	9785va	
			11935va	13755va		
2245	2300		India, All India Radio	9705as	9950as	11620as
			11645as	13605as		

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

Start	End	Flag	Station	Freq1	Freq2	Freq3
2300	0000		Anguilla, Caribbean Beacon	6090am		
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr	
2300	0000		Australia, ABC NT Katherine	5025do		
2300	0000		Australia, ABC NT Tennant Creek	4910do		
2300	0000	as	Australia, HCJB	15525as		
2300	0000		Canada, CBC Northern Service	9625do		
2300	0000		Canada, CFRX Toronto ON	6070do		
2300	0000		Canada, CFVP Calgary AB	6030do		
2300	0000		Canada, CKZN St John's NF	6160do		
2300	0000		Canada, CKZU Vancouver BC	6160do		
2300	0000		Costa Rica, University Network	13750va		
2300	0000		Cuba, Radio Havana 9550na			
2300	0000		Egypt, Radio Cairo 7115na			
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do	
2300	0000		Guyana, Voice of 3290do			
2300	0000		India, All India Radio	9705as	9950as	11620as
			11645as	13605as		
2300	0000		Malaysia, RTM 7295as			
2300	0000		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
2300	0000		New Zealand, Radio NZ Intl	17675pa		
2300	0000		Papua New Guinea, NBC	9675do		
2300	0000		Sierra Leone, Radio UNAMSIL	6137af		
2300	0000	vl	Sierra Leone, SLBS 3316do			
2300	0000		Singapore, Mediacorp Radio	6150do		
2300	0000	vl	Solomon Islands, SIBC	5020do	9545do	
2300	0000		UK, BBC World Service	5975ca	6195eu	
			12095ca			
2300	0000		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7590usb	7812usb	10320usb
			12133usb	12579usb	13362usb	13855usb
2300	0000		USA, KAIJ Dallas TX	13815na		
2300	0000		USA, KTBN Salt Lake City UT	15590na		
2300	0000		USA, KWHR Naalehu HI	11565as	17510as	
2300	0000		USA, Voice of America	7215va	9890va	
			11995va	15185va	15290va	15305va
			17740va			
2300	0000		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
2300	0000		USA, WBOH Newport NC	5920am		
2300	0000		USA, WEWN Birmingham AL	7425va	9975va	
			11530va	15695va		
2300	0000		USA, WHRA Greenbush ME	7570na	9455na	
			17650na			
2300	0000		USA, WHRI Noblesville IN	7315am	7535am	
2300	0000		USA, WINB Red Lion PA	9320am		
2300	0000		USA, WJIE Louisville KY	13595am		
2300	0000		USA, WTJC Newport NC	9370na		
2300	0000		USA, WWCR Nashville TN	3210na	5070na	
			7465na 13845na			
2300	0000		USA, WWRB Manchester TN	5050na	5085na	
			5745na 6890na			
2300	0000		USA, WYFR Okeechobee FL	5985am	11740am	
			11855am	15170am	15400am	
2300	0000		Zambia, Radio Christian Voice	4965af		
2300	2306		Nigeria, Radio/Lagos 3326do			
2300	2330		Australia, Radio	9660as	12080as	13620as
			13630pa	15230pa	15240pa	17795pa
			21740pa			
2300	2330		Germany, Deutsche Welle	9800na		
2300	2330	DRM	Sweden, Radio	9800va		
2300	2330		UK, BBC World Service	3915as	5965as	
			6195as 9740as	11945as	11955as	15280as
2300	2330		USA, Voice of America	6180va	7205va	
			9780va 11655va	15150va		
2300	2350		Turkey, Voice of	5960va		
2300	2356		Romania, Radio Romania Intl	6135eu	6180eu	
			7105eu 9610na			
2300	2357		China, China Radio Intl	5975as	5990na	
			6040na 7180as			
2300	2359		Germany, Deutsche Welle	6070as	9815as	
			12035as			
2315	2330	vl	Croatia, Croatian Radio	7285sa		
2330	0000		Australia, Radio	9660as	12080as	13620as
			13630pa	15230pa	15415pa	17750pa
			17795pa	21740pa		
2330	0000		Lithuania, Radio Vilnius	7325na		
2330	0000		UK, BBC World Service	3915as	5965as	
			6170as 6195as	9740as	11945as	11955as
			15280as			
2330	0000		USA, Voice of America	6180va	7130va	
			7205va 9620va	9780va	11665va	11805va
			13640va	15205va		
2330	2357		Czech Rep, Radio Prague Intl	5930va	7345va	
2330	2358		Vietnam, Voice of 9840as	12020as		
2335	0000	as	Austria, Radio Austria Intl	9870sa		
2340	0000	mtwhf	Austria, Radio Austria Intl	9870sa		

DoD Publications/Charts

In a stunning announcement in the November 18, 2004, issue of the *Federal Register*, the National Geospatial-Intelligence Agency (NGA) filed notice that it intends to remove its Flight Information Publications (FLIP), Digital Aeronautical Fight Information File (DAFIF), and related aeronautical safety of navigation digital and hard copy publications from public sale and distribution.

According to the notice, "This action is being taken to accomplish the following objectives: safeguarding the integrity of Department of Defense (DoD) aeronautical navigation data currently available on the public Internet; preventing unfettered access to air facility data by those intending harm to the United States, its interests or allies; upholding terms of bi-lateral geospatial data-sharing agreements; avoiding competition with commercial interests; and avoiding intellectual property/copyright disputes with foreign agencies that provide host-nation aeronautical data.

"The DAFIF and related digital aeronautical information files will be protected from general public access on the NGA home page. Navigation/Planning Charts (ONC, TPC, etc.), and the DAFIF CD will be available only through the Department of Defense (DoD) distribution system. U.S. Federal and State government agencies, authorized government contractors, and international agencies that currently receive those products under formal or informal geospatial data exchange arrangements will not be affected by this action."

IF this action is implemented on October 1, 2005, it will have a major impact on the Milair scanner hobby. But, in late-breaking news, outlined in the *Communications* column in this issue, the NGO has opened a comment period. Instructions on where you can comment on this government proposal are on page 6. Looks like it is time for *Milcom* hobbyists nationwide to pick up pen and paper and let your Congressman and the NGO know your dissatisfaction that another taxpayer funded service of the government is being withheld from public access.

Milair Band Realignment Continues

In the last few years this column has been published in *Monitoring Times*, your column editor has noticed the subtle shift by the Department of Defense to more of the Milair band 25 kHz splinter frequencies (xxx.x25/.x75). In years past this band used a spacing of 100 kHz between channels. Gradually as the older aircraft radios were phased out and newer technology was put into place, more channels spaced 25 kHz apart have been observed.

We have observed in the last year an even faster acceleration to channels ending with .x25/.x75. Table 1 is a frequency sampler, courtesy of the *Grove Military Frequency Directory*, of this shift to these new 25 kHz frequencies.

And that will do it for this month. Next month we will feature our annual airshow monitoring guide, so be sure to check back in then. Until next time, 73 and good hunting.

Table One: Splinter Frequency Sampler

Frequency	Service	Location	Use
225.525	USA	Fort Rucker/Hanchey AHP, AL	Goldberg East
225.575	USA	Fort Rucker/Hanchey AHP, AL	Tower
226.875	USA	Fort Stewart/Wright AAF, GA	3rd ID AH-64 Air-to-Air
227.025	USAF	Eglin AFB, FL	F-15 Blue Air (Eglin Mission)
227.125	USMC	Yuma MCAS/Yuma International, AZ	GCA
227.175	USN	Fort Lauderdale, FL	Blue Angels Pre-show/Post-show Interplane
228.325	USAF	Barksdale AFB, LA	2BW/11BS Air-to-Air
233.425	USAF	Columbus AFB, MS	Approach/Departure Control
234.875	USAF	Tyndall AFB, FL	Carrabelle Ranges
235.775	-------	Chicago, IL show	UHF Platform Frequency at 2004 Chicago air
	USAF	North Aux Field, SC	Tower
239.275	FAA	Atlanta, GA Approach/Departure Control	
	FAA	El Paso International, TX	Tower
240.775	USAF	Edwards AFB, CA	F-22 Raptor Flight Test
241.175	USA	Yuma Proving Ground/Laguna AAF, AZ	Tower/Airfield Advisory
241.525	USAF	Barksdale AFB, LA	917 Wing/47FS Air-to-Air
242.175	USMC	Yuma MCAS/Yuma International, AZ	Tower
242.425	USN	USS George Washington (CVN-73)	VAW-121/CVW-7 Air-to-Air
244.775	USMC	New River MCAS, NC	Metro
253.725	USAF	Vance AFB, OK	Tower
254.275	FAA	Tupelo Regional, MS	Tower/Ground Control
	USMC	New River MCAS, NC	Ground Control
	USAF	Ohio Statewide	Air National Guard Air-to-air
	FAA	Moon Township, PA	Low Altitude Discrete Cleveland ARTCC
	FAA	Cheyenne Airport, WY	Ground Control
254.325	FAA	Lake City, FL	Low Altitude Discrete Jacksonville ARTCC
254.725	USAF	Dyess AFB, TX	7BW Maintenance
255.725	Contractor	Dobbins JARB/Atlanta NAS, GA	Lockheed Flight Test Support
255.775	USAF	AR-652 (North/South)/A/B	Aerial Refueling Anchor
257.675	FAA	Cedar City, CA	High Altitude Los Angeles ARTCC
257.725	USAF	Altus AFB, OK	Approach/Departure Control
257.775	USN	Whiting Field NAS North, FL	Clearance Delivery
	FAA	Syracuse Hancock International, NY	Clearance Delivery
257.925	FAA	Harrison/Marion Regional, WV	Tower
257.975	USAF	Arnold AFB, TN	Base Operations
262.775	USN	NB Ventura County/Point Mugu NAS, CA	Base Operations
264.125	USAF	Gila Bend AF Aux Airfield, AZ	Range Control/Operations
269.075	USAF	Little Rock AFB, AR	Tower
	USAF	Keesler AFB, MS	Tower
	FAA	Nellis AFB, NV	Departure Control
269.175	FAA	Lincoln, NE	High Altitude
269.325	FAA	Gainesville, FL	Approach/Departure Control
	USN	Fort Worth NAS/JRB, TX	Local Control
269.425	FAA	Langley AFB, VA	Norfolk Approach/Departure Control
269.475	FAA	St. Augustine Airport, FL	Tower
	FAA	Mansfield, OH	Low Altitude Discrete Cleveland ARTCC
269.625	FAA	Unknown RCAG	Cleveland ARTCC
270.275	FAA	Williams Gateway Airport, AZ	ATIS
	FAA	Potomac	Approach/Departure Control
270.325	FAA	Pittsburgh International Airport, PA	Tower
270.925	Norfolk, VA	Approach/Departure Control	
273.475	USAF	Luke AFB, AZ	Clearance Delivery
	FAA	Norfolk, VA	Approach/Departure Control
273.525	FAA	New Orleans International Airport, LA	Ground Control
	FAA	Harrisburg, PA	Approach/Departure Control
	FAA	Unknown RCAG	Jacksonville ARTCC
279.525	USMC	Yuma MCAS/Yuma International, AZ	GCA
279.625	USAF	Offutt AFB, NE	Tower
281.475	USA	Fort Stewart/Wright AAF, GA	Flight Following Advisories
	FAA	Unknown RCAG	Cleveland ARTCC
281.525	FAA	Harrisburg, PA	Approach/Departure Control

Frequency	Agency	Location	Function
282.225	FAA	Unknown RCAG	Denver ARTCC
282.275	FAA	Potamac	Approach/Departure Control
282.325	FAA	Various RCAG	Kansas City ARTCC
282.375	USAF	Utah Test and Training Range (UTTR), UT	Range Control
283.875	USAF	Nationwide	JOSAC Air-to-Air
284.075	USAF	AR-312H	Aerial Refueling Track
284.625	FAA	Bakersfield	Approach/Departure Control
	FAA	Augusta, GA	Approach/Departure Control
	FAA	Unknown RCAG	Cleveland ARTCC
284.675	FAA	Paris, OH	Low Altitude Discrete Cleveland ARTCC
285.225	FAA	Mount Dora, NM	Albuquerque ARTCC
285.325	USMC	New River MCAS, NC	ATIS
285.425	USA	Hunter AAF, GA	Tower
285.475	USAF	Andrews AFB, MD	Clearance Delivery
285.525	FAA	Atlanta, GA	Approach/Departure Control
	FAA	Unknown RCAG	Cleveland ARTCC
288.325	FAA	Miramar MCAS, CA	SoCal Approach/Departure Control
290.275	USA	Redstone Arsenal/Redstone AAF, AL	Tower
	FAA	Jacksonville International Airport, FL	Clearance Delivery
	USAF	Wright Patterson AFB, OH	Tower
290.3250	FAA	Miami International, FL	Departure Control
	USN	Whiting Field NAS North, FL	ATIS
	FAA	Piedmont Triad International, NC	Tower
290.375	USA	Fort Sill, OK	Clearance Delivery/VFR Advisory Service Duncan Sector
	FAA	Quantico MCB/MCAF (Turner Field), VA	Approach/Departure Control
290.425	USAF	Eglin AF Aux Nr 3 (Duke Field), FL	Tower
290.475	FAA	Potomac	Approach/Departure Control
290.525	USAF	Randolph AFB, TX	ATIS
290.625	USAF	Tyndall AFB, FL	Metro
291.375	USN	Patuxent River NAS (Trapnell Field), MD	Test Range Control
291.625	FAA	Pensacola NAS (Forrest Sherman Field), FL	Approach/Departure Control
	FAA	Baltimore, MD	Potomac Approach Control
291.775	FAA	Savannah Hilton Head International, GA	Clearance Delivery
	USN	Fort Worth NAS/JRB, TX	Base Operations
297.025	USAF	Edwards AFB, CA	412TW/419FLTS Operations
298.925	USMC	Miramar MCAS, CA	Tower (Fixed Wing)
303.075	USAF	Twentynine Palms MCAGCC, CA	R-2501 FAC
303.125	USMC	AR-018V (North/South)	Aerial Refueling VFR Helicopter
306.925	USN	Whiting Field NAS North, FL	Tower
	FAA	Charleston, SC	Approach/Departure Control
306.975	FAA	Miami, FL	Approach/Departure Control
	FAA	Atlanta, GA	Ground Controlled Approach
307.025	USA	Fort Campbell/Campbell AAF, KY	Approach/Departure Control
307.225	FAA	Savannah, GA	Approach/Departure Control
307.275	USN	NB Ventura County/Point Mugu NAS, CA	Approach/Departure Control
307.325	USMC	Miramar MCAS, CA	Ground Control (Fixed Wing)
	USA	Fort Benning/Lawson AAF, GA	Ground Controlled Approach
310.425	USAF	AR-672	Aerial Refueling Anchor
310.825	USAF	Moody AFB, GA	Ground Controlled Approach
311.575	USMC	AR-018V (North/South)	Aerial Refueling VFR Helicopter
311.675	USAF	Barksdale AFB, LA	2BW Air-to-Air
312.225	USAF	AR-312H	Aerial Refueling Track
317.425	FAA	Potomac	Approach/Departure Control
317.475	FAA	Pensacola NAS (Forrest Sherman Field), FL	Approach/Departure Control
317.525	USAF	Nellis AFB, NV	Mormon Mesa Range/Las Vegas Range Control
317.625	USAF	Seymour Johnson AFB, NC	ATIS
317.725	FAA	Birmingham International Airport, AL	Tower
	FAA	Milwaukee, WI	Approach/Departure Control
322.325	FAA	Travis AFB, CA	Approach/Departure Control
322.375	USN	China Lake NAWS, CA	ATIS
322.475	FAA	Golden Triangle Regional, MS	Ground Control
322.525	USAF	Homestead ARB, FL	Ground Controlled Approach
323.075	FAA	Lavell Field, TN	Approach/Departure Control
323.125	USA	Hunter AAF, GA	ATIS
323.175	FAA	Coaldale, CA	Oakland ARTCC
323.925	USAF	Seymour Johnson AFB, NC	Metro
327.025	USMC	Miramar MCAS, CA	Tower (Helicopter)
327.075	FAA	Piedmont Triad International, NC	Approach/Departure Control
327.125	USA	Cairns, AL	Approach/Departure Control
	FAA	Atlantic City, NJ	Approach/Departure Control
335.525	FAA	Unknown RCAG	Cleveland ARTCC
335.625	USAF	Holloman AFB, NM	Ground Controlled Approach
338.225	FAA	San Diego International (Lindbergh Field), CA	Tower
338.2750	FAA	Athens Ben Epps Airport, GA	Tower
	FAA	Charlottesville Albermarle Airport, VA	Tower/Ground Control
343.725	FAA	Fayetteville, NC	Approach/Departure Control
	USAF	Nellis AFB, NV	Ground Controlled Approach/In Flight Emergency
343.775	FAA	Potomac	Approach/Departure Control
348.725	FAA	Potomac	Approach/Departure Control
	FAA	Pensacola, FL	Approach/Departure Control
349.725	Contractor	Fort Worth NAS/JRB, TX	Lockheed Flight Test Support
350.075	USA	Fort Rucker/Cairns AAF, AL	HUB Radio AO Vanguard South
350.325	FAA	SoCal Approach/Departure Control	
351.825	FAA	Pensacola, FL	Approach/Departure Control
353.525	FAA	Unknown RCAG	Indianapolis ARTCC
353.575	FAA	Tampa, FL	Approach/Departure Control
353.675	USN	Jacksonville NAS (Towers Field), FL	Clearance Delivery
353.725	USAF	Pope AFB, NC	ATIS
353.775	FAA	Atlantic City International Airport, NJ	Clearance Delivery
354.025	USA	Fort Sill/Henry Post AAF, OK	ATIS
360.625	USAF	Indian Springs AF Auxiliary Field, NV	Tower
360.675	USAF	Hurlburt Field, FL	ATIS
360.775	FAA	Cherry Point MCAS, NC	Approach Control
361.075	USA	Fort Rucker/Hanchey AHP, AL	Allen Stagefield South Backup
363.125	FAA	Norfolk, VA	Approach/Departure Control
364.325	USAF	AR-400 (North/South)	Aerial Refueling Track
365.775	USAF	AR-255H/L	USA Aerial Refueling Track
370.875	USAF	Seymour Johnson AFB, NC	Tower
370.925	USAF	Homestead ARB, FL	Ground Controlled Approach
	USN	Fallon NAS, NV	ATIS
	FAA	Norfolk, VA	Approach/Departure Control
371.875	FAA	St. Louis Downtown, IL	Approach/Departure Control
372.175	USAF	Robins AFB, GA	AFRC Command Post
374.225	USAF	AR-040V (East/West)	Aerial Refueling VFR Helicopter
377.125	FAA	SoCal Approach/Departure Control	
377.175	FAA	SoCal Approach/Departure Control	
	USMC	Cherry Point, NC	Approach/Departure Control
379.525	USAF	Dobbins JARB/Atlanta NAS, GA	94AW/700AS Command Post
379.925	FAA	Charleston, SC	Approach/Departure Control
380.025	FAA	Savannah, GA	Approach/Departure Control
380.225	FAA	Montgomery, AL	Approach/Departure Control
380.425	FAA	Fort Stewart/Wright AAF, GA	Approach/Departure Control
381.875	USMC	Beaufort MCAS (Merritt Field), SC	Beaufort Tacts North Range
382.925	USMC	Beaufort MCAS (Merritt Field), SC	Beaufort Tacts North Range
385.425	FAA	Majors Field (Greenville), TX	Tower
387.025	USAF	Moody AFB, GA	Ground Controlled Approach
388.875	USAF	Langley AFB, VA	375AW C-21 Aircraft Air-to-Air
392.225	USAF	Tyndall AFB, FL	325FW Operations/Supervisor of Flying
395.225	USA	Camp Mackall/Mackall AAF, NC	Base Operations
395.425	USA	Fort Rucker/Knox AHP, AL	Tac-X Tactical Tower Operations
397.875	FAA	Hayden, CO	Denver ARTCC
	USAF	Holloman AFB, NM	Clearance Delivery

State-by-State

You may have noticed some changes in *MT* recently. We'll be revising this column a bit, too, going to a two-page, every-other-month format. Please do chime in with any comments you might have; if you don't tell us what you want in your magazine, we can only guess!

A common goal of the domestic-band DXer is to log as many states as possible. To that end, I'm going to be listing my educated guesses as to the best bets for hearing each of the 50 U.S. states and ten Canadian provinces on the AM band. I'll be using personal experience, the frequency with which stations are reported logged by DXers, and the directional patterns registered in the Federal Communwications Comission Engineering Database. "Your Mileage May Vary" – Remember that interference and antenna patterns vary wildly, and when a station's directional antenna goes "out of whack," a logging that would normally be impossible becomes trivially easy. But hopefully this will be a good starting place...

I'll start with the six New England states. Many of these states are tough even for East Coast DXers. Those of you in the Midwest and West shouldn't give up, but don't expect most of these to be easy.

Maine:

Most of the powerful stations in Maine beam east at night. Hearing Maine (unless you live in New Brunswick!) will probably require sunset/sunrise skip DXing. This means trying to catch stations during the brief period between average monthly sunrise (when the FCC allows them to increase to full daytime non-directional power) and when the sun actually rises high enough to cut off the nighttime "skip" signal propagation. A similar brief period is available between when the sun begins to go down, and when the FCC requires stations to drop back to lower nighttime power.

Two of your best bets for Maine are WTME-780 Rumford and WSKW-1160 Skowhegan. Both stations run 10 kilowatts non-directional during "FCC daytime" and have been widely heard near sunrise and sunset. WTME is a religious station; WSKW is

Best bets for logging the New England states:	
Maine:	WTME-780, WSKW-1160
New Hampshire:	WNTK-1010
Vermont:	WTWN-1100
Massachusetts:	WBZ-1030
Connecticut:	WTIC-1080
Rhode Island:	WPRO-630, WSKO-790

all-sports. Sports station WZON-620 Bangor is also non-directional at 5 kilowatts during the day. The 620 channel is more crowded but WZON has been heard through much of the East anyway.

New Hampshire:

There are few powerful stations in this state, and most that do exist beam either north or east. As with Maine, you'll need sunrise/sunset tactics to log the Granite State. WNTK-1010 Newport, with 10 kilowatts of non-directional country music, is by far your best starting target. WGIN-930 Rochester is also non-directional during the day, but on a much more crowded channel. Still, it's worth a try. WGIN simulcasts WGIR-610 with a news/talk format.

A construction permit exists for 50,000-watt WQTH-720 Hanover. This station will be directional during the day, but its pattern is not all that unfavorable to the west. WQTH will likely be the best chance for New Hampshire once it signs on the air.

Vermont:

You'll have the same problems as with New Hampshire, only worse... WTWN-1100 Wells River (religious) is really the only powerful station on a relatively clear channel. It operates at 5kW, daytime only, so again you'll need sunrise/sunset techniques. WVMT-620 Burlington (news/talk) has been heard in places that aren't too close to WTMJ Milwaukee or the Newark, NJ, station.

Massachusetts:

This is the easiest New England state to log. 50,000-watt news/talk giant WBZ-1030 Boston is one of the few directional Class A stations – but its directional pattern *favors* the west. WBZ should be audible just about everywhere east of Wyoming just about any night. A second Massachusetts station, WBNW-1120 Concord, has been heard fairly often outside New England with a mix of business news and country music.

Connecticut:

The Nutmeg State also has a 50,000-watt clear-channel station. News/talk WTIC-1080 Hartford can be difficult to log if KRLD Dallas is too strong at your location. Sunrise DXing can help here – try to listen after Hartford sunrise (when WTIC is allowed to switch to non-directional transmission) but before Dallas sunrise (while KRLD is still required

to use a directional antenna, protecting WTIC from interference and nulling their signal to the northeast).

Rhode Island:

Here's another tough one. Providence's two strongest stations (WPRO-630, news and WSKO-790, sports) are both non-directional with 5kW during the day, but beam all their power offshore at night. They're also on crowded "regional" channels. These channels still might be worth a try at sunrise and sunset. The directional pattern of WDDZ-550 Pawtucket is not quite so unfavorable to the west, but the station carries Radio Disney, which means the only identifying information broadcast will be a very brief hourly ID.

WRNI-1290 Providence will be easier to identify; they simulcast WBUR-FM Boston with NPR information programming, which will really stand out on AM! - and the WBUR simulcast also features plenty of local identifying information. Unfortunately, the WRNI directional pattern is in use 24 hours and doesn't favor the west.

So there you have it: our first stop on a trip around the North American AM dial. Next time, we'll drop down the Atlantic Coast, where the states are bigger (and fewer) but there are more DX targets to go around.

❖ Massachusetts station in trouble?

There could be some legal problems for one New England station. Several sources report the new owner of WBIX-1060 Natick, Massachussetts, admitted to government investigators he purchased the station with money stolen from investment clients. He then attempted to commit suicide – luckily failing.

There has been no comment or action yet from the FCC. The Commission has the power to revoke a license if the licensee is convicted of serious crimes, even if they have nothing to do with radio. At this writing, at least one amateur's license is in trouble over a murder conviction. A few years ago, several Missouri and Indiana broadcast licenses were revoked after the licensee was convicted of serious crimes under Missouri state law.

❖ X-band News

New station CHSL-1610 Toronto is on

the air. CHSL runs 1kW fulltime, and carries Spanish-language community programming. With the only U.S.-based full-power 1610 station (KALT Atlanta, Texas) off the air, CHSL and its fellow Canadian CJWI Montreal should be fairly easily DXable.

Two expanded-band stations in the U.S. South have moved. The 1690 station that once operated from the Valdosta, Georgia, area has moved to the Atlanta suburb of Avondale Estates. WSWK is carrying the Air America liberal talk network. Also on the move is the former Atmore, Alabama, station. After several months of silence, this station is back on the air from Gulf Breeze, Florida (near Pensacola), as WNRP. WNRP is mostly a simulcast of WYCT "Cat Country 98.7" but also carries Ice Pilots minor-league hockey.

Reports on the National Radio Club email list suggest a new X-band station operating on 1650 in Flagstaff, Arizona. A Google search on "KBXZ Radio" turns up 125 hits on a station carrying Fox Sports in the northern Arizona city; the station even has its own website on http://www.foxsports1650.com

What KBXZ does *not* appear to have is a license. The FCC website has no record of a 1650 station anywhere in Arizona; nor is there any AM station with the calls KBXZ; nor was 1650 kHz allotted for use anywhere in Arizona. As mentioned above, there have been several long-distance moves of X-band stations, but I can find no record of any such move ending up in Flagstaff. The three closest 1650 stations – KFOX near Los Angeles, KBIV in El Paso, and KBJD in Denver – are all still operating from their original locations.

I have not had any reports of "KBXZ" being heard anywhere outside Flagstaff. I doubt it's a legal "Part 15" station (which would have a coverage of only a few blocks), but it also seems unlikely it's running more than 1kW of power. Still, if it can cover most of Flagstaff, then it should be DXable by the persistent listener elsewhere. DX quickly; high-profile pirates have a tendency to disappear without much notice...

❖ More Spanish stations

Expect more Spanish on your radio dial. Clear Channel has announced a new "Hurban" format, popular and urban music, generally with lyrics in Spanish, designed to appeal to second- and third-generation Hispanics. The target audience is generally fluent in English but connected to Hispanic cultural roots. This will be reflected in the stations' use of bilingual announcers who will use both languages on the air.

The press release says between 20 and 25 Clear Channel stations will be adopting this format. Some of the first include WWVA-FM and WVVA-FM in the Atlanta area; and KLOL-FM in Houston. The KLOL change shows that nothing is forever in radio... 101.1FM has been Houston's rock station ever since 1970.

(WWVA-FM is no relation to the 50,000-watt AM station in West Virginia that recently abandoned plans to move to Cleveland. Nor

is WVWA-FM any relation to the WVVA in New York depicted on http://www.wvwa.com. If you visit the WVVA site, be sure to read the fine print at the bottom!)

❖ Everything old is new again

Clear Channel has been resurrecting "heritage" call letters in a number of their markets. One of the earliest changes was in Milwaukee, where oldies station WZTR-95.7 picked up the WRIT call letters, which for years were the calls for the top-40 AM station on 1340 (now WJYI). A similar change occurred recently in Nashville, where oldies WRMX-96.3 adopted the WMAK calls used by the Music City's top-40 station on 1300 (now WNQM, and sister to WWCR shortwave).

More recently, Clear Channel re-acquired the channel 4 TV station in San Antonio. KMOL-TV was originally WOAI-TV, sister to WOAI-1200. WOAI Radio was Clear Channel's first radio station. The KMOL calls have been changed back to WOAI-TV.

A similar change has happened in Rochester, New York. Clear Channel owns WHAM-1180 there, as well as WOKR-TV channel 13. At the first of the year, the WOKR call letters were changed to WHAM-TV to correspond to the radio station.

Like the radio stations, channel 13 in Rochester never actually held the WHAM-TV calls in the past. The TV station has always been WOKR, ever since it went on the air in 1962. And like the radio stations, there was a WHAM-TV in the past – but on a different channel. (Channel 6, later changed to channel 8. The station is now WROC-TV.)

If something works in one Clear Channel market, you can expect to see it happen in other markets. I would expect to see more "heritage" call letters appearing on FM and TV. (And for that matter, on AM: remember the WWWE-WTAM change in Cleveland?)

❖ No, this isn't just a ship...

Loyal *MT* reader Patrick Griffith snapped the accompanying photo on a visit to Seattle in November. Yes, it looks like a picture of a ship... but it's actually the KKOL-1300 transmitter site. Note the white pole on the stern of the *Coast Angel*. This is a 75-foot center-loaded fiberglass vertical antenna.

Believe it or not, this is an AM transmitter site...

Patrick says the transmitter is in the metal shipping container just in front of the antenna; AC power is provided from shore.

Why put the transmitter on a ship? Good question. I suppose one reason is the excellent ground conductivity of sea water. AM stations' ground systems are half the antenna. The better the grounding connection, the better the coverage. A large metal ship floating on sea water is just about unbeatable as a ground system. Also, I would imagine Seattle's zoning ordinances don't apply to ships! – A lengthy and contentious building permit application process wouldn't be necessary.

KKOL is, strangely enough, *not* the first U.S. AM station to go maritime. For many years, WNOP-740 Newport, Kentucky, operated from three oil tanks, ballasted with concrete and floating in the Ohio River across from Cincinnati. However, unlike KKOL, WNOP's transmitter was (and still is) on dry land in Ohio; only their studios were on the river. In any case, the station has since been sold and moved their studios ashore as well.

❖ 'Til April

I'm happy to see the WOKR-TV call letters going away; my word-processor will no longer be automatically correcting my spelling to "WORK"! Hearing anything interesting? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to *dougsmith@monitoringtimes.com*. Good DX!

BOATS, PLANES, AND TRAINS

PLANES
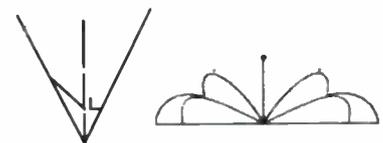
Iden Rogers, K6JHQ
idenrogers@monitoringtimes.com

Names and Numbers used in Aircraft Communications

Right out of the box, aircraft communications are not as easy to understand as are police or fire communications, but once some of the important aeronautical terms and basic flight procedures are learned, the fun really starts. This column is here to help.

As we listen to aircraft communications, we hear various names and numbers, some quite frequently, and many are specific to given listening areas. To increase listening enjoyment, it is helpful to recognize into which category each one falls and then to become familiar with the specifics of the ones you hear often.

A part of most all radio listening hobbies is collecting and organizing information, and aircraft listening is no exception with its many facets and challenges. So, dedicate a notebook and/or a place in your computer and let's get going!

❖ Frequency Numbers

Here are a few aircraft frequency tips: Frequencies in the civil aircraft band are in the 118 to 136 MHz range and those in the military band are in the 225 to 400 MHz range. The frequency allocations are in 25 kHz steps, that is, after the "point," they are .000, .025, .050, .075, .100, .125, and so on through .975 – and they repeat for each MHz.

As examples of what you will hear, the frequency 121.0 will be spoken as ONE TWO ONE POINT ZERO and 135.25 will be spoken as ONE THREE FIVE POINT TWO FIVE.

To simplify and shorten controller and pilot exchanges, the frequencies that have FIVE as the third digit past the decimal, such as 135.575 and 132.625, will be spoken as ONE THREE FIVE POINT FIVE SEVEN and ONE THREE TWO POINT SIX TWO. In these typical examples, neither FIVE SEVEN nor SIX TWO is divisible by 25, thus confirming that when you program your scanner you must include that last unspoken FIVE.

Ground Control frequencies are often abbreviated, but in a different way. The common Ground Control frequencies are 121.6, 121.7, 121.8, and 121.9. If you hear the Tower say to a landing or taxiing aircraft, "Contact Ground POINT SEVEN," this means 121.7. You have to add the 121 part.

❖ Runway Numbers

All airport runways are numbered, and these numbers are spoken frequently by Approach, Towers, Ground Control, and Clearance Delivery controllers. The runway numbers are based on the compass, that is, the orientation of the runway on the ground compared to magnetic North – and rounded to the closest ten degrees.

(For more info on Ground Control, Towers, VFR, phases of an IFR flight, and Air Traffic Control, see *Monitoring Times* November 2004 issue – *Air Traffic Control for the Hobby Listener*.)

A small airport may have only one physical runway on the ground but you hear RUNWAY NINE and RUNWAY TWO SEVEN used by the Tower at that airport. What does this mean? First, you must add the missing ZERO, thus RUNWAY NINE becomes 90 degrees, and RUNWAY TWO SEVEN becomes 270 degrees.

Looking at a compass, starting at North and rotating clockwise, you will see that 90 degrees is East and 270 degrees is West, thus the physical runway at this airport runs East-West on the ground. If an aircraft is taking off or landing to the East, it is using RUNWAY NINE. If an aircraft is taking off or landing to the West, it is using RUNWAY TWO SEVEN even though it is the very same strip of pavement on the ground.

In publications or on Internet sites, RUNWAY NINE may be written as "RWY-09" or "RY 09" or when including both directions, you may see "RWY 09-27," or "Runway 9/27."

Larger airports like Ontario International Airport (California) have parallel runways – two runways side by side in the same direction and both active at the same time. You will note at the AirNav URL **http://www.airnav.com/airport/KONT** that they are referred to as Runways 8L/26R and 8R/26L. Controllers specify RIGHT or LEFT as in "Cleared to land RUNWAY TWO SIX RIGHT." You would not want to hear controllers simultaneously clearing aircraft to land on Runways 26R and 8L.

As a visual aid to runway numbers, you may obtain Airport Diagrams for the various airports you listen to. They include runways, taxiways, buildings, etc. Download them at: **http://www.naco.faa.gov/ap_diagrams.asp** . Note that after the request has been returned, you have to click on the "PDF" and that will produce the airport graphic. Also, the "Airport Diagram Legend" may be helpful as well.

❖ VOR Names

VOR stands for "VHF Omni-directional Range." It is a type of navigational station which can be found in the 108.0 to 117.95 MHz band.

VORs send out their call letters in Morse Code or voice as well as sending out electronic spokes, called "radials," in a circle from their locations. An aircraft in range of and tuned to a particular VOR station can see a readout showing which radial it is on while inbound toward or outbound from the VOR station or which it is crossing if neither directly inbound nor outbound.

Air Traffic Controllers call out VORs by name, and radials in degrees, when directing an aircraft's route and you will frequently hear those names while monitoring. The names, call letters, and locations can be found on charts like "IFR ENROUTE LOW ALTITUDE." (Chart information provided below.)

If you think a name you hear might be that of a VOR station, go to the AirNav.com Airport site **http://www.airnav.com/airports/** and look up all the airports in your reception area and
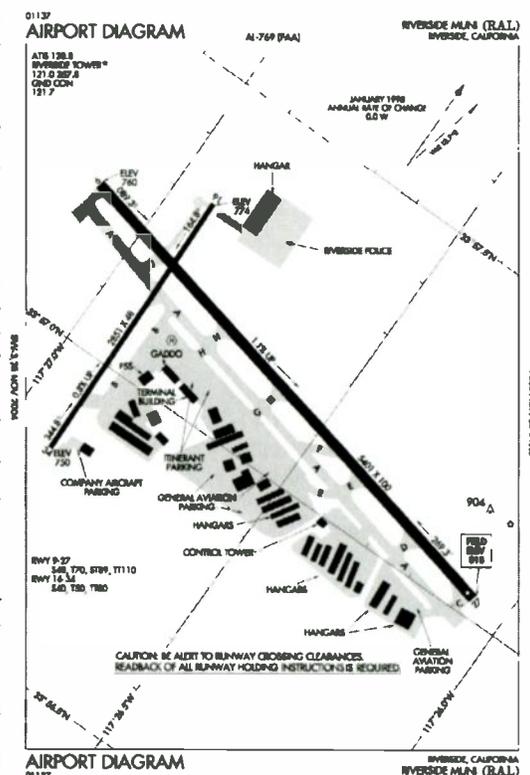
Example of airport diagram. Airport is RAL. (Courtesy NACO/FAA)

in each you will see a list of VORs. At least some names should be familiar to you.

As an example, a VOR may be listed as "POMr099/18.6 POMONA VORTAC 110.40." The "POM" (call letter part) is clickable and will take you to the info for that VOR. The "r099" is the degree radial that points from the VOR station to that airport and the "18.6" is the distance in nautical miles. "VORTAC" is a type of VOR station (VOR plus TACAN). And lastly, "110.4" is the frequency in MHz.

You may also look up VOR names via the AirNav.com NAVAID site at: **http://www. airnav.com/navaids/** .

VOR stations are an extremely important component of radio navigation. For additional information, see: **http://www.navfltsm. addr.com/vor-nav.htm** .

❖ Airspace Fix Names

An Air Traffic Controller can direct an aircraft toward a VOR station (a physical installation on the ground) but also to an Airspace Fix which is a location defined by Latitude and Longitude and not necessarily associated with anything on the ground. Fixes can be used in various ways, such as reporting points, turning points, military fixes, airway intersections, and more.

Five-letter Airspace Fix names are all pronounceable but often rather strange sounding. Here are some random examples: LABBE, DAGGS, OBAPY, and ZARAT.

One place to start figuring them out is **http://www.airnav.com/airspace/fix/** and having the first one or two letters is a necessity. Once you think you may have found it, click on the name and it will show the three-letter ARTCC identifier, the state, and if all this is consistent with your area, then you can refer to the Latitude and Longitude to pinpoint the location on an aeronautical chart.

The IFR HIGH and IFR LOW ALTITUDE charts will show the fixes as small triangles, some of which occur at airway intersections – which, of course, will have more meaning with a chart open in front of you.

For HF SSB (shortwave) transoceanic aircraft listeners, there are yet more Fix names to be heard. The Ocean Route Charts are indispensable for finding these Fixes and pinpointing or following aircraft as you listen.

For HF frequencies, enter "MWARA

VOR radial/distance	VOR name	Freq
PDZr322/9.0	PARADISE VORTAC	112.20
POMr083/9.3	POMONA VORTAC	110.40
RALr295/(9.8)	RIVERSIDE VOR	112.40
ELBr002/23.7	EL TORO VOR/DME	117.20
HDFr295/(26.6)	HOMELAND VOR	113.40
SLIr039/27.9	SEAL BEACH VORTAC	115.70
VCVr184/33.9	VICTORVILLE VOR/DME	109.40

An example of a VOR stations list at AirNav.com, a way for listeners to learn local VOR names and locations. Airport is ONT.

frequencies" (*include* quotation marks) into the Google search engine at: **http:// www.google.com/** .

❖ Visual Landmark Names

When listening to smaller airports, in particular, you will hear VFR aircraft making an initial contact with the Tower while over a known landmark for the area, such as: "....... over Lake Mathews for landing." The controller might respond, ".... report over the Auto Center." Figuring out these frequently-used landmark locations can be helpful. Some are shown on Sectional Aeronautical Charts.

### Arrival, Approach, and Departure Names

It would be hard to listen to your local aircraft communications without hearing Arrival, Approach, and Departure names being used. These are published procedures (defined routes that aircraft fly) to which both pilots and controllers refer.

The AirNav.com Airports site now includes links to these procedures. At that site, go to the larger airports in your area and scroll to near the bottom of the specific airport page and you will see them listed. You may then recognize some of the names you have been hearing. To get the specifics, click on the individual procedure links which then come up in PDF format.

STARs - Standard Terminal Arrivals are used during the transition from the enroute to the instrument approach phase of an IFR flight. The names can be pleasant sounding and generally easy to remember. Here are some examples of Arrivals at Dallas/Fort Worth International Airport: CEDAR CREEK SIX, GLEN ROSE EIGHT, DUMPY TWO, JONEZ FOUR. The first two incorporate a VOR name which, in these cases, is the same as the Texas communities they are in or near. The latter two names derive from Airspace Fixes associated with each specific Arrival.

IAPs - Instrument Approach Procedures succeed the Arrival procedure in flight sequence and take the plane right to the runway. The names are the type of Approach to a specific runway. Here are four selected examples from Miami International Airport: ILS OR LOC RWY 26L, RNAV (GPS) RWY 12, LOC/DME RWY 08L, and NDB RWY 27. At the end of each, you will see the runway number – and remember to add that final zero to get degrees.

Departure Procedures are published procedures to help insure the orderly departure of IFR aircraft from an airport on defined routes. You will hear these mentioned often on Clearance Delivery and Ground Control airport frequencies. Here are selected examples from Phoenix Sky Harbor International Airport: BARGN ONE, BUCKEYE TWO, CHILY ONE, ST.
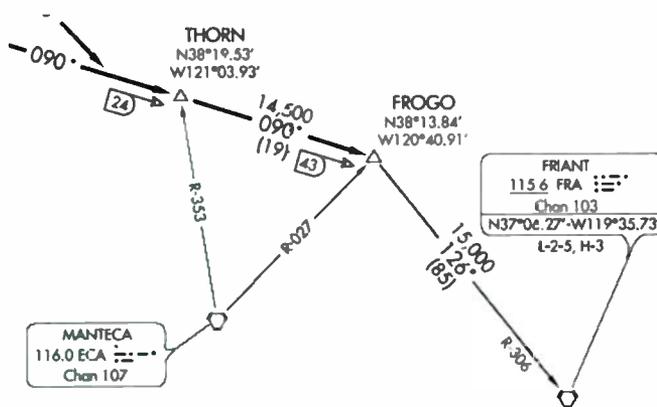
Partial view of a FROGO SIX Departure plate from airport SMF. It shows two VORs with selected radials and two Fixes. (Courtesy NACO/FAA)

JOHNS THREE – these are similar to those used for Arrivals.

Arrival, Approach, and Departure charts (sometimes called "plates"), easily found at AirNav.com, are another good way to help you locate VORs and Fixes by name. Not all Fixes seen will be heard on the radio.

The Chart Legend at **http://www.naco. faa.gov/d-tpp/frntmatter.pdf** (5.7 MB PDF download) will also be helpful.

Please see this **http://www.geocities. com/CapeCanaveral/6912/** Instrument Approach Plate tutorial with interactive illustrations. Go through sections 1 through 4 plus the Glossary. Click on any yellow shaded item for more info. Lots of good info here.

❖ Aero Chart Info and Ordering

Aeronautical charts used alone or in combination with other references, can prove to be very useful resources for the listener.

See **http://avn.faa.gov/index. asp?xml=naco/catalog** and click on the "IFR Chart" link, then on the "Enroute Low Altitude" and "Enroute High Altitude" links. Parts of charts are shown as examples and happen to illustrate some of the points mentioned above – such as VORs with radial/compass-degree marks.

For Sectional Aeronautical Charts, click on the "VFR Charts" link, then on "Sectionals."

For the Ocean Route Charts, click on the "Supplemental Charts/Pubs" link, then on "North Pacific Route" and/or "North Atlantic Route" links.

If you plan to order any charts, consider also ordering the *Aeronautical Chart User's Guide*.

❖ Names and Numbers in Closing

Similar to learning to recognize and locate the primary streets, buildings, parks, etc., where you live – learning to recognize your common reception area frequencies, runway numbers, VOR names, five-letter Airspace Fix names, and knowing what Arrival and Departure procedures are associated with which airports can truly increase the enjoyment of your aircraft listening. Good luck!

ELF Shutdown and Loggings

Ron Blocker (IN) sent along a news clipping that announced the shutdown of the Navy's ELF submarine communication systems at Clam Lake, Wisconsin, and Republic, Michigan. The systems were silenced forever on September 30, 2004. They operated near 76 Hz (yes, *Hertz*) and had the unique ability to penetrate water at considerable depths. This allowed one-way communication to submerged vessels equipped with trailing-wire antennas.

Although the ELF system was the target of numerous protests and acts of vandalism, many observers believe it played a crucial role in deterrence during the latter part of the Cold War. The program was nearly killed in the late '70s before it came on the air, but was revived by President Reagan as part of his swift response to the Communist nuclear threat.

Clam Lake resident Jerry Holter, 74, felt the system had served its purpose well. He had this to say in an Associated Press article about the shutdown: *"It was a great deterrent to nuclear war against the United States. When we were in the Cold War, the Russians knew that if they hit us we could hit back twice as bad. So it kept them in tow. Without the system, we were left out in the cold. We needed ELF."*

❖ VA3LK/WA3ZIA SK

The *ARRL Letter* (Volume 23, number 40) reported that Larry Kayser, VA3LK/WA3ZIA, became a silent key on October 5 at the age of 64. Mr. Kayser was widely known in the LF experimenting community, and was very active in weak-signal work on the 136 kHz band. In February 2001, he, along with Laurie Mayhead, G3AQC, set a record for the first 2-way transatlantic amateur radio contact on 136 kHz. Kayser was also a member of the First Class CW Operators Club, the ARRL, RAC, QCWA, and a past Editor of the "CW Today" column for the *Canadian Amateur*.

❖ New Band for UK?

For decades, 500 kHz was known as the International Distress frequency. Ships at sea and numerous shore stations kept a constant "watch" on this channel as required by maritime regulations. Other nearby frequencies were also used for marine traffic. In recent years, changes in technology have moved most of this traffic to satellite, HF or VHF systems. Since 1999, 500 kHz has not been monitored regularly by the U.S. Coast Guard.

The following news release from the American Radio Relay League's *ARRL Letter* (Vol. 23, No. 43), outlines a suggested use for the 500 kHz range by a group in the UK. A similar proposal was made by Australian amateurs just a few weeks earlier.
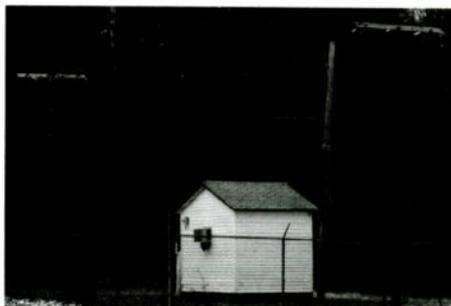
Roger Pience (ME) sent this photo of PW/394 at Portland, Maine

News release follows: *The Radio Society of Great Britain (RSGB) has proposed allowing radio amateurs in the UK to operate either 501-504 kHz or 508-515 kHz at a power of 10 W EIRP. "The allocation, if accepted, would extend amateurs' experimental work on other low and medium frequencies and thus aid understanding of propagation in those parts of the spectrum,"* the RSGB said. *The RSGB proposed the two band options since they are no longer used for maritime telegraphy in the Western Hemisphere, their usage for nondirectional aeronautical beacons is being phased out, and the frequencies also are not likely to be reallocated to another service anytime in the near future.*

The Wireless Institute of Australia (WIA) recently announced plans to request the Australian Communications Authority (ACA) to establish an experimental amateur allocation at 500 kHz. The RSGB says its proposal was drafted in consultation with the International Amateur Radio Union (IARU) Region 1 500 kHz Working group, formed following World Radiocommunication Conference 2003 (WRC-03) by the RSGB and chaired by the Union of Belgian Radio Amateurs UBA.

The Working Group includes representatives from all three IARU regions. The IARU also favors a worldwide Amateur Radio band at 135.7 to 137.8 kHz and is seeking support for such an allocation at WRC-07. Further details of the RSGB 500 kHz proposal are on the RSGB Spectrum Forum Web site **www.rsgb-spectrumforum.org.uk/mf.htm.**

Of course, it could be many years before a re-allocation takes place, and I'm unaware of any such proposal in the U.S. right now. Nevertheless, it is interesting to think about, and the discussion

will likely add energy to the voices calling for an LF ham band in the U.S.

❖ Loggings

This month's loggings come from Ken Maltz (NY) who uses two receivers for LF DXing – a JRC NRD-535D and an Icom R71A. Both receivers are fed by a 21-meter wire antenna facing NE/SW and coupled with an MLB Balun. Along with his loggings, Ken also recommends a web site for information on longwave beacons receivable in North America: http://www.classaxe.com/dx/ndb/ndbrna. Ken's loggings are listed in Table 1 below.

Table 1. Selected Beacon Loggings

Freq.	ID	Location
314	ZN	Portage, ON
332	LG	Queens, NY
366	YMW	Maniwaki, QC
385	UR	La Guardia, NY
390	JT	Stephenville, NL
391	DDP	San Juan, PR
392	ML	Charlevoix, QC
404	YSL	St. Leonard, NB
407	ZHU	Montreal, QC
407	FR	Plainview, NY
414	BC	Baie-Comeau, QC

Longwave Timeline Additions

Bob Fraser (ME) read the Longwave Timeline in the September 2004 issue and sent along a few additions related to maritime navigation, including Radio Compass Stations (375 kHz), Radiobeacons (285-325 kHz), LORAN A (100 kHz), and CONSOLAN (various frequencies). Space doesn't permit me to share Bob's entire letter here, but I found the description for Radio Compass Stations to be particularly interesting. I've repeated this portion below. Next time, I'll try to include more of Bob's descriptions.

«Radio Compass Stations – These were used from 1919 to about 1943. They first operated on 600 meters (500 kHz) which was then the general marine band. Within a short time, they were moved to 800 meters (375 kHz) exclusively. Later, 600 meters became the distress-only frequency. In operation, a ship would transmit a very long dash. The (shore) stations, using rotatable antennas, would radio back the bearings and where they crossed on the chart was the ship's position. They were first used to guide home our troop transports after World War I. The stations were maintained by the U.S. Navy until 1939 when they were transferred to the U.S. Coast Guard.»

That's it for this month. See you in March!

Pirate TV Advocacy in California

Steve Dunifer, the famous founder of California pirate **Radio Free Berkeley,** has returned to the news with a continued advocacy for pirate broadcasting in the United States. The Berkeley pirate was busted by the FCC, but Dunifer has returned with a new twist.

According to various news sources, including the *Berkeley Daily Planet,* Berkeley engineers have developed a micropowered pirate television transmitter. The station plans to market this device as a "simple" and relatively inexpensive kit. They are already marketing the device at seminars in the Bay Area of California. They promise additional information on this new revolutionary piece of equipment at the station's web site, found at **http://www.freeradio.org** on the internet. Such a device could change the nature of pirate broadcasting considerably, even though the unlicensed TV broadcasts would not be permitted by FCC regulations.

❖ Radio Insurgente

Another Mexican clandestine station has surfaced. This new one, called Radio Insurgente, is operated by the Zapatista opposition movement in Chiapas. Thus far, no shortwave loggings have materialized for the station, which claims to operate on Fridays at 2100 UTC on 6 MHz. The frequency and times may be approximate, and propagation on 49 meters to most parts of North America at this hour would normally not be likely.

But, the station does operate a web site at **http://www.radioinsurgente.org** on the internet, if you want to listen to their programming. The archived audio from this web site contains programs allegedly broadcast by the station. Occasional identifications on that archived audio are in English, but the rest of the programming is in Spanish, mixed with mariachi music. The internet broadcasts appear to prove that this Zapatista clandestine is not a hoax, like some other rumored stations in past years.

❖ Peace Radio Web Site

Given the demise of Radio for Peace International, some have speculated that the peace movement has disappeared from shortwave radio. This is not the case. A volunteer web site operated by Dr. Hansjoerg Beiner in Nuremberg, Germany, keeps track of peace-related shortwave stations across the world. This is somewhat of the opposite of political clandestine broadcasting, so you may want to check out Beiner's web site at: **http://www.evrel.ewf.uni-erlangen.de/pesc/ PESC-peaceradio.html#list%20of%20stations**

on the internet. The site lists peace-related stations around the world, many of which use leased time on European transmitters to broadcast to various world trouble spots.

❖ Old Pirate Confesses

The keen eye of Artie Bigley has noticed that a reformed pirate radio operator now holds a licensed broadcasting job at **KINK**, with a slogan of FM 102 in Seattle, Washington. Bob Ancheta points out this interesting fact in his promotional biography on the KINK web site, found at: **http://kink.fm/index.php/contact/more/bob_ancheta/**

❖ Al Qaeda

Many DXers have been wondering when the Al Qaeda movement would start a clandestine radio station. Although such a station would have little support in the United States, many DXers have always found it interesting to listen to radio stations on both sides of war and political conflict situations. Finally, Al Qaeda did make an attempt to start a clandestine station. In fact they operated two of them, using identifications of **Saut al-Jihad** (Voice of Jihad) and **Saut al-Ansar** (Voice of the Prophet's Fighting Followers). Both stations operated briefly as internet-only broadcasters. However, in late June the *Al Jazerra* network reported that police in Saudi Arabia closed down the web site that was hosting these broadcasts. As of press time at *MT*, no replacement source for these transmissions has surfaced. But, we of course should be on the alert for future broadcasting efforts by Al Qaeda.

❖ Maldives Address

Several DXers including Wendell Craighead are reporting QSLs from Minivan Radio, the quasi-clandestine program beamed to the Maldives. The address to use when writing to this one is Friends of Maldives, 64 Milford Street, Salisbury SP1 2BP, UK. The station uses 13855 kHz at times, and there are recent logs for them at 1600 UTC on 11810 kHz from a leased transmitter in Julich, Germany.

❖ Pancho's QSL Page

Our own Pancho Villa, a regular *MT* contributor, has been posting some of his interesting pirate QSLs on the internet. You can go to **http://www.geocities.com/piratepancho/** if you would like to take a look at them.

❖ What We Are Hearing

Monitoring Times readers heard nearly two dozen different North American pirates this month. You can hear them too, if you note a few simple tips:

Pirate radio stations never use regular announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. The primary North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, remains the best place to scan for 90% of all North American pirates.

Grasscutter Radio- Their rock and blues music is often supplemented by pirate discussions. Sometimes they have two-way QSO conversations with other pirates. (Uses grasscutterradio@hotmail.com e-mail)

Indira Calling- They are among the All India Radio parodies on the pirate bands. Pirate radio humor is their staple. (Providence)

Iron Man Radio- Scuffy Swab's recent shows have covered everything from pirate advocacy to cartoons and the Trinidad and Tobago government. (Belfast)

KIPM- Alan Maxwell's complex drama programs are probably the best produced pirate shows on the air today. But, his message goes over the head of some DXers, so the station generates some controversy. (Elkhorn)

Old Turkey Radio- This novelty holiday show often resurfaces around Thanksgiving, and this year was no exception. (None)

Radio First Termer- Dave Robbit's documentary about radio stations that broadcast to USA troops in Vietnam is still getting pirate relays occasionally. (None)

Radio Metallica Worldwide- For a while, Dr. Tornado's superpowered pirate was the biggest phenomenon in pirate radio. But, recent relays have been less powerful, causing questions about whether the shows are reruns rather than new productions. (Blue Ridge Summit)

Smooth Blues Radio- They claim to broadcast from Mississippi, and their identification matches their blues music format. (None)

The Crystal Ship- Their rock music shows are by no means routine. This 1970s pirate has returned, sometimes using odd frequencies such as 4069 kHz. You might find them anywhere on the dial. (Belfast or tcsshortwave@yahoo.com e-mail)

Tu Nave Kosmos- Danny Flex's South American pirate is very unusual, since it relays its shows via North American pirate transmitters, with the shows in English. (Uses tunavekosmos@hotmail.com e-mail)

Undercover Radio- Dr. Benway follows a standard pirate format, with rock music combined with satire sketches. (Merlin)

Voice of Laryngitis- Many people think that this one is the best pirate radio stations of all time. Genghis Huxley and Cowboy Stanley Huxley have returned with replays of their old classic shows from the 1980s, mixed with numbers station parodies and other new features. Old Battle Creek maildrop announcements should be ignored. (Belfast)

WAZU- QSLs from this one have arrived bearing the signature of Fearless Fred, the hilarious producer of Radio Garbanzo. Fearless also appears during the broadcasts. (Belfast)

Some Great Used HF Transceivers

I am always looking for ways for folks to get on board the Amateur Radio wagon on the cheap. If you look at the pages of any current issue of *QST* or *CQ* (Boy, do I ever miss *73!*) you can see that it is easy to lay out a kilobuck for even a modest HF transceiver. High end gear can rival the cost of a good used car.

Now, in no way to I want to run down the current crop of Ham hardware. If I had the money in the bank I'd probably be on the phone ordering a Ten Tec Orion in a heartbeat. But while still in recovery from financing Number One Son's college career and bolstering my family coffers for Number Two Son's assault on the same educational path, cutting financial corners in the hobby world is the only way to go. I know I am not alone in this. Also, lots of folks I know are just entering the realm of retirement. They want to give ham radio a try but need to keep the costs down as well.

As you may recall, I have demonstrated in this very column and many others that you can get on the air for well under $100. So, having shown that path, I would also be the first to admit that it is a rather Spartan trek. But let's move things up a notch or two from bare bones operation. You can still get on the air for a relatively reasonable cost with all the bells and whistles you can handle with one hand while reading the owner's manual with the other. Of course, I am talking about the used equipment market.

What got me thinking about this subject was a recent foray into the 17 meter band. I have a couple of rigs in the shack that include the WARC bands, but, in this case, I was shouting CQ by way of my Ten Tec Argonaut II. I may not have the scratch to purchase an Orion, but I got a great deal on this super QRP transceiver (and allband receiver) on the used market. This rig, essentially the QRP version of the higher power Delta II, sold new for $1300 and was about as over-engineered as any rig available in 1991. I bought it as a 10 year old, one owner piece for the princely sum of $400! It is the only rig in my shack that is a peer to my Elecraft K2, which sells new but in kit form with all the accessories to put it in the same class as the Argo for a touch over $800. It is hard to figure what a wired and tested K2 would go for, but I would hazard a guess at around two grand, give or take.

So do you see what I am getting at? If you are willing to go a bit back in time and do a bit of horse trading, you can get a perfectly serviceable HF transceiver for about a third of what a new unit might cost. If you can live without the WARC bands and live with a few relatively easy

to find vacuum tubes, you can slice an even bigger chunk off of the final cost of entry onto the ham radio low bands.

Further, we are in the heyday of used gear availability. It wasn't all that long ago that the only place you could find used gear was at a local hamfest or in the rather limited listings in the back of amateur radio magazines. Now, there are a number of Web sites, most notably **http://www.arrl.org** and **http://www.eham.net** that have extensive and timely listings of used equipment. Also there are Internet Newsgroups such as *rec.radio.amateur.equipment*. Sometimes even a simple search engine entry, listing the rig you are curious about, can turn up one or two units for current sale. I once put out the call on a newsgroup for an auxiliary VFO for an older transceiver I had, and got 10 responses within 24 hours. I might have chased that VFO down for months if it weren't for the Internet. And, of course, there are even the commercial sites such as **http://www.ebay.com** with many interesting opportunities. With so many options to find and research used equipment, you can really stretch your disposable income to the max with a bit of Web work.

Of course, you must be a responsible consumer when playing the used market. You need to check out both the equipment and seller. You need to verify that everything is being done in good faith and you also need to know your opportunities for recourse should something go awry. The good news is that hams, on the whole, have a great deal of respect for one another and bad deals are fairly rare. Still, open your eyes and ears before you open your wallet.

All that said, what are some nifty rigs worth chasing around on the Internet for? For purposes of this column, I'd like to limit our thinking to rigs that came out after the WARC bands became available to us. Also, while there can be some good deals, we'll stay away from kit built units. I have bought used Heathkits many times but always with the idea in the back of my head that I may have to rebuild a few sections of circuit to suit my standards. (Just what I need, yet another excuse to melt solder!)

❖ Icom IC-740

This unit puts out 100 watts. It has an adjustable noise blanker, speech processor, IF shift, passband tuning, notch filter, receiver preamp, VOX, adjustable rate tuning, adjustable AGC and dual internal VFOs. Options to keep an eye out for include a FM mode board for 10 meter operation, and internal power supply (allowing

for both AC and DC operation), electronic keyer, a marker generator, and a number of different SSB and CW filters. (Always check the filter complement on such used gear, as a unit not set up to your liking may not be worth the effort to track down more appropriate filtering. I like a 500 Hz CW filter; 250 Hz "rings" in my ears a bit too much for general use.)

The Icom IC-740 remains a great value for the Ham Shack.

The lack of a general coverage frequency synthesizer is actually a plus in rigs of this era, as it makes for a very quiet receiver ideal for digging out the tough ones down in the noise. A rig this quiet might give a modern DSP receiver a run for its money. For this reason, and the fact that it has T/R jack on the rear panel, this unit was very popular as a front end for transverters for folks who wanted to play in the weak signal UHF/VHF regions. As a matter of fact, that is probably where you'll still find most of them plugging away, feeding a few watts to a 23 centimeter "black box" pointed at the moon.

If you are a serious CW operator, you may not like that the CW offset is set at 800 Hz and cannot be adjusted. I like a 600 Hz note, so this would probably drive me a bit batty until I got used to it.

You cannot use the IF shift and passband tuning at the same time. This may make life a bit complicated when you're trying to dig out a signal during a tough contest. This unit does not have AM capability, but it would probably not be my first choice for playing in that mode anyway.

IC-740s are solid, serviceable rigs that can stand up in the modern world with few wants and no needs. They can be found in really good condition in the neighborhood of $300 - $500.

❖ Kenwood TS-430S

I have an interesting relationship with the rig. I never owned one, but my friend Jon WB2KKS bought one and that allowed him

to sell me his TS-520, my first "big league" transceiver. Jon always commented that the rig had more buttons than he could ever figure out. Twenty odd years later he still makes the same claim, because he is still using this fine rig in his shack as his primary DX tool. Not a bad service life.

The TS-430s is a 100 watt rig that includes all ham bands (CW, SSB, AM and optional FM) including the WARC set, and is easily modified for MARS and CAP. Also, the rig came stock from the factory with 17 and 12 meters locked out, but most have had this jumper removed as the bands became available generally. As a matter of fact, it is my understanding that it is one of the few older rigs that can be modified to make use of the new 60 meter band frequencies. The unit has an excellent general coverage receive capability on par with most of the middle class SW rigs of its time. You could still use it today for all but the most taxing broadcast band listening tasks.

The unit has two VFOs, making it a good contest and DX rig. The 430 came out when 10 meter repeaters were in fashion, so FM capability was available as an option. It has eight memory channels with memory scanning capability. It was also one of the first units to allow frequency control and scanning from the handheld or desktop mike designed for use with the radio.

This rig was designed as a desktop unit (requiring an external power supply) that could also be at home in a mobile setting. It includes a pulse noise blanker and, as mentioned, the scanning mike is great for mobile operation. Back when I was playing around with County Hunting I probably heard more of these rigs running mobile than I did at fixed locations.

The 430 is also capable of pushing a transverter and has the rear panel jacks to prove it. The unit also has a SWR protection feature. If the final stage sees too high an SWR, the rig automatically reduces power. Similarly, if the RF heatsink gets too hot, due to long transmissions or blocked air flow to the fan, the unit also reduces power. I am sure anyone looking into a 430 will have no worries about the condition of the final amplifier stage thanks to these features.

Good TS-430s rigs are found in the neighborhood of $400 - $500 (don't forget the power supply) if you can get the owner to part with one!

❖ YAESU FT-120

The FT-120 is a great 150 watt, 160 through 10 plus WARC rig from the era when Disco ruled the dance floor. The Yaesu unit is a bit of a throwback, but it is still a good, solid, basic transceiver that is well spoken of in the used market. CW and SSB are standard and AM and FM come as options. Designed as a desktop rig, it has a self-contained "mains" power supply.

Unlike the units from ICOM and Kenwood, the FT-120 has a tube final consisting of three 6146B tubes. This was a bit unusual for the time, as most tube final rigs used only two of these tubes. Using three tubes provided a couple of advantages. First, it gave a bit more oomph for driving amplifiers. Secondly, since the 6146B

was rated up to 250 watts, three of these puppies would loaf along at "normal" operating power levels. These tubes remain common and relatively inexpensive, so you do not need to shy away from this unit due to its glass bottle final stage.

Again, this unit was marketed with a number of alternative filtering schemes. Take the time to make sure you can live with what you get. Aftermarket filters were also available from several sources for this radio. Unlike the above units, the FT-120 only has one VFO, requiring an external VFO to really make it useful for contesting and DXing. But the auxiliary VFO they designed for this rig was a doozy! The FV-120DM included a synthesizer, CPU and memory system that gave the 120 tons of additional capabilities.

I wouldn't consider the FT-120 without the FV120DM. And if I did, I wouldn't spend more than $200 for the FT-120 without the FV-120DM. Together they can go for up to around $400, but check the tubes!

As you can see, back in the early '80s, with most American manufacturers in retreat against the Yen, Icom, Kenwood and Yaesu ruled the roost. So many of these rigs made their way to our shores, you can find dozens of units to choose from on the used market.

Have fun! I'll see you on the bottom end of 40 meters no matter what transmitter you are running.

UNCLE SKIP'S CONTEST CORNER

10-10 International Winter Contest (Phone)
Feb 5 0001UTC – Feb 6 2400 UTC

Minnesota QSO Party
Feb 5 1400 UTC – 2359 UTC

QRP ARCI Winter Fireside Sprint (SSB)
Feb 6 2000 UTC – 2400 UTC

Delaware QSO Party
Feb 5 1700 UTC – Feb 6 0500 UTC
Feb 6 1300 UTC – Feb 7 0100 UTC

North American Sprint (Phone)
Feb 6 0000 UTC – 0400 UTC

ARRL School Club Roundup
Feb 7 1300 UTC – Feb 12 0100 UTC

FISTS Winter Sprint
Feb 12 1700 UTC – 2100 UTC

North American Sprint (CW)
Feb 13 0000 UTC – 0400 UTC

ARRL International DX Contest (CW)
Feb 19 0000 UTC – Feb 20 2400 UTC

North American QSO Party (RTTY)
Feb 26 1800 UTC – Feb 27 0600 UTC

High Speed Club CW Contest
Feb 27 0900 UTC – 1100 UTC
Feb 27 1500 UTC – 1700 UTC

CQ 160-Meter Contest (SSB)
Feb 26 2000 UTC – Feb 27 1600 UTC

North Carolina QSO Party
Feb 27 1700 UTC – Feb 28 0300 UTC

Antenna Types: Dipoles

Around 1887, Heinrick Hertz convincingly demonstrated to the scientific world that the electromagnetic (EM) waves predicted by J. C. Maxwell did, in fact, exist. And, remarkably, in his early work, he developed the basic design features of the vast majority of the antennas in use today! In a series of articles we will discuss Hertz's antenna designs and also some of the few antenna designs that do not derive from his work.

This month we'll consider some antennas derived from the half-wavelength dipole now appropriately called the "Hertz" antenna. (Fig. 1A). The dipole antenna is popular in many different applications, and, as we will see later in this series, it is also found embedded in a variety of different antenna designs. The most basic realization of the half-wavelength dipole is a straight wire or rod whose length is, not surprisingly, a half wavelength at the frequency at which the antenna is designed to operate.

Consider now that, as the frequency at which EM waves are produced is increased, their wavelength decreases. For example, one wavelength at 10 MHz is 30 meters in length. So a half-wavelength dipole antenna designed for 10 MHz would be about 15 meters long. However, a half-wavelength dipole designed for 100 MHz would be approximately 1.5 meters in length. This illustrates the fact that the higher the frequency of operation the shorter the antenna.

Actually a dipole can be considerably shorter than a half-wavelength, even as short as a quarter wavelength, and still do a decent job of transmitting and receiving. And there are various dipole designs, such as the Double Zepp and Franklin with a length greater than a half wavelength. Each different dipole design offers a characteristic different from the basic half-wavelength design, such as variations from the half wave's radiation-reception pattern, feed-point impedance, or bandwidth.

When bandwidth greater than that provided by an ordinary, single-wire dipole is desired, the folded dipole (fig. 1B) is often useful. This antenna was developed by connecting two separate, ordinary dipoles at their ends. Whereas the bandwidth of simple wire dipoles is often around 4% of its operating frequency, the folded dipole offers more like 6%.

For reception on the HF and lower bands, where the signal-to-received noise ratio determines the quality of reception, we often don't notice any difference between the folded and basic dipoles. But for reception at frequencies above HF, where received-noise level is much lower, the folded dipole's greater bandwidth can be useful. And for transmitting on any band, the improved match across that wider bandwidth can be helpful at times.

In beam antennas, the feed point impedance of the beam's driven element often drops very low, so the higher feed point impedance of this dipole comes in handy here.

One dipole design, the T2FD, or Tilted, Terminated, Folded Dipole, brings a new twist into dipole design: it is terminated in a resistance. This resistance dissipates much of the received or transmitted signal as heat rather than as an EM signal. The return for this loss is a non-resonant antenna with a remarkably wide bandwidth of from four to six times its operating frequency. On HF and MF, the wide bandwidth facilitates matching in the antenna system, which can be useful for transmitting applications. Again, for reception, matching at these frequencies is not so important.

The dipole antenna design is extremely useful and very widely employed, and there is much more we could say about it. Check my June 2004 *Antenna Topics* column for an informative complement to this column with more dipole-related information which we don't have space to include here. As you can see, dipoles are a real work horse in the world of antennas, so why not try your hand at making one?

Let's Make a Folded Dipole:

Choose the operating frequency at the center of the band you want your dipole to cover. The total length of a half-wavelength dipole antenna, either the single-wire or folded design, is:

L (in feet) = 468/F; or

L (in meters) = 142/F

Here, L is length and F is frequency in MHz. Thus, the length for a 10 MHz half wavelength dipole would be 46.8 ft, or 14.2 m. Note that these distances (in wire) are slightly less than the length of a wavelength in air.

The feed point impedance for a half-wavelength, folded dipole is nominally around 270 ohms. The antenna's impedance thus gives a decent match to 300-ohm twinlead for the feed line. However, only very old rigs have 300-ohm antenna inputs or outputs to match that feed line, and 300-ohm line is sometimes hard to find.

If you use a 300-ohm feed line, then use an antenna tuner or a 4-to-1 balun (low-impedance winding
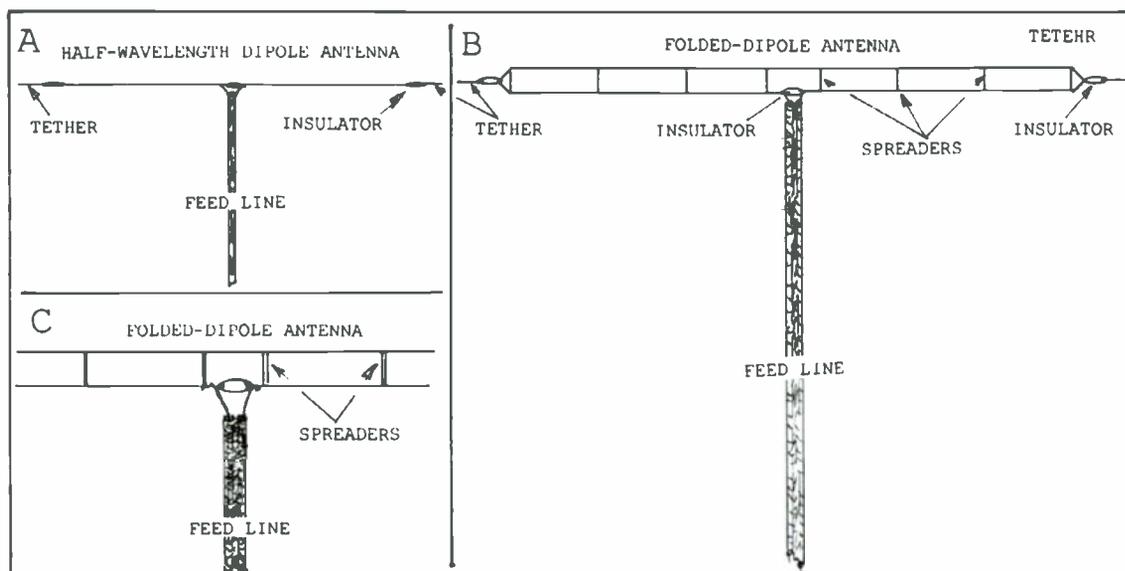
Fig. 1. A half-wavelength dipole, or Hertz Antenna (A), a folded-dipole antenna (B), feed line connections for the folded dipole.

toward the rig) for a good match at the input of today's rigs. Or, you can use a 4-to-1 balun at the antenna (high-impedance toward the antenna) and either 50-ohm or 75-ohm coax from the

RADIO RIDDLES

balun's low-impedance winding to the rig.

Steps in Building the Antenna:

1. Cut the antenna to length from 300-ohm twinlead, 450-ohm ladder line, or you can make your own ladder-line by spacing two insulated or bare wires an inch or so apart using spacers made of insulation such as plastic or fiberglass.
2. Cut one element of the dipole at its center and insert a short insulator as in fig. 1C.
3. Follow either step 3A or 3B below.
3A. Connect a feed line (length of twinlead or ladder-line) to the ends of the antenna-element wire where you cut it in the center (Fig. 1C). Use a balun or antenna tuner at the rig if needed as discussed above.
3B. If you are using a balun at the antenna's

center, solder the high-impedance winding to the ends of the antenna-element wire where you cut it in the center. Then connect a length of 50-ohm or 75-ohm coax to the low-impedance winding of the balun. The balun is heavy so you'll need a center support for the antenna.
4. Solder all connections well.
5. Don't forget protection from lightning-induced damage. The simplest is to never operate when lightning is likely, and to disconnect and ground the antenna when it is not in use.

Last Month:

I said: "OK so we can receive a signal a second time after it goes around the world and comes back past our location again in about .13 second. But what about receiving a transmission of our own voice a few seconds after it was transmitted? Sounds spooky, huh? Can it happen?"

Well, spooky or not, this actually happens, and is known as "long-delayed echo," or simply "LDE." A few seconds is a lot longer than .13 seconds, so something other than a simple, around-the-world, propagation path must be involved. There are various attempts at explaining LDEs, but still this phenomenon seems not to be well understood.

Nevertheless, the reception of LDEs are well documented with reports of their existence dating back into the early half of the last century. Delay times of from 1 to 30 seconds have been reported, with something like 3 seconds seeming more typical These spooky signals never

fail to mystify the operator who hears his own voice talking back to him! For more on this interesting mystery check out: **http://heim.ifi.uio.no/~sverre/LDE**, and **http://www.ham-shack.com/history31.html**.

Correction

In the December Antenna Topics the length of the anti-fade antenna should have been given as .53 rather than 7/8 wavelength. Thanks to Gary Peterson, KOCX, for catching this.

This Month:

EM waves have both electrical and magnetic properties, right? So are the dipole antennas discussed above "electric antennas," or "magnetic antennas," or "electromagnetic antennas," or is this just a joke?

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.

RADIO RESTORATIONS

BRINGING OLD RADIOS BACK TO LIFE

Marc Ellis

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The NC-57 Returns to Life

At the close of the last column, the electrical restoration of the NC-57 was all but complete – right down to the installation of a replacement line cord. But there were still some mechanical and cosmetic issues that had to be resolved before I could test the set. The re-whitening of the etched-in panel control markings had to be completed; a decision had to be made concerning what to do about the radio's battered paint finish; and the dial drive system for the tuning controls had to be re-installed.

❖ Restoring the Control Markings

I had worked out a good method for restoring the engraved control markings in the December issue of this column. I simply brushed white lacquer (from a tiny bottle bought in a hobby shop) into the markings, let it dry well, and then wiped off the excess with a rag dampened in lacquer thinner. The thinner wiped the dried lacquer right off, leaving the material in the markings intact. As determined by a test in an inconspicuous area, the thinner did not attack the panel's painted finish.

As luck would have it, the technique worked very well indeed on the two sets of control markings I chose to renew in December. But when I went to finish the job for this issue, I ran into trouble. The other engraved markings, though faded, were too full of original paint to hold the new lacquer.

I happened to have a needle-like pricking tool mounted in a sturdy metal handle. Just the thing for cleaning out those fine engraved lines. However, the lines were *so* fine that I needed magnification to see what I was doing. Have

The wraparound cabinet with lettering renewed and paint revitalized.

you ever done much work using a strong head-mounted magnifier? Instant vertigo.

However, I stuck with it, scratched out most of the original paint, and tried again. Now the engraved areas held the lacquer in a very satisfying manner and I was home free.

❖ Repaint Philosophy

When it came to the battered cabinet paint, I had already determined that a cleaning compound made for automobile finishes had quite a restorative effect on the panel. Many of the blemishes polished right out, and I figured I would touch up the worst of the remaining scrapes with more hobby shop paint.

I thought originally that I might mask off the panel and spray-paint the scraped sides of the wrap-around cabinet. However, I started to imagine how unsightly an amateur application of not-quite-matching, too-even paint might look next to the original paint on the panel. So I just went ahead and used more of the polishing compound, applied with a good deal of elbow grease, on the sides.

Yes, there were still plenty of scrapes showing – but the overall effect wasn't bad at all. A lot of the grime was gone and the surfaces had an overall polish that looked very credible. When in doubt, I always do my best to preserve an original finish. It takes a very talented amateur to come close to matching a factory job.

The hinged lid of the cabinet will be a different story. Its finish is almost destroyed from heavy things that have been stacked and dragged on it over the years. A spray repaint will be in order. But at least it's a separate piece, not continuous with the panel. I've picked out a color that I hope will be close.

❖ Reinstalling the Dial Drive

The dial drive assembly is one of my big disappointments. As often happens with old plastics, the main and bandspread dials have turned an unpleasant yellow with age. They are perfectly legible; they just look dingy. I imagine there might be a way, perhaps, to duplicate them
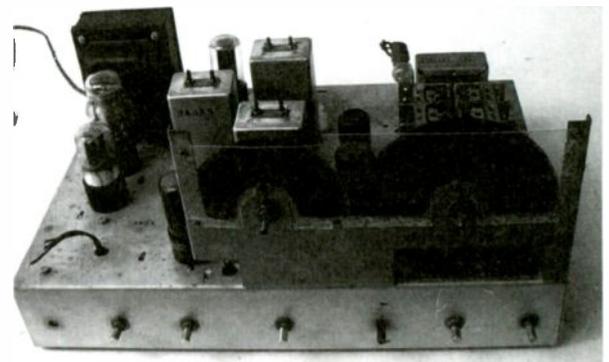
Its tubes and dial drives reinstalled, the chassis is ready for reinstallation in the cabinet. Note replacement plastic window in front of dial drives.

on the correct color plastic either photographically or with a copy machine. But that would not be one of my skills.

However, there was one definite improvement I *could* make. Positioned in front of these dials, riveted to the front of the dial drive assembly, was a window of (originally) clear plastic. It, too, was yellowed with age, and warped and curled to boot. *That* I could replace.

I found a nice piece of heavy, clear acetate at the hobby store. Then I carefully broke out the old plastic around the rivet heads. (Removing the rivets themselves would have meant total disassembly of the drive mechanism-which I definitely didn't want to do). Using it as a pattern, I cut a replacement piece out of the new acetate.

I cut little openings in the new piece to clear the rivet heads – so that the piece would lie flat. I then attached it to the front of the drive assembly using contact adhesive.

Reinstalling the dial drive assembly was now just a matter of sliding its pulleys over the tuning capacitor shafts and re-fastening it to the chassis. Of course, the dial readings were adjusted to correspond with the tuning capacitor positions before the pulley set screws were tightened.

❖ Reassembly and Smoke Test

The NC-57 was now essentially ready for a smoke test. I was tempted to run temporary wires to the speaker (which had been disconnected and removed earlier) and go to it. But I decided against that. Most testing requires access to both sides of the chassis, and I was concerned that I might break the dial assembly
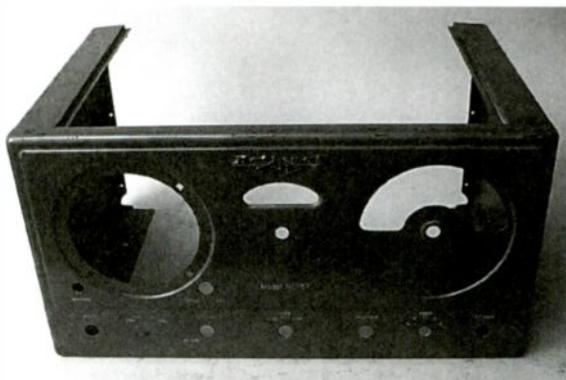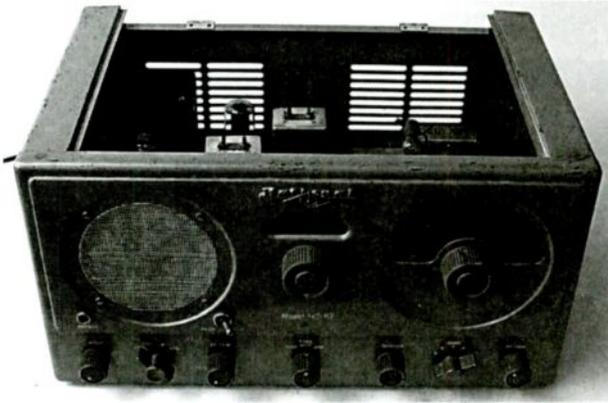
The NC-57 back in its cabinet and ready for testing. Lid will be installed after repainting.

as I jockeyed the chassis around to access the top or the bottom. It would be inconvenient, also, not to have the panel markings behind the controls as I operated the set.

Since the basic cabinet was a wraparound unit with open top and bottom giving full access to the chassis, I decided that I might as well install the cabinet right away. The speaker and send-receive switch wiring could then be permanently installed. Once the back (a separate piece) was screwed in place, the chassis would be firmly held within, and surrounded by, the cabinet and not exposed to any damage.

Before beginning the reassembly, I dropped all of the very grimy knobs into a jar of detergent solution to begin soaking. The most annoying part of the reassembly process was the reconnection of the speaker and send-receive switch wires. These run up from the front of the chassis and have to be connected behind the panel. The points to be soldered were in positions which made them difficult to see, past the hand holding the soldering iron. Some of the work had to be done by feel and instinct.

Finally, I screwed on the back and cleaned and reinstalled the knobs. Ready for testing at last!

After plugging in the set, probably for the first time in fifteen or twenty years, I put the send-receive switch on "send" to kill the B-plus and switched on the a.c. power. I could see the glass tubes lighting up – so far so good! Shutting off the a.c. again, I connected a meter to monitor B-plus voltage, moved the send-receive switch to "receive," and turned the a.c. back on.

What I should have seen was a gradual swing upward of the meter needle as the rectifier tube reached operating temperature. But the needle remained stubbornly on the pin while the rectifier tube plates, which I was also watching carefully, heated up to a cherry red color. Quite a sight if you've never seen it before!

Since the usual practice, these days, is to replace all paper and electrolytic capacitors before powering up an old set, the "smoke test" doesn't generally live up to its name. This time it did, though, or it sure would have, if I hadn't shut off the power immediately.

It didn't take long to find the short circuit. One of the new filter capacitors was in close contact with the terminal strip on which it was mounted. And one of the terminals had cut

through the capacitor's plastic coating and shorted to its metal case.

This was easily fixed and, after testing the rectifier tube to make sure it hadn't been destroyed (it hadn't), I applied power to the set once more. Now the B-plus voltage rose smoothly to about the proper value, the rectifier tube remained cool, and the voltage regulator tube fired (another sign that B-plus was being supplied).

However, the radio remained stubbornly silent. The only sign of life was a slight scratching from the speaker as the volume control was rotated. The control is located just before the output tube – so that stage was apparently operating okay. I verified it feeding an audio signal from my r.f./audio generator to the control grid of the tube. The signal could be clearly heard in the speaker.

Moving back one stage, to the audio section of the 6SN7 dual triode tube, I repeated the test with positive results. I was also able to get a signal through the previous stage – the audio detector section of the 6H6 dual diode. But when I moved back yet another stage and connected the signal generator (now switched over to produce a 455 kHz signal) to the input of the 6SG7 second i.f. amplifier, I got nothing. Not even the usual static when a probe is connected to the grid of a sensitive tube.

❖ Finally, Life Returns

Checking the voltages at the pins of the 6SG7, I soon found some anomalies. The plate voltage was about 300, some 50 volts too high. And the voltage at the cathode, expected to be 2, was also about 300. Tracing back the wiring from the cathode, I found the problem in the r.f. gain control, a 10,000-ohm wire-wound potentiometer.

This control works by adjusting the cathode bias voltage on the r.f. and i.f. amplifier tubes. The voltage is present on the control because it is in series with the power supply's bleeder resistor. (The bleeder resistor is a heavy-duty resistor connected across the output of a power supply to add stability by presenting a constant load.)

The innards of the control were visible and, inspecting them with a flashlight, I soon saw the problem. Apparently,

Bleeder resistor R4 (bottom) is normally grounded through r.f. gain control R5 (near center) – which in turn provides cathode bias for the r.f. and i.f. amplifier tubes. When the control open-circuited, plate and cathode voltages swung out of control (see text).
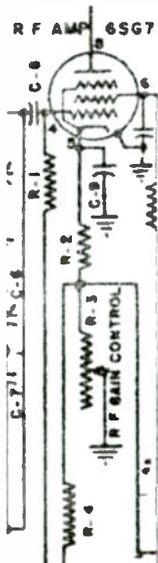
the potentiometer had once been forced against its stop and the wiper arm was now twisted completely out of position. It was certainly not resting on the resistance element – which made this component an open circuit.

The result: the bleeder resistor was lifted from ground and stopped loading the power supply. And the cathode bias line, connected to what should have been the ground end of the bleeder resistor, was no longer regulated by the control. So the full, unloaded power supply voltage appeared across the line.

To verify that this was the problem, I shorted out the open-circuited r.f. gain control – effectively simulating its high-sensitivity position. Now, as the set warmed up again, the tube voltages fell to their proper values and the welcome sound of atmospheric noise could be heard in the loudspeaker. Switching to the broadcast band, I easily picked up several stations in my basement workshop with no antenna connected.

That was the good news. The bad news is that I'm going to have to remove the chassis from the cabinet again because there is no other way to remove and replace the defective potentiometer. There'll also be the problem of obtaining a replacement because 2-watt, wire-wound pots are not the easiest things to find. However, I have a friend or two who might be able to help.

By next time I should have the new part installed and will be able to do a more thorough check on the performance of the NC-57. If all is well, we should be able to complete a realignment and conclude this interesting project.

A Builder's Primer
By Carl Herbert, AA2JZ

Have you ever had the "itch" to try building an electronics project, but are just a bit wary of where to begin? Then there is always the thought, "I'm not quite sure of what it is I'm doing." Perhaps these feelings can be overcome just by building a simple kit. There are many of them available, and completing one of them can be a rewarding experience.

The road to success is begun with the first step. I know, you've heard that one many times before, but what has that to do with building a kit? Those new to the world of electronics are often in awe of the complexity of parts, drawing, and associated language included in the work. Be assured, all of us began at this point, and have managed to overcome those feelings and continue with our adventures in building electronic devices.

Kits are a terrific way to begin your building career and learn while your building. The manufacturers, for the following reasons have created project kits.

1. They want to make a profit selling their product.

Well, that makes sense. Nobody would expect them to give the kits away after doing all the work of design, assembling parts inventories, documentation, advertising, and more.

2. A successfully completed project is what the supplier intends. They need for you to be happy with the product, before and after construction. They want for their product to work when completed

Without your success, they would soon be out of business. It's to their advantage to have satisfied customers who will in turn advertise their products. A dissatisfied builder will complain to anyone who will listen about products that are difficult to build or won't function when completed. That's not very good advertising for the company!

3. Items that do function as they should, often lead to increased sales. It is in the best interest of the kit provider to have items that are easily assembled and function as described.

Your thoughts at this point could be, "Well, if I made it through the first one and it worked as described, I'd like to try another"! The pride of accomplishment bolsters the ego, which can have wonderful effects on the neophyte builder and could lead to further projects.

❖ Choosing a Project

Search magazines and catalogs for kits you find interesting. It is an experience in itself. If you have little or no experience with building electronic circuits, try choosing a kit that more closely matches your abilities. Purchasing a kit for a "*whiz bang microprocessor controlled star ship force shield,*" may be alluring, but realizing your abilities and selecting a simple receiver or audio amplifier project would more closely match your talents.

Kit building is a fun time and a learning process. The knowledge gained from building a kit will be multiplied with each project. Those once unknown parts and schematics will become "old friends" very quickly.

Pay particular attention to the listing of tools and supplies required for assembly.

Hamtronics Weather Facsimile Receiver Kit

Tools must be available that match the type of project to be completed. A 75 watt soldering gun is great for sheet metal work, but won't do for circuit board soldering. A smaller wattage pencil type of soldering device is more acceptable. Its level of heat has been engineered to provide adequate heat transfer, while avoiding damage to delicate parts.

Other tools, such as pliers, tweezers and screwdrivers are commonplace on the builder's bench. Purchase the better quality tools if available; you'll be using them many times in the future and will find that the extra expense in the beginning is well worth it.

The more "in depth" projects often rely upon the builder's acquired skill in electronics for satisfactory completion. Special test equipment and tools are sometimes "taken for granted" in the descriptions given for more advanced circuits. The new builder is less likely to possess these skills and equipment, which could ultimately lead to an uncompleted, non-functioning project.

Jameco Big Ear Audio Amplifier Kit

❖ Work Space

Not all of us have a dedicated workbench used only for assembly of our electronic projects. Don't let this deter you from pressing forward and building your project. Before old age and adequate finances were my "norm," I assembled many projects working in a converted or shared closet! It's true, the closet environment could have been more spacious – it was "cozy," to say

American QRP Club Antenna Analyst kit

Ramsey Electronics AM/FM Receiver Learners Kit

the least. But it did provide a barrier from "little inquisitive persons," and the havoc that could have resulted from lost parts, etc. Those completed units worked equally well as those created on today's bench.

The desire to learn and complete a working project will overcome any minor difficulties you may have to endure.

❖ Read the guide!

The best source of information about your circuit is the assembly guide provided with the kit. Its function is to identify parts included, provide step by step instructions for assembly, and final alignment procedures if required. Most have been created with colored drawings or pictures of the parts for identification. Components that have similar visual characteristics will be identified here. This is great for the new and old builder alike. Axial lead chokes, resistors and capacitors can sometimes appear quite similar in size and markings! The guide should help identify the differences between items.

While contemplating production of a kit for market, several units will be selected and provided to builders who have different skill levels for assembly. Their comments, and any problems they have encountered are gathered and incorporated in the final assembly guide for the product. This is part of the "prototyping" process and is invaluable. The "test builders" have identified any problem areas before the product goes to market.

❖ Follow the instructions !

Assembly procedures have been written to make construction an enjoyable process.
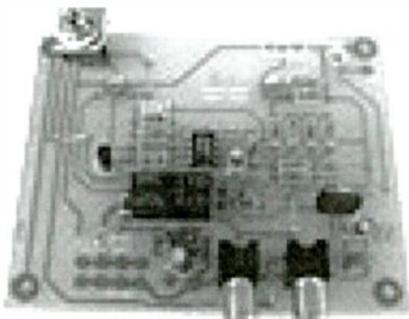
Ten-Tec Smart Squelch Kit

Smaller components are identified for installation first (jumper wires, and diodes come to mind). The larger items, if installed first, would make placement of the smaller units difficult at best.

❖ Parts Problems?

Take care to *understand* what the instructions are calling for. Some of the common errors builders are noted for are:

- reversed diode placement: the band on one end is an indicator. The instructions will tell you how the diode should be placed. Reversing the placement will affect circuit operation.
- reversed electrolytic capacitor placement: These are usually "filter capacitors." There are markings on them to indicate which leg is associated with the inner and outer layers. Reversing the placement can render the operation of the piece to be less effective than required, or not function at all.
- resistor color code errors: A 100 ohm resistor, (Brown-Black-Brown) can be confused with a 10 ohm resistor, (Brown-Black-Black). A 10,000 ohm resistor (10K)(Brown-Black-Orange), depending on the marking paint used, can be confused with a 1,000 ohm resistor (1K) (Brown-Black-Red). Use an ohm meter to identify all resistors before placing them on the circuit board. It's easier to do that now and be satisfied, than it is to remove an error later!
- resistor markings on schematics: i.e., some schematics will identify resistance values as 4k7, 5k6, etc. This method uses the "kilo" indicator (kilo = 1000) as the decimal point. The above resistors would measure 4,700 ohms, and 5,600 ohms respectively. The other "standard" used to mark resistance on schematics would read 4.7k or 5.6k. Either method is acceptable, both are widely used; just be aware of which method is used for your project.

❖ Work Ethics

So you've opened the package, sorted and inventoried the parts, and you're ready to begin assembly. Work slowly, be sure that each item placed into the circuit board is what is called for. Be sure to mark the instruction sheet as parts are placed. Test circuits when required. The assembly instructions will often require testing of a section before proceeding to the next one. Should your circuit not test as expected, go over your work and find the problem before beginning the next section.

❖ Kits, Kits, Kits!

Kits are available from many suppliers, and a few of them are listed here. I don't endorse any of them. They are listed only to provide you with a beginning place to look for your next project.

New Jersey QRP Club - **http://www.njqrp. org**

American QRP Club - **http://www.amqrp. org** (online ordering only)

Ramsey Electronics, Inc.
590 Fishers Station Dr.
Victor, NY 14564
800-446-2295 or 1-585-924-4560
http://www.ramseykits.com

Ten-Tec
1185 Dolly Parton Parkway
Sevierville, TN 37862
1-800-833-7373
http://www.tentec.com

Jameca Electronics
1355 Shoreway Road
Belmont, CA 94002
800-831-4242
http://www.jameco.com

Hamtronics, Inc.
65 Moul Road
Hilton, NY 14468-9535
(585)-392-9430
http://www.hamtronics.com

There are a few sources for you to investigate. Each has "easy to build" units, and more difficult projects for the experienced hobbyist. Read their advertisements, select a product that matches your building skills, and heat up your iron !

Building is fun and rewarding !

MT REVIEW

SWL IR Remote

Review by Kevin Carey, WB2QMY

Just about every TV, video player and sound system today comes with a handheld remote control. Some would call it a testament to the "couch potato" lifestyle. Nevertheless, there are certainly times when a remote control proves very useful. With few exceptions, SWLs have not had the luxury of remote control for their radios. Many tabletop receivers allow for PC-based control via a cable, but the concept of handheld remote control is not universal among the big players.

SWL-Remotes.com (Cincinnati, OH) aims to change that. Their *SWL IR Remote* is available for the majority of tabletop receivers in use today. It allows for wireless control of such receivers at a distance of at least 30 feet (9 meters). The SWL IR Remote consists of an infrared receiver module that connects to the radio through an interface cable, an AC power supply (unterminated DC cable for European shipments), and an optional handheld control unit. The photo below shows a typical setup with the remote connected to the rear panel of a Drake R8 receiver.
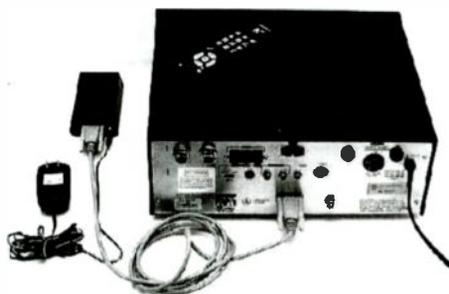
As of press time, the SWL IR Remote Control works with the following radios:

Drake R8/A/B
Yaesu FRG-100, 8800
Most Icom Transceivers
Icom R75 (virtually every function supported)
JRC NRD-535, -545
Lowe HF-225
Kenwood R-5000
Uniden Scanners – many models

So, why would you need wireless remote control for your receiver anyway? For starters, suppose you are working on some project across the shack and need to change the frequency, mode or other parameter of your receiver. With a remote, you can make the change(s) and get back to what you are doing. It eliminates the need to keep walking back and forth to your receiver.

Remote control might also be useful for someone who is confined to bed due to an illness. Using the remote, most receiver functions can be controlled without having to be physically at the radio's front panel. This could allow some listeners to continue their hobby with high performance gear, instead of compromising with a portable set.

❖ Setup

The unit I tested was configured for use with a Drake R8/A/B series receiver. My receiver is an original Drake R8 (1992 vintage). Installation was a simple matter of connecting the infrared receiver to the R8's serial data connector using the supplied cable, connecting the AC power supply, and entering a key sequence to prepare it for use with the R8. Total installation time was less than 5 minutes.

While many types of handheld remotes can be used with the IR unit, I recommend using the optional unit available from SWL-Remotes ($11.95). It is very easy to use, and the keypad has a nice feel to it. The most-often used keys even glow in the dark! Each numeric key is shown in the shape of the number it represents, making it very intuitive and easy to work with, even in marginal lighting conditions. This remote is not cluttered like some that I've seen. Why can't all remote controls be this simple?

❖ What Can You Control?

While the supported functions vary by radio model, the following parameters are controllable on the Drake R8/A/B series...

Radio Power on/off
Direct entry of frequencies
Frequency & Memory Channel Stepping
Frequency pacing
Scan control
VFO/Memory Mode
Preamp on/off
Attenuator on/off
Antenna 1 or 2 selection
VFO A/B selection
Notch on/off
AGC slow or fast
Sync. Detection on/off
Mode selection
Bandwidth setting
Tuning step sizes
Memory management

I had only one small disappointment with the SWL IR Remote, and that was VHF tuning capability. My R8 is equipped with the optional VHF converter board, but the remote system did not function reliably in the VHF range.

To my delight, just before publication of this review, the folks at SWL-Remotes issued an upgrade that adds VHF tuning capability for R8A/Bs equipped with the VHF converter. I have tested the upgrade with my Drake R8 and found that it performed flawlessly. This is a significant enhancement for those of us who enjoy listening to VHF traffic while we're working around the shack.

❖ Bottom Line

The SWL IR Remote was easy to use and performed all tasks listed in the manual without any difficulties. It is a useful accessory for extending the flexibility of your tabletop receiver and requires no modification to your gear. You can learn much more about the SWL IR Remote at the firm's website given below. You can even download an operator's manual from the site to see exactly what features are controllable on your receiver.

The cost of the SWL IR Remote varies from $69.95 to $99.95 depending on your receiver model. It is available online directly from **http://www.swl-remotes.com** or swl-remotes.com, 8070 Reading Rd, Suite 4, Cincinnati, Oh 45237; 513-236-0646. It may also be ordered from Universal Radio Inc., Reynoldsburg, OH (Tel. 800-431-3939) or via their website at **http://www.universal-radio.com**.

H-900 Gainprobe from LF Engineering

By Bob Grove W8JHD

When an outdoor dipole or random wire for shortwave reception is not practical or desirable, a two-foot vertical sounds like a pretty good alternative!

For many years, LF Engineering has led the field of affordable active antennas; their H800 Skymatch offers excellent performance over the wide frequency range of 10 kHz-50 MHz. Now, LF Engineering has introduced a new model, the H900.

With better high-frequency performance and extending the upper frequency to 60 MHz (-3 dB), the H-900 will make many shortwave listeners have second thoughts about erecting wire antennas. This new active antenna can be mounted in a variety of locations, outdoor or in – like its predecessor, it's only 25 inches long, and a mere inch in diameter.

The added features in the new model include an improved MOS-FET amplifier in the probe, and the introduction of a high performance signal amplifier within the coupler. There is no internal battery option available for the H-900, because the current drain of the new design, up to 80 mA with the signal amplifier on, would rapidly discharge an internal battery. An AC wall adaptor is included to provide the necessary 12 VDC power.

But if battery operation is still desired to isolate the antenna system from AC line interference, an external 12 volt battery can be readily attached through the mini-jack used for the AC adaptor.

The low-noise preamplifier offers 6-12 dB higher gain than the former model as well, and is integrated into the hermetically-sealed antenna assembly (tested to -66 ft. pressure, or two atmospheres). The remote-mountable antenna assembly is connected to the control box (measures approx. 4" x 2-1/2" x 1-1/2") by 50 feet of thin-diameter RG-174/U coax. The control box also contains a toggle switch that can be used to kick in an additional 10 dB of wideband gain for the weakest signals.

Purists may be suspicious of signal loss in RG-174/U, but at these design frequencies and length of line, that's not really an issue. Not only that, but the power output of the preamp is a husky 16 dBm, enough to overcome any loss in the line! The directions say that the coax can actually be extended by an additional length of up to 200 feet with no
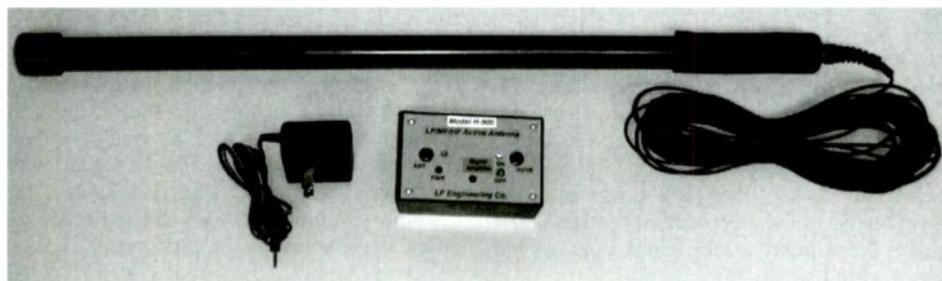
appreciable loss of signal!

To overcome third-order intermodulation, the bane of preamplified antenna systems, the husky amplifier in the H-900 boasts an IP3 greater than 35 dBm.

The antenna system operates over a wide temperature range of -25 to +120 degrees Fahrenheit, adequate for just about any geographical application.

While we would have preferred SO-239 coax connectors, the RCA phono jacks used on the H900 are easily adapted to the fitting required for any receiver.

Since no adjustments are required, this product is about as close to "plug and play" as you can get. Just be sure to plug the antenna input and output cables into the right receptacles!

❖ So how well does it work?

Comparing the H-900 with a 50-foot wire antenna at approximately the same elevation, reception was virtually identical throughout the 100 kHz-30 MHz spectrum. In the AM broadcast band (530-1700 kHz), there was no evidence of intermodulation from our local broadcasters in spite of their S9 +30 dB signal levels.

Equally important was the absence of amplifier-generated "hiss" which obscures weak signals and artificially deflects the S-meter higher. Off-signal, our S-meter stayed right on 0 with the preamplifier turned on or off.

For two-way radio users, saturation from a nearby transmitting antenna is a real concern with active antennas. In our experiment, an adjacent antenna for a 60-watt, two-meter transceiver caused no HF desensitization of the H-900.

Keeping in mind that the H-900 sensi-

tivity rolls off above 60 MHz, we couldn't resist the temptation to try it on a VHF/UHF scanner. At 160 MHz and 460 MHz, signals were down by more than 20 dB, and at 860 MHz they were down by a good 30 dB. That was to be expected.

While it would be nice to have an active antenna that works with the new breed of wide-frequency-coverage receivers that have only one antenna port, the new H-900 GainProbe is a welcome addition to the below-30 MHz shortwave, medium wave, and longwave receiving market. Its performance is equivalent to a much larger wire antenna, and its compact, weatherproof construction invites installation just about anywhere.

The H900 GainProbe ($189) and the standard H800 SkyMatch ($139) are available exclusively from Grove Enterprises (1-800-438-8155; 7540 Hwy 64 West Brasstown, NC 28904; http://www.grove-ent.com)

Gentlemen, Start Your Scanners!
First Look at the Uniden SC230

By Jim Clarke, NR2G

How would you race car fans like a scanner specifically designed for you? Well, that's exactly what Uniden has done with the new SC230. Yet, even if you don't scan car races, this receiver provides features not contained in the typical scanner. Although it looks very much like the new BC246T, the SC230 has the NASCAR logo on the front panel, and has keys that show it was designed specifically for the race-scanning enthusiast. It covers the same frequency bands, but does not provide trunk tracking.

❖ Ergonomics

The 230's compact design makes it easy to carry. The concentric volume and squelch knobs are different heights – the volume being taller – making it easy to increase the volume without accidentally changing the squelch setting. An "orangish" backlight makes viewing the display a non-issue in low light situations.

There is a programming port on the side, a jack for external power for operation and for charging. The 230 has a built-in charge circuit that allows it to operate while charging the batteries. A small switch, conveniently located in the battery compartment, selects rechargeable or non-rechargeable batteries. When you install your batteries, make sure you select the correct type to avoid possible damage to the scanner.

The Function and Menu buttons are operated with the thumb, if held in your left hand, leaving the other hand for operating the front panel keys or scroll knob.

❖ No More Wasted Memory

Using Uniden's new dynamically-allocated memory system to store race, car, driver, and frequency information doesn't waste an ounce of memory. Not only does it efficiently use memory, but alphanumeric labeling provides for logically naming the race, car, and driver; see Table 1 for a simple example. This way, the user can quickly see what he is listening to, without using a look-up table that correlates channel to content. And, with 1600 to 2000 channels available, depending on how it's configured, it would be difficult to max out this scanner's memory.

For those of you looking to scan services such as police, fire, amateur, etc., this scanner will work great for you, too. I have always been frustrated when setting up a typical scanner with fixed frequency banks, because organizing frequencies to monitor various services would inevitably waste memory channels.

With the SC230, I can arrange things exactly the way I want them. I can create a system, create as many groups as I think logically belong in that system, and then add the frequencies to the appropriate group. The system, group, and even the frequency can all be tagged with a custom alphanumeric label; see Table 2 for a simple example. Now when I am scanning police frequencies, for example, and it stops on an active channel, it displays the label I entered for that frequency. If I don't want to enter a label, I can leave the default the scanner uses when making my frequency entries.

★★★★☆
4 out of 5 stars

This new memory management system may be better understood if equated to a computer's file system. To scan a racing system, the race equates to the disk drive on the computer; a car in the race equates to a folder in that drive; and the driver for that car equates to a sub-folder within that folder; within that sub-folder, instead of files, you have frequencies for that driver.

Scanning a conventional system is similar, just using slightly different terminology: Using the drive/folder/file analogy, the conventional system's architecture is system/group/frequencies, respectively.

❖ A Little Different

Those of you who have been around scanners for a while will find the 230 also works a little differently when it comes to finding and entering frequencies. If you're like me, you're accustomed to having a variable frequency oscillator (VFO) for tuning around, and then saving the active frequency to a channel, if desired.

The best way I can describe this radio is like a crystal scanner in which you program the crystal's frequencies at will, with at least 1600 sockets available. I know it sounds like a step backward, but that's the analogy that came to my mind after learning how to use this scanner. There is no VFO; you work with what I would call a "scratch pad" that uses any available memory.

If you want to tune to a frequency, you enter it and quick save it to the "Quick Save" system/"Quick Save" group. As you add frequencies, the group gets larger. However, unlike a VFO, if you want to go back to one of those previously tuned frequencies, just select it from the group. When you're done checking new frequencies, you can delete discrete frequencies from the group, delete the group, or delete the entire "Quick Save" system.

❖ Other Settings

The 230 allows the user to configure a channel's CTCSS or DCS, modulation type, frequency step, 18dB attenuator, delay time, priority, alert, and lockout. To help the user be more efficient while at the track or in the shack, races, systems, cars, and groups can be assigned a "quick key" to provide single-key press selection. When a quick key is pressed, the corresponding item is enabled (or disabled)

in the scanning sequence.

❖ Built-In Tools

Have you ever wondered what was transmitting nearby? With the Close Call feature, the scanner will detect strong transmissions near the receive antenna. It can perform dedicated Close Call detection, or, during normal scanning, Close Call can check for activity in the background in the selected bands. Notification of a detected signal is customizable, and if desired, the detected signal's frequency can automatically be stored to a predefined system's group. I did some simple testing using a Family Radio Service (FRS) handie-talkie at a range of about 30 feet, and the scanner found the signal and stored its frequency without a hitch. When you are finished, you can go back and review the frequency list of hits that it found.

A search function is also available. The 230 comes preprogrammed with ten service ranges, or the user can create custom ranges and can lock out any that are undesired. Searching starts at the beginning of the non-locked-out ranges and sweeps through each range using the specified step size. Searching is reasonably fast, with the current frequency being scanned indicated on the display.

While in Close Call or search mode, the scanner is capable of searching for and displaying a sub-audible tone on a detected signal. As if this weren't enough, it can also be configured to screen out paging systems and skip data transmissions. Step size, modulation type, attenuation, and delay time are all settings available for customization.

❖ WX Alert Feature

The 230 even comes with a full-blown weather alert monitor. You can configure up to five SAME (Specific Area Message Encoding) groups, each with eight FIPS (Federal Information Processing System) codes. Three different alert modes are available: alert only, all FIPS, and specified SAME group. In alert only mode, you will be alerted whenever the 1050 Hz warning tone is transmitted. In all FIPS mode, you are alerted when any FIPS is transmitted with the alert information displayed on the scanner's display. In specified SAME group mode, you are only alerted when an FIPS code has been sent that is in the SAME group you have programmed and selected.

There is also a weather alert priority feature. It checks the weather channel every five seconds for the 1050 Hz alert tone, and if received, alerts the user and holds on the channel, allowing the user to listen to the warning message.

❖ Software for Scanner Management

Although the SC230 has those great memory management features, entering large or multiple systems would be quite tedious using the controls. Here's where the SC230 Uniden Advanced Scanner Director enters in. This software, sold separately by Uniden, allows the user to completely configure races or systems, and upload them into the scanner. Cloning will also be supported using the Director. Cloning copies the complete contents of one SC230 to as many other SC230s as you like. Cloning can be accomplished one radio at a time, using a cable, or over the air to multiple radios at the same time.

❖ What Comes With It?

Uniden supplies, in addition to the SC230 scanner, an owner's manual, wrist strap, wall adapter/charger, two AA NiMH rechargeable cells, six-inch rubber duck antenna, two-inch stubby antenna, plastic belt clip, computer-to-scanner cable with DB9 connector, and frequency guide. And to get the new owners started faster, the 230 comes already preprogrammed for many NASCAR races. Not only is it ready to monitor races out of the box, but those preprogrammed races can act as a "template" to help users plan their own races in the future.

❖ Final Thoughts and Overall Ratings

My biggest beef with the SC230 was the manual. Its lack of continuity, in my opinion, left me jumping back and forth just trying to figure out how to tune a frequency. It was challenging to switch over from my old "VFO thinking" to the new Quick Save, system, and group thinking. I like pictures, and it seems even a small example would have gone a long way toward making it easier.

Another thing I feel would make a marked improvement is somehow using the keyboard to select alphanumeric characters when entering labels, instead of having to spin a knob. When I entered a small system for testing purposes, I found myself getting frustrated rather quickly. While making minor modifications to existing systems is fairly easy, large or new races and systems would be best programmed using the Director software.

I am thrilled with the memory management system and think it's been a long time coming. With this new way of organizing channels, I recommend taking Uniden's advice before sitting down to program this scanner: Make copies of the manual's planning sheet and take a few minutes to lay things out before spending the time to enter all of the race or system information.

Bottom line, whether it's monitoring a race, or a conventional system, you'll find this scanner to be a worthy tool in your communications toolbox.

The MSRP for the SC230 is $279.

Table 1

Example of a Race System
(Frequencies may not be accurate)

Race	Car	Driver	Frequency
Nextel Cup	0	M.Bliss	466.5000
			469.1375
	2	R.Wallace	451.8250
			464.8250
Busch Gr Nat	0	K.Davis	466.2625
			467.1125
	1	C.Mears	468.3125
			460.7375
	2	R.Hornaday	461.5125
			461.5875

Table 2

Example of Conventional Systems
(Frequencies may not be accurate)

System	Group	Channel	Channel Name
Police	Liv. Co.	155.595	Dispatch
		155.620	Car to Car
	Monroe Co.	450.025	Towns East
		450.075	Towns West
		450.150	Car to Car
	Ontario Co.	155.755	Dispatch
		155.850	Car to Car
Fire	Henrietta	46.550	Dispatch
		46.650	Working E
		46.660	Working W
		150.255	Fire Police
	Bloomfield	48.125	Dispatch
	NY State	45.800	Mutual Aid

MT First Look Rating (0-10 scale)
Audio Quality...................... 9
Audio Level 8
Backlight/Display 9
Ease of Use 6
Feature Set 8
Keyboard/Button Layout 7
Overall Reception............... 8
Sensitivity 8
Reception 8
Battery Life......................... 9

Spectrum Capture Using the SDR-14 Receiver from RF Space

RFSpace's SDR-14 was introduced to *MT* readers in part three of our SDR series last month. But, before moving on, let's look at this state-of-the-art Software Definable Radio in more depth. We'll focus on its ability to receive a 150 kHz band of frequencies, simultaneously capturing and storing all signals it "hears." This sometimes referred to as spectrum vacuuming.

The SDR-14 then allows the user to recall the saved frequency spectrum capture file, tune through it and listen to any received stations as if they were "live" from-the-antenna stations. Very cool! Let's start by refreshing ourselves with the SDR-14.

❖ Tiny SPACE Radio

RFSpace's SDR-14 is housed in a small, professional, equipment style metal box measuring 6.5 x 5.5 x 1.5 inches. Its only features are four connectors (antenna, direct, power and USB) and three status LED. It's powered by an included small AC power supply supplying 12 volts DC. The connection to the PC is via the USB port using the supplied cable. It uses an SMA type connector, as used by the ICOM R2, for the signal inputs. Therefore, I suggest you have a BNC to SMA adapter on hand.

Figure 1 is a block diagram of the SDR-14 clearly showing that there is no frequency conversion of any kind prior to the digital (A/D) stage; making it a near ideal SDR. To learn about what the blocks do, see the two series of *Monitoring Times* articles, "Radio in the 21st Century" and Part three of the series on FlexRadio System's SDR-1000 and SDRs.

Most radio professionals, and even competitors in the radio industry that I have spoken to, rate the SDR-14's circuitry as the most advanced SDR available at this time. The SDR-14 covers 0.1 to 30 MHz directly. Frequencies up to 166 MHz can be monitored at much reduced selectivity and sensitivity, using harmonic sampling. The user can choose eight different modes of demodulation (AM, WFM, FM, USB, LSB, CW, CWr, and DSB) and an infinite range of DSP bandpass and audio filters.

❖ SpectraVue

The software that is supplied with the radio is SpectraVue version 1.23. The included 15-page paper User's Guide is woefully inadequate. It really only shows how to install the software. The included CD ROM and their website **http://www.rfspace.com** has lots of

SDR-14 FFT Spectrum Analyzer - Digital Receiver
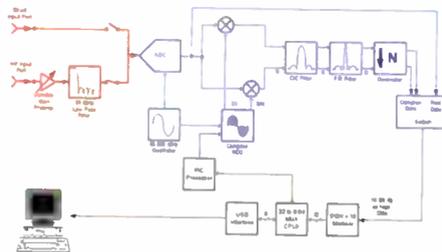
Figure 1 – Block Diagram of RFSpace's SDR-14 Software Definable Radio.

good, detailed information that the user will require to use the SDR-14 to its fullest.

SpectraVue *seems* to run on just about any recent PC. For the hardware to perform, a Pentium III 800 MHz PC, running Windows 98 or XP, is recommended. We used it on a system with exactly those parameters and 256MB of RAM.

SpectraVue is very easy to use. It came on CD and was installed and running within two minutes without any problems. For comparison, SpectraVue was loaded on a Pentium I 133 MHz ancient PC where it also seemed to run without problems. However, the SDR-14 was not connected to this system. I suspect that connecting the radio would really have slowed down the system, making it almost unusable.

SpectraVue was designed for spectrum analysis and is very easy to use, but its monitoring features are very basic. You'll find no frequency, mode or station logging features, commonplace in all other radio software. Frequencies are tuned either by keyboard input or clicking on the signal of interest on the display.

Since the main thrust of this software is spectrum analysis, a large display area dominates the main screen. It can be configured to show signals in a range of frequencies in a variety of ways: raw data, 2D FFT, 3D FFT, Horizontal Waterfall, Continuum, Phased signals or Vertical Waterfall as seen in Figure 2.

Figure 2 demonstrates a vertical waterfall display of frequencies from 5.899 to 6.049 MHz. If you look along the top of the spectrum window you can see the frequency axis. The frequencies carrying traffic are indicated on the display as lines of different color – visible to *MT Express* subscribers. Print subscribers will see Figure 2 in shades of gray.

Left click on a signal of interest and you will hear it demodulated through the computer's speakers. That "Demod" frequency is displayed in the large box at the lower center of Figure 2 when "Center Freq" is clicked off. The mode is chosen at the lower right.

❖ See (and Hear) History

Take another look at Figure 2. On the left side of the display you can periodically see a time-date stamp, showing when the spectrum was monitored. What you are actually looking at is a recording of *all* of the signals received between 5.899 and 6.049 MHz. The real fun comes from the fact that you can tune and demodulate (listen) to any of these signals as if they were being broadcast live!

Government agencies around the world have had this spectrum capture capability for many years. Of course, because of their massive computer systems and power, the government boys can capture much more than 150 kHz. Would you believe 2 GHz worth of radio spectrum is routinely swept up and stored for later analysis?!

Even with the 150 kHz limitation, I found this feature fascinating when monitoring active ham bands or shortwave broadcast bands.

❖ What is an FFT?

FFT stands for "Fourier Fast Transform" which is a mathematical method for data analysis, reduction and reconstruction. The FFT algorithm is capable of grabbing data at different levels of granularity or resolution. Just for example, if we break the 150 kHz into 150 equal pieces, then we could retrieve the data back to a resolution of 1 kHz, (150 kHz/150 = 1 kHz).
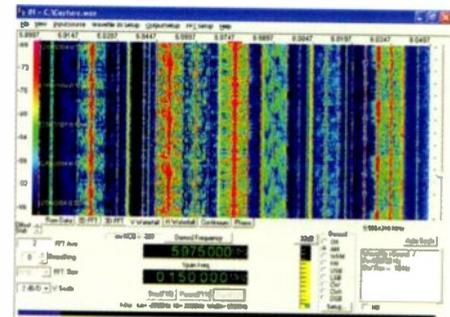

Figure 2 – SpectraVue's Spectrum Analysis Intensive Display showing all the signals in a 150 kHz spectrum centered at 5.975 MHz
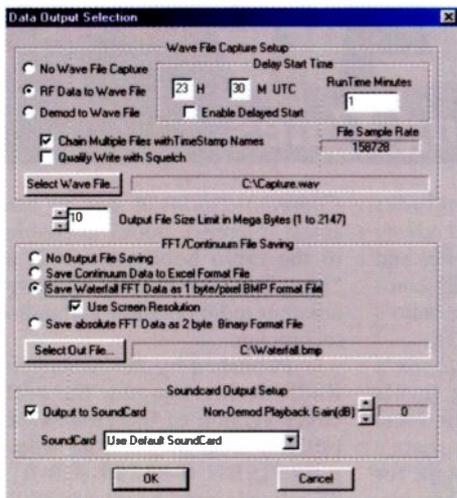
Figure 3 - The Output Setup Menu – The key to RF spectrum capture

Therefore, we would be capable of separating and listening to 1 kHz adjacent signals. The FFT size must be set at a suitable number for the signals we wish to monitor. This is done at the lower left of the main screen or from the FFT Setup menu.

We have chosen "8192" which yields a pretty tight 19 Hz (yes, Hz) bandwidth, as displayed in the box in the lower right of Figure 2. This bandwidth allows us see and to separate all signals, even CW signals.

❖ Gotcha!

Let's go over the steps needed to perform a spectrum capture. We'll target 150 kHz of spectrum in the 6 MHz band.

Go to the "OutputSetup" menu pulldown at the top of the main screen shown in Figure 2, and Figure 3 appears. Select "RF Data To Wave File," which tells the software that we wish to save raw radio spectrum, not demodulated audio.

We have chosen to display the "Time-Stamp" and chain multiple files. The resulting file's name and saving location is then selected in the "Select Wave File." Here we have called the file "Capture.wav" which is the default name, and we'll save it in the main directory on the "C" drive.

Also on this menu is where we set the capture file size. Since the file size is a function of FFT size and capture duration time, bigger gives us more capture time. We have chosen 10 Megs as the file size maximum, which gives us a relatively small capture time of seconds.

Next, instruct the program to save the resulting waterfall FFT graph data. And, finally, since we display the file on the same computer that we will use to capture it, we have selected "Use Screen Resolution."

Now that everything is set, all we have to do is enter a Center and Span Frequencies in the boxes, shown in the lower center of Figure 2. With an F12, the capture starts and runs until it uses all of the allocated memory (see above).

Now that we have captured all signals that the SDR-14 heard in the 150 kHz swath

centered around 5.975 MHz, how do we "tune" and listen to them? The answer is, quite easily.

First, from the "InputSource" menu at the top of the screen we chose the input as "Wave File". Then select "Start" or hit the F12 key and Figure 2 is displayed. Since we only captured a few seconds of spectrum, we have put the playback on continuous loop, as can be seen by the time stamp which repeats itself.

In Figure 2 we are listening to a shortwave broadcast station in center of the screen at 5.9750 MHz. Its signal strength, -33 dB, is seen on the bar meter, lower right.

And the best part is that the audio from this station can be heard from the PC's speakers as the waterfall display scrolls down. It feels like replaying history – a radio Time Machine.

Looking to the right of center, we can see a number of vertical lines which represent transmissions. Look at 5.980, 5.995, 6.010, 6.015, 6.030 and 6.035. By selecting AM mode, moving the cursor to any of these and left clicking we can "tune" to that frequency and hear it.

6.035 MHz reveals a station playing country and western music. At 6.030 we can listen to the hum modulated carrier of a station about to either go on or off the air. As its "signal" strength varies, other weaker stations can be heard under it. Tuning to the station at 5.980, we can listen to Middle Eastern sounding music with a female announcer.

Until the capture loop begins to repeat itself, it's hard to remember that you are not tuning a live station. Just look at the vast amount of display detail in Figure 2. Even in 150 kHz there is enough here to keep a monitor busy for hours. I discovered stations that I didn't hear when I performed the spectrum capture. So much to investigate!

❖ Never Satisfied

As anyone who has read my column knows, I'm never satisfied, even with a great product. In this spirit, I suggest that a more radio-monitor-friendly software module be added to the SDR-14's software package. This should include station logging, memory storage and digital decoding modes. I have a feeling the guys at RFSpace are listening.

❖ Summary

In my humble opinion, the SDR-14 is one great receiver and the closest thing you can currently get to the ideal SDR. As you can see in Figure 1, it has NO frequency conversion of any kind prior to its A/D digital circuitry. Its performance was sensitive, clean and constant, a pleasure to use. The RF Capture and Playback feature is great! It also does audio recording and more.

The SDR-14 is available from RFSpace at **http://www.RFSPACE.com**. Here you will also find audio and spectrum samples that you can play with. The price is $999 plus shipping. Questions should be directed to *INFO@RFSPACE.com*.

WBMR- Using a "Black Mountain Radio" slogan, this one mixes rock music with relays of drama shows. (Uses wbmrradio@hotmail.com e-mail)

WHGW- This relatively new pirate has been quite active, normally with relays of radio drama programs produced by others. As you see here, their new QSL, different from one MT printed previously, reminds us that pirates often orient their programming to holiday themes. (Uses whgw6925@myway.com e-mail)

WHYP- James Brownyard operated a tiny licensed station in North East, PA, using these call letters. The pirate version is the most active and innovative pirate on the air today. It's disguised as a memorial to Brownyard. Look for their rock, comedy, and pirate advocacy, sometimes in AM mode. (Providence)

WJAM- They have been featuring intense coverage of the punk rock scene, with musical selections and commentary about the music. (Belfast)

WMPR- The "dance party" techno rock format of this one is easy to spot when it is on the air. QSLs remain rare, since they provide no means to contact the station. (None)

WSPY- This new one came out of nowhere. So far programming has consisted only of number test counts. We shall see what develops here in the future. (None)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations, especially in Europe where the value of the US dollar is plunging rapidly. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 69, Elkhorn, NE 68022; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for submitting pirate loggings with a hope that pirates might QSL the logs remain *The ACE* ($2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via *niel@ican.net*. The *Free Radio Network* web site, another outstanding source of content about pirate radio, is found at *http://www.frn.net* on the internet, and a few pirates will occasionally QSL a report left on the FRN.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Jerry Berg, Lexington, MA; Ralph Brandi, Middletown, NJ; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Wendel Craighead, Prairie Village, KS; Gerry Dexter, Lake Geneva, WI; Rudy Elsen, Castro Valley, CA; Rich D'Angelo, Wyomissing, PA; John Figliozzi, Halfmoon, NY; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Wimberly, TX; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Pancho Villa, Upstate NY; Fred Roberts, Germany; Lee Reynolds, Lempster, NH; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; Matthew Weitendorf, Cleveland, OH; Niel Wolfish, Toronto, Ontario; and Joe Wood, Greenback, TN.

Don't Bust an Eardrum!

Got your new scanner all set up for monitoring the races? You won't hear a thing without a headset, and without a noise-canceling headset, you may keep hearing the roar of the engines long after you leave the track!

Race Scanners, also known as The Frequency Fan Club, has a number of great solutions for the race fan. "Solution 1" is a standard over-the-head set that reduces noise by 25 dBa while providing light-weight comfort. The headset weighs only 15.3 ounces and comes with super-soft ear seals and volume control for hours of listening without discomfort. The structure is of sturdy stainless steel and the ear cups come in three colors – black, blue or red. The "Solution 1" is Race Scanners' most popular model for $54.

Although most folks don't go to the races by themselves, conversation can be so difficult over the background noise, they could be alone under the headphones. Race Scanners has a solution for the isolation and the expense of multiple scanners – the Fan-Link Unlimited Intercom. Each headset is powered by a 9-volt battery and can be set up in a number of configurations – two, three, or more fans can listen simultaneously to one scanner, or can talk to each other while listening to their own radios, or just be in listen mode.

A set of two Fan-Link Unlimited Intercom System back-of-the-head headsets is $319 and

includes:
- (2) BTH Headsets w/ Micro-phone and PTT Button
- (2) Umbilical Cable Connecting Headsets
- (2) Headset to Scanner Cables (coiled)
- (2) 9-Volt Batteries (Non-re-chargeable Type Used)

Each additional headset is $170.

For information on these and other products visit **http://www.racescanners.com** or call 1-800-RACEFAN (Canadians Call: 1-478-968-0165). To write for a catalog, send to Race Scanners, 224 Old Plantation Trail, Milledgeville, GA 31061

The ARRL Handbook 2005

Getting a make-over every so often can be a good thing and the American Radio Relay League (ARRL) has done just that with their flagship publication, *The ARRL Handbook for Radio Communications*. The 2005 release marks the 82nd edition of this world-renowned publication, but more importantly, it marks the first major revision of this fine publication in a decade.

Entire sections of this book were updated to reflect the most current state-of-the-art technology. Such topics as analog and digital signals and components; working with surface-mount components; Spread Spectrum communications; a special section on High-Speed Multimedia Radio (HSMM), K8OCL; Digital Signal Processing (DSP) and software radio design; a new chapter on computers with internet tips for hams, Wireless Fidelity or Wi-Fi technology, personal computers in the shack, and a section on mode specific software are a part of this new edition of the *Handbook*.

Besides in-depth chapters on electronics, radio theory and electronic references, some of the other subjects covered by

this new *Handbook* includes new antenna projects and advice on antenna baluns; satellites and Earth-Moon-Earth (EME) communications, and amateur radio's newest satellite – Phase 3E.

Most of the *Handbook*'s projects have building levels aimed at the intermediate level electronic hobbyist. But there's something inside this book for experimenters of all skill levels. Some of the exciting new projects in this edition include a 10-watt upper sideband transceiver for the new 60-meter ham band; a simple broadcast Radio Frequency Interference (RFI) trap; a 10-meter Inverted-U antenna design (expandable to 12/15/17/20 meters); and a switched attenuator covering a range of 60-dB in 1-dB increments. I was particularly impressed with the 22 antenna projects covered in the *Handbook* and can see many trips to the local hardware store in my future, thanks to this new edition.

The *ARRL Handbook* is an unmatched source for building receivers, transceivers, power supplies, RF amplifiers, station accessories and antenna construction projects. And for the first time, this edition is bundled with *The ARRL Handbook CD* (version 9.0), a fully searchable and complete book on CD-ROM (including many color images).

The *Handbook* measures 8-1/8 by 10-5/8 inches, weighs 5.1-lbs, has 1178 pages separated into 26 chapters, and 74 projects scattered over 13 different chapters.

The 2005, 82nd edition of *The ARRL Handbook for Radio*
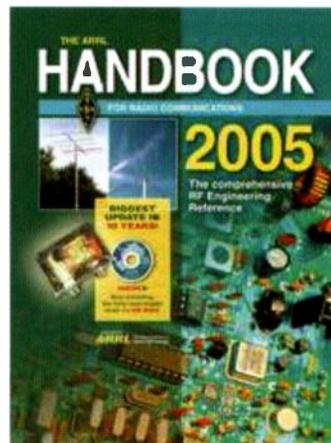
Communications is one of the finest reference books available to the radio hobbyist and is a "must buy" for the 21st Century amateur radio operator and radio technician.

Published by the American Radio Relay League, the soft cover version of the *Handbook* (#9280) costs $39.95 plus shipping (ISBN 0-87259-928-0). The hardcover book (#9299) costs $54.95 plus shipping (ISBN 0-87259-929-9). Both versions include the CD-ROM version 9.0. You can order the *Handbook* online from their website at **http://www.arrl.org**, via the phone at 888-277-5289, or via their snail mail address, ARRL, 225 Main Street, Newington, CT 06111-1494.

– Review by Larry Van Horn, N5FPW

DRM the Easy Way

German company Coding Technologies has introduced the world's first USB receiver for Digital Radio Mondiale broadcasts. Just plug the Digital World Traveller into the USB port of a notebook or standard PC with no additional power supply or battery.

The tiny radio covers spectrum in the 4.5, 5, 9, and 10 kHz bands, and receives analog AM/FM broadcasts in addition to DRM broadcasts below 30 kHz. The receiver will accommodate a loop or wire antenna (software switchable); a wire antenna is provided along with the USB cable and software.

The Digital World Traveller is 199 Euros plus shipping and handling from Coding Technologies, Digital World Traveller, Deutschherrnstrasse 15-19, D-90429 Nuernberg, Germany;

Phone: +49 911 928 91 0; Fax: +49 911 928 91 99; E-mail: *drmrx@codingtechnologies.com*; http://www.codingtechnologies.com

Worldwide Utility Guide Volume 3

It is hard to believe that the internet radio club WUN (Worldwide Utility News) is celebrating their tenth anniversary this year. As part of that celebration the 1,300-member club is releasing the third edition of their popular *WUN Utility Guide CD-ROM*.

Utility monitoring in the HF spectrum consists of monitoring anything that transmits outside the broadcast, amateur radio and citizen band portions of the shortwave spectrum. Becoming a successful utility monitor requires a good tabletop general coverage receiver, a good antenna system, the appropriate decoders for the digital modes you want to monitor, and solid frequency and identification information. The new WUN CD-ROM handles the last two conditions with flying colors.

The CD is organized into five sections selectable by clicking on menu tabs or links off the home page. There is a section devoted to "everything you ever wanted to know about WUN."

In the audio section WAV and MP3 audio files are included for various services including aeronautical and maritime stations, government and military stations, numbers and oddities, spacecraft and time signals, digital modes and characteristics, and samples of various digital stations using digital modes.

The files section has text files that include all of the WUN newsletters (1995 through September 2004), the WUN logs taken from the WUN newsletters January 1995 to September 2004,

over 70,000 numbers stations logs originally published in the *Numbers & Oddities* newsletter (this is in Excel spreadsheet format), samples of many historic station digital message traffic, the complete collection of the club's *Special Topic Reports* and utility information reports.

There is an images section were you will find HF FAX transmission images, Hellschreiber amateur radio images, a treasure trove of miscellaneous images, well over 200 images of utility station QSLs, and Slow Scan TV (SSTV) sample images.

Finally, there is a software section where you will find control software for the NRD 535/545 receiver, a SkySweep decoder demo, propagation software and even a KG-84 crypto decoding program. There are 13 software packages on this CD, including two specifically written for the Macintosh operating system.

The WUN CD is readable in any standard computer CD-ROM drive. It is compatible with Microsoft Windows, Apple Macintosh, and Linux operating systems. Minimum hardware requirements: 500 MHz CPU, 24x CD-ROM, and 128-MB of RAM memory. The CD interface is written in standard html, so it should be viewable by any web browser that supports HTML v4 or higher. It has been successfully tested with Internet Explorer v5, Netscape v7 or Mozilla v1 web browsers.

One of the largest and most useful files on the WUN CD is the 21.922 MB (269,426 lines of text) file that has all the past WUN logs sorted by frequency. This file is extremely useful to the ute enthusiast to help identify historical and current activity on each frequency. But you won't be able to use Windows Notepad to view this huge file. I use NoteTab

lite, which is freeware from the web and it handles the file with no problems.

The WUN CD has over 800 audio files, almost 600 images, and 400 plus text files in this new edition. And it is a "must" for the active HF utility hobbyist.

The *WUN Utility Guide #3* CD-ROM may be ordered from WUN for only U.S.$24.99, which includes postage to U.S. addresses and airmail postage elsewhere in the world. Payment must be in U.S. dollars (make checks & money orders out to "WUN"). You may also order using VISA or Master Card: All credit card orders will show "MagMusic" as the seller. Please allow up to 4 weeks for delivery on all orders. Orders may be mailed to: WUN, P.O. Box 4450, Youngstown, Ohio 44515 USA. Credit cards by e-mail to: rbaker@zoominternet.net or by FAX to (USA Country Code 01) 330-270-9654.

You can also order the WUN CD (SFT21) directly from Grove Enterprises; call 1-800-438-8155 for pricing.

– by Larry Van Horn, N5FPW

Radio/Television Broadcast Directory

Grove introduces the modern-day version of the renowned *White's Radio Log* in their *Grove Radio/Television Broadcast Directory* on CD-Rom. This comprehensive directory is packed with 750 pages of broadcasting stations in North, Central and South America.

Authored by *Monitoring Times* columnist and assistant editor, Larry Van Horn, this self-loading, information-packed PDF allows search by frequency, call sign, location or any combination of key word(s).

The AM broadcast (530-1700 kHz) station section includes station listings for North, Central and South America. The FM (88.1-107.9 MHz) and Television (channels 2-69) sections include listings for the United States, Canada and Mexico.

Listings include frequency, call sign, antenna configuration, location, power output for time of day/night, service designators, and station class listings and license status. A handy reference section lists informative Internet sites for radio clubs and additional station information.

Whether you are just starting to explore the broadcast frequency spectrum or you are a seasoned veteran, the *Grove Radio/Television Broadcast Directory* should be a part of your radio library. $29.95 from Grove Enterprises, 7540 Hwy 64 West, Brasstown, NC 28902; 1-800-438-8155; 828-837-2216 fax; http://www.grove-ent.com

NRC AM Radio Log

The National Radio Club has released its 25th edition of their *AM Radio Log* of AM Radio Stations in the United States and Canada.

The 25th edition of the *Log* contains *294 pages* in 8-1/2" x 11" size, 3-hole punched, U.S. loose leaf format. This publication fits nicely into a 1/2" three-ring binder. Nearly 1,500 updates since last year's log!

Recent additions to the log list call letters of FM simulcasts and listing of regional groups of stations in the groups section. The expanded indexes, as well as listings, indicate Talk Radio syndicators as well as regional and national networks.

The *AM Radio Log* is $25.95 in U.S. – $27.95 in Canada and $29 overseas. NRC/IRCA/WTFDA members can claim their usual discount @ $19.95 U.S. or $23.00 to Canada. Checks/money orders go to NRC, Box 164, Mannsville, NY 13661-0164 or use a credit card via PayPal by going to http://www.nrcdxas.org.

Travelers Information

The International Radio Club of America announces an updated TIS/HAR List is now available. Fifty-six pages of top-notch information has been compiled by Mike Hardester on current Traveler Information Stations/Highway Advisory Radio IS/HAR stations in the AM Band.

Get your copy from the IRCA Bookstore for $8.50 (IRCA members). Overseas, add $3.00. Non-IRCA members, add $1.00. IRCA Bookstore, 9705 Mary Ave NW, Seattle WA 98117-2334 (checks payable to Phil Bytheway.)

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