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

Monitoring Times

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September 2004

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Monitoring Times

Vol. 23, No. 9 September 2004

Cover Story

Broadcasting out of Sri Lanka

By Victor Goonetilleke

Off the southern tip of India lies a lush green jewel of an island – one that has been valued over several hundred years for its strategic location, its tea plantations, and, since the last century, for its ideal broadcast location for transmissions into Asia and the Middle East.

Sri Lanka (formerly known as Ceylon) is host to a several broadcast stations and relays, including the BBC, Radio Japan, Voice of America, Adventist World Radio, and Deutsche Welle, in addition to its own Sri Lanka Broadcast Service. Clandestine broadcasts are also heard from both the Sri Lankan government and Tamil rebels.

On the other side of the world from North America, Sri Lanka is a tough DX catch, but not impossible. Even mediumwave signals have been known to make it to North American shores on occasion. Story starts on page 12.

Or Our Cover: Sri Lanka Broadcast Corporation External Service at Ekala.

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Reviews:

In line with his feature article on software-defined radio, John Catalano revisits one of the forerunners of software radio – **ICOM's IC-PCR1000**. Increased software options for this radio have also increased its capabilities and its ease of use. (See page 80.)

In this era of sophisticated scanners, Bob Parnass wondered if he was wasting his time reviewing a simple 50-channel conventional scanner. Instead, operating the **Uniden BC80XLT** was like a breath of fresh air from back when scanning was fun. (See page 78.)

At the other end of the spectrum is a high-end accessory for high-end scanners with 10.7 MHz IF outputs. The **AOR ARD25 multimode data receiver** is currently designed to do one thing – decode conventional APCO25 transmissions. (See page 84.)

A slick solution, for the amateur operator on the go or the apartment dweller or anyone needing a portable resonant antenna, is **DWM's Yo-Yo Tenna**. (See page 85.)

Jock Elliott really took a shine to the **Ecustomware.com flashlights** – the brightest, most efficient LED flashlights yet! (Page 86.)

For a *cheap*, but very acceptable portable AM/FM/SW radio, check out the **County Com SW receiver** on page 88!

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- Signal strength and battery power level indicators
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- Multifunction LCD shows digital frequency, clock, and more
- Alarm and 1-90 minute sleep timer
- Variable, independent bass and treble controls
- Left/right line-level outputs (stereo in FM)
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, convertible nylon handle/carrying strap, earphones, and optional AC adaptor

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LETTERS TO THE EDITOR

Setting the Record Straight

Well, summertime is the season for relaxing, but it looks like we "relaxed" a little too much, because we find the need to issue several corrections this month, thanks to the vigilance of sharp-eyed readers.

MLB Baseball Line-Up

"The article 'The Annual MT Baseball Line-Up Card' has two errors in the radio station chart:

1. New York Mets, The call letters are correct, but the frequency should be 660 kHz.
2. New York Yankees, The call letters are correct, but the frequency should be 880 kHz.

"I have enjoyed *Monitoring Times* for a number of years and find the articles always very interesting. Keep up the good work."

– Bob Lynch

Author Ken Reitz says, "Yes, and this time there is no doubt about it....I have a block against being able to get those frequencies correct. Maybe it's because, as an Orioles fan who wakes up every morning with the knowledge that the Birds are in last place and the Yankees are in first, my fingers can't find the right keys. And, maybe it's because Lee Mazzilli, currently serving his sentence as O's manager, was the former Mets manager who had played for the Yanks. It's hard to say. But, I sense a conspiracy and I demand that Bud Selig look into the matter! I might add that I predicted the Orioles would end up in 3rd place this year, provided Toronto and Tampa Bay were 'contracted' out of the American League East." – *Ken*

Turnstile or Yagi?

"I'm a month behind in reading my *MT* issues, so others may have already contacted you about the antenna picture in the *Beginner's Corner* on Page 26 of the June 2004 issue. There may have been an editing error; in any event, the picture labeled as showing a 'turnstile' omnidirectional FM antenna is actually a highly directional Yagi type beam antenna. As you mention in the text, a turnstile is a set of crossed diploes at 90 degrees to each other."

– Perry Crabill, W3HQX, Winchester, VA

Perry is absolutely right; the antenna pictured was a Yagi which did not match the provided caption. Author Ken Reitz did address both types of antennas, and we picked up the wrong graphic!

The Joke was on Us

For the fun of it, in July we reproduced a suggestive picture from the cover of a Japanese magazine, one which we thought was verified to be a Japanese DX magazine. Turns out the joke was on us!

Glenn Hauser and Bob Grove were both contacted by Japanese correspondents who confirmed the magazine is exactly what it looks like – "adult only." "DX" was on the cover, but Takahito Akabayashi says, "'DX' is here used as the abbreviation of 'deluxe'." Taka Nakayama of AOR USA says "the magazine is not related with amateur radio or antenna. There is no mention about antenna, ham club, or amateur radio, but it is a 100% adult only magazine."

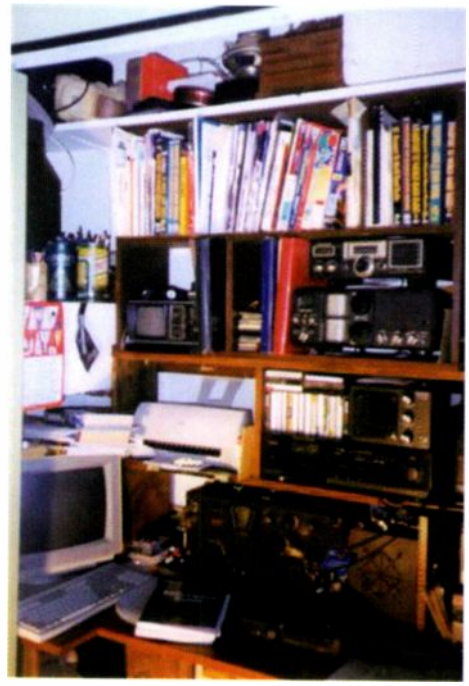
DX magazine or not, this comment from one of our regular contributors stands true: "Cheesecake photo for the Japanese radio magazine – she really is an antenna, and she is transmitting the oldest signal known to man ... "

Latin Logger

Gayle Van Horn forwarded a radio shack photo sent to her by Fernando Garcia of Baltimore, Maryland. She says, "He has terrific Latin logs, and I always appreciate everything he sends." Here's his story:

"My interest in radio started when I was very young, watching my father every night DXing with a Phillips all band radio. In 1960 I had to leave my country and by the mid '70s we were reunited again. Needless to say he needed a radio, so we found an old military BC-342, in which we had some fine loggings, and the SW fever set in, for over 30 years now."

– Fernando Garcia



Readers always enjoy seeing photos of other radio shacks – Why not send a picture of your shack by mail or email attachment to editor@monitoringtimes.com (or at the address on our masthead)? As you can see in this month's "On the Bench" column, whether the shack is humble or hi-tech, your set-up may solve somebody else's dilemma.

SW Online Forum in Spanish

"A new Spanish speaking short wave forum has been created for the Puerto Rico area, where this hobby is picking up fast among the radio community. Although the forum was created for the Puerto Rico area, any Spanish speaking colleague can also join.

"Its name is ONDACORTAPR@yahoo.com. The group has been growing fast with areas for comments, photos of QSLs, radios, antennas, as well as links.

"My regards to you and the outstanding group at *MT*."

– Hector (Luigi) Perez NP4FW, MT Subscriber , KPR-260 SWL, San Juan de Puerto Rico

Old Time Radio

Re July *Letters*: "Your answer to Stan's letter about bringing back old time radio dramas didn't mention satellite XM [*and Sirius-ed*] radio, the best source I've found in the last 30 years, and not just for information. XM plays the old programs 24 hrs a day on their channel 164. Of course, a person has to subscribe to the service, $29.97 per quarter, and get a receiver ...($129 or so) ... If you haven't seen the XM channel lineup or the weekly, old time program schedule, they're available at **http://www.xmradio.com**.

"I think XM is missing a potential market by not advertising in *Monitoring Times*. I don't know any group of people who are more interested in everything radio than radio enthusiasts."

– Russell G. Sheley, Phoenix, AZ

Good idea, Russell. We always welcome names of companies whose ads you'd like to see in MT. Perhaps they'll listen to potential customers!

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

Happy monitoring!

-Rachel Baughn, KE4OPD, editor

Monitoring and the Law

Jorge Rodriguez
jorgerodriguez@monitoringtimes.com

The Bill of Rights – Void Where Prohibited By Law?

Between 1969 and 1980 the Society for Individual Liberty created and distributed a political poster that showed the Bill of Rights with the words "Void Where Prohibited By Law" in red and as if rubber-stamped over the document. In the middle of that rubber stamp was the Forth Amendment – that most precious of rights which prevents the government from searching your person or property and seizing things without a warrant or probable cause.

The Amendment is not void. Although the courts have carved out exception after exception, causing some legal scholars to speculate that some day law students will only study the history of what used to be the Fourth Amendment, it is for now very much alive in all fifty states.

Although only fifty-four words long, perhaps no other amendment to the Bill of Rights has generated more commentary and cases in the area of criminal law than the Fourth Amendment. In fact, before becoming lawyers, law students today spend an entire semester in a course entitled "Criminal Procedure" to learn the current state of the law with regard to those 54 words.

The Fourth Amendment to the U.S Constitution provides that "The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized." Similar language appears in the constitutions and laws of each of the fifty states, giving that state's citizens the same or in some cases greater protections than the Federal Constitution, but never less.

It is not so much the power of the Amendment itself that has generated so much case law and commentary, but rather the result of the judicially created remedy for violations of the Amendment by the government. The Exclusionary Rule, as the remedy has come to be known, prevents the police from using evidence that has been obtained in violation of the Fourth Amendment. The rationale is simple: by not allowing the police to break one law to enforce others, you take away any incentive for their not following the Fourth Amendment.

So why do so many people freely give up their rights under the Fourth Amendment when confronted by the police? The recent stories of two hobbyists may illustrate the point.

Case #1

I'm a ham radio operator and scanner enthusiast who is in a little legal predicament. I live in an apartment building. I often get telephone conversations as intermodulation or images on frequencies I listen to which are legal for me to monitor on my Bearcat BC 895XLT scanner. I do not monitor cordless phones intentionally.

Last spring the police showed up at my door. They said someone reported that they heard the sounds of their telephone call coming from my apartment. I explained that I am a radio hobbyist and sometimes get interference on my receivers. I allowed them in and when they investigated they even made a test call on a cordless phone. The audio from that test call came across my scanner on 451.775 MHz., a local business frequency which was programmed into my scanner. I explained to the officers that the frequency is not a cordless telephone or other prohibited frequency. I even retrieved from the Internet the FCC's online license data for this frequency. Now I'm facing criminal charges.

Case #2

Another reader tells a similar tale while driving across state lines going from home to work.

I was pulled over for speeding late one night on an interstate highway just across the state line from my home state. When the officer approached me, he asked, "Do you know why I pulled you over?" Before I could answer, he saw a scanner mounted in my car and immediately asked, "Why do you have this scanner in your car?" As it turns out, my home state does not have any laws about having a scanner in a vehicle, but the state where I was stopped does.

Although I did not give permission for the officer to do a visual search of my car, he could see the radio, which was turned off and silent, mounted under the dash while standing outside my driver door and he even noted on the citation the words in plain view. I'm now facing a criminal charge of possession of a police radio.

Volunteering is not a Virtue

Could a different course of action, short of not having the radios, have prevented these hobbyists from getting charged criminally? Probably not; each fell victim to the belief that by cooperating and complying with the officers, the police would see that they were really not bad people and would let them go about their business.

The hobbyist in the first example had no obligation to let the police into his home without a warrant. He also has a Fifth Amendment right to remain silent. He did not have to say anything to the police about what he did or didn't do with his radio – or even that it was his radio and that he was or was not the listener of the radio.

Our listener in the second example has similar rights in his car to be protected from unreasonable searches and seizures. Although in his case the doctrine of plain view applies. Plain view is a concept of law that says that where the police are for any reason at a legal vantage point to see something which they know is illegal, they can usually seize that item, even if what brought them to the legal vantage point was something completely unrelated.

A common scenario is where the police serve an arrest warrant for a traffic violation or for failing to appear in court. When a person opens the door the police see illegal drugs and drug paraphernalia on a table a few feet away. The illegal drugs can then be seized since they are in plain view, even though that's not what the police were looking for and they had no knowledge there would be drugs there until the door was opened.

Ask a lawyer in your state what you should do if you had been either of the persons who got in trouble above and you'll probably hear: Don't say anything and don't consent to a search. Cooperation and confessions will not keep you from being arrested and charged with a crime, lawyers say. Criminal defense attorneys say you will rarely talk yourself out of being arrested if that was the officer's plan all along. Instead, you throw away some of the only avenues a skilled attorney may be able to use to defend a case such as the two presented here.

There is no need to be rude or impolite, they say; simply exercise your right to remain silent and do not agree to a search.

Perhaps the back of a Chicago lawyer's business card says it best: "Hourly Rate if you say anything to the police: $500. Hourly Rate if you keep your mouth shut $100."

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MISCELLANEOUS ACCESSORIES

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Scancat Gold for Windows	SFT 2W	$99.95
Scancat Gold for Windows SE Upgrade	SFT 2SE	$59.95
Scancat-Lite Plus	SFT 19	$29.95
PAR VHF Intermod Filter 152MHz	FTR 152DS	$69.95
PAR VHF Intermod Filter 158MHZ	FTR 158DS	$69.95
PAR VHF Intermod Filter 162MHz	FTR 462DS	$69.95
FM Trap Filter 88-108MHz	FTR-FMDS	$69.95
Drake MS-8 External Speaker	SPK 2	$59.00
PAR NOAA Weather Filter 162 MHz	FTR 162DS	$69.95
Yaesu SP-8 Speaker	SPK 4	$159.95
GRE Superamplifier	PRE 1	$59.95
VS6 Mobile Speaker	SPK 7	$14.95

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SCHOOLS

Radio Goes to School

Even though most schools start up in August in this day and age, September still feels like the back-to-school month. We have compiled a surprising number of radio-related school stories.

Hundreds of colleges, universities, high schools, and even elementary schools across the country experience the excitement and the agony of putting a station on the air, whether it's for two hours a day, one semester, one school year, or 30 years, and whether they are heard by one class, half the school, the local community, or across several states. Some are only on the internet.

In the 1960s, the frequencies between 88.1 and 91.9 were set aside for noncommercial broadcasting by stations of 100 watts or less. There are about 300 high school stations nationwide, said Fritz Kass, chief operating officer of the New Windsor, N.Y.-based Intercollegiate Broadcasting System, an organization that serves mainly college stations. There are about 2,400 stations classified as educational by the Federal Communications Commission. But even well established school stations must make way on the FM band for larger stations in Classes B, C and D if conflicts arise.

For instance, when Radio One bought 107.7 WSNJ in the Philadelphia area and moved its frequency to 107.9, that rang a death knell for WWHS, which has broadcast on 107.9 from Haverford High School since 1949 and is considered the longest-running high school station in the country. The station is expected to go off the air before the end of the year, a Radio One spokeswoman said.

New Jersey has a strong history of high school radio stations. WCVH, broadcasting out of Hunterdon Central High School, New Jersey, just celebrated its 30th anniversary. WJSV, based at Morristown High, has been broadcasting since 1971, and West Windsor-Plainsboro High's WWPH has been on the air for 28 years. Other stations operate out of Atlantic City, Piscataway and Brick high schools.

Last year, a contest held at the University of Indianapolis drew 20 high school radio station personnel from that state. The winner that year was WRFT-FM (91.5), Franklin Central, founded in 1978.

Woodrow Wilson Senior High School's Tiger Radio is a rarity among Washington DC schools. At 88.1, it puts out about one-tenth of a watt of power, and covers only half the campus. Since students are usually in class when the station is broadcasting, the majority of students don't know the school has a station. Wilson's on-air radio is, in part, a result of private philanthropy by a parent whose late son went on to become a radio DJ. Fairfax County schools have no radio stations, and Montgomery County has only a closed-circuit system.

College stations fare somewhat better. Some – like WAPX at Austin Peay State University and BCR 1090 AM at Brooklyn College – boast better state-of-the-art radio stations than most commercial stations. But others – like Penn State's WRFM – get shuffled from building to building, with deteriorating equipment and very little budget support.

Many of the college stations have a 30-year history, but some, like WSUI, date back to the early days of broadcasting. Licensed to the University of Iowa, WSUI AM/KSUI FM is a public radio broadcaster, but, with its full-time professional staff, it can't be categorized as a true student radio station. Still, it would be interesting to hear some of its early recordings. Program director Dennis Reese said that he was recently able to salvage hundreds of tape recordings from the 1940s and transcription discs from as early as the mid-1930s. After reprocessing, he hopes to have them available on the Web site for people to hear.

Hooked on Radio

Richard Wilds is a shortwave radio buff and a teacher at Capital City School – an alternative school in Topeka, Kansas. Wilds is using an approach he started when working with children at Topeka State Hospital. The idea, he says, is to help students "understand the world in ways they don't do in books."

Wilds listens to English broadcasts on foreign radio stations – sometimes long into the night – and takes notes, which he passes on to his students. The students write to the stations, mentioning what Wilds heard and posing their own questions and asking for a memento in return. They have received maps, cards, and even a message from China's Premier Wen Jiabao, who answered the student's questions during a news conference in Beijing.

One can hope the experience will incite a few students to listen for themselves. But kudos to a teacher who is putting in long hours to bring the world a little closer. Perhaps he could benefit from this month's feature on timeshifting, and get a little sleep!

AMATEUR RADIO

BPL Team Organization

Amateur Radio operators in the Cincinnati area are organizing a Broadband Over Power Line (BPL) team to keep an eye on a planned BPL deployment in two neighborhoods by utility Cinergy Corporation. The new group, consisting of a half dozen engineering professionals and some 20 others, will operate as a subcommittee of the Greater Cincinnati Local Interference Committee (LIC). Kirk Swallow, W8QID, will head the BPL/LIC effort.

The new BPL/LIC team will work to serve as a clearing house for BPL suggestions. comments and information from the Amateur Radio community. "We in Cincinnati are getting lots of calls and notes from all sections of the US, as this city has the biggest BPL offering from the largest utility," ARRL Ohio Section Manager Joe Phillips, K8QOE, noted.

Meanwhile, to combat BPL on another front, *MT* contributor Alan Bosch suggests approaching the investment community with the arguments demonstrating BPL as a bad investment risk. (See Ute World and Ham Bands for more.)

Hawaii's Governor Vetoes Amateur Bills

Hawaii Gov Linda Lingle has vetoed two Amateur Radio antenna bills which would have

BULLETIN BOARD

Sep 11: Grand Rapids, MI
GRAHamfest 2004 at Forest Hills Northern Middle School (3775 Leonard NE), talk-in 147.26+ (94.8 Hz) and 146.52 simp; 8am-past noon, adm $6. VEC exams 10am all walk-ins. Forums, exhibits, trunk sales. Contact Jack Amelar grahamfest04@w8dc.org (616) 897-6885, http://www.w8dc.org/swap.htm

Sep 11: Ballston Spa, NY
Saratoga Co RACES 19th Annual Hamfest, at Saratoga County Fairgrounds, talk-in 146.40/147.00 and 147.84/147.24. VE exam, fox hunt, door prizes, new and used equipment, food booth. Contact Darlene Lake, dar@saratogaspringsny.us (518) 587-2385, http://www.wa2umx.net

Sep 17: Elk Grove Village, IL
W9DXCC MidWest DX Convention and Banquet at Holiday Inn (Elk Grove Village near O'Hare Airport). Main speaker ON4UN John Devoldere, author of "Low Band DXing." DXpedition reports, guest speakers, exhibits, DXCC QSL card checking, ARRL forum, etc. For information contact Bill Smith W9VA, (847)945-1564, w9va@aol.com

Sep 18-19: Virginia Beach, VA
Virginia Beach Hamfest at Virginia Wesleyan College (1583 Wesleyan Drive, campus guard will direct you), Sat 9am-5pm, Sun 9am-3pm; adm $5. For information mail *hamfest@exia.net* , visit http://www.vahamfest.com or call Lynn Lilla W9DJQ 757-479-1597

Sep 24-25: Oakville, ON
RadioFest 2004, 30th anniversary of the Ontario DX Association (Monte Carlo Inn - 374 South Service Road E., Oakville, Ontario, L6J 2X6, CANADA; Tel: (905) 849-9500, http://www.montecarloinns.com/oak.htm) Wine and cheese reception, silent auction, displays, guest speakers, and raffle. Ian McFarland, speaker. Registration: $10.00 CDN ($7.00 US). For information, contact Harold Sellers at 905-853-3518 email: listeningin@rogers.com or Brian Smith at am740@rogers.com or by mail at: ODXA, 155 Main St.N., Apt. 313, Newmarket, Ontario L3Y 8C2, Canada; or visit http://www.odxa.on.ca/radiofest.html

provided limited opportunities for amateurs living under private deed covenants, conditions and restrictions (CC&Rs) to erect antennas. "This bill is objectionable because it amounts to an inappropriate and unacceptable governmental intrusion into the contractual affairs of the property owners," Lingle said July 13 in her veto messages to HB 2773 and HB 2774. "This measure would allow the installation of antennas in an owner's unit, notwithstanding objections by other owners."

NEW TECHNOLOGY

SDR Design Team Chosen

Monitoring Times readers have been learning from our series on *Communications for the 21st Century* about the Joint Tactical Radio System (JTRS) software radio development project. The ultimate radio was brought a little closer to reality with the recent award of a US Army contract to design and develop the new portable radios to a team led by General Dynamics Corp.

The Cluster 5 version of the JTRS family of radios can be programmed with software and uses satellite technology to provide voice, data, images and video communications to the troops. The GD-led team, which included Rockwell Collins Inc., Thales SA and BAE Systems Plc, won out over an ITT Industries Inc. team that included Raytheon Co., Boeing Co. and Harris Corp.

SCANNING

Fighting Fires with Relm

Florida radio-maker Relm Wireless Corp. once was Regency Electronics, which made some great scanners as well as two-way radios. Regency sold its scanner line to Uniden America, then, years later, bought Uniden's Private Radio Communications division.

Today, Relm is slowly building back a customer base of police, firefighters and forestry officials, producing a tough but affordable product. To meet the changing environment, Relm came out with a digital radio last year. To prove this digital radio is sturdy, well-built, and can stand up to harsh environments, Relm provided 12 radios to the Roosevelt Hotshots, an elite frontline firefighting team based in Colorado, for testing during the 2004 fire season.

Most agencies are also looking for encryption and trunking capability, and Relm is working steadily on developing those features. Ralph Flora, radio contracts and testing manager for U.S. Department of Agriculture Forest Service, said, "Relm was very close to the bigger companies ... It's a very good radio." If Relm can improve the radios by adding trunking and encryption capabilities, they would meet a need for a low-cost digital radio, he said.

SATELLITES

In a Disaster, Help from Above

With this summer bringing one of the worst fire seasons in California history, and a UCLA seismologist predicting a large earthquake in the Mojave Desert by September, the need for reliable communications systems for emergency workers has never been more critical.

Steve Vaughn, director of communications for the Riverside County California Department of Forestry and Fire Protection, said in spite of planning and back-up systems, "When the big one happens, it doesn't matter. It'll be overwhelmed."

Satellite experts say that's when satellite-based networks are increasingly able to respond – the systems are portable, able to be set up quickly, and do not rely on ground-based repeaters or towers.

MILESTONES

Congratulations

To George Jacobs, "semi-retired" shortwave broadcast engineer, who turned 80 on July 16th.

To Adventist World Radio's Global DX program for shortwave listeners and radio hobbyists on airing its 500th edition August 1.

To Ontario DX Association which celebrates 30 years of organization at their Radiofest September 24th.

John D. Kraus, W8JK, Deceased

Radio astronomer, antenna designer, cosmic explorer and author John D. Kraus, W8JK, of Delaware, Ohio, died July 18. He was 94. Kraus is known in Amateur Radio circles for his bi-directional wire beam antenna – often dubbed the '8JK array. Other important Kraus designs include the corner reflector and helix antennas.

The Michigan native was a pioneer of radiotelescope design and the father of the "Big Ear" radiotelescope, which detected the still-unidentified "Wow!" signal in 1978.

In 1996, Dayton Hamvention honored Kraus as the recipient of its Special Achievement Award. In 2001, *CQ* named Kraus to the inaugural class of its Amateur Radio Hall of Fame.

"Communications" is compiled by editor Rachel Baughn KE4OPD (editor@monitoringtimes.com) from newsclippings sent in by our readers. Thanks to this month's faithful reporters, Anonymous; Alan Bosch, Mark Cobbledick, Norman Hill, Sterling Marcher, Jerry None, Chuck Porter, Ken Reitz, Phil Riba, Doug Robertson, Brian Rogers, Richard Sklar, Donald Strumpf, Larry Van Horn, Ed Yeary. Special thanks also to the ARRL.

Broadcasting out of Sri Lanka

By Victor Goonetilleke

Photo by Jonathan Marks

Just minutes before you fly into Sri Lanka's International airport, what strikes you most is the lush green vegetation of the island, especially when you have been flying across the Middle East and South India. If you look down before you land, you will see two of Sri Lanka's broadcasting complexes: the age-old SLBC site, 5 kilometres south of the airport, which dates back to the days of the British South East Asia Command Radio (Radio SEAC), and the state of the art Voice of America (IBB) relay station at Iranawila, twenty-five kilometres to the north on the western coast.

If you are a DXer you will find Sri Lanka unique in that every aspect of the hobby is represented, from state of the art international broadcasting to clandestine broadcasting. Such is the character of the broadcasting culture of Sri Lanka (Ceylon), which probably has more international broadcasters than any other island on Earth.

NHK Ekala

Broadcasting began very early in "Ceylon," as it was known when it was a very important outpost of the British Empire. According to C. L. Pujitha Gunawardene in his book "This Is Colombo Calling," experiments with broadcasting started in 1922. The first official broadcast went on the air at 2.30 pm on June 27, 1924, with a half kilowatt, locally assembled transmitter by Mr. E. Harper, Chief Engineer Telegraphs and Telephones.

During the World War II years, Ceylon was a strategic location in the fight against imperial Japan, and when Singapore fell to the invading Japanese forces, the British had to shift its South East Asian Command to Ceylon for a last ditch stand against the Japanese. Broadcasting on shortwave was the only means of reaching people in South East Asia.

A different era of international broadcasting began with the establishment of Radio SEAC in the present SW complex of the Sri Lanka Broadcasting Corporation at Ekala 25 kms north of Colombo, the country's capital. In March of 1945 the installation of a 7.5 kW transmitter and in April of 1946 a Marconi 100kW transmitter established this historic station which has added so much character to South Asian broadcasting.

The war came to a sudden end after Hiroshima and Nagasaki, and by early 1949 Radio SEAC had finished the task for which it was commissioned. The British Government didn't know what to do with the station. It was too expensive to dismantle and relocate the station, but the government of Ceylon wasn't interested in buying it. Thus, an agreement resulted with the government of Ceylon to hand over the radio station to Radio Ceylon for Rs. 1. (1 cent US$ in today's terms) as the face value on the deed of transfer.

Radio Ceylon agreed to relay the BBC for a few hours and also decided to start an External Commercial Service to Asia on the 100 kW Marconi transmitter, thus becoming probably the first ever Asian International Commercial Broadcaster. It is said that the first station Sir Edmond Hillary heard from the summit of Mt. Everest was Radio Ceylon. There was a vast audience for such a service in Asia which was just emerging from almost 300 years of European colonial rule.

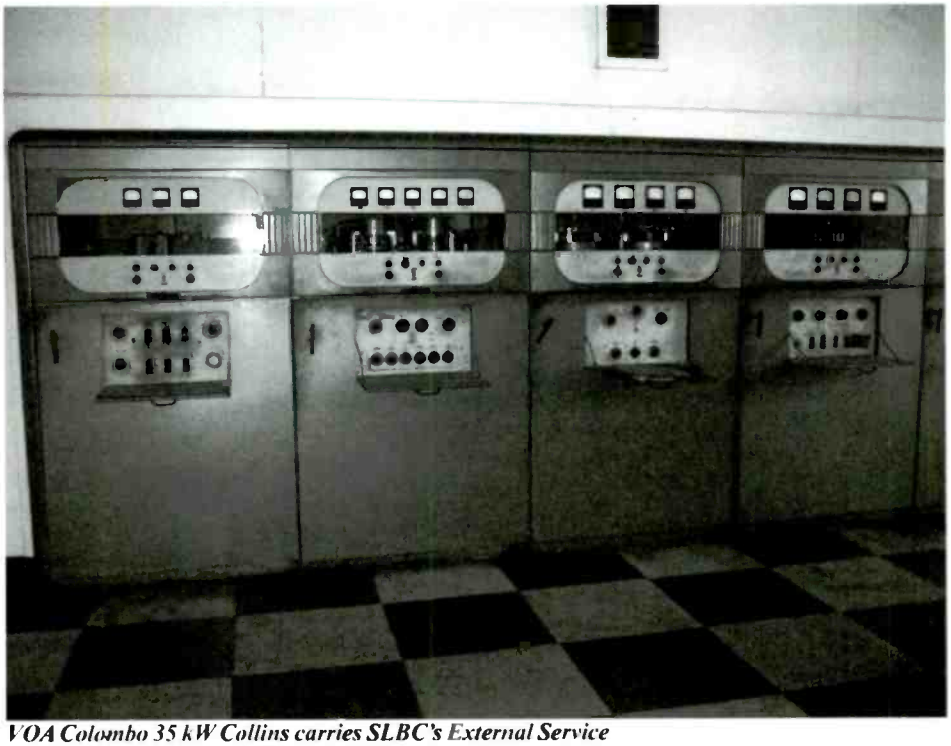
Today, the All Asia Service of the Sri Lanka Broadcasting Corporation might be a ghost of what it was in the early fifties, but it still goes on with a loyal audience in Western India with its original Marconi 100 kW transmitter, albeit running at about 80kW. It is also ironic that after 55 years this transmitter is still the most reliable and best loved transmitter at Ekala.

As you linger inside the Radio SEAC/Radio Ceylon transmitter hall, you still see notice boards from Radio Ceylon and a picture gallery of the opening ceremony of Radio SEAC. In the VOA Hall it is as if time has stood still, with the VOA Notice Board showing the roster of the last engineers to serve there.

Radio SEAC was followed by the Voice of America Colombo Relay Station, and as the years went by also followed Trans World Radio, Deutsche Welle and NHK. These stations are still active from Sri Lanka. Over the years many other countries including, France, Britain and Iran briefly toyed with the idea of a Sri Lankan relay, while AWR and Back to the Bible have had relays of programming over SLBC transmitters for a number of years.

The Sri Lanka Broadcasting Corporation

The SLBC is the only state-owned broadcasting station and it has a network of FM stations all over the island. It discontinued mediumwave (MW) a few years ago, but still



VOA Colombo 35 kW Collins carries SLBC's External Service

transmits on 855 kHz from the North Central province in Tamil to the people in areas controlled by the Liberation Tigers of Tamil Elaam (LTTE), a rebel group fighting for an independent state in the North and the East of the island.

The SLBC still uses SW for its domestic service in Sinhala, Tamil and English in the 60 meter band. The transmitters are quite old, and SLBC has been finding it hard to get spares to keep them on the air. Therefore, domestic SW will last as only long as the transmitters can be kept on the air. Already 4870 is off the air and there are no plans to resume on that frequency.

The All Asia Service in English plays a variety of '60s and '70s music and carries gospel programming, because the All Asia Service, called the Indian Beam at SLBC, has been catering to western oriented tastes of South Asians who have been educated in English schools. For older DXers, the All Asia Service gives a soothing old world charm of easy going life. Both 9770 and 15748 have been reported quite often all over the world. 15748 kHz, although rated at 35 kW, has been running about 25 but gets into the USA quite often around 0100 UTC.

Sri Lanka Broadcasting Corporation
(External Service)
E-mail: slbcddge@sri.lanka.net
Ekala: 2x10kW, 2x35kW, 1x100, 2x300 (operated at 250kW)

6005	10 kW	Non Directional
7302	10 kW	Non Directional
9770	100kW	350° degrees
11775	250/35 kW	350° degrees
11905	250/35 kW	350° degrees
15748	35 kW	350° degrees

English
0025-0430 Daily As 6005, 9770, 15748
1225-1530 Daily As 6005, 9770, 15748

Hindi
0050-0430 Daily As 7300, 11905
1330-1530 Daily As 7300, 11905

Kannada
0800-0830 Daily As 7302, 11905

Malayalam
1000-1130 Daily As 7302, 11905

Tamil
1130-1330 Daily As 7302, 11905

Telugu
0830-1000 Daily As 7302, 11905

Sinhala
1600-1900 Daily Mid East 11775

SLBC Domestic Service On SW
3x10 kW at Ekala

Sinhala
1000-1700 4902 kHz
Tamil
200-2005020 kHz 0200-1000 6150 kHz,
1000-1730 5020 kHz
English
1700-1700 4940 kHz

Voice of America Colombo Relay Station

The VOA started broadcasting with three Collins 35kW transmitters in 1953 from the SLBC transmitting complex at Ekala with its transmitting hall just a few feet away from the building housing the SEAC 100kW transmitter and SLBC's 10kW Phillips transmitters. In later years, VOA used two of the 35kW transmitters and a 10kW Phillips, while SLBC had the use of one of their 35kW transmitters.

Even though the power was modest, the station was heard well in S.Asia and by DXers all over the world. The station signed off with its final broadcast on the 31st of December 1999 with a touching farewell message, when the VOA (IBB) relay station at Iranawila commenced full operations with their 250 kW transmitters. VOA Colombo's 35 kW transmitters are still on the air carrying SLBC's External Services.

Voice of America Iranawila Relay Station

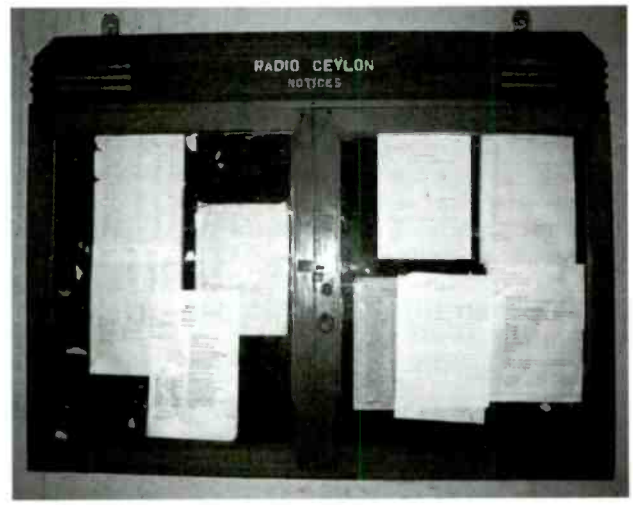
There were many protests over the establishment of the station and it took almost 15 years from its target date of 1983 to go on the air in 1999. Environmentalists, politicians and even India voiced its concern over the US establishment which was to be built and operated by the US, unlike the Colombo Relay which was operated by the SLBC. The station finally went on the air and all protests have by now been overcome.

The station plays a very important part in the US Government's outreach into Asia and the Middle East. With 7x250 kW transmitters it carries broadcasts of the Voice of America and Radio Free Asia. Its latest schedule is difficult to obtain as the IBB withdrew its transmitting site schedule from its web site. It carried broadcasts in English and other South Asian languages, and was also carrying broadcasts to Central Asia, South East Asia, China, Afghanistan and the Middle East, which it obviously does even today. 7115 kHz and 11705 kHz at 0100-0300 UTC, and 9640 kHz at 1700-1800 UTC carry English from Iranawila.

The IBB relay station is a beautiful station, just a few hundred metres from the Indian Ocean, and the lush green vegetation with tall coconut palm trees at Iranawila (near Chilaw on your map) creates a breath-taking backdrop for her tall curtain antenna towers. However, security is very tight and close up photography is nearly impossible.

Trans World Radio - Vishwa Vani - Puttalam

The TWR 400kW transmitter and its tall twin towers for 882 kHz reach high into the tropical sky in the Puttalam peninsula and delivers a strong signal to Southern India and parts of Central India. Late at night, the signals even reach Delhi, although the main target is the South



Radio Ceylon - as if time stood still

and Central part of India. TWR's inaugural transmission took the air on the 31st of May 1977.

For a short while TWR used a 12.5 kW SW transmitter on 6035 kHz from Puttalam for its English broadcasts, since the agreement disallowed broadcasting Christian programs in the national languages of Sri Lanka – Sinhala, Tamil and English. However, when this condition was relaxed in the late nineties, TWR switched off shortwave. Interestingly, this transmitter (which was more designed for jamming Tamil rebel clandestine broadcasts by the Sri Lankan government) was on loan from the SLBC.

On 882 kHz TWR broadcasts from sunset to sunrise, getting the first and last bits of medium wave propagation into India, while the SLBC uses 882 or sometimes 873 kHz for its broadcasts into northern Sri Lanka in Tamil. During the northern winter, 882 is often heard in Europe and a grey-line path exists to North and South America which should make it to the top MW DXers in the Americas.

Deutsche Welle Relay Station Trincomalee

Deutsche Welle's relay station is located at Perka, north of Trincomalee, the world's most secured natural harbor and the Far Eastern HQ of the British Royal Navy during WWII on the Northeast of the island. TWR first explored this WWII communications site which still had tropical bat-infested buildings remaining from WWII days. However, the DW came up with a better proposal to the Sri Lankan government, and TWR had to shift to Puttalam on the Northwest coast of the island.

The first SW test broadcasts from DW Trincomalee took the air on December 1, 1984. Today the DW's 600kW MW transmitter on 1548 kHz delivers a strong signal into India and Bangladesh, carrying German, English, Hindi and Bangla programs, while its 250 kW SW transmitters reach all corners of Asia on all international SW bands. DW Trincomalee has vastly improved Germany's outreach into Asia and the Pacific.

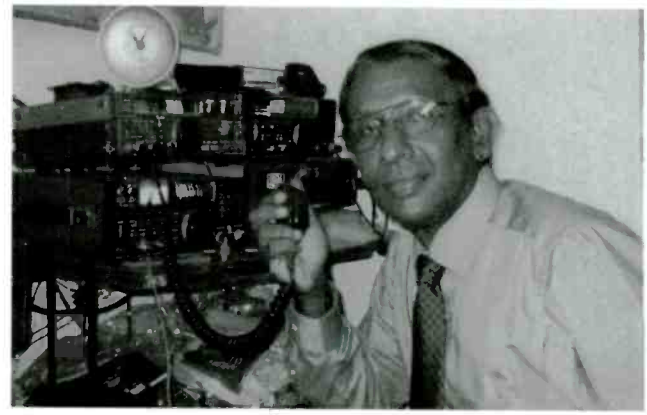
The DW relay station, too, is no exception to the wonderful settings of the other Sri Lankan broadcasters, as it nestles amongst the tropical green lands of the island. The station is located in the heartland of the civil conflict and was off the air when rebels ransacked the station. However, as in Rwanda, German ingenuity was able to get the station back on the air with no opposition from the warring sides and is fully operational today.

Two years ago DW replaced the old 600 kW MW transmitter on 1548 and this transmitter should give good opportunities for MW DXers to log and verify Sri Lanka.

Radio Japan NHK Relay Station Ekala

Radio Japan had no opposition or difficulty in setting up its two Kokkossai 300 kW transmitters and curtain antennae in the SLBC transmitting site at Ekala along with the VOA. Relations with Japan have been excellent ever since Ceylon (Sri Lanka) championed the cause of Japanese freedom and dignity after WWII, at the San Francisco Conference in 1948.

The Japanese were right on target for their first broadcasts on January 1, 1991. NHK uses its relay station to broadcast to South Asia and the Middle East, while SLBC uses the other transmitter for its Middle East and Indian services. The station was built by NHK and gifted to the Sri Lankan government in a colorful ceremony in late 1990.



The author at Christmas, 2003

Radio Japan NHK

11770	2200-2300	Japanese	300 kW	130°
11840	1400-1500	English	300 kW	130°
11890	0630-0700	Bengali	300kW	350°
11890	0700-0730	Hindi	300 kW	350°
11890	0730-0800	Urdu	300 kW	350°
11890	1230-1300	Bengali	300 kW	350°
11890	1300-1330	Hindi	300 kW	350°
11890	1330-1400	Urdu	300kW	350°
17595	1100-1115	Arabic	300kW	310°
17675	0830-0900	Farsi	300kW	310°
17780	0230-0300	Farsi	300kW	310°
17820	0500-0530	French	300kW	310°

Private and Commercial Broadcasting

As in international and commercial broadcasting, Sri Lanka was the first in South Asia to allow private broadcasting. The FM broadcast band is full of private stations and state channels. Some of the private stations are also on the Internet. Unlike some other South Asian countries, Sri Lanka exerts no control over the content, other than those of libel and accepted media laws in the West.

Lively discussions critical of government policy are freely aired, although, through restriction in transmitter power of private broadcasters, the government's much superior transmitter power and State resources give the government the upper hand. The ruling parties, without exception, haven't been shy of using state resources in their efforts to shape public opinion, but a country which has a literacy rate of over 96% has shown that people are not easily fooled!

Clandestine Broadcasting in Sri Lanka

In Sri Lanka in 1977 a very pro Western and anti Indian Congress Party Government was swept into power in an unprecedented election victory over the socialist government of the first woman Prime Minister in the world, Mrs. Sirima R. D. Bandaranaike (mother of the present executive President). The new government took a very strong pro US line, negotiating the new VOA relay and offering huge fuel storage tanks to the US Seventh Fleet in Trincomalee, in addition to many other pro Western moves.

A few months later in India, the Moraji

Radio SEAC Headquarters Building - a relic from World War II

NHK Transmitter Plant was deeded to Radio Ceylon

Desai Government was voted out and Mrs. Indira Gandhi and the Congress Party came back into power. Under her and later under her son Rajiv Gandhi (assassinated by an LTTE suicide bomber in Madras), the Indian intelligence service, Research and Analysis Wing (RAW), was given orders to destabilize the pro Western government in Sri Lanka using the Tamil independence movement.

Many Tamil groups were given military training in Tamil Nadu and sent across the 23 mile Palk Strait to wage guerrilla war against the Sri Lankan Government. The intention was to check the Sri Lankan Government and bring it back into the Indian orbit rather than creating an independent Tamil nation in the north and east of Sri Lanka. Unfortunately, things went out of control, eventually even bringing the Indian Army into Sri Lanka and turning the LTTE against its former ally which had trained and sheltered them.

Against this backdrop, political clandestine broadcasting hit the Sri Lankan airwaves in late 1983, when the ethnic conflict between the Tamils of the North and East and the Sinhalese in the rest of the island broke out into open military action. The first reports of clandestine broadcasts came in late September 1983 from the BBC's Tamil Service correspondent in Madras. However, the first monitored broadcasts, probably from a higher-powered transmitter, was on the 4th of November 1983 in the 7 MHz radio amateur segment of the 41 meter band, as reported in the pages of the Union of Asian DXers. The station called itself the Voice of Eelam. Soon, direction finding from the northern shores of Sri Lanka and naval craft got the bearings to cross in the Salem area of Tamil Nadu.

In the years that followed, many other groups sponsored by RAW started broadcasting, including the Peoples Liberation Organization of Tamil Eelam (PLOTE) and Eelam Peoples' Revolutionary Liberation Front (EPRLF) and the Liberation Tigers of Tamil Eelam (LTTE). The Sri Lankan government responded with jamming and airing its own black clandestine broadcasts.

By early 1985 certain areas of the North and the East were under rebel control and several clandestine stations shifted from Indian to Sri Lankan soil. In 1985 there was a cease-fire between the government and the rebels. While government forces were confined to barracks, the LTTE took the opportunity to destroy all opposition to it through assassinations within the Tamil movements and took control of all the rebel-held areas of the North and the East. Thus, the sole Tamil political broadcasting in the latter half of the eighties originated from the Voice of Tamil Eelam, also known as Voice of the Tiger "Paligulin Kural." VOT operated mostly on 7460 kHz and was heard by DXers as far away as Japan, Europe, and the Mauritius under good conditions.

The story of clandestine broadcasting is long, exotic, and one of intrigue. It includes black clandestines run by the Sri Lankan government, as well. In 1989 there was a Southern rebellion against the government by Sinhalese youth of the Peoples Liberation Front (JVP), and while the rebels operated a station on the 4 MHz range calling itself "Rana Handa" (Voice of War), the government ran its counter with a much more powerful black clandestine "Nidahas Handa" (Voice of Freedom).

Today, the LTTE, which is on a cease-fire memorandum of understanding without a political settlement, is operating its Voice of Tamil Eelam, ironically with the government's permission, on 98.0 MHz FM. The transmitting equipment which was gifted to the LTTE by the Norweigian Government – the facilitator in the peace talks – was cleared through Colombo with the approval of the government. The LTTE was asked to limit its signal to a 20km radius from their headquarters in Kilinochchi, and any attempt to increase coverage will surely result in jamming.

The move was highly controversial, and was a contributing factor in the government being thrown out of office in April of this year for being too soft on the LTTE. Up to the time of writing, the cease-fire and the status quo have been maintained.

Conclusion

As you leave the shores of Sri Lanka as a world traveler or as an armchair traveler through the ether, you have visited a country that is unique in every aspect of broadcasting. The ancient Roman cartographer Ptolemy called Sri Lanka *Taprobane* – the land of ivory, precious stones and spices. To the Arab traders and Marco Polo, it was *Serendib* – the land of serendipity. To the Portuguese it was *Ceilan* – the spice island, and to the British, *Lipton's Tea Garden* and the land of precious stones, which contributed the biggest blue sapphire in the British Crown.

To the people of Sri Lanka it is a proud land of more than 2,500 years of recorded history. A land they love and are proud of. Sri Lanka, a land like no other.

Acknowledgements

This is Colombo Calling, P. L. Pujitha Gunawardene
Dr. Adrian M.Peterson, AWR Asia
Bulletins of the Union of Asian DXers, Sri Lanka

A peaceful and electrically quiet riverside DX spot

Time-Shift Your Listening

By Richard Cuff

Picture this...

It's a Saturday afternoon, and you're stuck at the kitchen sink washing dishes or some other sort of mindless activity. You own a portable shortwave radio that you can use in the kitchen, but the only problem is that your options during the North American afternoon for easy-to-hear stations in English are limited. Yes, you can probably hear some of the Africa-targeted services from the BBC World Service, Deutsche Welle, or the Voice of America, but this is only a small sampling of the breadth and variety of the great radio that international broadcasters produce.

As we continue in this mind picture, consider that your favorite BBC World Service program might be "From Our Own Correspondent," or you really like "Innovations" from Radio Australia. The only problem is that, even if you could hear both stations on this Saturday afternoon, the odds of either program being on the air at that time are, frankly, quite slim. You know that, because of errands, family schedules, and so forth, this Saturday afternoon by the kitchen sink is your one best chance out of the whole weekend to listen to some great radio.

With a little bit of planning and some creative use of radios and audio recording devices, you can greatly increase your listening choices at any given time – by recording programs in advance off the air or off the World Wide Web for later listening. This way, if the phone rings, or another interruption comes your way, you don't miss a single word. Or, if you have a long commute to work and don't have a shortwave radio or satellite radio in your car, you don't have to be stuck with the choices on your mediumwave or FM dial.

This article will suggest several how-to approaches to off-the-air and off-the-web recording to increase your listening pleasure and give you a chance to listen to broadcasters you might otherwise miss. We'll call this concept time-shift listening.

Equipment You'll Need

It's handiest to plan for time-shift listening by thinking backwards, asking yourself three questions:

1. What device is most convenient for listening? Is it a cassette boom box or audiocassette player in your car? Or are you more likely to use an MP3 player? Your choice of player affects the recording strategies you'll use.

2. What device is most convenient for recording? Your listening choice limits, to some extent, what recording devices you should select from.

Some choices:

A combination shortwave radio and cassette recorder; the only current example is the Sangean ATS-818CSA (Fig 1), Sony's entry, the ICF-SW1000T (Fig 2), has been discontinued, but a web search identified several vendors still have the radio available.

Fig 1 Sangean ATS-818CSA (picture credit: Grove Ent.)

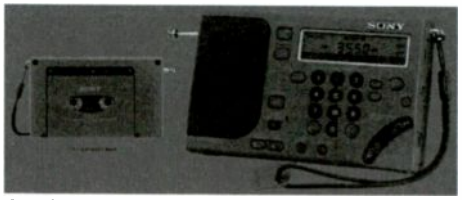


Fig 2 ICF-SW1000T(picture credit: Universal Radio)

Fig 3 Panasonic RQ-L31(image credit: amazon.com)

Fig 4 Sony TCM-200DV (image credit: amazon.com)

A voice-activated cassette recorder with an external microphone jack (my personal favorite); some examples are the Panasonic RQ-L31 (Fig 3), and RQ-L51, the Sony TCM-200DV (Fig 4), and the Radio Shack CTR-123. These are generally designed for recording classroom lectures, but these units all have external microphone jacks which can be connected via patch cord to a shortwave radio's headphone jack or a personal computer's external speaker jack.

A minidisk recorder (caution: I know of none of these with voice-activated recording, so this is only useful if you've already captured audio on a PC or if you're nearby to manually

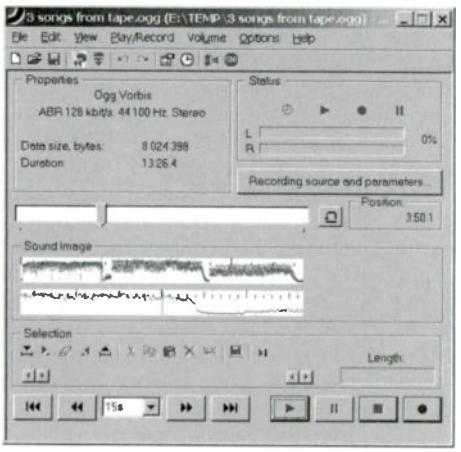


Fig 5 Total Recorder (photo credit: High Criteria Inc)

Fig 6 Audiotools (photo credit: product website)

start the recorder).

A personal computer with MP3 / WMA / Ogg Vorbis recording software (examples for the Windows platform include Total Recorder (Fig 5) and Audiotools (Fig 6). Macintosh users might want to investigate a similar program called RadioLover. These programs take the audio from your PC's sound card – for example, a live or on-demand webcast – and then save the audio as data files in MP3 or Ogg Vorbis formats; these files can then be transferred to portable music players or compact discs.

3. What audio source(s) are most convenient? Depending on how you're going to do your time-shifted listening, one or more of these may be appropriate

A combination shortwave radio with a cassette recorder

A timer-equipped shortwave radio with a headphone jack

A timer-equipped FM radio (for catching the typically inconvenient overnight broadcasts from the BBC World Service, for example)

A live or on-demand webcast through a sound card-equipped personal computer.

When using personal computer-based recording and audio sources, you'll need some software utilities that make the job much easier. We'll talk about those, too, when we discuss each step in the time shift recording process.

A Logical Approach to Time-shifting

Now that you have some ideas about the choices available for listening, recording, and sourcing your audio, we'll take you through some of the processes for time-shift recording.

Step 1: Find something to listen to.

With *Monitoring Times*, you're already on the right track as John Figliozzi's "Program Highlights" column – part of each month's Shortwave Guide section in the middle of each magazine – lists shortwave programs by broadcaster and time of day. In addition to *Monitoring Times*, there are other book and Internet references; you'll find them listed at the end of the article.

If you'll be recording programs via shortwave, you can use the *Monitoring Times* listings, along with your knowledge of which signals are most audible at your location, to set up your recording equipment.

If you'll be using your local public radio station to record either the BBC World Service, World Radio Network (itself an alternate source for many programs also heard on shortwave), As It Happens (available on many US public radio stations in the evening or overnight hours), or, if you're in Canada, CBC's CBC Overnight service, you can consult your local station's program guide for air times. If your local station webcasts, Kevin Kelly's Public Radio Fan website (see below) is a tremendous resource for program listings.

If you will be recording audio from a live or on-demand webcast, the best source for program information is the Public Radio Fan website mentioned above. The home page for the website is **http://www.publicradiofan.com**; there you'll find listings for practically all programs that are webcast from international broadcasters (and domestic public radio broadcasters as well).

Kevin Kelly and other volunteers help keep the information in the database remarkably up to date. You can select a program by name, by station, and by category; you can bring up a list of live webcasts and also find a link to the program on the broadcaster's website, if it exists. This can be handy if you want to listen to the program on-demand, because most broadcasters that provide on-demand audio provide links to it from their individual program pages.

Step 2: Set up your audio source.

Now that you know what you're going to record, you need to set up your audio source. Here are the steps you'll take:

a. Combined shortwave radio / cassette recorder

Using these is simply a matter of tuning the radio, setting the timer, and inserting a recordable cassette. Keep in mind that you can experiment with broadcast times that you might normally not consider when you're away from your shack – such as Deutsche Welle's 0500 or 0600 broadcasts targeting West Africa; sometimes these can be heard in the USA.

b. Timer-equipped radio (shortwave, FM, mediumwave)

My own radio setup is a Sony ICF-SW2010, a voice-activated cassette recorder, and a patch cord from the headphone jack of the radio to the microphone jack of the recorder. While the radio does have a fixed-level "line out" jack designed for recording, I find the flexibility of adjusting the volume level and using the headphone jack works slightly better.

Using this type of setup is also pretty simple:

i) Set the timer of the radio to the time and frequency of interest.

ii) You'll need to experiment a bit to determine the optimum recording volume; I have marked the volume control with a small dot of nail polish in case I listen to the radio "live" and adjust the volume to a different level than is optimum for the recorder. Set the volume of the radio to the appropriate level.

c. "On Demand" webcast via a personal computer

While this is more complicated than the configurations we've already discussed, it's pretty easy to set up once you have the right tools. Speaking of tools, it's assumed you have software that can play any of the three most popular audio formats on your computer – RealMedia, Windows Media, or MP3. Not all webcasters offer all three formats – most only offer one, a few offer two.

Once you have downloaded and set up these three players, you'll do the following:

i) Connect to the Internet as you normally would – either using a dial-up connection or a broadband connection.

ii) Navigate to the website where you can listen to your desired program.

iii) Set up your recording apparatus – either your voice-activated cassette recorder or your MP3 recording software; these will be discussed in more detail under Step 3, below.

iv) If you aren't going to be around your computer when the recording is finished, and you're on a dial-up connection, you'll want to obtain software that can automatically terminate your dial-up connection at a set time. A couple examples of programs that do this on the Windows platform are MultiModemia (see **http://www.leeos.com/multimodemia.html**) and HiDialer 2000 (see **http://www.hidialer2000.com/**). This way you don't need to monitor your on-demand recording or file download. We'll show examples of using this software a bit later in the document.

d. "Live" webcast via personal computer

While it seems more and more international broadcasters are offering their most recent editions of programs as on-demand downloads – in some instances, those archives stretch back months or years – there are still some programs that are only available via live webcast. To record these without needing to baby-sit your computer, you'll need software utilities that automatically connect you to the web, navigate to the audio link at the correct time, and then automatically shut down the streaming audio and, if applicable, your Internet connection at the proper time.

There are several freeware utility programs that easily manage this process for you; as we outline each step in the process we'll identify some of these programs and how they can make this process easier.

We'll assume that you will not be near your PC when you want to record a webcast of interest; you can skip some of these task automation steps if you'll be at your computer when you want to listen to a webcast.

We already assume you have configured streaming audio software capable of playing the three major formats (Real Media, Windows Media, MP3); see the paragraph under "on-demand webcasts" if you don't have these on your computer.

First thing you'll need once these audio players have been set up is a program to automatically launch a webcast at the predetermined time. While all versions of Windows since Windows 95 come with the Task Scheduler software, I've had better luck with a freeware program called Freebyte Task Scheduler, a Netherlands-based software company. The home page for Freebyte Task Scheduler is located at **http://www.freebyte.com/fbtaskscheduler/**; the software works with all flavors of Windows beginning with Windows 95. Download and setup of the software is straightforward.

For Macintosh users, it appears an analogous shareware application is Automize (Fig 7), which works on multiple operating system platforms including the Macintosh. This software, unfortunately, isn't freeware but does appear to offer the functionality you'll need.

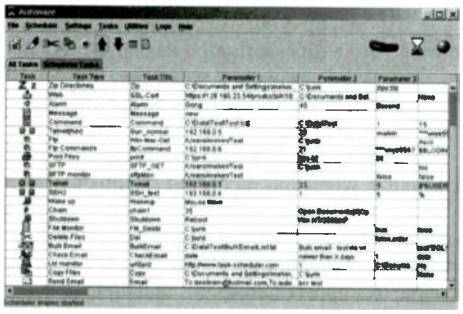


Fig 7 Automize

We will also need a software program to close the webcast audio stream when we're done recording our program, so we don't keep downloading audio and consuming bandwidth longer than necessary. A Windows-based task termination freeware example is ZEASoft's Task Terminator software (Fig 8), located at **http://www.zeasoft.com/products/taskterm.htm**.

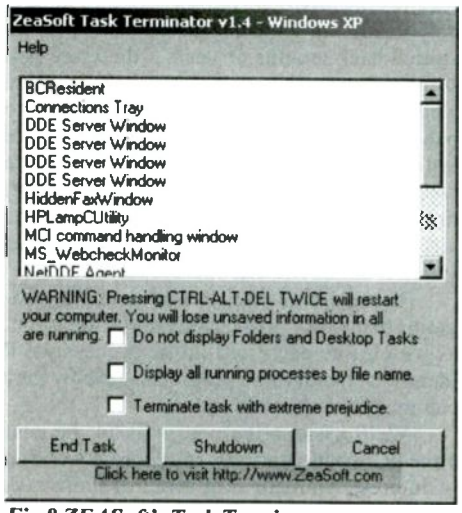


Fig 8 ZEASoft's Task Terminator

This software can be configured to close the streaming audio window at a time of our choosing – by using the Freebyte Task Scheduler software identified above.

We will use a real-life programming example to demonstrate how this process works: we'll set up an automated task to record Radio Australia's Australia Express program, currently scheduled after the 0300 UT news on Sundays, because this program isn't available in an on-demand archive. This program ends at 0330 UT. We'll use Freebyte Task Scheduler and ZEASoft Task Terminator in our example, and have downloaded and installed the software.

i) Launch Freebyte Task Scheduler and click on the "+" icon to define a new task. You can name the task anything you want; we'll call it Radio_Australia in this example.

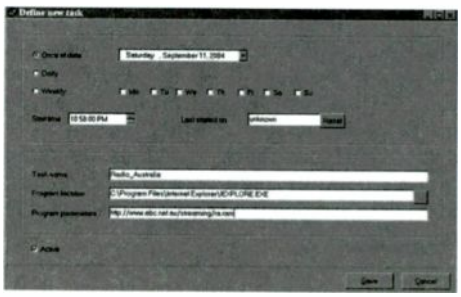
ii) Enter the date and time; we'll use Saturday, September 11th, 10:58 PM (local time); this allows the software to launch and buffer before the news at 0300 UT.

iii) Enter the program name of the Internet browser you use (for me, it's Microsoft's Internet Explorer, which is named IEXPLORE.EXE) in the space for Program Location.

iv) Enter the web address ("URL") for the live Radio Australia stream, **http://www.abc.net.au/streaming/ra.ram**, in the space for Program Parameters. With a Windows PC, you can find the URL by navigating to the webpage where you can launch a station's streaming audio and then right-clicking the link that launches the audio stream, selecting Copy Shortcut, and then pasting (right click - paste) the link. This can be a bit of a trial-and-error process until you get the hang of figuring out a streaming URL.

v) Make sure to click the "Reset" button so no time appears, and to click the check box labeled "Active"; this makes sure your program launches once and only once.

If you've done this correctly, your filled-in entry should look like the following (Fig 9):



vi) If you use a dial-up Internet connection and you're on a Windows computer, the handiest way to manage connecting and disconnecting from the Internet when you aren't around is the HiDialer 2000 shareware software mentioned above. HiDialer 2000 has a scheduler function you can set up separately to connect you to the Internet before you launch the webcast and then disconnect you afterwards. You'll want to set HiDialer 2000 to connect a couple minutes before you want to begin recording, and to disconnect after you've stopped recording the program of interest (Fig 10). If you have an always-on broadband connection, you won't need to worry about this.

vii) If you don't shut down your Internet connection using HiDialer 2000, you will also need to set up a task in Freebyte Task Scheduler to stop the streaming webcast once you've recorded your program of interest. In this instance, you'll specify the Task Terminator software as the program to be launched at the time you specify; for Program Parameters, use a portion of the window title that is part of the audio program you want to close down; for RealPlayer and Windows Media, the text "player" suffices; for Winamp, the text should be "winamp". You should allow an extra minute or two beyond the scheduled end of your program, because sometimes there is a time lag introduced by the encoding of the audio stream by the streaming service provider.

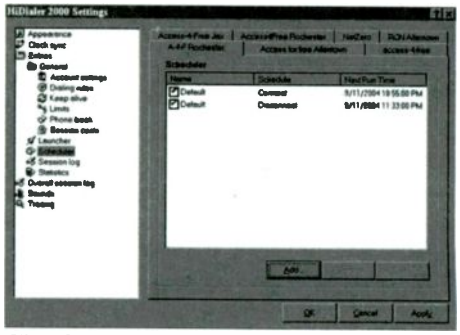
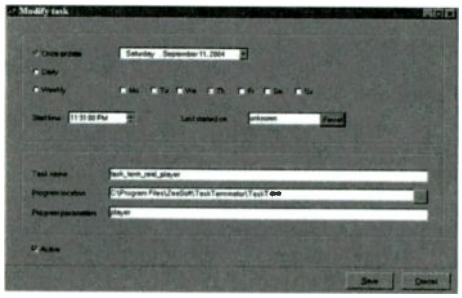


Fig 10 HiDialer 2000

See the example (Fig 11); your file location for Task Terminator might be different than mine.



This may seem complicated, but once you have these steps set up, you can easily reuse them each time you want to record a live webcast, changing the start time, URL, and stop time as needed. You can easily edit existing entries with Freebyte Task Scheduler, for example.

Step 3: Set up your recording equipment.

Now that you know what you're going to record, and how you're going to obtain your audio, you need to set up your recording apparatus. Here are the steps you'll take:

a. Combined shortwave radio / cassette recorder

We already described this earlier – just insert a recordable tape into the radio/recorder and set the recorder switch as needed.

b. Voice-activated cassette recorder with a timer-equipped shortwave or FM / medium radio (as appropriate):

We already addressed how to set up the radio. To use a voice-activated recorder, make

sure the voice activation is switched on, insert your recordable tape, and press "record". If you've done this correctly, the tape might run for a few seconds and then stop. It will switch on once the radio turns on at the time you've set.

c. Voice-activated cassette recorder with a personal computer:

This setup is quite similar to type "b" above – however, in this instance, the patch cord is connected between your computer's sound card and the external microphone jack of your cassette recorder. You may have to experiment with proper volume levels in your computer s software.

d. MP3 recorder

This will be a two-step process, as you will first create the MP3 file as you capture the streaming audio – or, if feasible, download the MP3 file directly if the broadcaster offers this capability (such as Radio Netherlands and Radio France International) (Fig 12).

If you've downloaded the MP3 file to your computer, simply transfer it to your player as directed by your MP3 player's software.

If the broadcaster doesn't offer a downloadable MP3 file, or if you want to capture audio from a live webcast, you'll need MP3 encoding software to do this. I've had good success with Total Recorder as mentioned above.

programme name	update	download	RA Low	RA High	WMA
Latest News	Hourly				
Newsline (including latest news)	Hourly				
Research File	Monday				
Euroquest	Tuesday				
Documentary	Wednesday				
Wide Angle	Saturday				
Insight	Saturday				
Europe Unzipped	Saturday				
Amsterdam Forum	Saturday				
Dutch Horizons	Wednesday				
Vox Humana	Sunday				
A Good Life	Friday				
Press Review	Mo-Fr				

Fig 12 (credit: Radio Netherlands website)

To capture streaming audio as an MP3 file using Total Recorder, take the following steps:

i) Before you begin, adjust the encoding settings in Total Recorder to a reasonably high-quality MP3 bandwidth and sampling rate – if you have broadband Internet access and a fair amount of hard disk space, you can select higher settings; if on dial-up, there's no use selecting anything above 48 kB. Change these settings by clicking Recording Source and Parameters and then Change... to MP3 and an appropriate bandwidth. You need to do this just once.

ii) Launch Total Recorder before you launch either the scheduling software or the dial-up connection manager software. Total Recorder will only begin recording once sound is emanating from your sound card – that is, once your scheduled webcast (or on-demand webcast) begins.

You can also use Total Recorder's scheduling feature (click the clock icon) to schedule the beginning and ending of the recording, but you will still need to use Freebyte Task Scheduler or a similar program to launch the audio stream itself.

iii) Stop recording once your streaming audio ends, either manually or via Total Recorder's scheduling tool. Total Recorder will automatically name the audio file, or you can specify one on your own.

iv) If you are listening to MP3 files on a portable player, transfer the audio file to your MP3 player as you would any other audio file.

Step 4: Enjoy your new-found listening options!

Even if some of these shortwave radio alternatives don't apply to your Internet or computing capabilities, hopefully this article has challenged you to think about how you can become a more selective program listener – Instead of simply accepting what's on at a given time of the day, you can pick and choose among the diverse vastness of international broadcasting alternatives, perhaps discovering programming you've long since forgotten. Or, you can listen to broadcasters – such as Radio France International – that are a lot harder to hear on shortwave than they used to be.

Good listening – whenever you please!

Monitoring the White Tops of HMX-1

By Ron Perron

The "White Tops" Presidential transport helicopters are almost as familiar to most of us as Air Force 1. We've all seen them on TV and in the movies as they either pick up or drop off the President at the White House helipad. The helicopters are affectionately known as "white tops" because of their distinctive paint schemes (white on top and olive-green sides).

The White Tops are from Marine Helicopter Squadron One (HMX-1) based at the Marine Corps Air Facility (MCAF) at Quantico, Virginia. Their Executive Transport mission is closely associated with the Air Force's 89th Airlift Wing's Presidential and VIP operations at Andrews Air Force Base. HMX-1's VH-60N and VH-3E helicopters provide direct transportation support to the President and Vice President.

As you can imagine the White Tops are a very active unit. The routine schedules of the President and Vice President already keep them busy, but add to that election year campaign trips, visits to the U.S. by foreign heads-of-state and dignitaries, and events such as Washington funerals for high-ranking individuals, and it's obvious that HMX-1 activity is always at high-level.

From what I've read, though, the pilots and ground personnel of the Executive Transport division wouldn't have it any other way. They are justifiably proud of their record of superb transportation support.

Executive transport support is only one mission of HMX-1. The unit also has the important mission of testing and performing operational evaluation of all rotary-winged aircraft (including the V-22 Osprey) destined for the Marine Corps inventory. This mission is the oldest one for HMX-1. In this article, however, I will deal only with their Executive Transport mission.

History

Transporting the President and Vice President has only been a mission for HMX-1 since the late 1950s, when HMX-1 provided the first Presidential lift aboard a rotary wing aircraft in 1957.

On September 7, 1957, President Dwight D. Eisenhower was vacationing at his summer home in Newport, Rhode Island, when his immediate presence was required at the White House. Typically, at that time, a return trip to Washington, DC, from Rhode Island required an hour-long ferry ride across Narragansett Bay to the awaiting presidential transport, Air Force One, followed by a 45-minute flight to Andrews Air Force Base, Maryland, and a 20-minute motorcade ride to the White House. Recognizing the urgent need for his presence in Washington, President Eisenhower directed his aide to find a way to get him to Air Force One more quickly. The aide informed the president that a helicopter was on station in Rhode Island in case of an emergency and could be used to fly him to the awaiting plane. President Eisenhower approved the idea, setting a precedent with the seven-minute trip in an HMX-1 UH-34 Seahorse.

Shortly thereafter, the president's naval aide asked HMX-1 to evaluate the possibility of landing a helicopter on the south lawn of the White House. Preliminary evaluations and test flights determined that there was ample room for a safe landing and departure. Once formal procedures were finalized, HMX-1 began flying the President to and from the south lawn of the White House to Andrews AFB, the home of Air Force One. Initially, the executive rotary wing mission was shared with the Army, but in 1976 HMX-1 was designated the sole source of rotary wing support for the President.

Since its commissioning in 1948, HMX-1 has flown over 273,500 flight hours. Over its history, no mishap has occurred during a Presidential lift mission. Only three aircraft have been involved in Class A mishaps since HMX-1 assumed the sole provider role for Presidential support. After two aircraft were lost to mechanical failures in the early 1960s, the Squadron went without a Class A mishap for more than the next quarter century.

A more detailed history of Marine Helicopter Squadron One can be found at **http://198.65.138.161/military/agency/usmc/hmx-1.htm**.

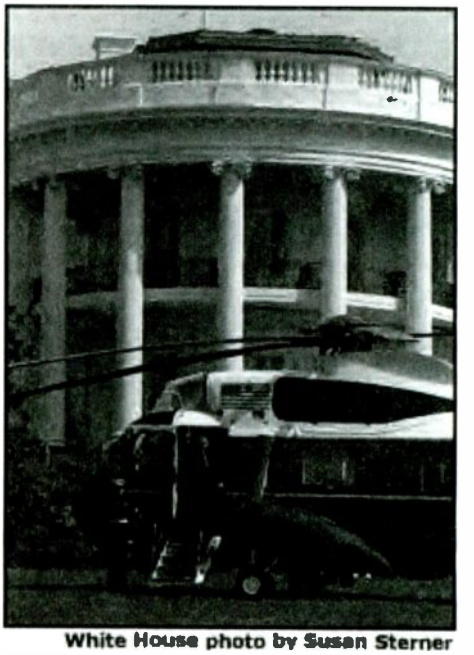
Current Operations

When the President or Vice-President is aboard a White Top, its callsign is either Marine 1 (President) or Marine 2 (Vice President). The callsigns Marine 1 and Marine 2 are only used by HMX-1 aircraft. If the President or Vice President is flying in another service's aircraft, they use that service as their callsign – Army 1, Navy 1, etc. When President Bush landed on the carrier in May of 2003, that aircraft used the callsign Navy 1.

When they are not transporting these high-ranking VIPs, the helicopters use the callsign Nighthawk. They are the only military aircraft authorized to use the Nighthawk callsign. In the Technical Information section I've listed all the Nighthawk calls I've logged, along with what I think are their aircraft types.

Two VH-60s or VC-H3Es are usually used for Presidential support, with one acting as a back-up for the primary. When the President or Vice President is safely on board and the main aircraft is airborne and operating normally, Marine 1/Marine 2 will release the back-up helicopter to return to home base at Quantico. When they operate outside of the Washington, DC, area, they still use the two-aircraft procedure. However, when released by Marine 1, the back-up aircraft returns to the forward staging airport/airbase.

During Presidential support missions, HMX-1 often requires Air Mobility Command (AMC) fixed wing support, known as Phoenix Banner missions. These fixed-wing support



White House photo by Susan Sterner

flights normally use a Reach callsign with a "Tango" suffix, i.e. Reach 123T.

For overseas Presidential trips, HMX-1 flies VH-3D or VH-60N helicopters to Andrews AFB, where C-5's can transport them to a forward operating base. Up to three aircraft can be lifted in a C-5B. For such long distance missions, HMX-1 also requires airlift for its logistics and personnel.

Fixed wing support normally entails flights to and from military air bases or civil airports with major runways and substantial ground support facilities, including instrument flight navigation aids. At the forward operating base, helicopters transported by C-5B must be reassembled and conduct post-maintenance inspection flights as well as a five hours "penalty" flight to ensure safe materiel condition. At all forward bases, helicopters tasked for actual missions must conduct exact rehearsals one day prior to the actual Presidential flight.

Marine Helicopter Squadron One also maintains a small detachment at the old Naval Air Station in Anacostia, Maryland, to support their executive transport operations. Anacostia puts them closer to downtown Washington and also closer to Andrews AFB. It's not uncommon for local residents driving by on I-395, which bypasses downtown Washington, to be lucky enough to spot one or more of the White Tops on a stop-over at Anacostia.

The Future

Marine Helicopter Squadron One is currently heavily involved in a project to replace its aging fleet of aircraft with the next generation of VIP helicopter transport. In the press, this project is known as " VXX" or " USA 101". It appears that potential candidate aircraft have been narrowed down to two: a US version, the Sikorsky 92 and a European version, the Agusta-Westwind EH 101. Reportedly, the final decision on which version will serve as the future Presidential Executive Transport helicopter will be made later this year.

According to press reports, the winner of this competition will also be a leading candidate to replace heavy helicopters used by the Coast Guard and the USAF's Combat Search and Rescue units. So you can see that the stakes are high. I expect that HMX-1's mission of testing and evaluating new rotary-winged aircraft will play an important role in this competition.

Technical Information

I've been listening to the White Tops for about eight years now from my location about 30 miles north of Washington, DC. Here's some technical information that I have compiled from both actual monitoring and researching the web. To my knowledge all of this information is available in open sources and none of it is classified.

Frequencies

HF:

Although they are a rare catch on HF, I have logged HMX-1 operating on 9022, 9260 and 11271 kHz. On these frequencies they are normally operating with Nighthawk Base. Most of the HF traffic I've heard were concerned with radio checks and maintenance testing, although I have heard them use HF with their base when they are deployed out of the Washington, DC, area.

VHF/UHF:

166.700	(no PL) Liaison with White House Communications Agency (WHCA) and the U.S. Secret Service, especially at Camp David
265.800	HMX-1 Squadron Common (not confirmed by me)
273.950	HMX-1 Air-to-Air
276.400	HMX-1 Air-to-Air
375.000	HMX-1 Air-to-Air

Other HMX-1 Frequencies:

118.400/349.000	Andrews AFB tower
119.300/335.500	Andrews AFB approach
141.550/378.100	Andrews AFB - SAM Command Post
122.850/372.200	Andrews AFB Dispatch
268.000	Pentagon Switchboard (callsign Wheelhouse)
293.500	Pentagon Switchboard (callsign Wheelhouse)

I've seen web sites that also list several low-VHF 30 MHz band frequencies for HMX-1. I believe that these were frequencies used in the past. In my listening, however, I've never been able to find any low-VHF frequencies associated with the White Tops.

MCAF Quantico Frequencies:

265.000	Automated Terminal Information Service (ATIS)
127.050/290.375	Quantico Approach/Departure
118.600/360.200	Quantico Tower
121.750/340.200	Quantico Ground
355.300	Dispatch
121.500/243.000	Emergency Frequencies

HMX-1 Aircraft:

The type identifications are based upon my own listening and open source research, along with visual spotting and posts by other listeners around the country.

H-3	# 159330
H-3	# 159351
H-3	# 159352
H-3	# 159353
H-3	# 159354
H-3	# 159355
H-3	# 159356
H-3	# 159357
H-3	# 159358
H-3	# 159359
H-3	# 159360
H-46	# 157680
CH-53E	# 165251
CH-53E	# 157166
CH-53E	# 157754
VH-60N	# 163259
VH-60N	# 163260
VH-60N	# 163261
VH-60N	# 163262
VH-60N	# 163263
VH-60N	# 163264
VH-60N	# 163265
VH-60N	# 163266
VH-60N	# 163267

Callsigns:

NIGHTHAWK 1	VH-60N
NIGHTHAWK 3	CH-46
NIGHTHAWK 7	VH-60
NIGHTHAWK 8	VH-3
NIGHTHAWK 10	UNKNOWN
NIGHTHAWK 11	CH-46
NIGHTHAWK 14	CH-46
NIGHTHAWK 17	CH-46
NIGHTHAWK 18	H-3
NIGHTHAWK 19	CH-46
NIGHTHAWK 32	CH-53
NIGHTHAWK 34	CH-53
NIGHTHAWK 42	CH-53
NIGHTHAWK 71	VH-3
NIGHTHAWK 73	UNKNOWN
NIGHTHAWK 77	H-53
NIGHTHAWK 81	CH-46
NIGHTHAWK 83	CH-46
NIGHTHAWK 85	VH-60N
NIGHTHAWK 86	UNKNOWN
NIGHTHAWK 91	H-60
NIGHTHAWK 92	UNKNOWN

Resources

There plenty of unclassified resources for information on HMX-1. Any good web search engine should be able to provide you with information using the search terms "HMX-1", " Marine 1", "MCAF Quantico", etc. Here are a few that I found while researching this article:

https://mcafquantico.usmc.mil/history.htm
https://mcafquantico.usmc.mil/atc_airfield_info.htm
http://www.globalsecurity.org/military/facility/anacostia.htm
http://198.65.138.161/military/agency/usmc/hmx-1.htm

Any time you're in the Washington, DC, area, be sure to bring your scanner. There's a wealth of military air monitoring to be heard. What I've outlined on HMX-1 is only the "tip of the iceberg." Good luck and good listening.

21st Century Radio Communications – Part 2

By Dr. John F. Catalano

In the first ten years of the 21st century, radio communications will change more than it has changed since the invention of radio over 100 years ago. In Part 1 last month, we tried to make sense of the various definitions and acronyms associated with radio development.

JTRS (Joint Tactical Radio System), Universal Radio, SDR (Software Definable Radio), Project X – regardless of what it's called, basic requirements for the ultimate digital radio are two-fold:

1. To *digitize* the signal right from the antenna to the speaker, and
2. To have *all* functions of the transceiver – including frequency range, frequency agility, mode of operation, modulation methods, encryption (if any) and display – to be totally software controllable.

When these two conditions are met, we have achieved the ultimate goal of *one* radio that does it *all*: military, cellphone, professional, emergency, law enforcement, aircraft and ham communications. Of course, it must be capable of all types and modes of operations for any existing radio communications system and programmable for just about any future system.

For 20th century technology such a dream was an impossibility, bordering on science fiction. Is it close to a reality for the first decade of the 21st century?

Quick Tech Review

Today, in 2004, we have the major technological pieces in place that did not exist in the 20th century:

a. Gigahertz speed digital integrated circuits, microprocessors and high levels of complex circuit integration on a chip which allow for whole systems on a chip (SOC). Many of these advances have been gleaned from the huge, and competitive, personal computer market which has developed at a dizzying pace.
b. Inexpensive high radio frequency integrated circuit design and manufacturing capabilities.
c. System level programming methodologies which is hardware independent, providing greater commonality. Although we have not touched on this topic, it is a crucial requirement to the complete implementation of the SDR concept.

Therefore, in 2004 we now have gigahertz processing speeds, low power semiconductor technologies, large chips allowing systems-on-chip, and inexpensive processing methods developed for the consumer PC market.

Mind Your Busines

But one factor that we have not yet covered is the business climate for SDR. In order for a new radio technology to transition from prototype development to real production, it requires industrial "Godfathers" in a number of industries, such as communications, semiconductors, software and production. These people must be willing to risk their own careers on the SDR product's success.

Let's review some companies in various market sectors, their efforts in SDR development, and the results.

Where Do We Stand Today?

With the turbulent world events of the past few years it should come as no surprise that the military is "leading the charge." However, the roots of SDR actually trace back to the 1990 SPEAKeasy DOD program. The SPEAKeasy concept is a 2 MHz to 2 GHz, software configurable radio. The second phase was successfully demonstrated in March of 1997 after almost seven years in development. It was a proof of concept for SDR and set the stage for the next phase, JTRS.

In 1997 DOD issued a request for a Joint Tactical Radio System (JTRS) that could handle voice, data and video in a digital format across a wide frequency spectrum. The request requirements includes communication capabilities between all elements of the military as well as civil authorities. The request also included the terms

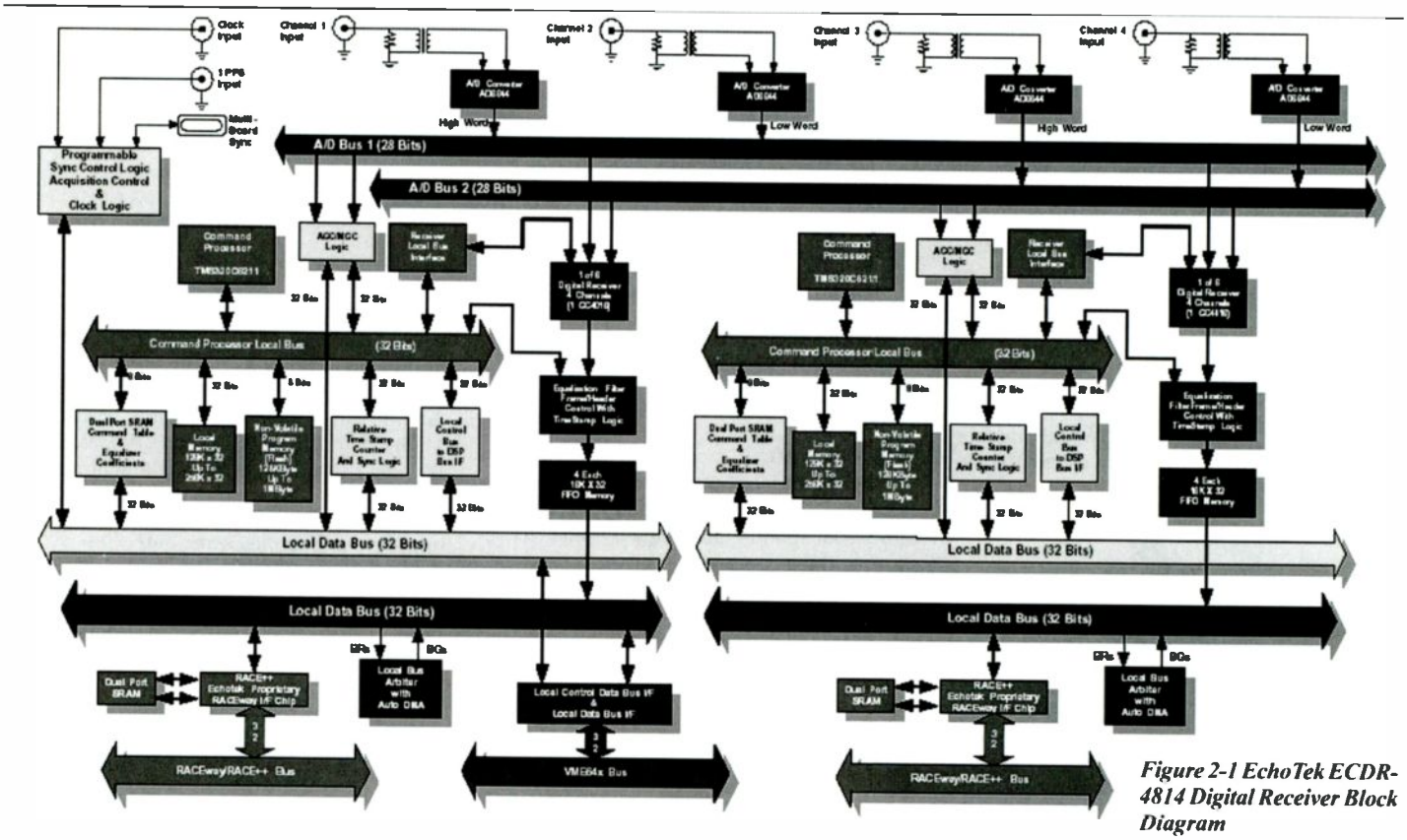


Figure 2-1 EchoTek ECDR-4814 Digital Receiver Block Diagram

"software programmable and hardware configurable digital radio system."

Everything is "almost" in place for the complete digital software definable radio, although in 2002, a director of one of the major contractors predicted that "an actual physical JTRS radio is some years away." Let's look elsewhere for some real product activity and development efforts.

Digital Modular Radio - DMR

The US Navy's requirement for one radio to provide all fleet communications, which is essentially based on four different communications structures, was a prime candidate for early SDR designs. General Dynamics and Motorola both provided DMR four-channel product to the US Navy beginning in 2000 and are committed to the JTRS/SDR concept in future designs.

The Falcon Flies

In 2002, Harris Corporation's (**http://www.harris.com**) software-defined Falcon II radio was one of the first to demonstrate "voice waveform on a fielded, software-defined radio platform and successfully conducted on-air interoperability demonstrations of its capabilities." That mouthful says they have a working model SDR.

The RF-5800 series of software definable radios covers 30 to 512 MHz. It includes frequency bands and modulation modes for combat net, close air support, military and civilian air-to-ground, long-range patrol and government land mobile radio (LMR). Falcon II radios come in various configurations, including man-packs, portables, fixed station and tactical mobile. Signal encryption is, of course, a standard feature.

Harris' advertising slogan for the Falcon II radio is "Multiple bands. Multiple missions. One solution." That's pretty close to the fully Software Definable Radio, but not quite. A *total* SDR mission statement should read, "All Missions. One Radio." It is toward this end that many companies are diligently working.

SDR Developer's Kit

DRS Technologies claims to be the first company to offer a software definable receiver with a software developer's kit. The kit enables users to download DSP algorithms that employ IQ filtering, special demodulation, signal pre-processing, or signal post-processing techniques.

The DRS WJ-9104B multi-channel digital tuner is a software-defined receiver that allows the user to monitor up to eight RF channels, with a frequency range of 20 to 3000 MHz. It has some impressive operating specs:

- 20 to 3000 MHz frequency coverage
- 10-MHz instantaneous BW (2 MHz or 25 MHz also available)
- 80-dB Spur-Free Dynamic Range (SFDR) digital, 85-dB SFDR analog
- 60 millisecond tuning speed
- Up to 8 phase-coherent or independently tunable channels
- Digitized IF outputs from each channel at 14 bits of precision
- Supported by Spectrum Signal Processing's SDR Development System

DRS Technologies products, which are not priced for the consumer market, can be seen on their website at **http://www.drs.com**

Echotek

The Echotek Company (**http://www.echotek.com**) has a range of "receivers" which use high speed and high resolution A to D Converters and digital receiver processing. The result, ECDR-4814's block diagram, is seen in Figure 2-1. The ECDR is not a stand-alone full receiver. The input can be as high as 100 MHz; however, a relatively high level input signal of 100 mV (millivolts) is required, as compared to a modern receiver input which is around .001 μV (microvolts). The ECDR-4814 is actually a multi-input IF (intermediate frequency) block or down converter, that can then be defined by software to do just about anything.

Another Echotek product, ECDR-GC314-PCI, is a PCI card for use in a personal computer. It has three analog IF inputs that can be used up to 200 MHz and 12 digital channels that can be combined for wide band use. It also has impressive dynamic range specs. However, it also requires a high input level of 100 mV, since it is designed as an SDR function block, not an entire SDR.

Gray Who?

If you look at Figure 2-1 you will see that a large part of the functionality of the Echotek product is performed by GrayChip's GC4016 Quad Multi-Standard Digital Down converter. This device has some very impressive digital performance capabilities. In fact, it is critical to the receiver's operation. Figure 2-2 shows how the GC4016 fits into a receiver.

If you are wondering who GrayChip is, think back to the first producer of DSP chips – Texas Instruments (TI). In 2001, TI purchased GrayChip, a small fourteen-person company founded in 1989, to design reconfigurable digital down converters (DDC) and digital up converters (DUC) for high-speed communications. TI's acquisition of GrayChip clearly shows that it is committed to expanding the DSP concept to the entire radio.

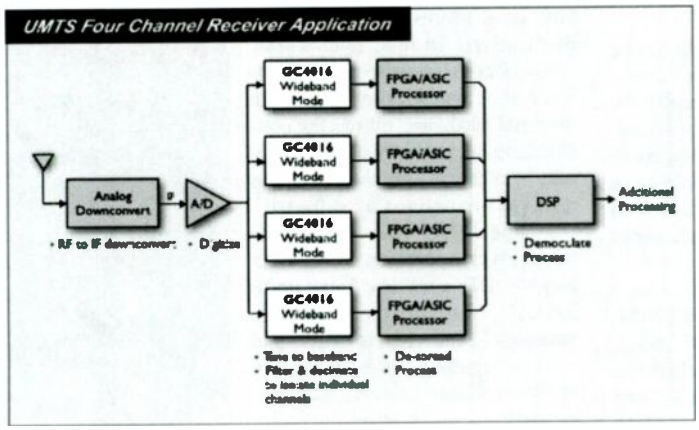


Figure 2-2 How GrayChip's GC-4016 Digital Down Converter "Fits" Into a Digital Receiver

"It's *Only* a Software Glitch"

In the 1980s a NASA spokesman used these ill-chosen words to explain a shuttle lunch delay. As a result of his glib, over-simplified comment, technical people around the world derided him. Anyone who has been involved in the development of a hardware/software product knows never to minimize the software's critical importance or to underestimate the required development resources.

Major software efforts directed toward SDR by a number of companies have produced the first generation of "middleware." Middleware has the difficult task of making operational software independent of the hardware. Hardware manufacturers have been co-operating with the SDR effort by producing hardware platforms which can accessed using this "common" language. This is another major step along the road to realizing the one radio SDR concept.

Where is SDR Today?

In January 2004 Cubic Corporation (**http://www.cubic.com**), a noted military communications systems company, and Spectrum Signal Processing (**http://www.spectrumsignal.com**), an SDR software company, joined forces. Together they have won an ambitious contract from the US Army. Under the 18-month contract, Cubic will develop waveform software that will help all branches of the military and multiple public agencies communicate with one another.

The software will be based on common Software Communications Architecture (SCA) that will guarantee interoperability, compatibility with current communications systems including APCO-25, and provide voice, data and video communications. This is a major step, or maybe even a leap, closer to the complete SDR concept.

One interesting fact is that although many companies are working on a true JTRS software, Cubic found that *only* Spectrum Signal's flexComm package could perform to JTRS signal processing requirements as laid out in the 1997 JTRS Request. Looks like the marketing mouth of some companies outpaces their technical capabilities! (SOS - Same Old Stuff!)

Other major international companies are proceeding along the development path to SDR. One interesting product providing a development link along the path to SDR is coming from Thales Communications Inc. They are working on defining an enhanced version of the JTRS radio called JTRS-JEM. JEM will provide enhanced multi-band inter/intra team communications, including cipher text. Version 2.2 of the JTRS software will be used on their current little SDR, AN/PRC-148, which weighs under two pounds.

As we have seen above, the software radios currently deployed in the field are really software *configurable* radios. They are the first step toward Software *Definable* Radios and the complete interoperability of the 1992 JTRS requirement.

When a radio is manufactured

which is capable of morphing itself, via downloads or internal programming, to communicate in any and all communications situations whether military or civilian, then we will have a full JTRS and an advanced software definable radio, SDR. Some are now defining this as the Universal Radio.

Strength in Numbers

A group called the SDR Forum (**http://www.sdrforum.org**) is steadily gaining membership among the hundred plus companies working on SDR. The forum's members include military communications, cellphone and professional communications companies. These include established companies with market muscle such as Harris, BAE Systems, General Dynamics, L-3 Communications, Intel and Motorola, as well as young companies such as Vanu Inc.

All are working to break down radio communications paradigms of the 20th century. The programs of interest have different names – JTRS for the military boys, SDR for the cellphone people, or Project25 for the public safety crowd – but the goals are the same: Total Interoperability.

3rd Generation SDR

Although the military applications for SDR are pretty tough, many feel that the cellphone industry presents the greater design challenge. First, they have to be backwards compatible with all existing formats: CDMA, CDMA-2000, GSM, D-AMPS, to name a few.

Then there is the issue of cost; very low cost is a prerequisite.

And, finally, the operational issues are far from easy to accomplish: 330 MHz to 2 GHZ frequency range, bandwidth in excess of 75 MHz, and dynamic range greater than 75 dB! Not easy operational parameters to achieve even without the economic constraints. To see the direction of SDR in the next five years, I suggest you carefully watch the cellphone industry for the real advances.

The Next Leap - Cognitive Radio

Cognition is defined by dictionary.com as, "The mental process of knowing, including aspects such as awareness, perception, reasoning, and judgment." The idea of the cognitive radio is a stretch of the SDR's downloadable reconfiguring capabilities.

Key to the SDR concept is its ability to be reconfigured through user initiated downloads. Okay, now let's say we build into the radio the ability to receive and then analyze any signal. Then, in theory, with this information and some very fancy internal software, the radio could *learn* how to reconfigure itself to communicate with any received signal. See Figure 2-3. Talk about artificial intelligence!

Cognitive Radio could handle all of today's modes: FDMA, TDMA, CDMA, TDD, AM, FM, MFSK, MPSK, MQAM, CPM, SSB, DSSS, DES, 3DES, AES, MeXe, Trunked Radio, APCO-25, GSM, Iridium, 802.11X, tone coded squelch, CVSD, LPC, VSELP, AMBE ...and the list goes on. Let cognitive radio hear it, and it becomes it.

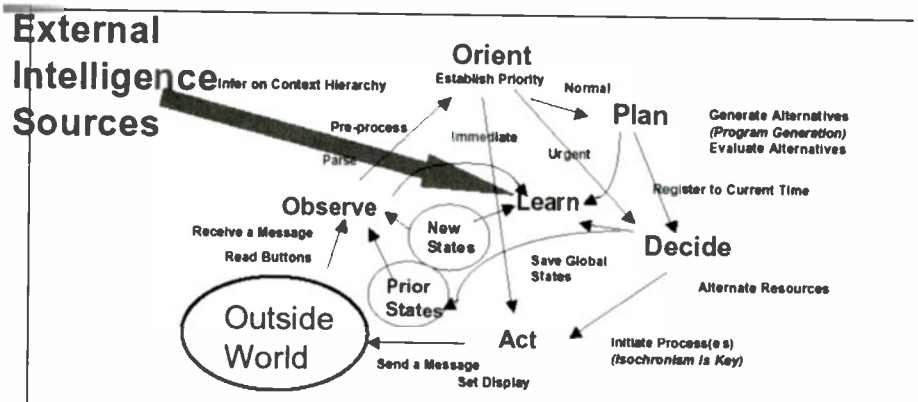


Figure 2-3 Cognitive Radio – A "Thinking" Radio

Mitola, "Cognitive Radio for Flexible Mobile Multimedia Communications", IEEE Mobile Multimedia Conference, 1999, pp3-10

The potential is huge. It has been hypothesized that cognitive radios could perform many more tricks such as selecting the optimum frequency spectrum, mode and power levels for given use, propagation and radio traffic conditions. The possibilities are limitless. The military has funded a cognitive project called XG, Next Generation Communications.

For an SDR to perform as a cognitive radio it must have some "self worth." It must know its own capabilities and how to reconfigure them. In 2004 this is pure concept since no radio exists with this ability. There are many licensing, control, and interaction issues which must be considered However, many heavyweights such as Microsoft and Intel, are diligently working on cognitive radio. I have no doubt that it will be a technical reality by the end of the decade.

Currently there is lobbying going on to allow cognitive radio in the UHF TV band. A number of groups have expressed their opposition to the cognitive concept. They point out that due to cognitive radio's auto adaptability it could monitor almost any radio communications, including voice, video, trunked system, satellite and data such as wireless LANs and Bluetooth networks. Wow! And the 20th century thought it had a privacy problems with scanners!

SDR for the Hobbyist

The military, professional and cellphone industries are not the only ones interested in SDR communications. In their own words, "GNU Radio is a collection of software that when combined with minimal hardware, allows the construction of radios where the actual waveforms transmitted and received are defined by software."

The GNU radio's goal is transceiver operation in all ham bands – HF, VHF and UHF up to 2.4 GHz. Currently the hardware's maximum bandwidth is 6 MHz and it has a capability of extracting up to four separate channels simultaneously.

The minimal hardware referred to is not exactly a simple onechip printed circuit board. It is, as expected, a sophisticated collection of high speed Analog to Digital and Digital to Analog converters (ADCs and DACs) and programmable logic. See Figure 2-4.

The large chip in the center is the programmable array for math functions and control. The RF front ends (receiver antenna input) are not on the board. They are "daughter" circuit boards (nearing availability when this was written) which plug into the two connectors on the top of the board. Software downloads and hardware info and purchase details are available on the website **http://www.gnu.org/software/gnuradio**. It appears to be in the early beta-testing phase of the hardware/software interfacing of the main board. The RF modules are either being prototyped or are under development.

Since the SDR technology is evolving at a rapid pace and the available chips are trying to keep up, designing and making a piece of hardware at this time is like trying to hit a moving target. But the GNU project is a great SDR ground floor learning experience open to any one.

The Essential Antenna

Although we have only concentrated on the

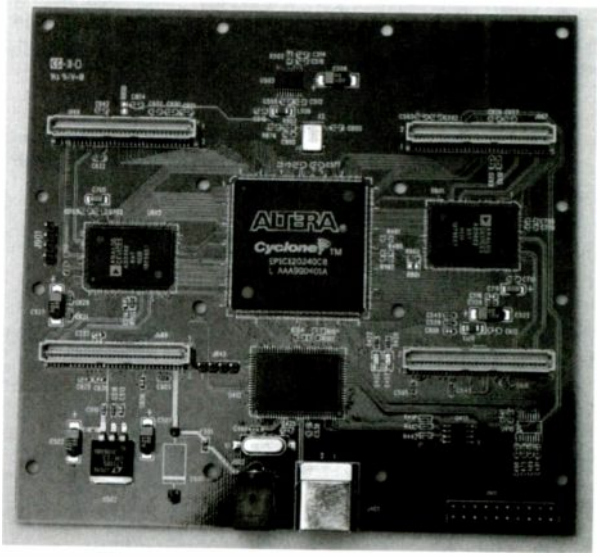


Figure 2-4 GNU's Universal Receiver Project PC Board. Note Four Horizontal Slots for Daughter Boards.

receiver of the 21st century another element in the receiving hardware chain will require equally revolutionary development. When we have these wildly frequency agile radios running all around the radio spectrum, fixed-tuned antennas are going to be as useless as a spark gap sphere!

The 21st century antenna must be capable of tuning itself on the fly as the radio runs around 2000 MHz of spectrum in different modes. Tuning and beam forming must be performed at very high speeds by the "antenna."

Watch for an explosion of adaptive antenna technology. This technology is not trivial. Although it has already been used in military applications, commercializing for consumer use it will be a major technical and manufacturing challenge.

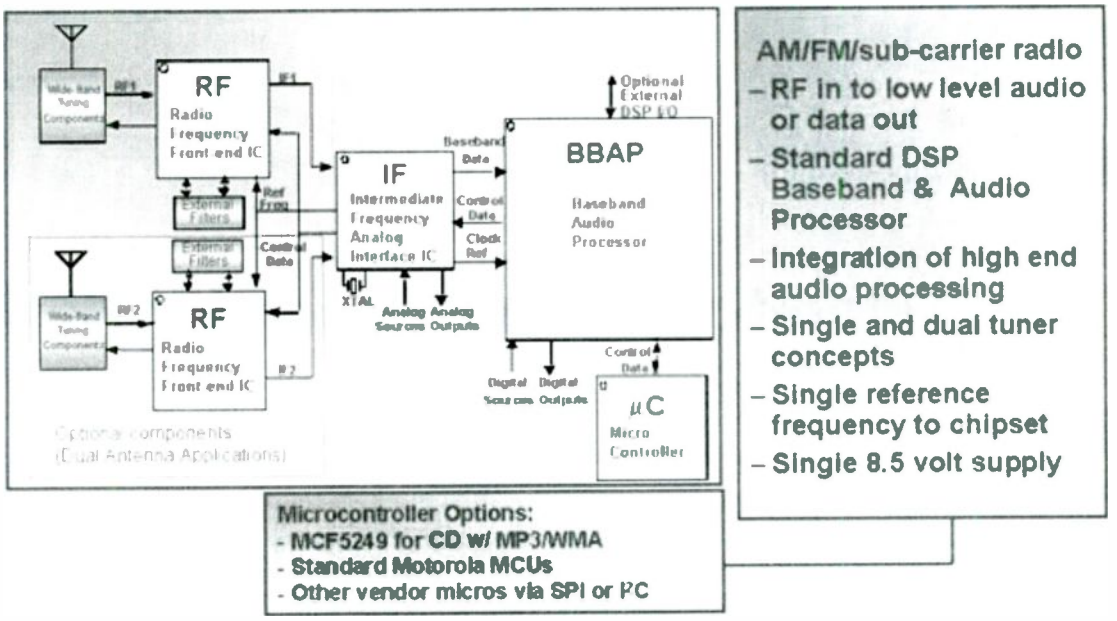


Figure 2-5 Motorola's Symphony Device: A Digital Treatment of Analog Broadcast Signals

Other Radio Systems Under Development

Although SDR promises to affect every facet of radio communications in the future, there are developments in other radio systems as well. Let's leave SDR and look at a few other major radio developments occurring in the 21st century

Digital Audio AM/FM Radio

The commercial radio bands are going through a new phase with the introduction of digital satellite and terrestrial radio services. Admittedly, satellite radio has not proven to be a commercial success as yet. And, after a number of false starts, digital terrestrial radio is trying to get off the ground again.

Texas Instruments, Philips Electronics, STMicroelectronics, and others are about to roll out their chips for demodulating commercial broadcast AM/FM digital audio. These are based on a software configurable approach.

Market predictions say that 2006-2007 will be the year that the digital radio makes its breakout and sells tens of millions of units. I predict that, without great pressure from the government to go digital, the acceptance period could be far greater.

Don't Discount Analog

If Motorola has its way, analog radio has a life yet! For the past few years Motorola has been working on improving analog radio using digital methods. Their latest chip effort is called Symphony™. According to a press announcement, Symphony is to the AM/FM radio what Compact Disk is to a cassette.

In actuality, it is a three chip set which is a complete digital Intermediate Frequency (IF) radio. See Figure 2-5. It is composed of combining a Digital Signal Processor (DSP) with a Radio Frequency (RF) front-end and IF analog interface.

Symphony was designed to improve radio static, fading, pops and hisses, tuning, adjacent station interference, limited listening range from existing signals, and audio clarity and volume. The digital methods that Motorola is employing should make a big difference in signal detection, bandwidth, distortion and resulting audio quality. The chipset is capable of AM/FM and weather band. I'm looking forward to hearing off air commercial radio using a Symphony based receiver. Will a wideband-monitoring receiver be next? Let's hope so.

Voice Activated Wireless Control

A low cost one-chip receiver and matching transmitter which uses FSK (frequency shift keying) promises to be the foundation of 21st century wireless applications. EZRadio by Integration Associates (**http://www.integration.com**) features user programmable frequencies in the ISM (Industrial Scientific and Medical) band of 315, 433, 868 and 915 MHz. Remote sensing, toy, vehicle monitoring, and control applications are immediately obvious. It has a range of between 100 and 40 meters and is capable of data rates of 256 kbps. It utilizes a patented antenna tuning method that is totally controllec on chip. All it requires for external parts is a 10 MHz crystal! Everything else is on-chip.

When EZRadio is coupled to the speech recognition technology of a company called RSC, via an EEPROM, we have a complete speech controlled remote system. Two chips and not much more which make a two-way wireless speech-controlled link.

21st Century Sat Com

As we saw in the first part of this series, digital satellite TV played a major part in the development of the digital signal technology and product base. But no industry can stand still and expect to survive. Broadband connectivity via satellite is the product being developed today. It is currently estimated that, using either wired T1 or DSL, only 60% of the business in the USA can be served. That translates to over 40% of broadband providers' potential business customers being lost due to their remote location. That is a lot of lost revenue. Satellite broadband may be the answer.

The technical challenges required to make a satellite broadband act like terrestrial broadband are not simple modifications. Both hardware and software are being developed to fit the role. Satellite links have lots of signal path variations. For TCP/IP the satellite link's unpredictable path timing events and signal strength variations require taming.

Whatever coding method is used, it has to be smarter and more robust than its constant propagation environment land-based brother.

Hughes Gives it a Try

Hughes has developed a whole new protocol for its Ka broadband satellite system, SPACEWAY. In Hughes' words, "Operating in globally assigned Ka-band spectrum, SPACEWAY employs high-performance, onboard digital processing, packet switching and spot-beam technology to offer single-hop connectivity, regardless of location." The move to the Ka band results in a higher bandwidth and, therefore, higher density data structure is possible.

It had better work as advertised if it is going to feel and act like a landline connection. Others trying to compete in this untapped, but risky market are iDirect and Aloha Networks.

What's Next

We have inhabited about the same 1000 or so MHz of frequency spectrum for the past 100 years. To what frequencies can the 21st century semiconductor technology take us?

Once there, it is unlikely that we will use radio in the same manner. What form will radio transmissions take? How will we use the expanded radio spectrum? When does a radio not act like radio? We'll attempt to gaze into the crystal ball to answer these questions and more in the next and final installment of radio in the 21st century.

Ken Reitz, KS4ZR
kenreitz@monitoringtimes.com

Monitoring the Specialty HF Nets

Hams love to talk and when they're not chatting with their friends on the local repeater or chasing DX in any mode on any band they're getting together on the hundreds of High Frequency (HF) Nets. Anytime you get more than two hams together on a frequency it's a good bet that a new net will be started.

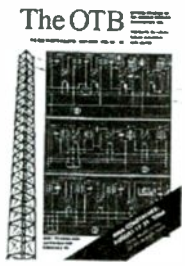
Most ham nets are special interest nets which get together at a scheduled time (known as a *sked*) and frequency to share their interests and promote whatever topic with which the net is concerned. Some nets are weekly, some are daily, but all are open to visitors who might drop by to hear what's going on. It's a great opportunity for SWLers and new hams to learn more about the amateur radio hobby and enjoy hearing what others have to say about the topic at hand.

❖ Net Organization

Most nets are informal, but virtually all use a Net Control Station (NCS) which calls the net together at the assigned hour and takes *check-ins*. There's usually a protocol when checking in and it's a good idea to monitor the net several times before checking in yourself. You'll want to introduce yourself in a good light and the best way to do that is to know how the net is conducted before you check in.

Some nets keep a formal roster of registered members. Often these members are assigned a number, usually in chronological order from the inception of the net, and members might use their assigned number when checking in along with their call sign. Once all the check-ins are added the NCS will usually start with the first check-in and go down the list. To expedite the check-in procedure the NCS might want only the last two letters of your call sign. However, FCC ham radio rules enforcer Riley Hollingsworth has recently pronounced that this is considered a violation of Part 97 Amateur Rules for US hams.

Normally, an NCS will ask for further check-ins every so often to add late-comers to the bottom of the list. Once everyone's had a chance to say something, there'll often be another call for last minute check-ins and perhaps a "73" round in which check-ins have the opportunity to respond to comments made by other net members. Depending on the number of check-ins and the purpose of the net, a net can last anywhere from 30 minutes to several hours. Informal chatter before and after the actual net is common.



AWA's The Old Timer's Bulletin is published quarterly and is included with the $20 AWA membership. Listen MWF at 9:30 AM ET on 3.867 MHz. (Courtesy AWA)

❖ Net Operating Courtesy

Because there can be so many check-ins to a net, it's expected that everyone adheres to the particular protocols of the net. The only way to know these protocols is to monitor the net until you feel familiar enough to join in. But, there is a short list of do's and don'ts to which all nets subscribe:

1) Try not to be long-winded. If there's something you need to respond to, get right to it.
2) If it's an emergency net, don't check in just to say everyone's doing a fine job.
3) Pay attention to what the NCS station says. If he or she is asking for emergency check-ins, mobile operators, or active duty service personnel, don't respond unless you are one.
4) It's usually not a good idea to crash a net just to get signal reports on an antenna adjustment you've just made. Instead, get on an open frequency somewhere else, call CQ and see what kind of reports you get.

❖ Old Friends Nets

Most 80, 40 and 20 meter nets can be characterized as Old Friends Nets. They're typically a lot of folks who just like to get together early in the morning to share a cup of coffee or late at night for a last minute harangue about the issues of the day. Many have been meeting this way for decades. Most are informal and welcome newcomers. Some have funny names like The Rooster's Net, The Gray Hair Net, The Old Buzzards Net and the like. Even if you're a stranger when you first check in to one of these nets, it won't be long before you've found some great friends.

Some old nets, such as the Antique Wireless Association Net (3.867 MWF 9:30 AM ET) whose purpose is to talk about old-time radio receivers and current AM activities, also sponsor activities for members, such as annual conventions. The AWA supports a very nice museum of antique radios (http://www.antiquewireless.org/index.htm) and publishes a very well done quarterly journal *The Old Timer's Bulletin* (edited by *MT* writer Marc Ellis).

❖ DX Nets

Among the most active HF nets are the DX nets. These nets provide a great opportunity for hams to contact DX stations without having to troll the bands in hopes of lucking onto a frequency on which a DX station is operating. DX nets are also great propagation barometers. You can hear what bands are open and to what part of the world just by monitoring the nets. Remember the old adage: "If you can hear 'em, you can work 'em!" Just don't be surprised if the report you're given is considerably less than the report you give. That's because many DX net operators are running 500 to 1,500 watts on substantial antenna systems. Regardless, if they can hear you, you'll get a report.

With DX nets it's important to be able to work the NCS in addition to the DX. If you can't hear the NCS, don't even try to work the DX. Again, listen to how the net operates before checking in. Don't ask for "relays" of the DX station's signal report; remember, this is supposed to be you working the station, not hearing the report second hand. If you can't do a proper *exchange* (call signs and signal reports) then it doesn't count as a contact.

If you really want to work a particular station but conditions are not good, keep checking in. You'll be surprised one day when everything lines up just right and you can finally work the DX. Keep in mind that chasing DX is supposed to be a challenge. If you don't get DXCC (worked *and confirmed* 100 countries) the first week you get your ham ticket, don't worry.

Another similar net is the WAS (Worked All States) net which allows contacts to be made between check-ins for purposes of filling the missing blanks in their list of states worked. Similarly, you will also find nets for working all counties, a truly daunting task, as there are just over 3,000 counties. Hams doing this type of DXing are known as "County Hunters."

Islands On The Air (IOTA) is yet another way hams and SWLers can earn more "wallpaper." As if there weren't enough counties and countries to have to work, you can get caught up in working all the official islands. Some islands actually qualify for DXCC. For complete details of this organization check out: **http://www.rsgbiota.org**

❖ Emergency Nets

The hurricane season is the time to be monitoring emergency nets, as information about current position, strength and nature of tropical storms is followed closely by tens of thousands of hams around the Gulf coast, the Atlantic coast, the Car-

Hurricane Watch Net is activated whenever a tropical storm has been elevated to hurricane status and is within 300 miles of a populated land mass. Listen on 14.325 MHz. (Courtesy HWN)

ibbean islands and the eastern coasts of Central America and Mexico. Critical information about current conditions in the storm and in the path of a storm is of the utmost importance to the National Weather Service in general and the National Hurricane Center in particular. Often, in the aftermath of a storm, hams working off battery power may be the only telecommunications into the area. Modern amenities such as cell phone towers are often among the first to go down in a major storm.

❖ Maritime Mobile Nets

Despite the technological progress and affordable price of GPS systems and satellite telephones, most open water sailors still depend on various HF nets and services. The nets provide a way to get health and welfare traffic back and forth to shore and to other boaters, and services such as WEFAX (weather facsimile), available on HF frequencies, give boaters timely weather information such as weather charts and satellite imagery.

Maritime Mobile Service Net helps operators underway, dockside, or just the rest of us landlubbers every day on 14.300. (Courtesy Maritime Mobile Service Net)

Regular members on these nets often provide *phone patch* hook-ups between their ham stations and family and friends of boaters. Monitoring these nets brings you right to the water's edge. It's great listening for the rest of us landlubbers and provides a very useful service for those at sea.

❖ Other Traffic Nets

Messages sent from one ham station to another via a net is called "handling traffic." The National Traffic System (NTS) was originally devised by the ARRL for the purpose of quickly relaying messages across the country. SSB (Sideband) and CW (Morse Code) traffic is passed at regular times and frequencies every day via the NTS. This system is a great way for new hams to hone their operating skills, especially the CW traffic nets. Practice makes perfect! More information on NTS may be found at **http://www.arrl.org**.

❖ YL Nets

YL is ham shorthand for *Young Lady* and it refers to any ham who is a woman. The sisterhood of amateur radio actually pre-dates the feminist revolution of the '60s by several decades. Founded in 1939 the YLRL (Young Ladies' Radio League) has been an active force for woman's issues regarding amateur radio and a close-knit society for all women hams. YL nets abound on the HF bands, are well attended and help maintain the camaraderie among YL operators. For more information on YL nets and activities see: **http://www.geocities.com/CapeCanaveral/Lab/3376/ylgroups.html**

❖ Buy & Swap Nets

Hams love bargains and most shacks have shelves groaning with like new, used, abused and completely defunct gear. That makes it all the more interesting to everyone else. Always on the look-out for another rig, a back-up rig, a piece of nostalgia or just something to use for parts, hams

The Young Ladies' Radio League "Girl on a Globe" logo. Organized in 1939 and currently with 800 members. Listen to 14.298 MHz on Thursdays at 1800Z for the "Tangle Net." (Courtesy YLRL)

like to buy and swap rigs and accessories. There are nets set up just for this purpose and, while the motto *caveat emptor* is the watch word here, many tune in just to hear the line-up of items on offer.

❖ EASTCARS, SOUTHCARS, MIDCARS

Regional nets such as the South Coast Amateur Radio Service (SOUTHCARS 7.251 MHz) operate typically on 40 meters bringing together hams of geographic regions for weather, traffic and health and welfare reports. More actively attended during the winter months when icy roads and heavy snow keep these hams glued to their rigs, these nets are more informal but provide a great service to their region.

❖ How You Can Help

All of the above nets are strictly volunteer organizations. Requirements for joining and becoming an NCS can be learned just by asking (wait for a lull in the action, though!). All nets can use extra help to spread the work around. What they're looking for are good operators with good stations who are willing to sign up for a scheduled shift and make a commitment to be on frequency when they're supposed to be. Once you get involved with an HF net you'll usually get as much responsibility as you can handle.

CHECK OUT THE NETS

Here is a sample of the various nets available on HF. For a complete list check out **http://www.ac6v.com/nets.htm**.

DX Nets:
Name Time (UTC) Frequency (MHz)
10 Meter DX Net Daily 1430 28.330
Africana Net Daily 21.355
European DX Net M-Sa 14.243
IOTA try 14.260, 21.260, 28.460
Southern Cross Net Daily 1100 14.226.5

Swap and Vintage Nets:
East Coast Traders Fri 10 PM ET 3.919
Hallicrafters Assoc. Net Sun 1745 14.293
Heath/DX-60 Users Net Sun. 1400 (ET) 7.290
Icom Net Sun 1700 14.317
Midwest Classic Radio Sat. 1300 3.885
Ten-Tec User's Sun. 2300 14.267
Swan User's Net Sun 5 PM (ET) 14.250
Yaesu Users Net Sun. 1300 3.902

Maritime Mobile Nets:
Hurricane Net As Needed 14.325
Maritime Mobile Service Net Daily 14.300
Pacific Maritime 20 Meter Net 0400 14.313

Getting Started

Ask Bob

Bob Grove, W8JHD
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Motorola and Nextel

In our June issue, I suggested that Motorola owned Nextel – not true. The old SMR licensees (Specialized Mobile Radio service) were purchased by Nextel, the majority of equipment for which is Motorola. Motorola also owns, according to reader/shareholder Bill Reuter of Hutchinson Island, Florida, about 20% of Nextel stock. Thanks, Bill, for forwarding this correction.

Q: Is it possible that the weakening of the earth's magnetic field over geologic time, including pole reversals, could be affected by man's artificial magnetism? (John Morris, email)

A: Scientists believe that the earth's magnetic field is generated by circulating electrical current within its iron-nickel core, a "dynamo" effect. While the field is weak, even the total magnetic energy of all artificially-generated electromagnetic fields created by technology pale in comparison. Man-made magnetic fields are confined, erratic and isolated when compared to the giant magnetic earth. And virtually all of the artificial magnetism is alternating current from 60 Hz on up, from power lines through microwaves, and the higher the frequency, the less it can penetrate the earth crust or alter the effects of Earth's direct current magnetism.

Q. Is the choice of lead-in for shortwave reception important? Do I need 50 ohm coax rather than 75 ohm? (Various inquiries)

A. No. At these lower frequencies, many alternatives are available with minimal signal loss. First of all, no common shortwave receiving antenna maintains constant impedance over its operational range (2-30 MHz), so choice of impedance in a transmission line is of no consequence. Secondly, losses from poor insulation material is of little consequence at low frequencies.

Years ago, it was common – even for transmitting – for hams to use house wire, TV twin lead and even lamp cord ("zip" cord) for transmission lines at shortwave frequencies. Global communication was easily accomplished at low power. Nowadays, better coax at low cost is readily available.

Even if there were some moderate signal loss, shortwave signals are mixed with atmospheric noise, so even if both noise and signal are reduced somewhat, the receiver's automatic gain control (AGC) circuitry compensates for that. You would hear no difference, even if the S-meter shows reduced signal strength.

Since our homes and offices now generate far more electrical interference than they did years ago, it's a good idea to use shielded transmission line (coaxial cable) out to the antenna, but don't worry about its impedance.

Q. If I were to put two scanner beams on a mast with one about 4 to 5 feet above the other and point them in the same direction, then connect them to the same radio with a splitter (used in reverse as a combiner), would it double the gain in that direction? (Tim Rapps, Springfield, IL)

A. Yes, if all is perfect and there are no losses, but doubling the signal strength is only a 3 dB increase, barely perceptible to the ear when compared to background noise. The improvement is more in narrow-beam-width directivity than gain, thus reducing co-channel interference.

Q. A friend of mine who lives close to several broadcasting stations is planning to cure his household interference by winding electrical wires and phone lines around ferrite toroids; will this really help? (Kenneth Pearson, Freehold, NJ)

A. Yes, it should. Other "cures" include ferrite bead sleeves over the coax, audio and speaker leads of stereo systems; bypass capacitors (.001 microfarads) across phone lines; RF chokes in series with phone lines and speaker leads; and trap filters adjusted to the interfering frequency bands in series with antenna lines.

Q. In our "new" house (c. 1933), I can use a crawl space off our bedroom for my radio shack. Since the space is not insulated, will the seasonal extremes of temperature and humidity have a negative effect on my radios (Matthew Stanley, Long Island, NY)

A. Temperature extremes and humidity can be a problem, as can dust, but it's all a question of degree. Radios get dusty, they get hot, and they feel moisture, but don't worry about it unless the cold is near freezing and the high temperature is well over 100 degrees F.

On questionable-temperature days, you may wish to leave the door open to share house heat, and some folks find that a small room dehumidifier is helpful for moisture.

Periodically check connectors and exposed metal (screw heads, jacks) for the appearance of corrosion. If you find evidence, that's a cue to change the environment.

Q. Where can I get a VLF (very low frequency) receiver? Is there any truth to claims that signals may be heard from the spirit world? (Tim Taylor, East Haven, CT)

A. An excellent frequency converter that allows reception from under 3 kHz clear up through 530 kHz is available from LF Engineering, 17 Jeffery Rd., East Haven, CT 06513. They can be reached by phone at (860) 526-4759, by email at *sales@lfengineering.com*, and visited on the web site at **http://www.lfengineering.com**.

Claims of communication with the spirit world, whether by radio or telepathy, remain demonstrable only to faithful believers.

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

Getting Started

Bright Ideas

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The theme this month is customizing my new car for radio monitoring and transmitting purposes. As the proud owner of a new 2004 Ford Escape SUV, I decided to go simple, primarily concerned with safety and convenience features. Naturally, I made dark privacy windows a must, as they hide all the valuables I tend to carry in my vehicle.

I suppose I could have included "radio friendly dash" in my vehicle selection process, but frankly, most cars have precious little room in the dash or center console for radio equipment. In my Escape, there was only one small storage niche that I used for two small knives. There was a large compartment under the dash at the floor level, but it was dark and difficult to access. A box of baby wipes filled that space. (Hey, stuff happens.)

There are three key components for radio work: antenna, DC power, and the radio itself. I call it APR. Naturally, I tried to find some smart, easy, and affordable solutions. My first chore was to comb through all the boxes in the garage and radio room. (No small task!) No sense in buying what I already had stashed away.

Antennas

The vehicle is well built, with very tight-fitting tolerances. Frankly, it is nearly impossible to run any cables or wires under the moldings, seats, etc. I decided to use one "on glass dual band," and one window suction rubber duck style antenna with a BNC connection. An over-the-top of the side window model gave me one more option.

I carry a variety of specialty rubber duck antennas, including VHF low, aircraft band, VHF 144-148 ham, 153-161 public safety, and 162-174 for federal allocations, UHF, and even a converted cell phone antenna for 800-900 MHz. Of course, I carry a two meter 5/8 mag mount inside, ready for rooftop deployment. I have found that few of the large mag mount antennas can hold up at highway speeds. I also carry a small dual band magmount. For the moment, no rooftop NMO antennas. Perhaps a future trunk lid dualbander adapted for the front hood.

DC/AC power sources

The vehicle comes with three DC power ports. The standard dash cigarette lighter is energized only when the car is running or the key is in the accessories position. There is a second power port on in the front console, and one in the rear storage compartment. Both are energized 24/7 with 20 amp service. Be careful not to leave too much plugged into these, lest you run down the main battery.

For each of these, my new three hole outlets are perfect, because they have an off/on switch as well as a red LED to indicate if the power is on. I found these while shopping at an interstate truck stop. These new style three hole DC outlets feature a new sleek 45° degree angle for the holes. Had to have it!

I placed the Coleman power source on the floor of the back seat. (Available at discount and auto parts stores, or on the web.) Naturally, I attached a power strip with Anderson connecters. I can use this as platform for powering any DC devices I might need. I can constantly trickle charge the Coleman and my rechargeable flashlights from the front power port. The first day I had the vehicle, I ran some power cords under the center console from the front to the rear back floor just for this purpose.

Need an AC power source? Use a DC to AC converter. Radio Shack supplies two possibilities, a large 250 watt converter ($75). or a small 70 watt version ($50). I carry both.

The MFJ DC power strip is used for all the various radios, frequency finders, nightlights, flashlights, etc.

My deep cycle marine battery is too heavy to carry every day, but always stands ready to load in the floor of the back seat.

Radios

Scout™ Frequency Finder. I found a cup holder at an auto parts store that matched the interior colors perfectly, and mounts between the glass and door sill to hold this radio out of harm's way in the back seat. I leave it running when I am running. I continue to be amazed at the signals (max of 400) that it sucks out of thin air.

Pro 26 scanner. Two hundred channels, easy to program, large display, and wide coverage including CB channels, FM radio stations, and TV audio. It sits in my converted metal bookend at the window line.

Yaesu FT-51 HT. An oldie but a goodie. Most importantly, it has an optional powered holder that fits into an AC vent and keeps the radio illuminated anytime the power is on.

Icom T-90 HT. A new and very dependable multiband HT.

Alinco 605 Mobile dual bander. Dual display and cross band operations.

Accessories

A police style equipment organizer for the front passenger seat. Available at **Galls.com**, or other police equipment vendors.

At K-Mart, I perused the auto aisle and found a section that caters to the latest fad among young folks for bright neon lights, etc. I found a silver colored metal gooseneck lamp with three blue LEDs. Had to have that, too! I also bought some way cool "accent map lamps."

I use a coffee cup to hold upright my rubber duck antennas, pens, small tools, and knife.

From the Ford parts dept., I bought the standard white (with red lamp options) overhead police style lamp.

Emergency response supplies

I use an ice chest to store (and hide from wandering eyes) some of my emergency gear.

Metal clipboards, fire extinguishers, tool kits, a 1,000,000 rechargeable spotlight, etc. I have a theory about those of us that spend many hours listening to the scanners. We like to help others; thus a long list of emergency supplies.

I also ordered my ham radio callsign license plate. In the state of Washington, it is only a one time fee of $9.35. So if you see a red Ford Escape SUV with the plates of AB7NI, be sure to come over, and say hello, or least honk as you go by.

What? You don't have a new car? Perhaps it is time to retro-fit your current vehicle. Get moving! I suspect this month's column will trigger many questions, suggestions, and comments. I try to answer these, but when they become overwhelming at, say, 50 a day, I just can't answer all of them. But I do read every one, so keep sending them!

Dan Veeneman
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Phoenix, Philadelphia, and Pennsylvania

This month we'll answer more reader mail and update you on various radio-related activities in Pennsylvania. We'll start with a serendipitous photograph sent in by an observant scanner listener and photographer.

❖ Philadelphia Air and Sea

Greetings, Mr. Veeneman,

I am a Monitoring Times subscriber and I enjoy your column as it appears each month. Since you invite activity reports from your readers, I thought to submit the attached photograph as a kind of visual scanning activity report. Perhaps it will be useful as an illustration for your article.

I took this digital photo on October 19, 2003 at around 3:20 PM EST from an old Revolutionary War fort (Fort Mercer) at National Park, New Jersey. The fort is just across the Delaware River from Philadelphia International Airport (PHL), and just downstream from the Philadelphia Naval Shipyard and the City of Philadelphia. This location makes a perfect site from which to monitor air and maritime signals in the Philly area.

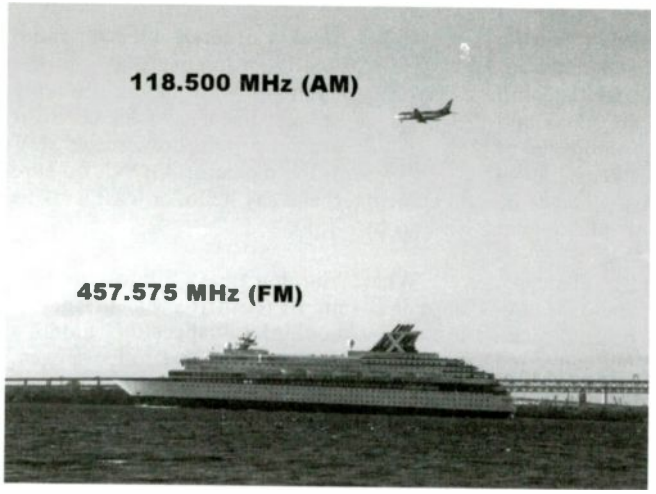
On this day, the Celebrity Lines cruise ship, "Horizon", had just left its berth at the shipyard loaded with passengers bound for Bermuda. The river runs downhill parallel to runway 9L-27R, on which the US Airways 737 was about to land. I had two Uniden Bearcat BC245XLT scanners with me, one of which was scanning the VHF marine band; the other was programmed with PHL's VHF air frequencies.

In this case, I could hear the tower giving landing clearance to the aircraft on 118.500 MHz AM on one scanner, while on the other I could hear the captain and crew discussing various ship operations on 457.575 MHz FM as the Horizon cruised downriver. In a case of lucky timing, I was able to snap this photo as the aircraft flew over the ship on final approach to 27R while listening to the tower controller warning the pilot of the presence of a large ship below.

Incidentally, while I was shooting the picture, a police cruiser pulled up behind my car to investigate who was photographing ships and planes while also monitoring their communications. The officer evidently didn't consider me to be a threat, as he left without comment after closely observing my activities for fifteen minutes or so. It was a good reminder that all of us involved in the monitoring hobbies should be sensitive to how our activities might be perceived.

Hope you enjoy the shot! Best regards & keep up the good work,

Scott in New Jersey



Just a brief word of caution – readers should be aware that there have been a number of reports of police officers stopping and questioning amateur photographers, especially those near airports, bridges, railroads, oil refineries and other sensitive areas. In nearly all cases the encounter was resolved quickly and without incident, but please be aware police departments have been instructed to be suspicious of anyone engaged in such picture-taking, especially if they have scanners or other electronic equipment with them.

❖ Homeland Defense Alerts

As many scanner listeners already know, the National Oceanic and Atmospheric Administration (NOAA) operates more than 800 radio transmitters across the country, providing forecasts, alerts and warnings from the National Weather Service. This "All-Hazards Network"also provides information and warnings about natural disasters and man-made events.

You can now add security alerts to the list of warnings available from your weather receiver. In June the Department of Homeland Security and NOAA signed an agreement allowing DHS to send warnings through the All-Hazards Network. Such warnings will be created by DHS and delivered to NOAA for broadcast. NOAA will also distribute the message to the Emergency Alert System (EAS), overseen by the Federal Emergency Management Agency (FEMA), so that it also appears on televisions and radio stations.

Because these alerts will also use SAME (Specific Area Message Encoding), listeners are able to choose the geographic area and category of message they're interested in, just as they do now for weather information.

❖ Phoenix, Arizona

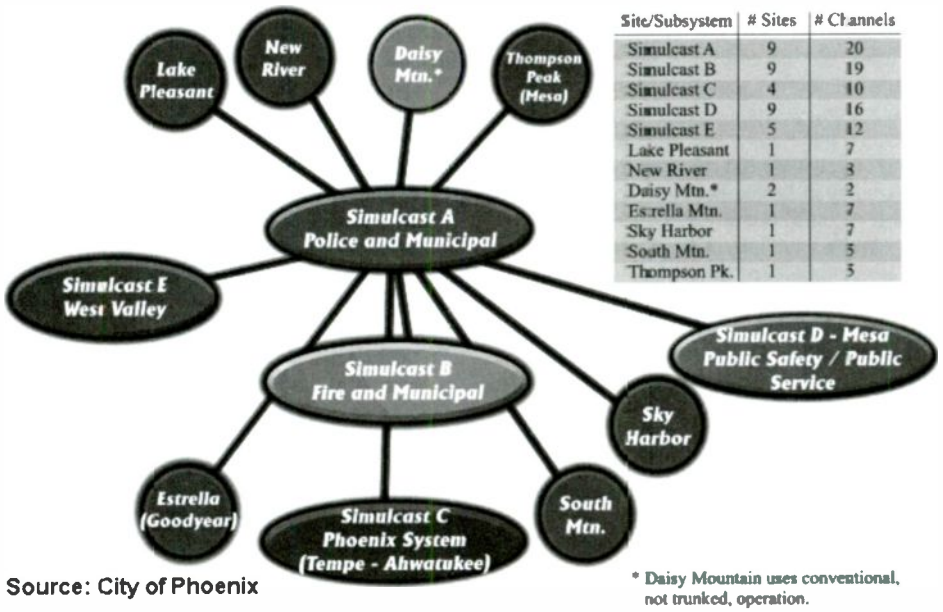
Dear M.T.,

I am writing to see if you can help answer a few questions for me. On April 17th, 2004, the Phoenix Police Department and Mesa Police Department here in Arizona finally went all digital (APCO 25) per a newscast on that day. This must be true because when a police car is shown, I've noticed the VHF antennas that were once on the trunk have been replaced by the standard 1/4-wave 800 MHz whip and the radios the officers carry are different from the old VHF ones they used to carry. I've also noticed that the Arizona Highway Patrol (DPS) cars have had the old 460 MHz antennas replaced with the 800 MHz coiled whip.

I have searched the Internet for the frequencies but to no avail and it's driving me crazy as I can't listen to the frequencies of these agencies because I can't find them. Could you please do a scanning report column on Phoenix and Mesa's new digital frequencies along with the talkgroups? And if DPS has also converted to digital 800 MHz as well, with their frequencies and talkgroups.

All major cities and towns in Maricopa County are now 800 MHz trunked (analog or

Phoenix - Mesa Basic System Configuration



Site/Subsystem	# Sites	# Channels
Simulcast A	9	20
Simulcast B	9	19
Simulcast C	4	10
Simulcast D	9	16
Simulcast E	5	12
Lake Pleasant	1	7
New River	1	3
Daisy Mtn.*	2	2
Estrella Mtn.	1	7
Sky Harbor	1	7
South Mtn.	1	5
Thompson Pk.	1	5

Source: City of Phoenix

* Daisy Mountain uses conventional, not trunked, operation.

digital). Gone are the good old days of the "enter a frequency and go." Please help!

Motley in North Phoenix

Phoenix and Mesa form the core of the Phoenix Regional Wireless Network (PRWN) and together operate a trunked, APCO Project 25 system using a 9600-baud control channel. What this means is that you'll need a Radio Shack PRO-96, a Uniden BC296D or a Uniden BC796D to properly follow all of the action. In particular, the PRO-96 has a "Virtual Scanner" feature with the PRWN frequencies already loaded in V-Scanner folder #2. By using this feature you can save yourself a lot of programming time and get straight on to listening.

The PRWN is a complex network of more than two dozen repeater sites spread out across the metro basin and surrounding mountains. Most of these repeaters work together to form "simulcast" zones in different geographic areas. For instance, Phoenix Police and Phoenix Fire have their own zones. South Phoenix, Tempe and Chandler have another, Mesa has another and the West Valley has their own.

The system serves more than 15,000 users on a large number of National Public Safety Planning Advisory Committee (NPSPAC) frequencies between 866 and 869 MHz. Since you mentioned north Phoenix, the following are frequencies in use at the repeater site up in Deer Valley on the west side of I-17, near the airport. Perhaps you can monitor them from your location.

867.0375, 867.0625, 867.0875,
867.1125, 867.1750, 867.2125,
867.2375, 867.2625, 867.2875,
867.3125, 867.3875, 867.4125,
867.4375, 867.4625, 867.5875,
867.6125, 867.6875, 867.7125,
867.7375, 867.7625, 867.7875,
867.8125, 867.8750, 867.9125,
867.9375, 867.9625, 867.9875,
868.0375, 868.1625, 868.1875,
868.2125, 868.2375, 868.2625,
868.3375, 868.3875, 868.4125,
868.4375, 868.4875 and 868.5125 MHz.

As for talkgroups...that's more of a problem. Because the system was so recently activated, local listeners are still trying to work them all out. Here are a few to get you started:

Phoenix Police appear to be using talkgroups 2991 though 2996 (hex BAF to BB4) for patrol and dispatch duties. Other groups are active, but many appear to be encrypted. Mesa Fire appears to be using 3064 and 3065. If any readers in the Phoenix Metro area have additions or corrections, please send them in!

I haven't been to Phoenix in many months, but last I heard the Arizona Department of Public Safety (DPS) was still operating in the 460 MHz band. Here are a few frequencies to check:

460.20000	Phoenix (East)
460.22500	Statewide
460.30000	Phoenix (West)
460.32500	Phoenix (Central)

Maricopa County continues to operate a large, separate Motorola SmartZone trunked radio system. The frequency list is pretty long:

851.3375, 852.7125, 853.3625, 853.5625, 853.7625, 854.3375, 854.5875, 855.9875, 856.2375, 857.2375, 857.2625, 857.7625, 857.8625, 858.2625, 858.7625, 859.2625, 859.7625, 860.2375, 860.2625, 860.9625

866.0750, 866.1250, 866.1500, 866.1750, 866.1625, 866.1875, 866.2000, 866.2125, 866.2250, 866.2500, 866.2875, 866.3250, 866.3375, 866.3625, 866.4375, 866.4500, 866.5625, 866.5875, 866.6250, 866.6500, 866.6875, 866.7125, 866.7375, 866.7750, 866.8000, 866 8375, 866.8625

867.1375, 867.1500, 867.1625, 867.1750, 867.1875, 867.2125, 867.2375, 867.2875, 867.3000, 867.3125, 867.3625, 867.4375, 867.5000, 867.6750, 867.7250, 867.7375, 867.7500, 867.7625, 867.8125, 867.8375, 867.8625, 867.9125

868.0375, 868.1375, 868.5375, 868.5625, 868.6500, 868.6750, 868.7625, 868.7750, 868.7875, 868.8000, 868.8125, 868.8250, 868.8500, 868.8625, 868.8750, 868.8875, 868.9000, 868.9125, 868.9250, 868.9375 and 868.9500 MHz.

The Maricopa County Sheriff's Office uses the following talkgroups:

43120	A87	Dispatch (West)
43152	A89	Car-to-Car (West)
43184	A8B	Emergency (West)
43216	A8D	Tactical (West)
43248	A8F	Dispatch (East)
43280	A91	Car-to-Car (East)
43312	A93	Emergency (East)
43344	A95	Tactical (East)
43376	A97	Dispatch (Central)
43408	A99	Information
43504	A9F	SWAT

The Scottsdale Police Department is another user on the system, with the following common talkgroups:

4208	107	Patrol (South)
4240	109	Patrol (Emergency)
4272	108	Patrol (North)
4368	111	Tactical 1
4400	113	Tactical 2
4432	115	Car to Car

◆ Concert Scanning

Loren writes in with some scanning results from a summertime rock concert. Here's another opportunity to hunt for unusual transmissions, as long as you can hear your scanner over the sound of the band!

Greetings, Dan!

I attended the Boston tour kick-off concert in Augusta, Maine, on Wednesday, 14 July 2004, at the Augusta Civic Center. I "glommed onto" the following frequencies courtesy of my Yaesu VX-7R. The specific info listings are hard confirms. Needless to say it was a trip to hear Kimberley Dahme's actual bass guitar plucking before the signal went into the reverb and processing equipment. She and her colleagues are extremely talented at putting on a fantastic show.

The concert itself was non-stop for over 2.5 hours, and wonderfully presented. This group was "audience centered." If you like good, straight-ahead rock 'n roll, this concert is for you. You can reach their tour web site at http://www.boston.org/concert.html. Attend even if you only know one or two of their songs. You will not be disappointed.

Folks, let me know what you think. Are there any others out there that attend concerts with communications gear at the ready?

"Open carriers" most likely are unplayed guitars awaiting activation by the techies. Frequencies were "wide" and easily discernible.

Frequency	Usage/possible use
525.2500	"Full quieting" buzz/hum
626.5000	Open Carrier
630.0000	Open Carrier
630.0000	Open Carrier
632.6000	Kimberley Dahme voice mic
632.6500	Drummer's Headset
634.5000	Brad Delp (singer)
638.8000	Rhythm guitar
639.7000	Weak carrier heard
642.4000	New singer's vocals (don't know which one)
647.4500	Heard distinct snare drum
647.6000	Vocals
655.2500	Open Carrier
655.3000	Rhythm guitar
707.5000	Bass guitar (Kimberley Dahme)
707.5000	Open Carrier
713.4000	Open Carrier
722.3500	Open Carrier
724.5500	Vocals
726.1500	Vocals
805.0000	Open Carrier

Best from Augusta, Maine,
Loren Fields, N1UMF

❖ Pennsylvania

There are a lot of things going on in Pennsylvania related to public safety radio.

The State Police are shifting to a more consolidated method of handling emergency calls. In June they began using a new dispatch center near Harrisburg, the first of five new regional communications facilities. Additional centers in Clarion County, Norristown, Westmoreland County, and Wilkes-Barre/Scranton should all be up and running within two years, completing the statewide effort to centralize emergency calls. Communications specialists will staff these centers, freeing police offers from phone duty to get back out on patrol.

The centers are being funded under a $125 million information initiative. This money will also pay for the purchase and installation of GPS (Global Positioning System) equipment in every police car, allowing dispatchers to see the location of each car and making it easier for them to contact the most appropriate one to handle a call.

Each police car will also have a computer displaying call locations on a digital map, with directions and street names, making it easier and faster for them to arrive on-scene.

State Radio System

Pennsylvania's state radio system has come under a good deal of criticism lately, specifically for being over budget and three years behind schedule.

In 1996 the state began the planning and specification for a statewide digital radio system. Three years later, Pennsylvania selected a bid from a Massachusetts company called M/A-COM for a new and untried system called OpenSky. The state originally wanted the system built and running in 18 months. Motorola, another bidder on the project, believed it would take at least 36 months and perhaps as long as 48 months to finish such an ambitious project. M/A-Com said they could do it in 20 months.

M/A-Com is one of four companies that received a contract in 1999 to build the system. At that time the state established the Radio Project Office to oversee the effort. The total cost in 1999 of $222 million has now grown to $240 million and the 20-month schedule stretched out, according to the state, due to a variety of factors including contractor bankruptcies and legal disputes over tower locations. In particular, the company originally signed to provide the repeater towers filed for bankruptcy in September 2003, leaving the state unable to build out any new sites.

Besides the large towers, the design calls for several hundred "microsites" to be mounted on rooftops, utility poles, and other lower-profile locations. The 240 towers are laid out to provide 80% of the system coverage and 95% of capacity – the microsites are intended to give additional coverage in locations where the towers won't reach. M/A-Com claims they are ready to install these microsites as soon as the state can purchase the property on which they are to be located.

M/A-Com's position is that their portion of the project is basically done. They're just waiting on the state and the other contractors to do their part.

Due in large part to pressure from two Pennsylvania legislators who feel the system is not working as intended, the state recently hired an independent consulting company to advise them on the best way to complete a statewide radio system.

In the meantime, the Pennsylvania Office of Administration has responded to these criticisms by stating that the Radio Project Office accepted the system as "public-safety ready" a year ago and is currently providing voice service to more than 4,000 users. The State Police are also using the data capability of the system.

OpenSky Network

Motorola is now writing to the governor and other state officials, claiming that the OpenSky technology doesn't work and is still not in widespread use. They also claim that the state is pressuring counties and local governments to join the statewide system. As we covered in last month's column, Motorola may lose out to M/A-Com for a $1 billion statewide system in neighboring New York. Since Motorola is already working with several counties in Pennsylvania, perhaps they fear losing there as well if OpenSky proves to be a success.

While Motorola works to compete against M/A-Com, the have a few issues to solve in Philadelphia themselves.

Philadelphia, Pennsylvania

Philadelphia's $54 million police radio system has experienced a number of problems since it went live in December 2002. Two failures earlier this year highlight the problem of debugging these complex combinations of hardware and software.

In March and again in May, when an officer requested immediate backup, the dispatcher's use of various "all call" features caused the system to "lock down" for an extended period of time. During these lock down periods other officers were unable to reach the dispatcher.

Motorola, the designer of the system and equipment provider, believes they've solved these problems but have been unable to test them – mainly because Philadelphia's system is operational 24 hours a day and testing may result in further outages. Their answer is to build a duplicate system in a testing facility, to try and isolate and correct problems without affecting the real network.

Cumberland County, Pennsylvania

Over in the south-central part of the state, after years of delay, Cumberland County is getting ready to begin using the OpenSky system in the western end of county. The system has been in use for two years in Carlisle and the surrounding area, but the more rural towns to the west have adopted a "show me" attitude, asking for demonstrations and proof of coverage before ordering radios and other equipment. The county has a total of seven repeater sites to serve a population of 200,000 residents, at the standard 95% transmission success rate over 95% of the geographic area.

The county planned for a $10 million budget, with a quarter of that earmarked to help towns purchase the $1,600 (portable) or $3,000 (mobile) OpenSky radios.

Westmoreland County, Pennsylvania

Westmoreland County is having trouble getting repeater towers operational in time for the start date for their new 800 MHz radio system. Originally July, the $19 million system is now scheduled for a September start as the county works to resolve legal issues surrounding three tower sites. A total of 25 sites are planned for the countywide system, although not all may be built and operational by the start date.

Testing is underway to locate any "dead zones" where coverage is poor or non-existent.

The system was funded through a $12 million county bond issue, $6 million from the Department of Homeland Security (DHS) and an additional $1.3 million federal grant.

York County, Pennsylvania

On the southern border with Maryland, the County of York has asked the Federal Communications Commission (FCC) for permission to operate a trunked public safety radio system on fifty-eight channels in the UHF television band. Channel 19, between 500 and 506 MHz, is unused in and near the county. York County is currently using a patchwork of systems in low band (30 to 50 MHz), VHF (150 to 174 MHz) and UHF (450 to 470 MHz).

That's all for this month. You can get more frequencies and radio-related information on my website at **http://www.signalharbor.com** and I welcome your electronic mail to *dan@monitoringtimes.com*. Until next time, happy scanning!

Scanning Canada

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Ontario Government Mobile Communications Update

In May 1998 the Ontario Government announced a program to amalgamate the radio systems for five provincial agencies (Ontario Provincial Police, Ministry of the Solicitor General correctional services, Ministry of Health ambulance services, Ministry of Natural Resources fire-fighting and conservation enforcement, and Ministry of Transportation highway safety and enforcement). The network is managed by the Ontario Government Mobile Communications Office (GMCO). GMCO acquired responsibility for the legacy systems in use at the time and planned a migration to the new Bell Fleetnet system.

Existing trunked systems are analog and at this time it is believed that only the police have adopted Fleetnet APCO 25 digital communications, while the Ministry of Health ambulance system is operating unencrypted analog systems.

The GMCP (Government Mobile Communications Project) owns over 4000 licenses for frequencies ranging from HF up to 3 GHz. The total allocation of licenses shows frequency groupings around each agency covered by the GMCP. This month's frequency table shows the licensed frequencies granted by the federal government regulators to the GMCP in each region of Ontario, in the frequency range believed to be used mainly by the police. New frequencies have been added for Fleetnet operations but, at the time of writing, are not yet shown in the government records.

The new Bell Fleetnet system is well documented by unofficial sources. One particularly good coverage is provided at **http://www.radioreference.com** which provides a detailed list of the latest frequencies and talkgroups.

Currently Licensed Frequencies for GMCP by Region Between 140 and 144 MHz
Note: Some of these frequencies are already believed to have been changed and others may be changed by press time. Updates will be provided as they become available.

Alban	143.85		
Alice	143.81	143.97	
Armstrong	143.81	143.87	
Aroland	143.81		
Atikokan	143.81		
Aubrey Falls	143.81	143.85	
Avonmore	143.85		
Bancroft	143.81	143.87	
Beardmore	142.58	143.81	143.85
Beaverton	143.81		
Blue Mountain	143.81	143.88	
Blyth	143.87		
Bobcaygeon	143.81	143.97	
Bowling Green	143.94		
Brantford	143.54		
Burlington	143.37		
Camp Robinson	143.81	143.88	
Cartier	143.45	143.73	143.81
Cayuga	143.94		
Chapleau	143.73	143.81	143.88
Chateau Royale	142.89		
Chatham	143.88		
Chepstow	143.88		
Cloyne	143.81	143.97	
Cochrane	143.81		
Cottam	143.94		
Crayfish Lake	143.81		
Delhi	143.96		
Devlin	143.96		
Dinorwic	143.81		
Doherty	143.81	143.97	
Dwight	143.81	143.96	
Edgar	142.04		
Elk Lake	143.81	143.85	
Elliot Lake	143.81	143.94	
English River	143.87		
Ferndale	143.97		
Flame Lake	143.88		
Flanders	143.73		
Flynn Lake	143.81	143.94	
Foleyet	143.81	143.96	
Fonthill	143.87		
Foymount	143.81	143.96	
Fraser River	143.81	143.88	
Fraserdale	143.81	143.87	
French River	143.81		
Gameland	143.94		
Geraldton	143.81	143.97	
Girard Lake	143.81	143.87	
Glenburnie	143.81	143.96	
Gogama	143.81	143.97	
Gowganda	143.81	143.94	
Guelph	143.96		
Haliburton	143.73	143.81	
Hamilton	143.73		
Harriston	143.85		
Hazelwood	143.73	143.81	
Hearst	143.73	143.81	
Hilton	143.73	143.81	
Homepayne	143.81	143.87	
Huntsville	143.81	143.97	
Hurricane	143.81	143.85	
Ignace	143.81	143.88	
Iron Bridge	143.81		
Kapuskasing	143.81	143.94	
Kashabowie	143.73		
Kempis Mountain	143.81	143.88	
Kenora	143.73	143.81	
Kesagami	143.81	143.96	
Kirkland Lake	143.81	143.96	
Lansdowne	143.81	143.97	
Little Current	143.81		
London	143.87		
Maberly	143.81	143.88	
Manitouwadge	143.81	143.96	
Marathon	143.81	143.73	
Marsh Lake	143.88		
Martin	143.81		
Mattawa	143.81	143.85	
Mckellar	143.73	143.81	
Mckerrow	143.81	143.96	
Medcalf Lake	142.13	142.67	143.81 143.96
Mine Centre	143.81	143.85	
Mississauga	143.37	143.51	
Montreal River	143.81	143.96	
Mount St-Patrick	143.81	143.85	
Mountain grove	143.81	143.94	
Mt St Louis	143.85		
Nakina	143.73		
Nellie Lake	143.81	143.97	
New Liskeard	143.81	143.87	
New Park	143.81	143.94	
Niagara Falls	140.96		
Nipigon	143.81	143.87	
North Augusta	143.73	143.81	143.87
North Bay	143.81	143.96	
Northland	143.81		
Oak Lake	143.85		
Oak ridges	143.97		
Ottawa	143.81	143.94	
Parkhill	143.94		
Pevensey Lake	143.81	143.88	
Pickle Lake	143.81	143.94	
Plantagenet	143.81	143.97	
Raith	143.81	143.97	
Red Lake	143.81	143.94	
Rossmount	143.81	143.87	
Salt Lake	143.73	143.81	
Sapawe	143.94		
Sault Ste. Marie	143.81		
Savant Lake	143.81	143.85	
Schreiber	142.46	143.88	
Silver Water	143.88		
Sioux Lookout	143.81	143.87	
Smoothrock Falls	143.81	143.85	
South Gilles	143.81	143.88	
South River	143.87		
St.George	143.85		
Stratford	143.97		
Sturgeon Lake	142.37	142.58	143.73 143.81
Sudbury	143.81	143.88	
Terrace Bay	142.46	143.81	
Thunder Bay	143.81	143.96	
Timmins	143.73	143.81	
Toronto	143.34		
Torrance	143.81	143.94	
Uxbridge	143.96		
Verner	143.81	143.94	
Wardsville	143.81		
Warwick	143.73		
Watershed	143.87		
Wawa	143.81	143.94	
West Bay	143.87		
Wharncliffe	143.97		
White River	143.81	143.85	
Whitfield	143.73		
Whitney	143.81	143.94	
Woodford	143.96		
Woodstock	143.88		
Ontario Wide	140.15	140.33	141.29 141.66
	143.67	140.18	140.48 141.32
	141.78	143.70	140.25 140.54
	141.47	141.81	143.73 140.30
	141.14	141.65	143.19 143.81
Mobile Repeaters	142.89	143.34	143.37 143.51

Scanning Canada will cover some of the features of the new Fleetnet system in future issues.

◆ No Scanning Here Please!

This month's picture was snapped in southwestern Ontario near the Nanticoke power station. Okay, it is probably intended to prohibit the use of radio transmitters. However, *ScanCan* was caught by surprise while touring in the area using a handheld transceiver in scanning mode and thought the sign was worth a few kilobytes in the old digital camera.

Are you ready for the cold weather yet? Until next month, happy scanning north of the border.

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A Wandering Blue Star

The "Blue Star" is not only a well-known emblem for military families, but it's also the static radio callsign of a United States Navy ground station that is sometimes heard working the venerable P-3 Orions and other patrol aircraft in upper sideband (USB) voice. The primary frequency is 8971 kilohertz (kHz). Other net frequencies are 4739, 6246, 6693, and 14561 USB. It's also been occasionally logged on such US Air Force USB frequencies as 10780 and 11175 kHz.

If you've been missing Blue Star recently, it's because the station has moved. Its old location was at a Tactical Service Center (TSC) within the US Navy's Atlantic Fleet Weapons Training Facility on Vieques, a large island just east of the main part of Puerto Rico. Anyone who follows the news knows that the Navy has recently vacated this facility after a long and bitter controversy regarding live-weapons training on the island. The TSC has been dismantled and hauled away.

As a further consequence, the entire US Navy presence on the east end of Puerto Rico has been rather abruptly "disestablished," as specifically ordered by Congress in Public Law 108-87 and implemented in early May of 2004. This includes not only Vieques, but everything in the other section of Naval Station Roosevelt Roads, just across a narrow strait. The nearby town of Ceiba has taken an economic hit.

Although it's being heard a lot less, the Blue Star net and mission still exist. Control is from an undisclosed location, probably somewhere in the Caribbean or Central America. While the shore station is no longer a TSC, its mission is still related to Joint Interagency Task Force drug enforcement, plus similar surveillance and patrols.

❖ Digital Voice on USB

Charles Brain, G4GUO, is a British ham who is well known for his advanced software. It makes digital HF modes such as Automatic Link Establishment (ALE) and High-Frequency Data Link (HFDL) available to this hobby at a very fair price (or even free). Fewer people, however, know about the several years he spent on hardware digital voice for ordinary USB radios such as the ones used by hams.

His system uses 36 tones, and sounds like a slowed-down version of the 39-tone voice modem that the military and commercial companies have used on HF for quite some time. The ham version is a little wide at 3.2 kHz, but well within amateur rules.

As always with digital radio, it's either all the way in with high-fidelity audio, or just plain gone. Noise and interference greatly limit results, and it's no longer possible to copy two signals at once. It's probably not a great amateur mode, but the fancier military versions are attractive to defense contract planners looking for a single standardized HF radio that seamlessly integrates voice and data.

Those wanting to experiment with Charles' "G4GUO mode" can get it in a commercial product, the AOR ARD-9800, for US$500. Experienced builders can "homebrew" something similar for much less.

Charles' web site is at **http://www.chbrain.dircon.co.uk/**, and the AOR unit is described at **http://www.aorusa.com/ard9800.html**.

❖ US BPL Threat Continues

BPL stands for Broadband over Power Line. It's the latest hot, corporate technology, using a combination of wireless networking ("Wi-Fi") and wired transmission to make high-speed Internet and other "broadband" digital services available to anyone on the power grid. That's a lot of people. Needless to say, the corporate stakes are enormous, and the debate has even involved the President of the United States.

The problem is that the technology does not well address the problem of high-frequency radio (HF) signals transmitted by the wires. BPL's frequency band, which in most systems runs roughly from 3 through 30 megahertz (MHz), covers the entire HF spectrum. Careful tests by competent engineers have revealed real, quantifiable, reproducible, problems, which the Federal Communications Commission (FCC) has chosen to talk around or even ignore in its feeble rule-making documents of early 2004.

Unfortunately for the FCC and everyone else, it's really kind of a no-brainer. In its most basic form, a transmitting antenna is a length of ungrounded, unshielded wire that is connected to radio-frequency electricity. In its only form, an overhead power line with BPL is a length of ungrounded, unshielded, wire that is connected to radio-frequency electricity. Therefore, while the laws of man can and often do discount the laws of physics, in the end physics wins yet again.

According to the exhaustive information on the American Radio Relay League (ARRL) web site at **http://www.arrl.org**, a recent BPL experimental trial in Cedar Rapids, Iowa, ended in disaster for the power company. Cedar Rapids, of course, is the longtime home of a different sort of HF radio powerhouse, namely the Rockwell/Collins Company. It's fortunate for us that the power company chose a community guaranteed to have plenty of technically savvy people around.

About a week before this column went to press, the Cedar Rapids power company yanked the plug, so to speak. Complaints from amateurs about unacceptable interference were one of several factors cited by Alliant Energy for its very premature termination of the trial. Others were "regulatory uncertainty and other unspecified technical issues," according to Alliant source Dan Hinz.

The "technical issues" might have included the failure of the much-touted "notching" system to reduce interference. Of course, this would not help utility listeners anyway, seeing as it only "notches" out the amateur bands. The "regulatory uncertainty" might have something to do with the conflict brewing within the government, between the FCC and the powerful National Telecommunications and Information Administration. NTIA has expressed concern over the integrity of its 59,000 affected frequency allocations, some of which are important to national security.

But, given the huge financial stakes here, the best threat to widespread US deployment of BPL is competition from other technologies that also offer wireless high-speed Internet in the home. There are several of these, and nothing in the computer telecom field ever stands still for long. Cross your fingers until next month.

Utility World

Utility Logs

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ABBREVIATIONS USED IN THIS COLUMN

ALE ..... Automatic Link Establishment
AM ..... Amplitude Modulation
ARQ ..... Automatic Repeat Request teleprinting system
ARQ-E3 ..... French ARQ teleprinting system
CAMSLANT .. Communication Area Master Station, Atlantic
CW ..... Morse code telegraphy ("Continuous Wave")
DSC ..... Digital Selective Calling
EAM ..... Emergency Action Message
EOC ..... Emergency Operations Center
FAX ..... Radiofacsimile
FEC ..... Forward Error Correction teleprinting system
G22 ..... European "numbers," unknown agency, ends "000"
HF-GCS ..... High-Frequency Global Communications System
HFDL ..... High-Frequency Data Link
LDOC ..... Long-Distance Operational Control
LSB ..... Lower Sideband
M8 ..... Cuban Morse code, using letters for numbers
M22 ..... Israeli Navy 4XZ, weather and "numbers"
Meteo ..... Meteorological
MFA ..... Ministry of Foreign Affairs
M/V ..... Matar Vessel
NAVTEX ..... Navigational Telex
NATO ..... North Atlantic Treaty Organization
PR ..... Puerto Rico
RSA ..... Republic of South Africa
RTTY ..... Radio Teletype
SHARES ..... SHAred RESources (US Government)
SITOR-A ..... Simplex Teleprinting Over Radio, ARQ mode
SITOR-B ..... Simplex Teleprinting Over Radio, FEC mode
SYNOP ..... Synoptic Code (for weather reports)
UK ..... United Kingdom
Unid ..... Unidentified
US ..... United States
V2 ..... Cuban Spanish female "numbers," all formats
VOLMET ..... Flying Weather (loosely from French)

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

518.0 ZSJ-South African Navy, NAVTEX in SITOR-B, at 1230. (Bob Hall-RSA)

2187.5 Netherland Coast Guard Radio, working GDX (M/V *Sir Charles Parsons*), in DSC at 0052. GRAL-M/V ARCO *Humber*, working Netherland CG Radio, DSC at 0521. EI6277-M/V *Atlantic Fisher*, DSC identifier at 2226. Coruna Radio, Spain, working GXDH (M/V *North Coast*), DSC at 2233. LGT-Tjome Radio, Norway, working C6PT3 (M/V *Patricia*), DSC at 2303. GYOE-M/V *Wear Fisher*, working Milford Haven, UK, DSC at 2309. (Ary Boender-Netherlands)

2582.0 Bermuda Harbor Radio-St. George, Bermuda, signing off at end of scheduled information broadcast, at 0046. (Ron Perron-MD)

3175.5 LOR-Argentine Navy, Puerto Belgrano, RTTY warnings in Spanish, at 0615. (Hall-RSA)

3178.0 LOR-Argentine Navy, Puerto Belgrano, encrypted RTTY message in 5-letter groups at 0503. (Hall-RSA)

3388.0 DE3-Delaware State EOC, Wilmington, working HQ703N, US Army 703rd Main Support Battalion, GA, also using 5961, 12216; 14776, and 15708, in ALE at 1807 (Perron-MD) *[This traffic, along with the SHARES exercise, was all part of Grecian Firebolt 2004. -Hugh]*

4014.0 ZSJ-South African Navy, Silvermine, RTTY warnings and weather, also on 13538, at 1715. (Hall-RSA)

4207.5 UFME-Russian vessel *Svyatitel Aleksiy*, DSC identifier at 2339. (Day Watson-UK)

4280.0 PBC34-Dutch Navy, Goeree Island, working a ship in RTTY at 1128. (Watson-UK)

4290.5 IAR-Rome Radio, Italy, SITOR-B maritime warnings in Spanish at 1950. (Hall-RSA) *[For Argentine Navy? -Hugh]*

4295.0 FUE-French Navy, Brest, RTTY test loop to "ABC001 ALL," at 1214. (Watson-UK)

4320.3 GYA-UK Royal Navy, London, 4-channel Voice Frequency Telegraphy at 1227. (Watson-UK)

4583.0 DDK2-Hamburg Meteo Germany, with SYNOP weather observations in RTTY, at 1318. (Watson-UK)

4601.5 0A-Irish Navy, Haulbowline, passing encrypted traffic to CVVD, at 1328. (Watson-UK)

4610.0 GYA-UK Navy weather center, Northwood, with FAX charts indicating a possible schedule change, at 1937. (Watson-UK)

4924.5 HQ703N-US Army, GA, calling U080TN in ALE, at 1504. (Perron-MD)

4942.3 FDI22-French Air Force, Narbonne, CW marker at 1830. (Watson-UK)

4996.0 RWM-Russian standard time station, with CW identifier marker in minutes 39 and 40, at 1839. (Watson-UK)

5088.5 DCS-Unknown US government, ALE radio check with USAIS1012 (US Army Intelligence & Security Command, VA), at 1507. (Perron-MD)

5135.0 CL1AR-New Hampshire emergency net, Clarendon EOC, ALE sounding at 0321. (Perron-MD)

5195.0 DRA5-German Amateur Radio Club, Scheggerott, northern Germany, propagation beacon identifying in CW, at 2140. (Patrice Privat-France)

5379.0 TWLL-Spanish Guardia Civil, La Rioja, working 111 in ALE, at 0805. (Watson-UK)

5403.0 Hotel Foxtrot-US Navy battle group net, working Delta, Romeo and other 1-letter callsigns, at 0116. (Rick Baker-OH) *[Much of this increased US Navy activity was from exercise Summer Pulse 2004, involving 7 carrier groups. -Hugh]*

5418.0 Cuban "Atencion" (V2), 5-figure groups in AM, at 0208. (Camilo Castillo-Panama)

5696.0 Borinquen Air-US Coast Guard, PR, calling Coast Guard 2139, at 0113. Oceania Radio-US Coast Guard Auxiliary, VA, working Coast Guard 2117, at 0330. (Baker-OH)

5760.0 Cuban "Atencion" (V2), 5-figure groups in AM, at 0213. (Castillo-Panama)

5860.0 FAAZMP-US Federal Aviation Agency, Minneapolis, MN, ALE sounding at 0217. (Perron-MD)

5868.5 Hotel Whiskey-US Navy battle group net control, taking roll with Romeo 1445, Golf, Kila, and Victor, at 2250. (Ray Stickney-FL)

5871.0 TWLV-Spanish Guardia Civil, Vizcaya, working TXXX, Valdemaro, in ALE at 0158. TYME, Madrid, calling TXXX, ALE at 0453. TZSM, Malaga, working TXXX, ALE at 0656. TZSA, Almeria, working TXXX, ALE at 0716. TZSO, Cordoba, working TXXX, ALE at 0740. (Watson-UK)

6235.7 Unid-Station testing in RTTY, with repeated "06" and "06 INV," at 2208. (Perron-MD) *[Copied all over eastern US. -Hugh]*

6312.0 SVO-Olympia Radio, Greece, DSC identifier at 0109. (Boender-Netherlands)

6628.0 Air France 625-Boeing 747 (registration F-BTDG), working Santa Maria oceanic air control at 0515. (Privat-France)

6697.0 Aluminum-US military, with a 22-character EAM simulcast on 8992 and 11244, at 0227 and 0237. Rail Man-US military, with a 28-character EAM simulcast on 8992, 11244, and 13155, at 1725. (Jeff Haverlah-TX)

6834.4 GYA-UK Royal Navy, Northwood, with FAX charts for the Middle East at 0720. (Privat-France)

6985.0 USAIS1012-US Army, VA, calling USAMD1010, US Army, in ALE, also 3285, at 1458. (Perron-MD)

7317.0 "Edna Sednitzer" (G22)-German-language version of famous Slavic "numbers," in AM, at 2209. (Chris Smolinski-MD)

7650.0 T2Z238-US Army 2/238th Aviation Regiment, IN, ALE sound, also 8171.5 and 10151.5, at 1530. (Perron-MD)

7777.0 Obregon-Mexican Army, calling Zorrillo ZM ("Little Fox") in ALE, at 1636. Diamante ("Diamond") calling Jade, in ALE at 2215. (Glenn Blum-TX)

7805.0 HI1LL-NH emergency net, Hillsborough EOC, ALE sounding at 0058. WPFJ625-NH State EOC, Concord, sounding at 1033. BE1RL-Berlin, NH EOC, sounding at 1410. (Perron-MD)

7849.0 CGGN-Venezuelan National Guard Headquarters, calling

PORLAMAR (Parlomar Airport), in ALE, also 9052, at 2326. (Perron-MD)

8010.0 Cuban "Cut Number" station (M8), 5-letter CW groups at 2220. (Perron-MD)

8020.0 Golden Gater-Unknown US military, broadcasting the EAM received earlier from Examiner on 8992, at 1352. (Haverlah-TX)

8047.0 W030VN-US Army, calling HQ703N, 703rd Main Support Battalion, GA, at 1901. (Perron-MD)

8125.0 FAAZNY-US Federal Aviation Administration, New York, ALE sounding at 0117. (Perron-MD)

8252.0 Yankee Kilo-NATO net control, working several trigraph callsigns in Combined Joint Task Force Exercise 04-2, at 0215. Bravo Foxtrot-US Navy battle group net, at 1845. (Baker-OH) Predator-Probable US Navy, in the Bravo Foxtrot net with Davey Jones, at 1725. (Mark Cleary-SC)

8280.0 BRION- Venezuelan Navy Frigate *Almirante Brion*, F-22,) calling DCCOP (naval operations control), in LSB ALE, also on 8825, at 0113. (Perron-MD)

8414.5 P3FE9- V7BB2-Vessel *Pecos*, with five DSC distress calls at 0105. (Watson-UK) M/V *Kanaris*, working Madrid Radio in DSC at 1149. (Boender-Netherlands)

8418.0 IAR-Rome Radio, Italy, CW marker at 0319. (Castillo-Panama)

8421.5 LZW-Varna Radio, Bulgaria, CW in SITOR-A marker, at 0220. (Castillo-Panama)

8424.0 SVO-Olympia Radio, Greece, CW in SITOR-A marker, at 0218. (Castillo-Panama)

8430.0 TAH-Istanbul Radio, Turkey, CW in SITOR-A marker, at 0217. (Castillo-Panama)

8431.5 UAT-Moscow Radio, Russia, CW in SITOR-A marker, at 0314. (Castillo-Panama)

8668.5 Hotel Whiskey-US Navy battle group net, air defense exercises at 0004. (Baker-OH)

8734.0 SVO-Olympia Radio, Greece, attempting a patch with unheard vessel, at 0100. (Jeff Seale-KY) SVO, voice mirror with channel numbers at 0240. (Baker-OH)

8891.0 Speedbird 282-British Airways, enroute to London from Los Angeles, working Arctic Radio at 0510. (Privat-France)

8903.0 Springbok 203-South African Airways, position for Kinshasa, Congo, at 2152. (Perron-MD)

8906.0 LTE 708-Volar Airlines, working Santa Maria at 2111. (Privat-France)

8971.0 Orion 50-US Navy, calling Jaguar (US Navy), at 1522. (Baker-OH)

8983.0 Coast Guard 1706-US Coast Guard helicopter, being diverted by CAMSLANT to help search for a migrant raft north of Haiti, at 1503. (Allan Stern-FL)

8992.0 Japan Navy 76-Aircraft making several Mainsail (general) calls, no joy at 0602. Golden Gater-US military, asking Examiner for "EAMs in the queue," at 1203. Trout 99-US Air Force C-135 "Speckled Trout," working McClellan (CA), at 1849. Dixie 21-US Air National Guard tanker, working Lajes (Azores), at 2324. (Haverlah-TX) Bathroom-US military, working many stations in a NATO exercise at 1230. (Cleary-SC)

9052.0 CGGN-Venezuelan National Guard, calling several stations in ALE, also on 10272 and 10600, at 0106. LECAIRE-French Embassy, Cairo, Egypt, calling CER41, French MFA, Paris, in ALE at 0259. (Perron-MD)

9106.0 KGD34NCC-SHARES coordinating station, VA, ALE sound, also on 17487, at 1647. (Perron-MD)

9190.0 CGA-Venezuelan Navy Headquarters, calling BNA, Amario, in ALE at 1129 (Perron-MD)

9198.0 TAC-Chilean Navy, calling 23R in LSB ALE, at 0855. (Perron-MD)

9215.0 Sierra Foxtrot-US Navy battle group net, working Bravo and other 1-letter callsigns, at 0010. (Baker-OH)

9360.0 OXT-Copenhagen Meteo, Denmark, ice chart FAX at 1208. (Watson-UK)

9462.0 DE3-Delaware EOC, calling G6X, in ALE at 1817. (Perron-MD)

10446.0 Cuban "Atencion" station (V2), female voice with 5-number groups, distorted, humming AM at 0330. (Ray Babecki-NJ) Cuban "Atencion" AM female voice (V2), with 5-number groups at 2310. (Seale-KY)

10711.0 BR-Brazilian Navy, calling PR1 in ALE, at 0041. (Perron-MD)

10914.5 NDDCEA-Brazilian Navy Landing Ship Ceará, calling NTGMTA, Fleet Oiler *Almirante Gastao Motta*, in ALE at 0744. (Perron-MD)

11175.0 Shark 81-US surveillance or drug operation, making a patch via Lajes to Smasher (Joint Task Force, FL), at 0325. (Baker-OH) Navy 676-US Navy, several calls to Andrews (MD), no joy at 1723. (Haverlah-TX)

11232.0 Trenton Military-Canadian Forces Base, Trenton, Ontario, passing weather data to Rescue 313, at 0234. (Seale-KY)

11244.0 Candy Man-US military, probably the "Nightwatch" net, with 3 28-character EAMs simulcast on 6697, 8992, and 13155, at 0207. Tango 101-US military, with an EAM at 1218. (Haverlah-TX)

11247.0 Architect-UK Royal Air Force Flight Watch, airfield status broadcast at 0100 . (Perron-MD)

11253.0 Unid-UK Royal Air Force VOLMET, with Middle Eastern aviation weather at 2353. (Seale-KY)

11345.0 EEZ2804- Eurofly A330 (I-EEZA), working Stockholm at 0630. (Privat-France)

11429.0 LIO-Chilean Navy, calling HLA in ALE at 0626. (Perron-MD)

12577.0 SYEN-Greek vessel, calling Lyngby in DSC, at 0954. (Privat-France) 9KEB-M/V *Al Khaleej*, calling Lyngby Radio in DSC at 1234. 9KHN-M/V *Al Mirqab* calling Olympia Radio, in DSC at 1922. BONT-M/V *Fu Shou Hai*, working Shanghai Radio, China, at 1943. J8GK8-M/V *Ferosa*, working NMF (US Coast Guard, Boston), DSC at 2109. (Boender-Netherlands)

12668.0 RFFMEA-French Navy, RTTY test loop at 1935. (Hall-RSA)

12745.5 JJC-Tokyo Radio, with Kyodo News FAX (60/576), in Japanese at 1539. (Boender-Netherlands)

12984.0 4XZ-Israeli Navy, Haifa (M22), CW marker at 2132. (Privat-France)

13042.2 FUV-French Forces, Djibouti, RTTY test loop at 1600. (Hall-RSA)

13155.0 Overhang-US military, probably the "Nightwatch" net, with a 20-character EAM simulcast on 8992 and 11244, at 2306. (Haverlah-TX)

13221.0 NOJ-US Coast Guard, Kodiak, AK, ALE sounding, also on 11196, at 0547. (Perron-MD)

13510.0 CFH-Canadian Forces, Halifax, NS, FAX weather charts at 2002. (Boender-Netherlands)

13530.0 PRF320-Colombian Army border post, automated LSB ALE phone patch with 1901, at 2253. (Perron-MD)

13597.0 JMH4-Tokyo Radio, Japan, FAX weather satellite image at 1914. (Boender-Netherlands)

14493.5 CL1-US Federal Bureau of Investigation, calling OM2 in ALE, at 1738. (Privat-France)

14653.0 I070AN-US Army, calling HQ701N, possibly 701st Military Police, in ALE at 1456. (Perron-MD)

14671.0 CER11-French MFA, Paris, calling RABAT, Morocco embassy, in ALE at 1716. (Perron-MD)

14780.0 NDCCMM-Brazilian Navy landing ship *Mattoso Maia*, calling NDDCEA, landing ship Ceará, also 10914.5, in ALE at 1116. (Perron-MD)

14926.5 RFTJ-French Navy, Dakar, Senegal, ARQ-E3 circuit test message ("Controle de Voie") to itself, at 1458. (Hall-RSA)

15025.0 CPA830-Cathay Pacific Airlines (B-HQC), sending HFDL position and receiving JFK Airport information Juliet, at 1605. (Privat-France)

16804.5 NMG-US Coast Guard, New Orleans, LA, DSC identifier at 1526. (Boender-Netherlands)

17010.0 NDDCEA-Brazilian Navy landing ship Ceará, calling ERMBEL, Belem, also 10914.5 and 14780, in ALE at 1108. (Perron-MD)

17146.7 CBV- Valparaiso Radio, Chile, weak weather FAX at 1215. (Hall-RSA)

17441.2 5YE-Nairobi Meteo, Kenya, with RTTY test loop, then marine weather in French, at 0851. (Hall-RSA)

17982.0 Unid-Arabic speaking male working an aircraft, possibly a Stockholm LDOC patch, at 2102. HERMES-Brazilian Air Force Headquarters, Brasilia, ALE sounding at 2325. (Perron-MD)

18757.0 RFGW-French MFA, Paris, with FEC traffic in 5-letter groups at 0655. (Hall-RSA)

19200.0 T81-Venezuelan Navy oiler *Ciudad Bolivar*, calling T61, Landing Ship Capana, at 1800. (Perron-MD)

19969.0 Unid-Station using ALE address "010101010101010," possibly a default or a place holder, sounding at 1912. (Perron-MD)

Digital Digest

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Keeping Up-To-Date

This month we focus on a few ways that listeners can keep abreast of the latest goings-on in shortwave digital utility listening. Plus, MFA Delhi appears to be back on the air a little more regularly these days and provides another interesting catch with simple equipment.

World Utility News Club

If you're a regular reader of this column, you will probably recognize the name WUN, short for the Worldwide Utility (or UTE) News club. For nearly a decade, WUN has provided what is probably the best flow of daily, weekly and monthly news about utility listening around the world.

WUN covers utility listening in its widest sense including voice and digital communications from maritime, aeronautical, government, diplomatic, intelligence and military sources. In fact, just about everything except broadcast stations. There are many hundreds of members spread across the world which further increases the diversity of content and coverage.

The club offers three ways to stay well-informed of utility goings-on. Firstly, and most popular, is the WUN listserv that members can subscribe to over email. By sending a message to wun@qth.net the listserv will instantly relay that email every subscriber. There are probably between 20 and 40 messages a day that arrive from the listserv, which can quickly fill an inbox, but the system does not accept attachments and so the messages are all relatively short and succinct. Alternatively, one can subscribe to a daily digest form of these messages. Instead of receiving every message individually, one receives a single daily compilation of everything sent.

Lastly, one can also pick up the monthly newsletter from the club's website. The newsletter contains regular columns covering a wide spectrum of topics written by recognized experts in the field. Also included is a usually rich and voluminous "logs" section with a listing of members' choicest catches.

WUN's website also contains a veritable treasure trove of information for listeners new and old. Many year's worth of newsletters are archived there, in addition to special topic reports written by listeners to explain complex topics in-depth such as French Forces routing indicators, US Coast Guard information and many other specialized frequency lists and databases. The club has also raised funds through the years with a CD version of the newsletter logs containing tens of thousands of up-to-date frequencies.

Give WUN a try. You're sure to enjoy it, whatever you prefer listening to.

Internet Relay Chat

Internet Relay Chat or IRC for short, was conceived many years ago as a simple and reliable way for people of similar interests to meet in one place and converse – by keyboard, of course. Like many systems on the Internet, IRC is held together by a loose federation of IRC servers across the world that host the individual places to meet (called channels) and like other services, some servers are open, some are by invitation only, and others are closed.

For many years, utility listeners have gathered on channel #monitor to exchange real-time information about intercepts or to chew the fat on a utility topic. Sometimes special automated programs (called bots) are also on-channel and may provide real-time propagation or frequency database interrogation and logging services.

Accessing IRC is pretty straightforward and requires no more than downloading a client program for your favorite operating system. There's one for just about OS imaginable: Windows, Mac OS, Linux, and so on. The most popular ones are probably Mirc (Windows), Snak and XChat (Mac OS) and BitchX and Irssi (Linux).

I usually access #monitor from the excellent Zirc network.

Indian Ministry of External Affairs

MFA Delhi is a rare catch these days. However, the use of standard baudot RTTY provides for a relatively easy catch if you are in the right place at the right time. Over the years, the MFA and embassies have used 2400bps PSK modems, standard SITOR-A and a VFT made up of three channels of 96bd, 170Hz shift FEC-A with each channel spaced at 600Hz although most intercepts are made with the stations using standard 50bd, 170Hz RTTY.

The Indians have been spotted on the following frequencies:

15916.7 16372.0 16413.9

and reported on these:

10477.0 10723.0 11147.0 11155.0 12104.0 12112.0
15755.0 15919.5 15917.7 15919.7 15920.5 16203.7
16375.0 16378.0 16379.0 16412.0 16414.5 17535.0
17540.0 17541.8 18277.0 18285.0 18325.0 18407.0
18459.7 18470.0 18465.0 18466.7 18469.3 18725.0
19003.0 19021.0 19022.0 19035.0 19052.0 19055.3
19057.0 19440.0 19440.6 20375.0 20610.0 20614.8
20841.7 20882.5 20885.0 20887.0 20892.0

Probably the most distinctive facet of the Indian operation is that station callsigns are indicative of the link in use. In other words, traffic from Delhi to Baghdad will be sent with one callsign, while Delhi to Damascus will use another. The MFA uses a callsign of 8WD plus a number identifying the link in use.

Some other distinctive behavior is the use of the following signals:

- "rrrrrrrrrrrrr" to indicate message received OK at remate end.
- "ovovovovovovov" to indicate that ather side should go ahead with message
- "ofotofofofofof" to terminate link

and 2-digit channel identifiers are also used, for example "qsy ch 53 53 53 53".

Messages from the MFA are headed and signed with "foreign new delhi" or "hicom india," whereas messages from embassies headed and signed "indembassy embassy-name."

The following callsigns and links have been copied over the years:

Callsign	Link
20	MFA New Delhi to Male
8WD2	MFA New Delhi to Rangoon, Myanmar
8WD3	MFA New Delhi to Victoria,
8WD32	MFA New Delhi to Hanoi, Vietnam
8WD4	MFA New Delhi to Belgrade, Serbia
8WD5	MFA New Delhi to Kabul, Afghanistan
8WD6	MFA New Delhi to Port Louis
8WD7	MFA New Delhi to Tehran
8WD9	MFA New Delhi to Dhaka
8WA23	Beijing, China
8WB1	Belgrade, Serbio
8WA5	Colombo, Sri Lanko
8WA46	Hanoi, Vietnam
8WB4	Teheran, Iran
8WA11	Thimphu, Bhutan

Here is a sample of the typical test tape used by stations:

ryryryryryryryryryryryryryryryryryryryryryryryryryryryry
this is the time for all good men to come to the aid of nation
fig chk 0000 1111 2222 3333 4444 5555 6666 7777 8888 9999
int qrk int qrk hr qru hr qru qru hr qru hr qru ///
|
8wd7 8wd7 8wd7 de 8wb4 8wb4 8wb4
ryryryryryryryryryryryryryryryryryryryryryryryryryryryry

Until next month, enjoy your digital listening.

Resources

WUN Club	http://www.wunclub.com
Mirc	http://www.mirc.com
IRC Help	http://www.irchelp.org
XChat	http://www.xchat.org
Zirc	http://www.zirc.org
Indian MEA	http://meaindia.nic.in

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Shakeup at Voice of America Leads to Staff Revolt

On June 30, VOA News Director Andre DeNesnera had to inform his staff that the Front Office decided to close down editorial functions in London as of Sept. 1, despite strong opposition from the News Division. The next day he was demoted to Chief Diplomatic Correspondent, with the News Division reorganized to service various non-English language services. The Tokyo bureau had been closed earlier this year, in a continuing trend to remove VOA presence from major world capitals. However, VOA Director David Jackson said new bureaus would be opening in Seoul, Hong Kong and Jakarta.

DeNesnera's reassignment was the last straw for almost half the VOA staff, who signed a petition calling for a congressional investigation of the Broadcasting Board of Governors, accusing it of "dismantling the nation's radio beacon," despite a slight budget increase for the next fiscal year. President Bush had signaled early on his intention to reshape VOA into a voice of U.S. policy, rather than a neutral purveyor of news.

Major complaints cited in the petition involve the board's new services in the Middle East, Radio Sawa, al-Hurra and Radio Farda, which the signatories say provide inadequate news coverage and do not operate under VOA's charter, which guarantees balanced reporting. While the board is launching new services to the Middle East, VOA English broadcasts are being crippled, as previously reported here.

Commercial broadcaster Norm Pattiz, godfather of Radio Sawa, rejected the petitioners, as did Kenneth Tomlinson, chairman of the BBG. VOA did not cover its own internal controversy. The VOA newsfile did not contain a single story on the removal of the DeNesnera, nor any mention of the International Press Institute condemnation.

Alan Heil, a 36-year veteran and historian of VOA, who retired in 1998, said Radio "Sawa has been on the air for 26 months and has never had an independent review" of its news content for accuracy and depth. Heil said DeNesnera had fended off attempts by VOA director David Jackson to downplay negative news from Iraq and highlight positive developments over the past year.

Theodore A. Iliff, who has the new title of "associate director for central programming," has replaced de Nesnera. Iliff worked for more than 12 years at CNN and CNN International as an executive editor and producer, most recently served as the general manager of the U.S.-funded Iraq Media Network in Baghdad.

From DeNesnera's parting memo to news staff: "Though some, to this day, still cast us as a propaganda organization, a mouthpiece of the U.S. government, the journalists in this building and colleagues around the world know better, as does our audience. We must continue to maintain our journalistic independence and at the Voice of America all voices must be heard. There must always be a place here for constructive dissent and we must brook no tolerance for anyone who would construe it as disloyalty, or worse, make it a punishable action or a reason for retaliation."

The removal of DeNesnera, who had served as News Director over four years, longer than most, was condemned by the International Press Institute. IPI Director Johann P. Fritz said, "As news director, deNesnera stood for the fundamental right of editors and journalists to set the news agenda themselves and his demotion sends the wrong message to both his former staff and any successor."

Gary A. Marco, President, AFSCME Local 1418, said, "One associates Andre de Nesnera with impeccable credentials, personal and professional integrity, high principles and standards, advocacy for the VOA Charter and the ability to rally a diverse staff around these qualities and get things done. That is leadership, by any definition.

"We have no confidence in the Board and its actions. The Board, initially presumed to be a firewall against politicizing the mission of the agency, has become, to all appearances, the instrument of that which we loathe the most – the tooling of the Voice of America into a shill for special interests, or worse, ideologically-driven prattle." (Other sources: *USA Today, The Hill, DX Listening Digest*, Media Network, Committee to Protect Journalists, AFGE Local 1812)

AFGHANISTAN Unidentified station in Pashto noted in Bulgaria June 22 at 1330-1500 on 17700, excellent (Observer) Only fair here, so probably from western Europe (Noel R. Green, UK, *BC-DX*) Silences, tones and gaps in transmission, probably from UK's 250/300 kW Rampisham or Skelton sites at 85 degrees (Wolfgang Büschel, Germany, *BC-DX*) Rather professional, in both Dari and Pushtu (Olle Alm, Sweden, *BC-DX*) This is Internews Radio / Salaam Watandar, daily 1330-1500 on 17700 and also 0130-0300 on 11795. See **http://www.internews.org** (*WRTH* July Update) Internews is involved in lots of countries, but the Afghanistan page **http://www.internews.org/regions/centralasia/afghanistan.htm** talks about various FM stations, etc., but nothing about this SW service. Why? (Glenn Hauser, *DXLD*) First half hour on 17700 clashes with BBCWS in English. After that, strong, steady and good signal, program divided into three segments and after each, a break of several minutes. Many fine *"Salaam Watander"* IDs (Jouko Huuskonen, Finland, *DX LISTENING DIGEST*) VT Merlin owns the SW transmitters in Skelton and Woofferton and was also appointed to operate the station in Dhabbaya, UAE (which is owned by Emirates Media) until 2011 (Bernd Trutenau, Lithuania, *DXLD*)

Internews Afghanistan now has a 24-hour radio channel on the Hotbird satellite to beam programs out to 14 local stations we have already set up and the 20 that we will be setting up this year. Actual programs from Kabul are only three hours a day: 0130-0300 and 1330-1500 GMT. We will increase end user programs probably to about six to seven hours a day by yearend (John West, Country Director, Internews Afghanistan, UK, Creative Radio-afghan mailing list via Bernd Trutenau) The SW relays are obviously not a priority for him, not worth mentioning (gh, *DXLD*)

Internews Radio / Salaam Watandar in Pashto and Dari via Merlin Communications:

0130-0300 on 11795 DHA 250 kW / 045 deg
1330-1500 on 17700 RMP 500 kW / 085 deg
DHA=Al-Dhabbaya, UAE; RMP=Rampisham, U.K. (Observer, Bulgaria)

ALBANIA R. Tirana says they have two new 100 kW transmitters going into service at Shijak on August 5 (*BC-DX*) See if they improve reception in English to NAm at 0145-0200 & 0230-0300 on 6115, 7160 at 300 degrees, and whether they no longer vary (gh)

ARMENIA New schedule for Voice of Armenia from July 1 includes Mon-Sat 1825-1845 English on 4810 and 9960. Strong in Sweden on 9960 (Christer Brunström, Sweden, via Thomas Nilsson, *DXLD*) But even weaker in North America than it was two hours later (gh)

BRAZIL R. Nacional da Amazônia heard on 6190 instead of usual 6180 at 0000, numerous IDs. R. Senado Federal has been listed on 6190 (Jim Clar, NY, *DXLD*) Also at 0030 the night before, but IDs as R. Nacional, Rio de Janeiro (Björn Malm, Quito, Ecuador, *DXLD*) Another night at 0819 RNA jumped from 6180 to 6190 (Satoru S., [Japan?], *hard-core-dx*)

CANADA RCI's *Mailbag* announced they were adding more broadcasts to the SE USA, Cuba and Haiti in French and English (Will Martin, MO) From June 21, English at 1900-2200 on 17765 (Bill Westenhaver, RCI) Programming includes: M-F *The Roundup* [2h], *The World at 6*, & *As It Happens*; Sat *Definitely Not The Opera* [3h]; Sun *Tapestry* [1h], *Cross-Country Checkup* [2h] (Will Martin, *DXLD*) Updated schedule at: **http://www.rcinet.ca/horaires/A04_SW_24h.pdf** (Bill Westenhaver, RCI) Beam is 227 degrees, i.e. southwestward from Sackville; a new memory on my SW car radio. *Roundup*, *DNTO*, and CCC new on SW, except NQ service on 9625 (gh, OK)

R. Japan heard on 5775 at 0016-0036 in English, poor, from where? (Scott R.

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

Barbour, Jr., NH, *DXLD*) What else but yet another Sackville mixing product: NHK from 6145, leapfrogging 5960 lands on 5775, 185 kHz separation (gh)

CONGO After 22 years of trying, I finally received a full-data QSL card and letter from Radio Congo, Félix Lossombo, Le Directeur Administratif et Financier for a June 2001 report on 4765, in 10 months after follow-up for $5 and a registered letter. I figure this QSL cost me approx. $53.50 to obtain over the last 22 years. Their schedule per letter is:

6115 0600-0830, 1700-2030, 50 kW
9610 0700-1700, no power mentioned
5985 0430-0700, 1700-2300, 100 kW reduced to 50
(Terry Palmersheim, KC7LDP, MT, *hard-core-dx*)

CONGO DR Keep an ear on 4585, where a new missionary station is reportedly operating, 30 km west of Arua, Uganda. David Firth, who installs mostly FM religious stations in Africa, was planning to raise the power from 50 to 500 watts (David Plumridge, G3KMG, County Durham, World DX Club Contact)

DENMARK World Music Radio's website **http://www.wmr.dk** is rather uninformative. No program schedule for one thing; perhaps that means there are no programs! Just random music. The listen link did not work, and I had to go to the history page to find this on June 29: "Currently 5815 kHz is running at half power (around 6000 Watts) and on 15810 kHz the power is 500 W. Besides shortwave, WMR is also available worldwide via the Internet, and will soon be available locally in Eastern Jutland, Denmark on FM 104.2 MHz" But this is contradicted by: (Glenn Hauser, *DXLD*) 15810, World Music R., Ilskav near Karup. This transmitter has been off the air since Jun 17 due to antenna problems. 5815 is still on the air testing 24 hours a day (Stig Hartvig Nielsen, WMR, June 24, DSWCI *DX Window*) Dear Teemu, Our test transmissions on 5815 stopped July 5. We're hoping to be back early August (Stig Hartvig Nielsen, WMR, to Teemu Juurinen, Finland, *hard-core-dx* via Bernd Trutenau, Lithuania)

GERMANY Sudwestrundfunk Shutdown – Received a QSL from SWR for 7265 along with some stickers and station guide plus a note from Dieter Dangel stating: "Our short wave service will be shut dawn at the end of the year 2004" (Wayne Bastow, Australia, ARDXC)

INDONESIA 3266.416 at 1130-1145, RRI Gorontalo, English program called 'Kang garu English shaw', provided by Radio Australia to improve English in Indonesia. Basically an English lesson. This is listed Sundays but heard on a Saturday (Guy Atkins & Volodya Salmaniw, Grayland WA DX-pedition, *DXLD*)

At the other end of the spectrum, the easiest Indonesian is probably Suara Indonesia, 9525, with an excellent signal here most mornings, such as July 13 at 1355 wrapping up with news headlines, *Warta Berita*, full address and website info, and national anthem. Carrier stayed on for a while. *If only* VOI would follow this with their English hour, they would actually have a North American service, at least to the western half of the continent. All Indonesian registrations in HFCC A-04 have been censored out, so we can only guess at the parameters for this. Per *WRTH* 2004, the 1300 English hour is for SE Asia, and it must be 250 kW from the Cimanggis site near Jakarta. From that angle, it may well be aimed unintentionally also at North America, much further in the same direction (gh)

INTERNATIONAL WATERS Radio Ma'luumaati (Information Radio, in Urdu), 15500-USB, best signal ever noted at my location in northern Sweden, June 23, 1645-1710, on a Sony ICF2001D and a 7 meter random outdoor wire. Music resembling Indian "film music," multilingual announcements in Hindi, Urdu, Pashtu, Farsi and Arabic. In the English language portion, station name as "Radio One" and schedule, with times in UT, mentioned as 0300-0800 on 6125 and 1400-1900 on 15500. The name "Information Radio" was not heard during the English language portion I monitored, only "Radio One" and "Radio Ma'luumaati." A weak BBC WS outlet (// 15565) was producing co-channel interference from 1640 to 1730* Which one? Peak reception time does not seem consistent with that of Kuwait on 15505, and so I suspect Radio One is from some other place further east. Reception was possible on June 23 and 25 but almost unreadable on the 24th. I have heard an accented English language segment, about 4 minutes long, on both occasions dealing with drug trafficking. The Urdu name for "Information Radio" has been heard also in the English PSA which ends in an invitation to "tune in every day" to their morning frequency of 6125 and in the afternoons on 15500. On June 25, from 1600 to past 1730, the English segment, probably read by a Pakistani national, included both slogans (Henrik Klemetz, Luleå, *DXLD*)

Radio One, 15500-USB again audible July 4 around 1700. Intermittent, not continuous, transmissions on that date. Two emails from the MARLO HQ reveal that the power is 250 W and that the transmissions are from ships at sea.

"We're broadcasting from our ships at sea. The broadcast duties rotate among ships any given day/week/month and can be located anywhere near the Horn of Africa, North Arabian Sea, or Persian Gulf – transmitting at 250 watts. Our shipboard broadcasts will soon be augmented with a land-based broadcast from the UAE, adding an hour to each of our 5 hour morning broadcast and 5 hour afternoon/evening broadcast times, for a total of 12 hours/day. Most of our messages implore citizens to notify Coalition authorities if they have information about terrorist operations. We also provide other information deemed useful to ordinary mariners." (Henrik Klemetz, *DXLD*) UAE will no doubt be at much greater power, like three orders of magnitude (gh)

6125 is totally covered by REE in Spanish to NAm *0200-0600* here in Denmark (Anker Petersen, DSWCI *DX Window*)

IRAN VOIRI English SW schedule as of mid-July: 1030-1127 15600 17660; 1530-1627 9635 11650; 1930-2027 9800 11750 (*Observer*, Bulgaria)

ITALY I recently visited Milan and talked to Alfredo, who runs IRRS. I did ask if I could visit the transmitter site, but he said that wasn't possible. As far as I know, all his transmitters are in Italy, although I'm aware of the speculation that at least the 100 kW transmitter is in Rumania. Knowing Alfredo and his business, I feel that's unlikely, because it wouldn't make economic sense. But I haven't actually visited the transmitter site for myself, so I could be wrong (Tony Currie, Radio Six International, *DXLD*)

Why wouldn't it make more sense to rent a few hours a week on a 100 kW somewhere else than to buy/build one's own and only use it for short periods? (gh)

MONGOLIA On 12085 at 1007, Voice of Mongolia, English programming with same YL as I've heard for years. Into rap music (?Mongolian rap!). Fair level at best (Volodya Salmaniw, Grayland WA DX-pedition, *DXLD*)

NIGERIA VON returned to normal schedule in early July after weeks of chaos. 15120 is strong in the mornings with relatively good audio now; only broadcasts from Abuja are usually distorted. 17800 good at 2000, fade-out later in the evening. The second transmitter sounds much worse, rough audio, but strong signal in the afternoon on 11770 (Arabic/French) (Thorsten Hallmann, Germany, *DXLD*) *WRTH* July update shows only two English broadcasts from VON: 0800-1100 & 1450-1900 daily on 15120 to Eu/Af (gh) When only one transmitter in use, but then added English at 0500-0600 (Hallmann) 17800 at 2045-2055 with "news from Nigeria." Good signal but audio terribly muffled (Chuck Bolland, FL, *DXLD*) 17800 at 2130 with *"Perspectives"* promoting tourism for Nigeria. Fair (Scott R. Barbour, Jr., NH, *DXLD*)

PAKISTAN R. Pakistan replaced 21465 with 15100 for the World Service to WEu at 0800-1104, both 250 kW at Rewat. English news at around 0800 has been extended to about 8 minutes, made possible by the retiming of the Sindhi news [which used to follow English] to 0755-0800 (Noel Green, UK, *WORLD OF RADIO*) 1600-1615 English news heard on new 15070 (Ignacio Sotomayor, Spain, *Noticias DX*)

PAPUA NEW GUINEA 4960, 1140-1209, Catholic Radio Network, Vanimo, July 9 with ads noted for first time, in English by female for PNG Motors, Michael's Sporting & Fishing. Very good signal. On July 11, excellent signal at 0953 tune-in, with Catholic Bishops Conference of PNG in Pidgin and English (Guy Atkins, DXing at Grayland, WA, with Beverages, *Cumbredx*) From 1150 with loads of ads, UNDP, 1252 mentioned EWTN, still no ID until 1333, 'This is the Catholic Radio Network of Papua New Guinea'. On Sunday at 1005 with Pidgin Catholic service, then speech mentioned problems such as AIDS, status of women, youth, overcoming the evils of the nation. The Catholic church of PNG does not want any money from the government. Fascinating listening! (Volodya Salmaniw, Grayland WA DX-peditian, *DXLD*)

PERÚ At first unID on 5930.27, news and ads, talking about Bolivia. And 5949.75, unID religious station. Further monitoring confirmed 5930.27 at 0030 as R. Melodia, Arequipa; and 5949.78 at 1130 ID as CPN Radio, which turned out to be R. Bethel, also Arequipa, which sometimes relays CPN; very difficult to get an ID, hours with nonstop religious music or preaching without ID, not even on half/full hour (Björn Malm, Ecuador, *DXLD*)

Bandscan on June 25 found these, all in Spanish when heard:

3172 R. Municipal, Marcawana, 1124
3234.8 R. Luz y Sonido, Huánuco, 1126
3329.5 R. Ondas del Huallagas, Huallaga, 1128
4170.4 R. Ilucán, Ilucán, 1135 [mix of SW and MW]
4386.5 R. Imperio, Chiclayo, 0345 and 1140
4428.6 R. Bambamarca, Bambamarca, 1142
4746.8 R. Huanta 2000, Huanta, 1200
4774.9 R. Tarma, Tarma, 1202
4790.0 R. Atlántida, Iquitos, 1205
4835.4 R. Marañón, Tarapoto, 1207
4855.9 R. La Hora, Cuzco, 1209
4954.9 Radiodifusora Cultural Amauta, Huanta, 1211
4974.7 R. del Pacifico, Lima, 0347
5014.6 R. Altura, Cerro de Pasco, 1212
5019.9 R. Horizonte, Chachapoyas, 1214
5024.9 R. Quillabamba, Quillabamba, 1216
5039.1 R. Libertad, Junin, 1218
5460.2 La Voz de Bolivar, Bolivar, 1220
5470.7 R. San Nicolás, Rodriguez de Mendoza, 1222
5677.9 R. Ilucán, Ilucán, 1225
5939.2 R. Melodía, Arequipa, 0341 and 1228
6020.3 R. Victoria, Lima, 1230
6114.8 R. Unión, Lima, 1232
6173.8 R. Tawantinsuyo, Cuzco, 1234
6188.0 R. Oriente, Yurimaguas, 1236
6249.2 Voz de Andahuaylas, 1238
6819.4 Voz de las Huarinjas, Huancabamba, 1240
6956.9 Voz del Campesino, Huarmaca, 1242
(Alfredo Cañote, Chaclacayo, Perú, *DXLD*)

If you take Alfredo Cañote's list together with the stations in my "extra" list here below you have a complete list of all active (more or less irregular - some are very irregular) Peruvian stations on the tropical bands.

2680.14 R. Melodía, Santiago de Chuco (harmonic)
3375.12 R. San Antonio, Callalli
4415.0v R. Cielo, Chiclayo (drifting, you can hear them anywhere
4446.0v R. Naylamp, Lambayeque (drifting, you can hear them anywhere
4824.39 La Voz de la Selva, Iquitos
.36 R. Sicuani, Sicuani
4886.62 R. Virgen del Carmen, Huancavelica
4890.27 R. Chota, Chota
4940.00 R. San Antonio, Villa Atalaya
4950.17 R. Madre de Diós, Puerto Maldonado
4964.98 R. Santa Mónica, Cusco
4996.xx R. Andina, Huancayo
5005.72 R. L.T.C., Juliaca

5486.73 La Reina de la Selva, Chachapoyas
5637.22 R. Perú, San Ignacio
5699.92 R. Frecuencia, San Ignacio
5775.29 La Voz de San Juan, Lonya Grande
5949.78 R. Bethel, Arequipa
6193.45 R. Cusco, Cusco
(Björn Malm, Quito, Ecuador, *DXLD*)

The 5775 station not heard here for more than three years; four more I hear regularly:

4460.9 R. Norandina
4485.2 R. Frecuencia VH
6479.8 R. Altura
6536.0 RD Huancabamba
(Rafael Rodriguez, Bogotá, Colombia, *Conexión Digital*)

POLAND A wonderful segment on R. Polonia is *Multimedia*: "News, chat and interviews for those passionate about radio, hosted by Sawek Szefs and Marek Lasota. The cutting edge of broadcast technologies, including Sirius satellite car radio and MBN that allows you to listen in on your mobile phone in the States. I'm constantly being torn apart between the aura of romance in good old hum-buzz-crackling and fading of traditional SW transmitting and the infinite possibilities of ultra modern and impeccable radio on-line. My interest in these spheres started in the end Seventies while in the army. My assignments dealt with satellite communications, but thanks to my ham operator colleagues I managed a brief encounter with amateur bands. Now, in *Multimedia*, I capitalize on this as well as the expertise of Morek Lasota, deputy director of IAR – the Polish Radio's News & Information Agency" (R. Polonia website via Fred Waterer, *Programming Matters*, ODXA *Listening In*) Summer scheduling on SW: Tue 1730-1750 on 7285, 7265; Thu 1230-1250 on 11820, 9525 (John Norfolk, *DX/SWL/Media Programs*, **http://www.worldofradio.com**)

RUSSIA At the DRM consortium's first-ever board meetings in Russia, V. of Russia announced successful implementation and planned expansion of its DRM broadcasts on SW and MW. VOR currently transmits DRM in Russian, English, German and French toward Europe, using a SW transmitter in Taldom, Russia. In near future, VOR will add more transmitters adapted for DRM, on SW in Moscow, Irkutsk, Khabarovsk (*Radio Currents* via Joe Buch, *Swprograms*)

SLOVAKIA Another reprieve for R. Slovakia International on SW was achieved: new deadline August 1st. Slovensky Rozhlas and the foreign ministry agreed to install a common study group responsible for developing o proposal on how the foreign service should be operated in future. This will be presented to the ministry of finance, per RSI's German service on June 27 (Kai Ludwig, Germany, *DXLD*)

SUDAN The Voice of New Sudan, a new radio station based in southern Sudan, will start broadcasting a test transmission 28th June 2004 on 9310. Tune in around 0400-0600 & 1400-1600. Listeners can write the Voice of New Sudan through: voiceofnewsudan@eikmail.com (*SPLM Today* via Jari Savolainen, *DXLD*) SPLM has a base referred to as New Site, just SE of a village called Narus in Eastern Equatorial region of southern Sudan, just over the border with Kenya, abaut halfway between Lokichoggio (Kenya) and Kapoeta (Sudan). (Jeremy Groce, SRS, via Savolainen) By mid July no reports yet of 9310 being heard (gh) There was a delay waiting for a part, but supposed to begin around July 19, testing a new 50 kW ELCOR from Costa Rica, 0700-1500 (Savolainen)

[non] Sudan Radio Service language schedule is Mon, Tue, Thu, Fri: English 0300-0345, Juba-Arabic 0345-0430, Arabic 0430-0515. Wed English 0300-0330, Juba-Arabic 0330-0400, Arabic 0400-0430, Neur 0430-0515. 0515-0600 is Dinka Mon, Zande Tue, Muro Wed, Bari Thu, Shilluk Fri. Schedule is 0300-0500 11665, 0500-0600 15325, repeated at 1500-1800 on 17660 (EDC schedule via Sergey Kolesov, Ukraine, World DX Club *Contact* via Mike Barraclough)

SWEDEN Very pleasantly surprised to receive e-mail from Mark Cummins, new Head of R. Sweden's English Service. Originally from Brisbane in Queensland, his parents are still living there and apparently complaining to him that they can never listen to their son with their SW radio. Mark has just recently taken over the English Department from Nidia and you can hear him doing many programs including the *In Touch With Stockholm* mailbag every first Sunday on the month. Mark is requesting listeners from all over the world to write to Radio Sweden, S105 10, Stockholm, Sweden or email english@sr.se or log onto the web site at **http://www.sr.se/rs/** and tell him what you like about Sweden and Radio Sweden, what you would like to hear about Sweden and what changes or programs you would like to hear from Radio Sweden (Michael Stevenson, NSW, *EDXP*)

SYRIA [non] Following up last month's news about the R. Free Syria: revised DTK schedule shows the Sunday 1800-1859 on 13650 from Jülich, Germany, as Radio Miami International! (gh) We're just the broker. I think it would be more interesting if the Syrians would QSL. If so, we would just poss any reports we receive on to them. If they aren't going to issue QSLs, I think we would be willing to do it. I believe Deutsche Telekom/T-Systems will issue QSLs for this (Jeff White, RMI, *DXLD*)

Music mixed with commentaries, ID in Arabic *"Sawt Suriyya al-Hurr"* (Gabriel Iván Barrera, Argentina, *Conexión Digital*) Monitored an entire broadcast, which included: the Reform Party of Syria will grant $100,000 for any Syrian citizen who would help in locating the WMD locations in Syria; Urgent Message by a Syrian citizen to the Syrian President Dr. Bashaor Al Assad criticizing the current situation in Syria. A very famous song by a Syrian singer Sabah Fakhry. Report criticizing the Ba'ath party. A man shouting "a very famous man" and a lady osking "who" – it turned out to be a program talking about the profile of "Jameel Al-Assad", the brother of the late Syrian president Hafez Al-Assad and his role in the corruption taking place now in Syria. Mailbag program called *"Menkom wa Lakom"*, promised to increase time for this; a man reading poem with musical breaks, etc. It sounded like the other Syrian opposition radio "Arabic Radio" when it comes to the directing of the programs and the usage of all these musical breaks. A previous program on their website **http://www.radiofreesyria.org/Programs/rfs_friends.htm** announced the assassination of the Syrian President; also a coded message "to the people, the meeting will be in the 7 floors building, main entrance is ONLY from the fourth gate. End" !! (Tarek Zeidan, Cairo, Egypt, *DXLD*)

Radio Free Syria plans to air cynical and humorous programs criticizing Syria's ruling Baath party as well as on-air plays written by dissident Syrian playwrights (Nir Boms & Erick Stakelbeck, *National Review Online* via Kim Elliott)

The older clandestine to Syria, Arabic Radio is still heard via a Dxtuner in Europe, on weak 7470 and strong 12085 at 1507 with speech by woman in Arabic. Good modulation, 1515 music, more talk and off at 1530 with IDs (Hans Johnson, WY, *Cumbre DX*)

UAE R. Dubai, checked in mid-June, was lacking any English broadcasts as previously scheduled, just Arabic music: at 0330-0336* on 13675.02, 15400.02, 12005.01. Also at 1330-1350+ and 1600-1615 on 15395, while 21605 was off (Brian Alexander, PA, *DXLD*) Agreed, only hear Arabic music programs instead of English (Mike Barraclough, England, World DX Club *Contact*) Gone forever, or English staff on summer vocation away from the searing heat? (gh)

USA VOA's 'Music Man', Leo Sarkisian, announced his apparently voluntary retirement at yearend, after 50 years of spinning African music; he was the subject of a tribute in the *Washington File* of the State Department. Sarkisian works with Rita Rochelle, who presents the *Music Time in Africa* series; lacking an adequate budget, Sarkisian spends his own money and time on weekends trying to keep up with all the fanmail received (via Andy Sennitt)

In early July, WRMI 7385 became almost unlistenable due to a constant co-channel noise, doesn't seem like jamming Cuba imposes on WRMI's 9955. Comes on well before WRMI opens; in OK, sometimes buries WRMI while at ather times WRMI surfaces atop it, but it's extremely annoying and one would not voluntarily listen to WRMI with so much interference. If this keeps up, WRMI will have to move. If it is a legitimate utility transmission, that would have priority on this out-of-band frequency, as the 41m band has not yet been extended as high as 7385 for exclusive broadcasting.

MT's Larry Van Horn consulted his extensive database, and found 7385 is a US Navy Marine Corps MARS frequency; he was astounded that WRMI had ever been allowed to use 7385. But that had been cleared by IRAC and FCC, WRMI has been on 7385 for several years at night and there have never been any complaints or such an interference problem before. We have heard MARS voice nets on 7385 in the mornings, no problem, when WRMI is not using it. 7385 ought to be sharable by time, if necessary (Glenn Hauser, *DXLD*) The interference audible here at 0620; believe it is ALE (Noel Green, UK, *DXLD*)

Brother Stair's broadcasts on WBCQ ended June 30, many daytime hours on 17495, 9330, 7415, overnight on 5105, leaving lots of available airtime, and an extensive schedule revision followed, including a number of feature programs at 1800 on 17495 (via John Norfolk, *DXLD*) Mon, *Allan Weiner Worldwide*; Tue, *Marion's Attic*; Wed, *Radio Timtron Worldwide*; Thu, *The Lost Discs Radio Show*; Fri, *Operator's Choice* (*Annotated WBCQ Program Guide* via Norfolk)

Once WHRI had abandoned 5745 with its move to WSHB facilities, WWRB glommed onto it at night (gh) We are very pleased with 5745. We have had a very significant surge in absolutely new listeners! This new frequency is within the tuning range of inexpensive windup and various other SW radios such as the Bell and Howell $9.95 model (Dave Frantz, WWRB, *DXLD*) Unlike 5050, 5085, 6890, even 12172 (gh)

[non] In late June, AFN-AFRTS showed up on new 9980-USB, good at 1445 (Noel Green, UK, *BC-DX*) Were better off far from the broadcasting bands; now they will have problems from big AM transmitters on 9975, 9985 (gh) Actually, 9940 was A04 HFCC-coördinated for AFRTS via Iceland (Bernd Trutenau, Lithuania, *DXLD*) 9980.5-USB good here tho jammed [sic] at 0615 (Robert Wise, Hobart, Australia, *Cumbre DX*) Also at 2228 with NPR, barely above noise floor, Guam or Hawaii? (Robin L. Harwood, Tasmania, *DXLD*) At 0512 with sports, from where? (Dmitry Mezin, Kazan, Russia, *Signal*) On 9980 and \\ 7590 USB at 1918 with program *51 Percent* (Zacharias Liangas, Thessaloniki, Greece, *DXLD*) 9980-USB, 0238-0316 countless mini-segments (Rich D'Angelo, PA, NASWA *Flashsheet*) via Iceland? At 1507 sports (Scott R. Barbour, Jr., NH, *DXLD*) 9980.0 USB, is AFRTS via Grindavik, Iceland, audible between 0238 and 1200, replacing 13855 and confirmed by direction finding. At 0900-1000 sports stream \\ 7507-Puerto Rico, 6350-Hawaii and 7590-Iceland. Also heard, with a different stream, was Florida on 5446.5 ond 12133.5 (Berg, D'Angelo and Ron Howard, CA, DSWCI *DX Window*) Former 13855 USB was unheard; thus 9980 is the replacement! (Anker Petersen, DSWCI *DX Window*)

From July 1, WYFR via Taiwan "got religion" and exited the maritime/aero bands, moving inside the SWBC bands (gh) 0000-0200 to India 15195 ex-15060; 1100-1600 and 2100-2400 to China 6155 ex-6300 (WYFR)

VENEZUELA [non] A report sent to the P O Box address R. Nacional has been announcing via Cuba, Apartado 3979, Caracas 1010, was returned to sender, indicating the box had been canceled by the user. New address found on website is: Final Calle Las Marias, entre Chapellin y Country Club, La Florida, Caracas, Distrito Capital, Venezuela, Zona Postal 1050 (José Hernández Madrid, Caragena, Spain, *BCLNews*)

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

Global Forum

Broadcast Logs

Gayle Van Horn, W4GVH
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0030 UTC on 5400 LSB
ARGENTINA: Radio Continental. Spanish feeder of live soccer "Boca vs Deportivo Cali" (Copa Libertadores). Station ID "Cadena Continental republic Deportiva." Argentinians monitored are **Radio Mitre** 1100, 20276 LSB. Station identification and public services announcements. **Radio Nacional** 15345, 1900; 20276, 2030 **La Red 910**-AM Spanish feeder on LSB; 15810, 2130 **Radio de la Ciudad**, Spanish feeder with ads and IDs, 15820, 2300 **Radio Cien** 99.9 FM Buenos Aires Spanish feeder LSB. Radio "Cien" IDs into *Disco Retro* program. English/Spanish oldies tunes to soccer report and ads, // 10490. 15820, 2230 **Radio Diez,** Spanish feeder. (Fernando Garcia, Baltimore, MD) **RAE** 11710.15, 2346-2352+ // 15345.20. (Harold Frodge, Midland, MI) 3240.60, 2145-2153 **Radio Italia** in Spanish. Harmonic 1620.30 x 2. Station ID and promo. (Arnaldo Slaen, Buenos Aires, Argentina) **Radio Baluarte** (tent) 6215, 2314-2323. (Scott Barbour, Intervale, NH)

0030 UTC on 4960.3
PERU: Radio La Hora. Spanish criollo music into calendar of events and mentions of religious crusade in Lima. Signal off in mid sentence at 0105, nothing on // 4856. Peruvians audible; **Radio Santa Rosa** 6047.2, 0850; **Radio Victoria** 9750, 0915 // 6020 with healing crusade from Lima. (Garcia, MD)

0108 UTC on 9770
SRI LANKA: SLBC. *Monday Morning Show* with numerous "SLBC" identifications and program intros for oldies musical selections. Fair quality for local time check, "it is now 7:15". 15747, Audible *1229-1240 weak-poor signal.(Barbour, NH)

0135 UTC on 4865
BRAZIL: Radio Verdes Florestas. Portuguese. Music program to "canned" closings including ID, freqs for medium wave and tropical bands plus location as "Cruzeiro, Acre, Brasil." Piano music to 0100*. Poor-fair signal. Brazilians heard; **Radio Difusora** 4945, 0200; **Radio Anhanguera** 11830, 2200; **Radio Difusora** (Londrina) 4815, 2226; **Radio Educadora** (tent.) 2380, 2324. (John Sgrulletta, Mahopac, NY/Cumbre) **Radio Aparecida** 5035, 0030; **Radio Nacional da Amazonia**. 6190, 00010. (Frank Hillton, Charleston, SC)

0235 UTC on 3306
ZIMBABWE: Radio Zimbabwe. Male's vernacular talks hosting African vocals program. Station identification at 0300 and 0307. Poor-fair signal steadily improving. (Rich D'Angelo, PA/NASWA Flash Sheet) 3305.9, 0250 English calypso and ethnic vernacular music. ID with background drums/xylophone signal into newscast at 0301. (Garcia, MD)

0315 UTC on 15627.6
PAKISTAN: Radio Pakistan. Tamil. Fair signal for flute music and recitations. Male's talks to music and identification at 0329. News, commentary and music to announcer's sign-off promo and national anthem at 0344* Poor quality // 17485. (Barbour, NH) 15100, 1602 with English news to 1615*. (Walter Salmaniw, Victoria, Canada/HCDX)

0400 UTC on 6030
GERMANY: Sudwestrundfunk. German news to pop music. Occasional ads, and men's chat. Signal poor-fair during Radio Marti's silent period. (D'Angelo, PA)

0838 UTC on 5019.94
SOLOMON ISLANDS: SIBC. Male's English segment until 0856. Regional music to brief identification and sign-off amid poor signal quality. (Chuck Bolland, Clewiston, FL/Cumbre) 5019.9, 1205-1225+ presumed Tok Pisin or heavily accented English. Sports commentary with audio clips. (John Wilkins, Wheat Ridge, CO/Cumbre)

0900 UTC on 9736.8
PARAGUAY: Radio Nacional. Spanish national anthem into extended prayer. Good signal for Guarani and harp music. (Garcia, MD)9736.85, 2235-2250+ Spanish sports talk. No ID but Paraguay promo at 2249. SIO 333. (Frodge, MI) 9737, 0050 two IDs at 0100. (Tom Banks, Dallas, TX)

0910 UTC on 4960
PAPUA NEW GUINEA: Catholic Radio Network. Rosary readings at fair signal level, improving by 1001 recheck. PNG's audible; **Radio Madang** 3260, 1025-1035; **Radio East Sepik** 3335, 1036-1052. (Guy Atkins, Puyallup, WA/HCDX) **CRN** 4960, 1148-1200+. (Wilkins, CO)

0955 UTC on 4869.9
ECUADOR: La Voz del Upano. Spanish identifications for FM 90.5 and shortwave into prayers. (Garcia, MD) Ecuador's **HCJB** 12005, *Adventures in Odyssey* at 1130. (Bob Fraser, Belfast, ME) 21455 USB, 2230 celebrating carnival Cuenca by Ecuadorian Indians. (Garcia, MD)

1050 UTC on 9885
NEW ZEALAND: Radio NZ Intl. *Deep Purple* with program of classical music. Pacific service identification of Radio New Zealand, followed by time pips at 1100. (Fraser, ME) 9885, 1214-1232 National Radio IDs and *Late Edition* program. (Barbour, NH)

1053 UTC on 4870.9
INDONESIA: RRI Sorong. Indonesian time check and text. Local news to ukelele tune and ID.(Watkins, WA) **RRI Cimmingas** 15125, 1118-1202. (Barbour, NH)**Voice of Indonesia** 9525, 1110-1130 with IDs. (Banks, TX)

1115 UTC on 11985
TAIWAN: Radio Taiwan Intl. Presumed Russian discussion to identification. Regional Asian music with fair-poor signal. (Sam Wright, Biloxi, MS) 11815, 1600-1700, poor reception. (David Crystal, Ramat Zvi, Israel) **RTI** (via Okeechobee, FL) 15600, 2230. (Fraser, ME) **RTI's France relay** 3965, 2247-2300*. (Barbour, NH)

1200 UTC on 11735
NORTH KOREA: Voice of Korea. Looking for scheduled Radio Trans Mundial, Brazil but heard Korea's sign-on interval signal, ID and anthem. Alternating talks from male/female announcers. (Barbour, NH) French service 15180, 0300-0315 // 13760 fair. (Jim Evans, TN/Cumbre) 9335, 1308-1321 English service. (Barbour, NH)

1247 UTC on 15240
SWEDEN: Radio Sweden. Report on government support of investors and inventions. (Fraser, ME)

1249 UTC on 9560
CANADA: Radio Korea Intl relay. Report on fishing rituals. (Fraser, ME) **Radio Canada Intl**'s **Korean relay** 6160, 2300 with IDs to 2328*.(Garcia, MD)

1910 UTC on 17535
ISRAEL: Kol Israel. Gaza Disengagement Plan discussion, // 15640. (Fraser, ME) 17535, 1913-1931 English/French service, fair signal on // 15640. (Barbour, NH)

2130 UTC on 9725
ROMANIA: Radio Romania Intl. Station identification into international news // 7285. (Fraser, ME)

2115 UTC on 9990
EGYPT: Radio Cairo. Sign-on identification into news briefs and classical Egyptian music. Subsequent logging 2145. (Fraser, ME) 11725, 2336-2345+. (Frodge, MI)

2201 UTC on 11635
BONAIRE: Radio Vlaanderen Int relay. National news and features. SIO 544. (Fradge, MI) **AWR-Bonaire** relay 6165, 2330. Spanish program *La Conquista* to Alajuela address. Program *Somos Cuba* at 0000 with health tips. *Revista Radial* to 0030* (Garcia, MD)

2243 UTC on 5240
TIBET: Xizang PBS, Lhasa. Tibetan. Repeating format of pounding drums and male's wailing vocals to fast paced "sing-song" recitations. Ten minute block at 2250 of presumed ads and announcements mixed with music bits. Male/female presumed identification at news pause. Fair signal quality at 2300. 7240, 2304-2320 Mandarin service (Barbour, NH)

2310 UTC on 13855 USB
ICELAND: AFRTS via Grindavik. Interview with NASCAR's Rusty Wallace plus racing news and ID at 2316. (Garcia, MD) 13855, 1316 with fair reception //**Hawaii** 6350 USB, **Guam** 5765 USB. (Salmaniw, CAN/HCDX)

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

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Staying Current on QSLing Trends

One factor in successful QSLing is staying current on what's happening on the verification field. By knowing "*who's on first*" (or second) in news and trends, you should be able to successfully nab your favorite targets. Keep a sharp eye on the QSL columns in *MT*, as well as club bulletins, on-line newsletters and publications. Reading QSL columns regularly – and the more the better – will provide the collector with valuable information that could result in a verification.

Pay attention to details such as enclosures like mint stamps or IRCs, and be aware of upcoming special events or holidays.

A list of active verification signers is a good idea, as well as addresses that may have changed or closed. Watching current affairs and the world political scene has proven successful, as new stations, including clandestines, abruptly sign-on with a new voice or cause.

Of course, there are no guarantees of success. Ultimately, the key to successful QSLing is staying up to date and sharing with like-minded hobbyists.

AMATEUR RADIO

Georgia, 4L6AM, 20 meters SSB. Full data card. Received in 38 days for a Euro nested envelope and two US dollars. QSL address: Boris Chudacov, P.O. Box 387, Yeroham 80500 Israel-QSL Manager. (Larry Van Horn N5FPW, NC)

Nigeria, 5N6EAM/7, 20 meters SSB. Full data card. Received in 17 days for a Euro nested envelope and two US mint stamps. QSL address: Favio Tavecchio IK2IQD, Via Buco Del Riombo 1, 22036 Erba Co Italy. (Van Horn, NC)

CONGO (REPUBLIC)

RTV Congolaise, 4765 kHz. Full data card and letter from Felix Lossombo-Directeur le Administrafir et Financier. Letter directed to Jean Medard Bokatola. Verification received after six new reports and 13 follow ups. Most reports for 15190 kHz, but the 4765 kHz was the best reception in 2001. Station address: Boite Postal 2241, Brazzaville, Congo Republic. (Terry Palmersheim KC7LDP, Helena, MT)

MEDIUM WAVE

KATZ, 1600 kHz AM. Confirmation written and signed by Chuck Atkins-VP of Operations, on my report. *Clear Channel* business card and *Gospel 1600* logo pen enclosed. Station logged during a rare maintenance period for my local KCKK station. Station address: 10155 Corporate Square Drive, St. Louis, MO 63132. (Patrick Griffith NONNK, Westminster, CO)

KVNS, 1700 kHz Brownsville, TX. Partial data letter signed by John Munoz-IT Manager & Assistant Engineer, on *Clear Channel Worldwide & News Talk 1700* letterhead. Colorful coverage maps graces the bottom of the letter. Received in 20 days for an AM report. Station address: 901 Easr Pike Blvd., Weslaco, TX 78596. (Griffith, CO)

WHK, 1220 kHz AM Cleveland, OH. Verification letter signed by David S. Johnson-Director of Engineering, plus photos of tower site and transmitter. Received in eight days for a taped report. Station address: 4 Summitt Park Dr., Independence, OH 44131. (Patrick Martin, Seaside, OR)

WQMA, 1520 kHz AM. Multicolored verification form letter, signed by Paul Walker-Assistant Program Director, plus copy of my report and coverage map. Received in 10 days for a taped report. Station address: 1820 West Marks Rd., Marks, MS 38646. (Martin, OR)

PERU

Radio Santa Rosa, 6045 kHz. Full data *Tarjeta de Verificacion* card with station seal, plus pamphlet. Received in 50 days for an English report and two US dollars. Station address: Jiron Camana 170, Casilla 4451, Lima 01m Peru. (Scott Barbour, Intervale, NH)

SOUTH AFRICA

FEBA relay via Meyerton, 11885. Full data *Cyprus Market* scenery card, plus confirmation for Russian relay, plus personal letter from Annie Hall-Administrator in Cyprus. Received in 71 days. Letter indicates Cyprus address only deals with Arabic program, reports should be sent to: Mr. Whittington-FEBA Radio, Ivy Arch Road, Worthington, West Sussex BN14 8BX, United Kingdom. (Ed Kusalik, Alberta, Canada/DXLD)

ST. HELENA

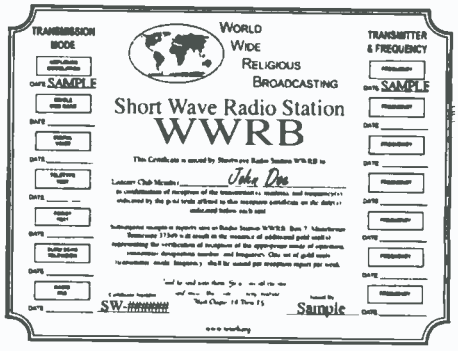
Radio St. Helena, 11092 kHz. Full data map card and letter signed by Ralph St. Peters-Station Manager with an apology for delay, plus form letter from Tony Leo. Verification courtesy of Robert Kipp of Langen, Germany, who personally carried information to St. Helena earlier this year from me and others who did not receive their verifications. Original report sent registered, followed by a follow-up letter and three emails. Process through Mr. Kipp took 158 days, including 26 days by airmail from St. Helena. Station address: Radio St. Helena, Pounceys, St. Helena Island, South Atlantic Ocean. Email: radio.sthelena@helants.sh. (Bill Wilkins, Springfield, MO)

SWEDEN

Radio Sweden, 13590 kHz. Full data *Warship Wasa* card with illegible signature. Received in 33 days for special broadcast. Station address: SE-141 99 Stockholm, Sweden. (Barbour, NH)

USA

WWRB, 6890 kHz. Full data certificate, plus stickers indicating transmission mode and frequency, signed by Angela Frantz. Received in 856 days for a SASE (not used). Station address: Box 7, Manchester, TN 37349-0007. (Barbour, NH) *SW Listener's Certificates are now available by sending your reception report to the postal address only. This certificate is 81/2 x 11 and suitable for framing. - ed.*



YEMEN

Radio San'a 9780 kHz. Full data card signed by Mohammed H. Bather-Engineer, plus letter. Nice stamps on the envelope! Received in 260 days for a taped report and one US dollar. Station address: Technical Dept., P.O. Box 2371, San'a, Rep. of Yemen. Very pleased with this one. (Martin, OR)

September Holiday DXing

Libya Revolution Day, Sept. 1
Slovakia Constitution Day, Sept. 1
Uzbekistan Independence Day, Sept 1
Vietnam Independence Day, Sept. 2
Qatar Independence Day, Sept. 3
Swaziland Independence Day, Sept. 6
Brazil Independence Day, Sept. 7
Andorra Our Lady of Meritxell Day, Sept. 8
North Korea Founding of Dem Party, Sept. 9
Tajikistan Independence Day, Sept. 9
Gibraltar National Day, Sept. 10
Costa Rica Independence Day, Sept. 15
El Salvador Independence Day, Sept. 15
Guatemala Independence Day, Sept. 15
Honduras Independence Day, Sept. 15
Nicaragua Independence Day, Sept. 15
Mexico Independence Day, Sept. 16
Papua New Guinea Independence Day, Sept. 16
Chile Independence Day, Sept. 18
Armenia Independence Doy, Sept. 21
Belize Independence Day, Sept. 21
Malta Independence Day, Sept. 21
Mali Independence Day, Sept. 22
Saudi Arabia Kingdom Unification, Sept. 23
Guinea-Bissau Independence Day, Sept. 24
Botswona Day, Sept. 30

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Appreciating What's Come Before

Last month, we began a short discussion of radios that provide optimal results for those of us who like to listen to programs on shortwave. We focused on receivers that are on the market today, as well as on possible "homebrew" ways to improve the audio performance of some radios lacking somewhat in that one regard.

❖ Some Classic "Listener" Radios

What's left, then, for this month's bifurcated column, is a look at the large and vibrant (thanks in large measure to eBay) "previously owned" market segment.

The most immediate advantage to purchasing a used radio is cost. Well cared-for (or skillfully refurbished) older models with earned reputations for high quality work as well as they did when they first hit the market – and now at an affordable or even bargain price

Furthermore, when you spend some time with these radios, you can't help but be impressed with the full range sound produced by many of them. For example, firing up a well performing tube radio from the '30s, '40s or '50s can be an ear opening experience. For one thing, today's "prevailing wisdom" about the inability of AM radio to produce satisfying audio with soaring highs and deep, rich lows is immediately debunked. One quickly comes to the conclusion that the problem is much more one of modern receiver design than the medium itself.

So, with this in mind, here are a few suggestions of what you might look for in the higher end of the affordable portable "classics" market.

Grundig A.G. produced a series of some of the world's best sounding and most meticulously engineered transistor shortwave radios between 1964 and 1996. The recommendation here is to seek out the **Satellit** series (including: analog – 205, 208, 210, 1000, 2000, 2100; analog tuning with digital readout – 3000, 3400; digital – 600, 650, 700) because of its powerful audio stages, larger speakers, more sophisticated tuning facilities and superior sensitivity.

A few notes on these. The 205 (single conversion; all others are double), 208 and 210 have wood cabinetry, which appears to provide for a warmer, richer sound. Analog tuned radios (with slide-rule style dials) tend to be quieter electrically, equating to a superior signal to noise ratio and better listenability.

Having said that, the three digital Satellits mentioned are great performers for our purposes. The 600 and 650 are virtually identical inside, very large for a "portable" (as are the 3000 and 3400), but with a very powerful (15 watts on mains) and well crafted audio section. All Satellits also have separate treble and bass controls.

Two excellent Satellit web sites with lots of useful information and great pictures are *http://www.geocities.com/grundigradioboy/* and *http://www.classic-worldband.com/*.

The **Zenith Transoceanic** series also is most deserving of its legendary status. From the post-war tube "suitcase" portables (8G005Y, G500, H500, 600 series) to the transistor models ("Royal" 1000, 3000 and 7000 series) of the 60s and 70s, all T-Os were so well engineered and assembled that many (especially the transistor models) continue to play today as well as they did when new. To my ears, the T-O audio is not quite up to Satellit standards, yet it's very pleasing to the ear all the same.

Two excellent resources include *http://www.transoceanic.nostalgiaair.org/* and the essential Bryant-Cones book, *The Zenith Transoceanic. The Royalty of Radios.*

These two series stand out, but other highly regarded affordable classics ideal for program listening on shortwave include the **Drake** R8, R8A and SW8, the **Lowe** HF-150 (with a good bookshelf speaker), **Palstar** R30 (still available new), **Philips-Magnavox** D2999, **Sony** ICF-6800WA and ICF-SW55. I've owned or heard all of these in action and can personally vouch for their superior audio capability.

As with any serious shopping experience (eBay or otherwise), do your homework – observe prices and conditions over time, question sellers while checking their references and feedback, and ensure yourself before bidding or buying that the descriptions and depictions are accurate. Minding these caveats, I've had generally good experiences both with used equipment and their sellers.

❖ The VOA Needs Our Help Now!

I don't know of a more direct way to say it! This month's ***Closing Comments*** on the last page of this magazine describes the dire state in which a justifiably proud international public broadcaster – ours! – finds itself.

The **Voice of America** has been this country's most reputable broadcasting organization internationally over more than 60 years, with a history that includes giants like Edward R. Murrow, John Chancellor and Willis Conover. It is being surreptitiously and duplicitously dismantled by a *Broadcasting Board of Governors* with a considerably lesser reputation, primarily for ideological and commercial reasons. Apparently, the *VOA Charter* prevents it from being the propaganda mouthpiece the *BBG* desires US international broadcasting to be and some feel our tax money can be best used to test whether US-style commercial pop music radio (*Radio Sawa*, *Radio Farda*) will sell in the Mideast.

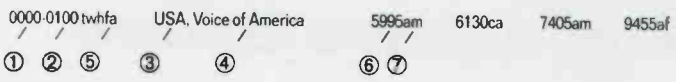
Incredibly, an institution that once rivaled the vaunted **BBC** and had an indispensable role in bringing down the Berlin Wall, winning the Cold War and opening China has been deemed not quite up to the task of combating terrorism by telling America's real story to the Islamic world. The *BBG*, in effect, is telling us that Brittney Spears and doctoring the news can do it better. "The news may be good or it may be bad; but we will tell you the truth" has apparently become "Hit me baby one more time."

Thanks to the Smith Mundt Act, shortwave listeners are perhaps the only citizens in a position to understand what it is really happening and what the stakes are. **While I know that many of us are in this as a hobby and prefer not to involve ourselves in controversy when our reason for being here is pleasure and relaxation, I strongly suggest to you that this issue is just too important and vital to ignore.**

If not us, who else? We are the only citizens with the knowledge and institutional memory to back up our views. We know this is wrong. We alone know what is about to be lost, forever. **Write your representatives TODAY and support the VOA!**

Until October, good listening!

How to Use the Shortwave Guide



Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each 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, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

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

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

Day Codes

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

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

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

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

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

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

Target Areas

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

Choose a program or station you want to hear.

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

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

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

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Program Highlights

John Figliozzi

The Peacock Project

A group of internet broaddcasters have joined forces to present a variety of music eras, styles and talks on **WBCQ**, Saturday (in NA) evenings. The title is a tribute to one of their group, Ron Peacock, who suddenly passed away in January. The line-up includes the popular *A Different Kind Oldies Show* with Big Steve Cole, which is now a monthly offering on the 4th week of each month. Dave Kirby looks back at *Old Time Radio* (first week); Steve Evanchuck presents *The Voice of Savage Henry*, a '60s/'70s garage band rock show (second); *Tim Gaynor*, a noted DXer from Australia has the slot the third week; and on the five times a year when there's a fifth Saturday, there's *Hollow-State Hound* featuring big band music. All this airs on 7415 kHz., *S 0000-0100 UT*.

Look Who's on SW to NA!

With **WRMI** carrying extensive parts of the **World Radio Network** (WRN) schedule *(S 0300-0900, 1400-2000; M 0330-0900; M-F 1200-1600; A 1200-2300* - as of July 22), listeners have some opportunities to hear stations on shortwave that are (at least "officially") no longer (or never have been) on the bands for North America. These include **RTE Ireland** *(M-A 1300-1400, S/A 1800-1830, A 2100-2130)*, **Deutsche Welle** *(M-F 1400-1430)*, **Radio Guangdong** *(A 1600-1615)*, **UN Radio** *(S 1600-1630)*, **Radio Polonia** *(S 0300-0330, S/A 1700-1730)*, **Banns Radio International** *(S 0530-0600, 1730-1800)*, **Channel Africa** *(M 0530-0600)*. ***Realtime China***, a daily program **not** broadcast by **China Radio International** on shortwave, also can be heard *(S/M 0600-0630, A 2000-2030)*.

Many other popular international broadcasters are on the **WRN** schedule, which is carried 24/7 on **Sirius Satellite Radio,** *stream 115*. All of WRN's worldwide schedules can be heard in streaming audio from the web site *www.wrn.org* Complete schedules are available from the "Listeners' Area" portion of the site, which also stores on-demand files for many programs.

0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

0000	0007		Sierra Leone, SLBS	3316da		
0000	0015	vl	Cambodia, National Radio Of	11940as		
0000	0027		Czech Rep, Radio Prague Intl	7345na	9440na	
0000	0030		Egypt, Radio Cairo	11725na		
0000	0030		Japan, Radio	13650as	17810as	
0000	0030		Serbia & Montenegro, Intl Radio	9580na		
0000	0030		Thailand, Radio	5890va	9570va	
0000	0030		UK, BBC World Service	3915as	5970as	
			6195as 9410as	9740as	11945as	11995as
			15280as	15360as	17655va	17790as
0000	0030		USA, Voice of America	7215va	15185va	
			17820va			
0000	0045		India, All India Radio	9705as	9950as	
			11620as	11645as	13605as	
0000	0057		Canada, Radio Canada Intl	9640as	15205as	
0000	0059		Germany, Deutsche Welle	7130as	9505as	
			9825as			
0000	0059		Spain, Radio Exterior Espanc	15385na		
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs	2310irr	4835do	
0000	0100		Australia, ABC NT Katherine	5025do		
0000	0100		Australia, ABC NT Tennant Creek	4910do		
0000	0100		Australia, Radio	9660pa	12080va	13630pa
			15240pa	17750pa	17775as	17795as
			21725as			
0000	0100		Canada, CBC Northern Service	9625do		
0000	0100		Canada, CFRX Toronto ON	6070do		
0000	0100		Canada, CFVP Calgary AB	6030do		
0000	0100		Canada, CKZN St John's NF	6160do		
0000	0100		Canada, CKZU Vancouver BC	6160do		
0000	0100		China, China Radio Intl	6145va		
0000	0100		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa		
0000	0100	vl	Croatia, Croatian Radio	9925ca		
0000	0100	mtwhf	Germany, Bible Voice Broadcasting		6010na	
0000	0100		Guyana, Voice of	3290do		
0000	0100		Japan, Radio	6145ca		
0000	0100		Malaysia, Radio Malaysia	7295do		
0000	0100		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
0000	0100		Netherlands, Radio	9845na		
0000	0100		New Zealand, Radio NZ Intl	15720pa		
0000	0100		Sierra Leone, Radio UNAMSIL	6139af		
0000	0100		Singapore, Mediacorp Radio	6150do		
0000	0100	vl	Solomon Islands, SIBC	5020do	9545dc	
0000	0100		UK, BBC World Service	5975ca	7545af	
			9825ca	11835ca	12095ca	
0000	0100		Ukraine, Radio Ukraine Intl	7545na		
0000	0100		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	7590usb	10320usb
			12133usb	13362usb	13855usb	
0000	0100		USA, KAIJ Dallas TX	13815va		
0000	0100		USA, KTBN Salt Lake City UT	7505na	15590na	
0000	0100		USA, KVOH Rancho Simi CA	17775as		
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0000	0100		USA, WBOH Newport NC	5920am		
0000	0100		USA, WEWN Birmingham AL	5825na	7425na	
			13615va			
0000	0100		USA, WHRA Greenbush ME	7580va		
0000	0100		USA, WHRI Noblesville IN	7315am	7535am	
0000	0100		USA, WINB Red Lion PA	9320am		
0000	0100		USA, WJIE Louisville KY	13595am		
0000	0100		USA, WRMI Miami FL	7385am	9955am	
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100		USA, WWCR Nashville TN	5070na	9475na	
			13845na			
0000	0100		USA, WWRB Manchester TN	5050na	5085na	
			5745na	6890na		
0000	0100		USA, WYFR Okeechobee FL	6065na	9505na	
			15130sa	15195as		
0000	0100		Zambia, Radio Christian Voice	4965af		
0005	0030	twhfa	Austria, Radio Austria Intl	9870sa		

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0015	0030	twhfa	Austria, Radio Austria Intl	9870ca		
0030	0100		Australia, Radio	9660pa	12080va	13630pa
			15240pa	15415as	17750pa	17775as
			17795as	21725as		
0030	0100		Canada, Radio Canada Intl	9755am	11990am	
			13710am			
0030	0100		Iran, Voice of the Islamic Rep	9905sa		
0030	0100		Lithuania, Radio Vilnius	11690na		
0030	0100		Sri Lanka, SLBC	6005as	11905as	15745as
0030	0100		Thailand, Radio	5890na	15395na	
0030	0100		UK, BBC World Service	6195as	9410as	
			9740as 11955as	15280as	15310as	15360as
			17655as	17790as		
0030	0100		USA, Voice of America	7215va	11760va	
			15185va	15290va	17740va	17820va
0035	0100	sm	Austria, Radio Austria Intl	9870ca		
0045	0100	twhfa	Austria, Radio Austria Intl	9870sa		
0045	0100		Germany, Ran American BC	9740eu		
0045	0100		Pakistan, Radio	9340as	11565as	
0055	0100		Italy, RAI Intl	11800na		
0100	0115		Italy, RAI Intl	11800na		
0100	0115		Pakistan, Radio	9340as	11565as	
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na	
0100	0128		Vietnam, Voice of	6175na		
0100	0130	mtwhf	Germany, Bible Voice Broadcasting		5925 mw	
0100	0130	s	Germany, Universal Life	9485as		
0100	0130	mtwhfa	Hungary, Radio Budapest	9590na		
0100	0130	mtwhfa	Serbia & Montenegro, Intl Radio	9580na		
0100	0130		Uzbekistan, Radio Tashkent Intl	7190as	6165as	
			9715as			
0100	0156		Romania, Radio Romania Intl	9690na	11940na	
			15430na	17760na		
0100	0157	DRM	Netherlands, Radio	15525na		
0100	0159		Canada, Radio Canada Intl	9755am	11990am	
			13710am			
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Creek	4910do		
0100	0200		Australia, HCJB	15525as	15560as	
0100	0200		Canada, CBC Northern Service	9625do		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		China, China Radio Intl	9580am	9790ca	
0100	0200		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa		
0100	0200	vl	Croatia, Croatian Radio	9925na		
0100	0200		Cuba, Radio Havana	6000na	9820na	
0100	0200		Guyana, Voice of	3290do		
0100	0200		Indonesia, Voice of	9525as	11785as	15150al
0100	0200		Iran, Voice of the Islamic Rep	9905sa		
0100	0200		Japan, Radio	6025va	11860as	15325as
			17560va	17685pa	17810as	17835am
			17845sa			
0100	0200		Malaysia, Radio Malaysia	7295do		
0100	0200		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
0100	0200		Netherlands, Radio	9845na		
0100	0200		New Zealand, Radio NZ Intl	15720pc		
0100	0200		North Korea, Voice of	3560as	7140as	
			9345am	9720as	11735am	13760as
			15180as			
0100	0200		Russia, Voice of	5945me	9665na	15595na
			17660na			
0100	0200		Sierra Leone, Radio UNAMSIL	6139af		
0100	0200		Singapore, Mediacorp Radio	6150do		
0100	0200	vl	Solomon Islands, SIBC	5020do	9545do	
0100	0200		Sri Lanka, SLBC	6005as	11905as	15745as
0100	0200		UK, BBC World Service	5975ca	6195as	
			9410as 9525ca	9825ca	11835ca	12095ca
			15280as	15310as	15360as	17790as
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
0100	0200		USA, KAIJ Dallas TX	13815va		
0100	0200		USA, KJES Vado NM	7555na		
0100	0200		USA, KTBN Salt Lake City UT	7505na		
0100	0200		USA, KVOH Rancho Simi CA	9975as		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200	mtwhf	USA, Voice of America	7115va	9885va	
			11705va	11725va		
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5825na	7425na	
			13615va			
0100	0200		USA, WHRA Greenbush ME	7580va		
0100	0200		USA, WHRI Noblesville IN	7315am	7535am	
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	13595am		
0100	0200		USA, WRMI Miami FL	7385am	9955am	
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	

SELECTED PROGRAMMING BEGINS ON PAGE 57

			7465na 13845na		
0100	0200		USA, WWRB Manchester TN 5745 6890na	5050na	5085na
0100	0200		USA, WYFR Okeechabee FL 15060va 15195as	6065na	9505na
0100	0200		Zambia, Radio Christian Voice	4965af	
0105	0130	sm	Austria, Radio Austria Intl	9870na	
0115	0120	mtwhf	Kyrgystan, Radio Kyrghyz	4010irr	4795irr
0115	0130	twhfa	Austria, Radio Austria Intl	9870am	
0130	0145		Germany, Pan American BC	9495eu	
0130	0200		Australia, Radio 9660pa 15240pa 15415as 17795as 21725as	12080va 17750as	13630pa 17775as
0130	0200		Sweden, Radio 6010na	9435va	
0130	0200		USA, Voice of America	9775am	13740am
0135	0150	sm	Austria, Radio Austria Intl	9870am	
0140	0200		Vatican City, Vatican Radio	9650as	12055as
0145	0200		Albania, Radio Tirana Intl	6115eu	7160eu
0145	0200		Austria, Radio Austria Intl	9870am	

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0230		Australia, HCJB 15525as	15560as	
0200	0230		Austria, AWR Europe	9820as	
0200	0230	fmw	Belarus, Radio Belarus Intl	5970eu	7210eu
0200	0230	vl	Croatia, Croatian Radio	9925na	
0200	0230		Iran, Voice of the Islamic Rep	9905sa	
0200	0230	a	UK, Wales Radio Intl	9795na	
0200	0230		USA, KJES Vado NM	7555na	
0200	0257		Canada, Radio Canada Intl	15510as	17860as
0200	0300		Anguilla, Caribbean Beacon	6090am	
0200	0300	twhfa	Argentina, RAE 11710na		
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835do
0200	0300		Australia, ABC NT Katherine	5025do	
0200	0300		Australia, ABC NT Tennant Creek	4910do	
0200	0300		Australia, Radio 9660pa 15240pa 15415as 21725as	12080va 17750as	13630pa 17750as
0200	0300		Bulgaria, Radio 9700na	11700na	
0200	0300		Canada, CBC Northern Service	9625do	
0200	0300		Canada, CFRX Toronto ON	6070do	
0200	0300		Canada, CFVP Calgary AB	6030do	
0200	0300		Canada, CKZN St John's NF	6160do	
0200	0300		Canada, CKZU Vancouver BC	6160do	
0200	0300		Costa Rica, University Network 7375am 9725sa	5030am	6150am
0200	0300		Cuba, Radio Havana	6000na	9820na
0200	0300		Egypt, Radio Cairo 11855na		
0200	0300		Guyana, Voice of 3290do		
0200	0300		Malaysia, Radio Malaysia	7295do	
0200	0300		Myanmar, Radio 7185do		
0200	0300		Namibia, Namibian BC Corp 6090af	3270af	3290af
0200	0300		New Zealand, Radio NZ Intl	15720pa	
0200	0300		North Korea, Voice of 15230as	4405as	11845as
0200	0300	as	Philippines, Radio Pilipinas 15270me	11885me	15120me
0200	0300		Russia, Voice of 5945me 15595na 17660na	9665na	9860na
0200	0300		Sierra Leone, Radio UNAMSIL	6139af	
0200	0300		Singapore, Mediacorp Radio	6150do	
0200	0300	vl	Solomon Islands, SIBC	5020do	9545do
0200	0300		South Korea, Radio Korea Intl 15575na	9560na	11810na
0200	0300		Sri Lanka, SLBC 6005as	11905as	15745as
0200	0300		Taiwan, Radio Taiwan Intl 11875as 15320as	5950na	9680na 15465as
0200	0300		UK, BBC World Service 9410va 9750af 11835ca 11955as 15310as 15360as	5975ca 9825ca 12095ca 17790as	6195me 11760me 15280as
0200	0300		USA, AFRTS 4319usb 6350usb 7507usb 12133usb 13362usb	5446usb 10320usb	5765usb 12133usb 13855usb
0200	0300		USA, KAIJ Dallas TX 5755va		
0200	0300		USA, KTBN Salt Lake City UT	7505na	
0200	0300		USA, KVOH Rancho Simi CA	9975as	
0200	0300		USA, KWHR Naalehu HI	17510as	
0200	0300	mtwhf	USA, Voice of America 11705va 11725va	7115va	9885va
0200	0300		USA, WBCQ Kennebunk ME 9330na	5105na	7415na
0200	0300		USA, WBOH Newport NC	5920am	
0200	0300		USA, WEWN Birmingham AL 13615va	5825na	7425na
0200	0300		USA, WHRA Greenbush ME	7580va	
0200	0300		USA, WHRI Noblesville IN	7315am	7535am
0200	0300		USA, WINB Red Lion PA	9320am	
0200	0300		USA, WJIE Louisville KY	13595am	
0200	0300		USA, WRMI Miami FL	7385am	9955am
0200	0300		USA, WTJC Newport NC	9370na	
0200	0300		USA, WWCR Nashville TN 5770na 5935na	3210na	5070na
0200	0300		USA, WWRB Manchester TN 5745na 6890na	5050na	5085na
0200	0300		USA, WYFR Okeechobee FL 9505na 11855ca	5985na	6065na 15255ca
0200	0300		Zambia, Radio Christian Voice	4965af	
0215	0230		Nepal, Radio 3230as 7165as	5005as	6100as
0230	0258		Vietnam, Voice of 6175na		
0230	0300		Albania, Radio Tirana Intl	6115eu	7160eu
0230	0300	mtwhfa	Hungary, Radio Budapest	9790na	
0230	0300		Sweden, Radio 6010na		
0250	0300		Vatican City, Vatican Radio	7305am	9605am
0250	0300		Zambia, Radio 4910do		

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0315		Vatican City, Vatican Radio	17590va	
0300	0327		Czech Rep, Radio Prague Intl	7345na	9870na
0300	0330		Egypt, Radio Cairo 11855na		
0300	0330	as	Philippines, Radio Pilipinas 15270me	11885me	15120me
0300	0330		Thailand, Radio 15395na		
0300	0330		Vatican City, Vatican Radio	9660af	
0300	0350		Turkey, Voice of 6020va	6140va	7270me
0300	0355		South Africa, Channel Africa 9770af	3345af	6160af
0300	0400		Anguilla, Caribbean Beacon	6090am	
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do
0300	0400		Australia, ABC NT Katherine	5025do	
0300	0400		Australia, ABC NT Tennant Creek	4910do	
0300	0400		Australia, Radio 9660pa 15240pa 15415as 21725as	12080va 17750as	13630pa 17750as
0300	0400		Canada, CBC Northern Service	9625do	
0300	0400		Canada, CFRX Toronto ON	6070do	
0300	0400		Canada, CFVP Calgary AB	6030do	
0300	0400		Canada, CKZN St John's NF	6160do	
0300	0400		Canada, CKZU Vancouver BC	6160do	
0300	0400		China, China Radio Intl	9690am	9790ca
0300	0400		Costa Rica, University Network 7375am 9725sa	5030am	6150am
0300	0400		Cuba, Radio Havana	6000na	9820na
0300	0400	vl	Guatemala, Radio Cultural	3300am	
0300	0400		Guyana, Voice of 3290do		
0300	0400		Japan, Radio 21610pa		
0300	0400		Malaysia, Radio Malaysia	7295do	
0300	0400		Malaysia, Voice of 6175as	9750as	15295as
0300	0400		Namibia, Namibian BC Corp 6090af	3270af	3290af
0300	0400		New Zealand, Radio NZ Intl	15720pa	
0300	0400		North Korea, Voice of 9345as 9720as	3560as	7140as
0300	0400		Oman, Radio 15355af		
0300	0400		Russia, Voice of 7300na 15595na 17660na	9665na	9860na
0300	0400		Sierra Leone, Radio UNAMSIL	6139af	
0300	0400		Singapore, Mediacorp Radio	6150do	
0300	0400	vl	Solomon Islands, SIBC	5020do	9545do
0300	0400		Sri Lanka, SLBC 6005as	11905as	15745as
0300	0400		Taiwan, Radio Taiwan Intl 15320as	5950na	15215na
0300	0400		Uganda, Radio 4976do	5026do	7196do
0300	0400		UK, BBC World Service 9410va 15280as 17760as	5975ca 11760me 15310as 17790as	6195eu 11835ca 12095va 15360as 15575me 21660as
0300	0400		Ukraine, Radio Ukraine Intl	7545na	
0300	0400		USA, AFRTS 4319usb 6350usb 7507usb 12133usb 13362usb	5446usb	5765usb 10320usb 12133usb 13855usb
0300	0400		USA, KAIJ Dallas TX 5755va		
0300	0400		USA, KTBN Salt Lake City UT	7505na	
0300	0400		USA, KVOH Rancho Simi CA	9975as	
0300	0400		USA, KWHR Naalehu HI	17510as	
0300	0400	mtwh:	USA, Voice of America 7290af 7340af	6080af 9885af	7105af 12080af 17895af
0300	0400		USA, Voice of America	9620va	11695va
0300	0400		USA, WBCQ Kennebunk ME 9330na	5105na	7415na
0300	0400		USA, WBOH Newport NC	5920am	
0300	0400		USA, WEWN Birmingham AL 13615va	5825na	7425na
0300	0400		USA, WHRA Greenbush ME	7580va	
0300	0400		USA, WHRI Noblesville IN	7315am	7535am
0300	0400		USA, WINB Red Lion PA	9320am	
0300	0400		USA, WJIE Louisville KY	13595am	

0300	0400		USA, WMLK Bethel PA	9465eu	9955al
0300	0400		USA, WRMI Miami FL	7385am	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	9505va
			11740na		
0300	0400		Zambia, Radio 4910do		
0300	0400		Zambia, Radio Christian Voice	4965af	
0300	0400	vl	Zimbabwe, ZBC Corp	5975do	
0330	0357		Czech Rep, Radio Prague Intl	11600va	15600va
0330	0358		Vietnam, Voice of 6175ca		
0330	0400		UK, BBC World Service	3255af	6005af
			6190af 7120af 7160af	12035af	15420af
0330	0400	mtwhf	USA, Voice of America	6080af	7105af
			7290af 9885af 12080af	17895af	
0345	0400		Tajikistan, Radio 7245irr		

0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

0400	0415		Israel, Kol Israel 9435va	11590va	17600va
0400	0430		Belgium, Radio Vlaanderen Intl	11635na	
0400	0430	vl	Croatia, Croatian Radio	9480na	12105va
			12110va		
0400	0430		France, Radio France Intl	9550af	9805af
			11955af 13610af		
0400	0430		Sri Lanka, SLBC 6005as	11905as	15745cs
0400	0430	mtwhf	USA, Voice of America	4960af	6080af
			7290af 9575af 9885af	12080af	17895af
0400	0456		Romania, Radio Romania Intl	11820na	15140ra
			15235na 17860na		
0400	0457	DRM/as	Netherlands, Radio 15400au		
0400	0458		New Zealand, Radio NZ Intl	15720pa	
0400	0459		Germany, Deutsche Welle	7225af	9630af
			9710af 11945af		
0400	0500		Anguilla, Caribbean Beacon	6090am	
0400	0500		Australia, ABC NT Alice Springs	2310irr	4835do
0400	0500		Australia, ABC NT Katherine	5025do	
0400	0500		Australia, ABC NT Tennant Creek	4910do	
0400	0500		Australia, Radio 9660pa	12080va	13630pa
			15240pa 15515va	17750as	21725cs
0400	0500		Canada, CBC Northern Service	9625do	
0400	0500		Canada, CFRX Toronto ON	6070do	
0400	0500		Canada, CKZN St John's NF	6160do	
0400	0500		Canada, CKZU Vancouver BC	6160do	
0400	0500		China, China Radio Intl	6190am	9560am
			9755am 17490am	17650am	
0400	0500		Costa Rica, University Network	5030am	6150am
			7375am 9725sa		
0400	0500		Cuba, Radio Havana	6000na	9820na
0400	0500		Guyana, Voice of 3290do		
0400	0500		Malaysia, Radio Malaysia	7295do	
0400	0500		Malaysia, Voice of 6175as	9750as	15295as
0400	0500		Namibia, Namibian BC Corp	3270af	3290af
			6090af		
0400	0500		Netherlands, Radio 6165na	9590na	
0400	0500		Russia, Voice of 7300na	9665na	15595na
			17660na		
0400	0500		Sierra Leone, Radio UNAMSIL	6139af	
0400	0500		Singapore, Mediacorp Radio	6150do	
0400	0500	vl	Solomon Islands, SIBC	5020do	9545do
0400	0500		Uganda, Radio 4976do	5026do	7196do
0400	0500		UK, BBC World Service	3255af	5975co
			6005af 6190af 6195eu	7120af	7160af
			9410va 11760me	11835ca	12035af
			12095va 15280as	15310as	15360as
			15420af 15575me	17760as	17790as
			21660as		
0400	0500		USA, AFRTS 4319usb	5446usb	5765usb
			6350usb 7507usb	10320usb	12133usb
			12133usb 13362usb	13855usb	
0400	0500		USA, KAIJ Dallas TX 5755va		
0400	0500		USA, KTBN Salt Lake City UT	7505na	
0400	0500		USA, KVOH Rancho Simi CA	9975as	
0400	0500		USA, KWHR Naalehu HI	17780as	
0400	0500		USA, Voice of America	9620va	11695va
0400	0500		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na		
0400	0500		USA, WBOH Newport NC	5920am	
0400	0500		USA, WEWN Birmingham AL	5825na	7425na
			13615va		
0400	0500		USA, WHRA Greenbush ME	7580va	
0400	0500		USA, WHRI Noblesville IN	7315am	7535am
0400	0500		USA, WJIE Louisville KY	7490am	13595am
0400	0500		USA, WRMI Miami FL	7385am	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	6855va	7355va
			9715na		
0400	0500		Zambia, Radio 4910do		
0400	0500		Zambia, Radio Christian Voice	4965af	
0400	0500	vl	Zimbabwe, ZBC Corp	5975do	
0415	0420	mtwhf	Kyrgyston, Radio Kyrghyz	4010irr	4795irr
0430	0500		Nigeria, Radio/Enugu	6025do	
0430	0500		Nigeria, Radio/Ibadan	6050do	
0430	0500		Nigeria, Radio/Kaduna	4770do	6090do
0430	0500		Nigeria, Radio/Lagos	3326do	4990do
0430	0500		Serbia & Montenegro, Intl Radio	9580va	
0430	0500		Swaziland, TWR 4775af	6120af	
0430	0500	mtwhf	USA, Voice of America	4960af	6080af
			7290af 9575af 11835af	12080af	17895af
0445	0500		Italy, RAI Intl 6110af	7235af	9875af
0459	0500		New Zealand, Radio NZ Intl	9615pa	

0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0530		France, Radio France Intl	11850af	13610af
			15155af		
0500	0530		UK, BBC World Service	6005af	6190af
			7160af 11765af 11940af	11955as	15280as
			15310as 15360as	15420af	17640af
			17760me 17790as	17885af	21660as
0500	0530		Vatican City, Vatican Radio	9660af	11625af
			13765af		
0500	0559		Germany, Deutsche Welle	9630af	9700af
			12045af 15410af	17860af	
0500	0600		Anguilla, Caribbean Beacon	6090am	
0500	0600		Australia, ABC NT Alice Springs	2310irr	4835do
0500	0600		Australia, ABC NT Katherine	5025do	
0500	0600		Australia, ABC NT Tennant Creek	4910do	
0500	0600		Australia, Radio 9660pa	12080va	13630pa
			15160pa 15240as	15415va	15515as
			17750as 21725as		
0500	0600		Canada, CBC Northern Service	9625do	
0500	0600		Canada, CFRX Toronto ON	6070do	
0500	0600		Canada, CKZN St John's NF	6160do	
0500	0600		Canada, CKZU Vancouver BC	6160do	
0500	0600		China, China Radio Intl	9560am	9755na
			17490am 17650am		
0500	0600		Costa Rica, University Network	5030am	6150am
			7375am 9725sa		
0500	0600		Cuba, Radio Havana	9550ca	9655pa
			9820pa		
0500	0600		Guyana, Voice of 3290do		
0500	0600		Japan, Radio 5975va	6110na	7230va
			15195va 17810va	21755va	
0500	0600		Malaysia, Radio Malaysia	7295do	
0500	0600		Malaysia, Voice of 6175as	9750as	15295as
0500	0600		Namibia, Namibian BC Corp	6060af	6175al
0500	0600		New Zealand, Radio NZ Intl	9615pa	
0500	0600		Nigeria, Radio/Enugu	6025do	
0500	0600		Nigeria, Radio/Ibadan	6050do	
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do
0500	0600		Nigeria, Radio/Lagos	3326do	4990do
0500	0600		Nigeria, Voice of 7255af	15120af	
0500	0600		Russia, Voice of 21790pa		
0500	0600		Sierra Leone, Radio UNAMSIL	6139af	
0500	0600		Singapore, Mediacorp Radio	6150do	
0500	0600	vl	Solomon Islands, SIBC	5020do	9545do
0500	0600		South Africa, Channel Africa	7210af	9770af
0500	0600		Swaziland, TWR 6120af	7205af	9500af
0500	0600		Uganda, Radio 4976do	5026do	7196do
0500	0600		UK, BBC World Service	9410me	11760me
			15565me 15575me		
0500	0600		USA, AFRTS 4319usb	5446usb	5765usb
			6350usb 7507usb	10320usb	12133usb
			12133usb 13362usb	13855usb	
0500	0600		USA, KAIJ Dallas TX 5755va		
0500	0600		USA, KTBN Salt Lake City UT	7505na	
0500	0600		USA, KVOH Rancho Simi CA	9975as	
0500	0600		USA, KWHR Naalehu HI	11565as	17780as
0500	0600	mtwhf	USA, Voice of America	6035af	6080af
			6180af 7290af 12080af		
0500	0600		USA, WBCQ Kennebunk ME	5105na	7415na
0500	0600		USA, WBOH Newport NC	5920am	
0500	0600		USA, WEWN Birmingham AL	5825na	7425na
			13615va		
0500	0600		USA, WHRA Greenbush ME	11730na	
0500	0600		USA, WHRI Noblesville IN	7315am	7535am
0500	0600		USA, WJIE Louisville KY	7490am	13595am
0500	0600		USA, WMLK Bethel PA	9465eu	9955al
0500	0600		USA, WRMI Miami FL	7385am	9955am
0500	0600		USA, WTJC Newport NC	9370na	
0500	0600		USA, WWCR Nashville TN	3210na	5070na
			5770na 5935na		

0500	0600		USA, WYFR Okeechabee FL	6855va	9355eu
0500	0600		Zambia, Radio Christian Vaice	9865af	
0500	0600	vl	Zimbabwe, ZBC Corp	5975da	
0505	0530	s	Austria, Radio Austria Intl	17870me	
0515	0525		Rwanda, Radio 6005do		
0525	0600	vl	Ghana, Ghana BC Corp	3366da	4915do
0530	0600		Serbia & Montenegro, Intl Radia	9580va	
0530	0600		Thailand, Radio 21795eu		
0530	0600		UAE, Radio Dubai 15435va	17830va	21700va
0530	0600		UK, BBC World Service	6005af	6190af
			7160af 11765af 11940af	11955as	15310as
			15360as 15420af	17640af	17760as
			17790as 21660as		
0535	0600	s	Austria, Radia Austria Intl	17870me	

0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0603	vl	Croatia, Croatian Radia	9480na	12105va
			12110va		
0600	0620		Vatican City, Vatican Radia	4005eu	5890eu
			7250eu		
0600	0630		France, Radio France Intl	11665as	11725as
			15155as 17800as	21620as	
0600	0630		Swaziland, TWR 6120af	7205af	9500af
0600	0630	mtwhf	USA, Voice of America	6035af	6180af
			12080af		
0600	0659		Germany, Deutsche Welle	7170af	15275af
			17860af 21675af		
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835do
0600	0700		Australia, ABC NT Katherine	5025da	
0600	0700		Australia, ABC NT Tennant Creek	4910do	
0600	0700		Australia, Radia 9660pa	11880pa	12080va
			13605pa 13630pa	15160pa	15240as
			15415va 15515va	17750as	
0600	0700		Canada, CFRX Toranto ON	6070da	
0600	0700		Canada, CFVP Calgary AB	6030da	
0600	0700		Canada, CKZN St John's NF	6160do	
0600	0700		Canada, CKZU Vancouver BC	6160da	
0600	0700		Casta Rica, University Network	5030am	6150am
			7375am 9725sa	11870sa	
0600	0700		Cuba, Radio Havana	9550ca	9655pa
			9820pa		
0600	0700		Germany, Deutsche Welle	6140eu	
0600	0700		Germany, Overcamer Ministries	6110eu	
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of 3290da		
0600	0700		Japan, Radia 7230va	11715va	11740va
			11690va 11760va	13630va	15195va
			17870va 21755va		
0600	0700		Liberia, ELWA 4760do		
0600	0700		Malaysia, Radio Malaysia	7295do	
0600	0700		Malaysia, Voice of 6175as	9750as	
0600	0700		Namibia, Namibian BC Corp	6060af	6175al
0600	0700		New Zealand, Radio NZ Intl	9615pa	
0600	0700		Nigeria, Radio/Enugu	6025do	
0600	0700		Nigeria, Radio/Ibadan	6050do	
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do
0600	0700		Nigeria, Radio/Lagos	3326do	4990do
0600	0700		Nigeria, Voice of 7255af	15120af	
0600	0700		Papua New Guinea, NBC	4890do	9675irr
0600	0700		Russia, Voice of 21790pa		
0600	0700		Sierra Leone, Radia UNAMSIL	6139af	
0600	0700		Singapore, Mediacorp Radio	6150do	
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do
0600	0700		South Africa, Channel Africa	7210af	15215af
0600	0700		UK, BBC World Service	6005af	6190af
			7160af 9410eu 11760af	11940af	12095eu
			15485eu 15545af	15565me	15575me
			17640af		
0600	0700	as	UK, BBC World Service	17885af	
0600	0700		USA, AFRTS 4319usb	5446usb	5765usb
			6350usb 7507usb	10320usb	12133usb
			12133usb 13362usb	13855usb	
0600	0700		USA, KAIJ Dallas TX 5755va		
0600	0700		USA, KTBN Salt Lake City UT	7505na	
0600	0700		USA, KVOH Rancho Simi CA	9975as	
0600	0700		USA, KWHR Naalehu HI	11565as	17780as
0600	0700		USA, Voice of America	6080af	7290af
0600	0700		USA, WBCQ Kennebunk ME	5105na	7415na
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5825na	7425na
			7580va 13615na		
0600	0700		USA, WHRA Greenbush ME	11730na	
0600	0700		USA, WHRI Noblesville IN	7315am	7535am
0600	0700		USA, WJIE Louisville KY	7490am	13595am
0600	0700		USA, WMLK Bethel PA	9465eu	9955al
0600	0700		USA, WRMI Miami FL	7385am	9955am
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na
			5770na 5935na		
0600	0700		USA, WYFR Okeechabee FL	7355eu	11530eu
			11580eu		
0600	0700	vl	Vanuatu, Radio 4960do	7260da	
0600	0700		Yemen, Rep of Yemen Radio	9780me	
0600	0700		Zambia, Radio Christian Vaice	9865af	
0600	0700	vl	Zimbabwe, ZBC Carp	5975do	
0630	0645		Vatican City, Vatican Radio	5890va	15595va
0630	0700		Bulgaria, Radia 11600eu	13600eu	
0630	0700	vl	Geargia, Radia Georgia	11805eu	
0630	0700		Swaziland, TWR 7205af	9500af	
0630	0700		Vatican City, Vatican Radio	11625af	13765af
			15570af		
0645	0700	as	Albania, TWR 11865eu		
0645	0700	as	Monaco, TWR 9870eu		

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0705		New Zealand, Radio NZ Intl	9615pa	
0700	0715		Israel, Kal Israel 11590va	15640va	17600va
0700	0720		UK, BBC World Service	6190af	11765af
			11940af 15400af		
0700	0720	as	UK, BBC World Service	17885af	
0700	0726		Romania, Radia Ramania Intl	11830na	15150na
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0730		Belgium, Radio Vlaanderen Intl	5985eu	
0700	0730	a	Tibet, Xizang PBS 6110as	9490as	9580as
0700	0730		UK, BBC Warld Service	15565me	15575me
0700	0750	as	Albania, TWR 11865eu		
0700	0750	as	Monaco, TWR 9870eu		
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	4910da	
0700	0800		Australia, HCJB 11750pa		
0700	0800		Australia, Radio 9580pa	9660pa	11880pa
			12080va 13630pa	15160pa	15240as
			15415va 15515as	17750as	
0700	0800		Canada, CFRX Toronto ON	6070da	
0700	0800		Canada, CFVP Calgary AB	6030da	
0700	0800		Canada, CKZN St John's NF	6160do	
0700	0800		Canada, CKZU Vancouver BC	6160da	
0700	0800		Casta Rica, University Network	5030am	6150am
			7375am 9725sa	11870sa	
0700	0800		Eqt Guinea, Radia Africa	15184af	
0700	0800		France, Radia France Intl	15605af	
0700	0800		Germany, Deutsche Welle	6140eu	21675af
0700	0800	DRM	Germany, Deutsche Welle	21675eu	
0700	0800		Germany, Overcomer Ministries	6110eu	
0700	0800	vl	Ghana, Ghana BC Carp	3366da	4915da
0700	0800		Guyana, Voice of 3290do	5950do	
0700	0800	vl/as	Italy, IRRS 13840va		
0700	0800		Liberia, ELWA 4760do		
0700	0800		Malaysia, Radio Malaysia	7295do	
0700	0800		Malaysia, Voice of 6175as	9750as	
0700	0800		Myanmar, Radio 9730do		
0700	0800		Nigeria, Radio Enugu	6025do	
0700	0800		Nigeria, Radio/Ibadan	6050do	
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do
0700	0800		Nigeria, Radio/Lagos	3326do	4990do
0700	0800		Nigeria, Voice af 7255af	15120af	
0700	0800		Papua New Guinea, NBC	4890do	9675irr
0700	0800		Russia, Voice of 17495pa	17525pa	17635pa
			21790pa		
0700	0800		Sierra Leone, Radio UNAMSIL	6139af	
0700	0800		Singapore, Mediacorp Radio	6150do	
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do
0700	0800		South Africa, Channel Africa	11825af	
0700	0800		Swaziland, TWR 7205af	9500af	
0700	0800		Taiwan, Radio Taiwan Intl	5950na	
0700	0800		UK, BBC World Service	11955as	15310as
			15360as 15545af	17760as	17790as
			21660as		
0700	0800		USA, AFRTS 4319usb	5446usb	5765usb
			6350usb 7507usb	10320usb	12133usb
			12133usb 13362usb	13855usb	
0700	0800		USA, KAIJ Dallas TX 5755va		
0700	0800		USA, KTBN Salt Lake City UT	7505na	
0700	0800		USA, KVOH Rancho Simi CA	9975as	
0700	0800		USA, KWHR Naalehu HI	11565as	17780as
0700	0800		USA, WBCQ Kennebunk ME	5105na	7415na
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Birmingham AL	5825na	7425na
			7580na 11875va		
0700	0800		USA, WHRA Greenbush ME	11730na	
0700	0800		USA, WHRI Noblesville IN	7315am	7535am
0700	0800		USA, WMLK Bethel PA	9465eu	9955al
0700	0800		USA, WRMI Miami FL	7385am	9955am
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3210na	5070na

			5770na	5935na		
0700	0800		USA, WYFR Okeechabee FL		9715va	9930va
0700	0800	vl	Vanuatu, Radia	4960da	7260da	
0700	0800		Zambia, Radia Christian Voice		9865af	
0706	0800		New Zealand, Radia NZ Intl		9885pa	
0715	0800	mtwhf	Albania, TWR	11865eu		
0715	0800	mtwhf	Manaca, TWR	9870eu		
0720	0800		UK, BBC World Service		6190af	11765af
			11940af	15400af		
0730	0745		Vatican City, Vatican Radio		4005va	5890vo
			6185va	7250va	9645va	11740va
			15595va			
0730	0800		Georgia, Radia Geargia		11910eu	
0730	0800	as	Guam, TWR/KTWR 15205as			
0730	0800	as	UK, BBC World Service		15575me	17885af
0730	0800		UK, BBC World Service		11760me	15565me
0740	0800	mtwhf	Guam, TWR/KTWR 15205as			
0745	0800	mtwhf	Guam, TWR/KTWR 11840as			
0755	0800	s	Manaca, TWR	9870eu		

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0820	smtwhf	Albania, TWR	11865eu		
0800	0820	mtwhfs	Manaca, TWR	9870eu		
0800	0830		Australia, ABC NT Katherine		5025do	
0800	0830		Australia, ABC NT Tennant Creek		4910do	
0800	0830		Malaysia, Voice of	6175as	9750as	
0800	0830		Myanmar, Radio	9730do		
0800	0900		Anguilla, Caribbean Beacon		6090am	
0800	0900		Australia, ABC NT Alice Springs		2310irr	4835do
0800	0900		Australia, HCJB	11750pa		
0800	0900		Australia, Radio	5995pa	9580va	9590as
			9710pa	12080va	13630pa	15415as
			15515va	17750as		
0800	0900		Canada, CFRX Toronto ON		6070do	
0800	0900		Canada, CFVP Calgary AB		6030do	
0800	0900		Canada, CKZN St John's NF		6160do	
0800	0900		Canada, CKZU Vancouver BC		6160do	
0800	0900		Costa Rica, University Network		5030am	6150am
			7375am	9725sa	11870sa	
0800	0900		Eqt Guinea, Radio Africa		15184af	
0800	0900		Germany, Deutsche Welle		6140eu	21675af
0800	0900	DRM	Germany, Deutsche Welle		15440af	
0800	0900	vl	Ghana, Ghana BC Corp		3366do	4915do
0800	0900		Guam, TWR/KTWR 15205as			
0800	0900	mtwhf	Guam, TWR/KTWR 11840as			
0800	0900		Guyana, Voice of	3290do	5950do	
0800	0900		Indonesia, Voice of	9525as	11785as	15150al
0800	0900	vl/as	Italy, IRRS	13840va		
0800	0900		Liberia, ELWA	4760do		
0800	0900		Malaysia, Radio Malaysia		7295do	
0800	0900		New Zealand, Radio NZ Intl		9885pa	
0800	0900		Nigeria, Radio Enugu		6025do	
0800	0900		Nigeria, Radio/Ibadan		6050do	
0800	0900		Nigeria, Radio/Kaduna		4770do	6090ao
0800	0900		Nigeria, Radio/Lagos		3326do	4990ao
0800	0900		Nigeria, Voice of	7255af	15120af	
0800	0900	vl	Pakistan, Radio	15100eu	17835eu	
0800	0900		Papua New Guinea, Cath Radio		Network	4960va
0800	0900		Papua New Guinea, NBC		4890do	9675irr
0800	0900		Russia, Voice of	17495pa	17525pa	17635pa
			21790pa			
0800	0900		Sierra Leone, Radio UNAMSIL		6139af	
0800	0900		Singapore, Mediacorp Radio		6150do	
0800	0900	vl	Salomon Islands, SIBC		5020da	9545do
0800	0900		South Korea, Radio Korea Intl		13670eu	
0800	0900		Swaziland, TWR	7205af	9500af	
0800	0900		Taiwan, Radio Taiwan Intl		9610au	
0800	0900		UK, BBC World Service		6190af	11760me
			11955as	12095eu	15310as	15360as
			15400af	15485eu	15565me	15575me
			17760as	17790as	17830af	21470af
			21660as			
0800	0900		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
0800	0900		USA, KAIJ Dallas TX	5755va		
0800	0900		USA, KNLS Anchor Point AK		11765as	
0800	0900		USA, KTBN Salt Lake City UT		7505na	
0800	0900		USA, KWHR Naalehu HI		11565as	17780as
0800	0900		USA, WBCQ Kennebunk ME		5105na	7415na
0800	0900		USA, WBOH Newport NC		5920am	
0800	0900		USA, WEWN Birmingham AL		5825na	7425na
			7580na	11875va		
0800	0900		USA, WHRI Noblesville IN		7315am	7535am
0800	0900		USA, WJIE Louisville KY		7490am	13595am
0800	0900		USA, WMLK Bethel PA		9465eu	9955al
0800	0900		USA, WRMI Miami FL		7385am	9955am
0800	0900		USA, WTJC Newport NC		9370na	
0800	0900		USA, WWCR Nashville TN		3210na	5070na
			5770na	5935na		
0800	0900		USA, WYFR Okeechabee FL		5950af	9930af
0800	0900	vl	Vanuatu, Radia	4960da	7260da	
0800	0900		Zambia, Radia Christian Voice		9865af	
0815	0900	as	Guam, TWR/KTWR 15330as			
0830	0850		Bangladesh, Bangla Betar		7185as	9550as
0830	0900		Australia, ABC NT Katherine		2485da	
0830	0900		Australia, ABC NT Tennant Creek		2325da	
0830	0900		Georgia, Radia Geargia		11910eu	
0830	0900		Lithuania, Radia Vilnius		9710eu	

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0915	vl	Ghana, Ghana BC Carp		3366da	4915da
0900	0929		Czech Rep, Radia Prague Intl		21745va	
0900	0930		Guam, TWR/KTWR 11840as			
0900	0930		Russia, Radia Ezra	17590va		
0900	1000		Anguilla, Caribbean Beacon		6090am	
0900	1000		Australia, ABC NT Alice Springs		2310da	4835irr
0900	1000		Australia, ABC NT Katherine		2485da	
0900	1000		Australia, ABC NT Tennant Creek		2325da	
0900	1000		Australia, HCJB	11750pa		
0900	1000		Australia, Radia	9580va	9590as	11880as
			12080va	13630pa	15415as	
0900	1000		Australia, Voice Intl	11955as	13685as	
0900	1000		Canada, CFRX Toronto ON		6070do	
0900	1000		Canada, CFVP Calgary AB		6030do	
0900	1000		Canada, CKZN St John's NF		6160do	
0900	1000		Canada, CKZU Vancouver BC		6160do	
0900	1000		China, China Radio Intl		15210pa	17490va
			17690va			
0900	1000		Costa Rica, University Network		5030am	6150am
			7375am	9725sa	11870am	13750na
0900	1000		Eqt Guinea, Radio Africa		15184af	
0900	1000	DRM/ m-f	Germany, Deutsche Welle		15440af	17700af
0900	1000		Germany, Deutsche Welle		6140eu	21675af
0900	1000		Guyana, Voice of	3290da	5950do	
0900	1000	vl/as	Italy, IRRS	13840va		
0900	1000		Malaysia, Radio Malaysia		7295da	
0900	1000		Malaysia, Voice of	15295as		
0900	1000	DRM	Netherlands, Radio	9815eu		
0900	1000		New Zealand, Radia NZ Intl		9885pa	
0900	1000		Nigeria, Radio Enugu		6025da	
0900	1000		Nigeria, Radio/Ibadan		6050do	
0900	1000		Nigeria, Radio/Kaduna		4770do	6090da
0900	1000		Nigeria, Radio/Lagos		3326do	4990do
0900	1000		Nigeria, Voice of	7255af	15120af	
0900	1000	vl	Pakistan, Radio	15100eu	17835eu	
0900	1000		Palau, KHBN	15725as		
0900	1000		Papua New Guinea, Cath Radio		Network	4960va
0900	1000		Papua New Guinea, NBC		4890do	9675irr
0900	1000		Singapore, Mediacorp Radia		6150do	
0900	1000	vl	Solomon Islands, SIBC		5020do	9545do
0900	1000	s	UAE, Radio UNMEE	21460af		
0900	1000		UK, BBC World Service		6195as	9605as
			9740as	11760me	12095eu	15190ca	15310as
			15360as	15485eu	15575me	17640me
			17760as	17790as	21660as	
0900	1000		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
0900	1000		USA, KAIJ Dallas TX	5755va		
0900	1000		USA, KTBN Salt Lake City UT		7505na	
0900	1000		USA, KWHR Naalehu HI		11565as	17780as
0900	1000		USA, WBCQ Kennebunk ME		5105na	7415na
0900	1000		USA, WBOH Newport NC		5920am	
0900	1000		USA, WEWN Birmingham AL		5825na	7425na
			11875na			
0900	1000		USA, WHRA Greenbush ME		11730na	
0900	1000		USA, WHRI Noblesville IN		7315am	7535am
0900	1000		USA, WJIE Louisville KY		7490am	13595am
0900	1000		USA, WRMI Miami FL		7385am	9955am
0900	1000		USA, WTJC Newport NC		9370na	
0900	1000		USA, WWCR Nashville TN		5070na	5770na
			5935na	9475na		
0900	1000		USA, WYFR Okeechobee FL		5950na	
0900	1000	vl	Vanuatu, Radio	4960da	7260dc	
0900	1000		Zambia, Radio Christian Voice		9865af	
0910	0930	s	Armenia, Voice of	4810eu	15270as	
0930	1000		Georgia, Radio Georgia		11910me	
0930	1000	smwhfa	Greece, Voice of	9420eu	15630eu	15650af

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1029		Germany, Deutsche Welle	15190os	15350as
			17820as		
1000	1030		Guam, AWR/KSDA	11560as	11930as
1000	1030		Mongolia, Voice of	12085as	

1000	1030		UK, BBC World Service	6195as	9605as	
			9740as	15310as	15360as	15360as	17760as
			17790as	21660as		
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	2325da		
1000	1100		Australia, HCJB	15425as		
1000	1100		Australia, Radio	5995pa	6020pa	6035va
			9475as	9560as	9580va	9590as	11880va
			12080as	13630pa		
1000	1100		Australia, Voice Intl	11955as	13685as	
1000	1100		Canada, CFRX Toronto ON	6070da		
1000	1100		Canada, CFVP Calgary AB	6030do		
1000	1100		Canada, CKZN St John's NF	6160do		
1000	1100		Canada, CKZU Vancouver BC	6160da		
1000	1100		China, China Radio Intl	6040na	17490va	
			17690va			
1000	1100		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa	11870am	13750na	
1000	1100		Eqt Guinea, Radio Africa	15184af		
1000	1100	DRM/ m-f	Germany, Deutsche Welle	15440eu	17700eu	
1000	1100		Guyana, Voice of	3290da	5950do	
1000	1100		India, All India Radio	13695as	15020as	
			15260as	15410as	17510au	17800as	
			17895as			
1000	1100	vl/as	Italy, IRRS	13840va		
1000	1100		Japan, Radio	6120ca	9695as	11730as	
			17585eu	17720va	21755va		
1000	1100	vl	Libya, Voice of Africa	21695af		
1000	1100		Malaysia, Radio Malaysia	7295da		
1000	1100		Malaysia, Voice of	15295as		
1000	1100	DRM	Netherlands, Radio	9815eu		
1000	1100		Netherlands, Radio	9785au	12065as	13710as	
			13820as			
1000	1100		Nigeria, Voice of	7255af	15120af	
1000	1100		North Korea, Voice of	3560as	11710am	
			11735na	13650as	15180as	
1000	1100		Palau, KHBN	15725as		
1000	1100		Papua New Guinea, Coth Radio	Network	4960va	
1000	1100		Papua New Guinea, NBC	4890do	9675irr	
1000	1100		Singapore, Mediocorp Radio	6150da		
1000	1100	vl	Solomon Islands, SIBC	5020do	9545do	
1000	1100		South Africa, Channel Africa	11825af		
1000	1100		UK, BBC World Service	6190af	11940af	
			12095eu	15485eu	17885af	21470af	
1000	1100	as	UK, BBC World Service	15190ca	15400af	
			17830af			
1000	1100	DRM/ m	UK, Christian Voice	9760eu		
1000	1100		USA, AFRTS	4319usb	5446usb	5765usb	
			6350usb	7507usb	10320usb	12133usb	
			12133usb	13362usb	13855usb	
1000	1100		USA, KAIJ Dallas TX	5755va		
1000	1100		USA, KTBN Salt Lake City UT	7505na		
1000	1100		USA, KWHR Naalehu HI	9930as	11565as	
1000	1100		USA, WBCQ Kennebunk ME	5105na		
1000	1100		USA, WBOH Newport NC	5920am		
1000	1100		USA, WEWN Birmingham AL	7425na	7520na	
			11875na			
1000	1100		USA, WHRI Noblesville IN	7315am	7535am	
1000	1100		USA, WINB Red Lion PA	9320am		
1000	1100		USA, WJIE Louisville KY	7490am	13595am	
1000	1100		USA, WRMI Miami FL	7385am	9955am	
1000	1100		USA, WTJC Newport NC	9370na		
1000	1100		USA, WWCR Nashville TN	5070na	5935na	
			15825na			
1000	1100		USA, WYFR Okeechobee FL	5950na	9755sa	
1000	1100	vl	Vanuatu, Radio	4960da	7260do	
1000	1100		Zambia, Radio Christian Voice	9865af		
1010	1020		Israel, Kol Israel	15640va	17535va	
1015	1100		Guam, TWR/KTWR	9865as		
1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9704do	
1030	1057		Czech Rep, Radio Prague Intl	9880eu	11615eu	
1030	1100	mt hfa	Guom, AWR/KSDA	11900as		
1030	1100		Iran, Voice of the Islamic Rep	15600as	17660as	
1030	1100		UAE, Radio Duboi	13675va	15370va	15395va	
			21605eu			
1030	1100	t	UAE, Radio UNMEE	21550af		
1030	1100		UK, BBC World Service	6195as	9740as	
			15310as	17760as	17790as	
1030	1100		Voticon City, Vatican Radio	5890eu		

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1104	vl	Pakistan, Radio	15100eu	17835eu	
1100	1115	mtwhfa/ vl	Vanuotu, Radio	4960do	7260do	
1100	1127		Iran, Voice of the Islomic Rep	15600as	17660as	
1100	1128		Vietnam, Voice of	7285as		
1100	1130		Tibet, Xizong PBS	4920as	6110as	9490as	
1100	1130	t	UAE, Radio UNMEE	21550af		
1100	1130		UK, BBC World Service	6190af	6195ca	
			11940af	15190ca	15400af	17790ca	
			17830af	17885af	21470af	
1100	1159		Germany, Deutsche Welle	15105as	17820as	
			21650as	21820as		
1100	1200		Anguilla, Caribbean Beacon	11775am		
1100	1200		Australia, ABC NT Alice Springs	2310da	4835irr	
1100	1200		Australia, ABC NT Katherine	2485do		
1100	1200		Australia, ABC NT Tennant Creek	2325da		
1100	1200		Australia, HCJB	15425as		
1100	1200		Australia, Radio	5995pa	6020pa	6035va	
			9475as	9560as	9590va	9590as	11880va	
			12080as			
1100	1200		Australia, Voice Intl	13685as		
1100	1200		Canada, CFRX Toronto ON	6070do		
1100	1200		Canada, CFVP Calgary AB	6030do		
1100	1200		Canada, CKZN St John's NF	6160do		
1100	1200		Canada, CKZU Vancouver BC	6160do		
1100	1200		China, China Radio Intl	6040am	11750ca	
			17490am	17650am		
1100	1200		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa	11870am	13750na	
1100	1200		Ecuador, HCJB	12005va	21455am	
1100	1200	DRM	Germany, Deutsche Welle	15440eu		
1100	1200	vl/as	Italy, IRRS	13840va		
1100	1200	f	Italy, IRRS	15665af		
1100	1200		Japan, Radio	6120na	9695as	11730as	
			17585eu			
1100	1200	vl	Libya, Voice of Africa	15610af	17695af	
			21675af	21695af		
1100	1200		Malaysia, Radio Malaysia	7295do		
1100	1200		Malaysia, Voice of	15295as		
1100	1200		Netherlands, Radio	11675na		
1100	1200		New Zealand, Radio NZ Intl	9885pa		
1100	1200		Papua New Guinea, Cath Radio	Network	4960va	
1100	1200		Papua New Guinea, NBC	4890da	9675irr	
1100	1200		Singapore, Radio Singapore Intl	6080as	6150as	
1100	1200		South Africa, Channel Africa	11825af		
1100	1200		Taiwan, Radio Taiwan Intl	7445as		
1100	1200		UK, BBC World Service	6195as	9740as	
			12095eu	15310as	15485eu	17760as	
			17790as			
1100	1200		Ukraine, Radio Ukraine Intl	15415eu		
1100	1200		USA, AFRTS	4319usb	5446usb	5765usb	
			6350usb	7507usb	10320usb	12133usb	
			12133usb	13362usb	13855usb	
1100	1200		USA, KAIJ Dallas TX	5755va		
1100	1200		USA, KTBN Salt Lake City UT	7505na		
1100	1200		USA, KWHR Naalehu HI	9930as	11565as	
1100	1200		USA, WBCQ Kennebunk ME	5105na		
1100	1200		USA, WBOH Newport NC	5920am		
1100	1200		USA, WEWN Birmingham AL	7425na	7520na	
			11875na			
1100	1200		USA, WHRI Noblesville IN	7315am	7535am	
1100	1200		USA, WINB Red Lion PA	9320am		
1100	1200		USA, WJIE Louisville KY	7490am	13595am	
1100	1200		USA, WRMI Miami FL	7385am	9955am	
1100	1200		USA, WTJC Newport NC	9370na		
1100	1200		USA, WWCR Nashville TN	5070na	5935na	
			7465na	15825na		
1100	1200		USA, WYFR Okeechobee FL	5850na	5950na	
			6015na	6155na	7355na	9755na	
			11855naq			
1100	1200		Zambio, Radio Christian Voice	9865af		
1130	1200		Belgium, Radio Vlaanderen Intl	9940as		
1130	1200		Bulgaria, Radio	11700eu	15700eu	
1130	1200		UK, BBC World Service	6190af	6195ca	
			11940af	15190ca	17830af	17885af	
			21470af			
1130	1200	f	Vatican City, Vatican Radio	15595va	17515va	
1145	1155		Rwanda, Radio	6055do		

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200	1215	vl	Cambodia, National Radio Of	11940as		
1200	1230		France, Radio France Intl	17815af	25820af	
1200	1230	vl	Libya, Voice of Africo	15610af	17695af	
			21675af	21695af		
1200	1230		Malaysia, Voice of	15295as		
1200	1230		UAE, AWR Africa	15135as		
1200	1230		Uzbekistan, Radio Tashkent Intl	7285as	9715as	
			15295as	17775as		
1200	1259		Canado, Radio Canado Intl	9660am	15190as	
			13655am	15190as	17800am	
1200	1259		New Zeoland, Radio NZ Intl	9885pa		
1200	1259		Poland, Radio Polonia	9525eu	11820eu	
1200	1300		Anguilla, Caribbean Beacon	11775am		
1200	1300		Australia, ABC NT Alice Springs	2310do	4835irr	
1200	1300		Australia, ABC NT Kotherine	2485do		

Shortwave Guide

1200	1300		Australia, ABC NT Tennant Creek	2325da		
1200	1300		Australia, HCJB	15435as		
1200	1300		Australia, Radio	5995pa	6020pa	6035va
			9475as	9560as	9590as	11880as
1200	1300		Australia, Voice Intl	13685as		
1200	1300		Canada, CBC Northern Service	9625do		
1200	1300		Canada, CFRX Toronto ON	6070do		
1200	1300		Canada, CFVP Calgary AB	6030do		
1200	1300		Canada, CKZN St John's NF	6160do		
1200	1300		Canada, CKZU Vancouver BC	6160do		
1200	1300		China, China Radio Intl	9730as	9795va	
			11760pa	11980pa	15415as	17490va
			17650va			
1200	1300		Costa Rica, University Network	9725am	11870am	
			13750am			
1200	1300		Ecuador, HCJB	12005va	21455am	
1200	1300	DRM	Germany, Deutsche Welle	9655eu	15440eu	
1200	1300		Malaysia, Radio Malaysia	7295do		
1200	1300		Papua New Guinea, Cath Radio	Network	4960va	
1200	1300		Papua New Guinea, NBC	4890do	9675irr	
1200	1300		Singapore, Radio Singapore Intl	6080as	6150as	
1200	1300		South Korea, Radio Korea Intl	9650ca		
1200	1300		Taiwan, Radio Taiwan Intl	7130as		
1200	1300		UK, BBC World Service	6195va	9740as	
			12095eu	15190ca	15310as	15485eu
			17760as	17790as		
1200	1300		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
1200	1300		USA, KAIJ Dallas TX	13815va		
1200	1300		USA, KTBN Salt Lake City UT	7505na		
1200	1300		USA, KWHR Naalehu HI	9930as	11565as	
1200	1300		USA, KWHR Naalehu HI	9930as	11565as	
1200	1300		USA, Voice of America	6160va	9645va	
			9760va	15240va		
1200	1300		USA, WBCQ Kennebunk ME	9330na	17495no	
1200	1300		USA, WBOH Newport NC	5920am		
1200	1300		USA, WEWN Birmingham AL	7425na	7520na	
			9355na	13615na		
1200	1300		USA, WHRI Noblesville IN	7315am	11670am	
1200	1300		USA, WINB Red Lion PA	13570am		
1200	1300		USA, WJIE Louisville KY	7490am	13595am	
1200	1300		USA, WRMI Miami FL	9955am	15725am	
1200	1300		USA, WTJC Newport NC	9370na		
1200	1300		USA, WWCR Nashville TN	7465na	9985nc	
			13845na	15825na		
1200	1300		USA, WWRB Manchester TN	9320na	12170na	
1200	1300		USA, WYFR Okeechobee FL	5850na	5950na	
			6015na	6155na	13695na	17750na
1200	1300		Zambia, Radio Christian Voice	9865af		
1205	1215	as	Austria, Radio Austria Intl	6155eu	13730eu	
			17715va			
1215	1230		Austria, Radio Austria Intl	6155as	13730eu	
			17715va			
1215	1230	as	India, TWR	7560as		
1215	1300		Egypt, Radio Cairo	17670as		
1230	1255		Vietnam, Voice of	9840va	12020va	
1230	1300		Bangladesh, Bangla Betar	7185as	9550as	
1230	1300	vl	Libya, Voice of Africa	21675af	21695af	
1230	1300		Sri Lanka, SLBC	6005as	11930as	15745as
1230	1300		Sweden, Radio	13580va	15240na	15735va
1230	1300		Thailand, Radio	9855va		
1230	1300		Turkey, Voice of	15225va	15535eu	
1230	1300	a	UK, Wales Radio Intl	17745au		
1235	1245	as	Austria, Radio Austria Intl	6155eu	13730eu	
			17715va			
1240	1255		Greece, Voice of	9420eu	9690eu	15630af
			15650af			
1245	1300	mtwhf	Austria, Radio Austria Intl	17715as		
1245	1300	as	Austria, Radio Austria Intl	6155eu	13730eu	

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300	1320		Czech Rep, Radio Prague Intl	13580eu	21745af	
1300	1330	DRM	Canada, Radio Canada Intl	9815eu		
1300	1330		Ecuador, HCJB	12005va	21455am	
1300	1330		Egypt, Radio Cairo	17670as		
1300	1330		Turkey, Voice of	15255va	15535eu	
1300	1350		Romania, Radio Romania Intl	11830eu	15105eu	
1300	1400		Anguilla, Caribbean Beacon	11775am		
1300	1400		Australia, HCJB	15435as		
1300	1400		Australia, Radio	5995pa	6020pa	9475as
			9560as	9580va	11660as	
1300	1400		Canada, CBC Northern Service	9625do		
1300	1400		Canada, CFRX Toronto ON	6070do		
1300	1400		Canada, CFVP Calgary AB	6030do		
1300	1400		Canada, CKZN St John's NF	6160do		
1300	1400		Canada, CKZU Vancouver BC	6160do		
1300	1400		Canada, Radio Canada Intl	9515am	13655am	
			17800sa			
1300	1400		China, China Radio Intl	7405am	9570am	
			9795va	11760pa	11980as	15180as
			17490va	17650va		
1300	1400	DRM	China, China Radio Intl	7250va	11810va	
1300	1400		Costa Rica, University Network	9725am	11870am	
			13750am			
1300	1400	DRM	Germany, Deutsche Welle	9655eu	15440eu	
1300	1400		Germany, Deutsche Welle	6140eu		
1300	1400		Germany, Overcomer Ministries	6110eu	13810eu	
1300	1400		Jordan, Radio	11690eu		
1300	1400	vl	Libya, Voice of Africa	21675af	21695af	
1300	1400		Malaysia, Radio Malaysia	7295do		
1300	1400		New Zealand, Radio NZ Intl	6095pa		
1300	1400		North Korea, Voice of	4405as	9335eu	
			11710na	13760eu	15245am	
1300	1400		Papua New Guinea, Cath Radio	Network	4960va	
1300	1400		Papua New Guinea, NBC	4890do	9675irr	
1300	1400		Singapore, Radio Singapore Intl	6080as	6150as	
1300	1400		South Korea, Radio Korea Intl	9570as	9700as	
1300	1400		Sri Lanka, SLBC	6005as	11930as	15745as
1300	1400		UK, BBC World Service	6190af	6195va	
			9740as	11940af	12095eu	15190af	15310as
			15420af	15485eu	17760as	17790as
			17830af	17885af	21470af	
1300	1400		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
1300	1400		USA, KJES Vado NM	11715na		
1300	1400		USA, KNLS Anchor Point AK	11870as		
1300	1400		USA, KTBN Salt Lake City UT	7505na		
1300	1400		USA, KVOH Rancho Simi CA	9975as		
1300	1400		USA, KWHR Naalehu HI	9930as	11565as	
1300	1400		USA, Voice of America	9645va	9760va	
1300	1400		USA, WBCQ Kennebunk ME	9330na	17495na	
1300	1400		USA, WBOH Newport NC	5920am		
1300	1400		USA, WEWN Birmingham AL	7425na	7520na	
			9355na	13615na		
1300	1400		USA, WHRA Greenbush ME	17560na		
1300	1400		USA, WHRI Noblesville IN	11670am	15105am	
1300	1400		USA, WINB Red Lion PA	13570am		
1300	1400		USA, WJIE Louisville KY	7490am	13595am	
1300	1400		USA, WRMI Miami FL	9955am	15725am	
1300	1400		USA, WTJC Newport NC	9370na		
1300	1400		USA, WWCR Nashville TN	7465na	9985na	
			13845na	15825na		
1300	1400		USA, WWRB Manchester TN	9320na	12170na	
1300	1400		USA, WYFR Okeechobee FL	6155na	11560na	
			11830as	11865as	11970na	13695na
			17750na			
1300	1400		Zambia, Radio Christian Voice	9865af		
1305	1315	mtwhfa	Turkmenistan, Turkmen Radio	5015as		
1315	1330	a	Russia, TWR	9485eu		
1330	1400		Guam, AWR/KSDA	11980as		
1330	1400	mtwhfa	Guam, AWR/KSDA	15275as		
1330	1400		India, All India Radio	9690as	11620as	
			13710as			
1330	1400		Laos, National Radio	7145as		
1330	1400		Sweden, Radio	15240na	15735va	
1330	1400		Uzbekistan, Radio Tashkent Intl	7285as	9715as	
			15295as	17775as		

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1415		Russia, FEBA	9495as		
1400	1430		Australia, HCJB	15435as		
1400	1430		Thailand, Radio	9830as		
1400	1459	as	Canada, Radio Canada Intl	9515as		
1400	1500		Anguilla, Caribbean Beacon	11775am		
1400	1500		Australia, Radio	5995pa	6080pa	7260as
			9475as	9590as	11660as	11750as
1400	1500		Canada, CBC Northern Service	9625do		
1400	1500		Canada, CFRX Toronto ON	6070do		
1400	1500		Canada, CFVP Calgary AB	6030do		
1400	1500		Canada, CKZN St John's NF	6160do		
1400	1500		Canada, CKZU Vancouver BC	6160do		
1400	1500		China, China Radio Intl	7405am	9610va	
			9795va	11675as	11765af	13685am
			13680af	15125am	17490am	17650am
1400	1500		Costa Rica, University Network	9725am	11870am	
			13750am			
1400	1500		France, Radio France Intl	7175as	9580as	
			11610as	17515as	17620as	
1400	1500		Germany, Deutsche Welle	6140eu		
1400	1500		Germany, Overcomer Ministries	6110eu	13810eu	
1400	1500		Germany, Pan American BC	15650eu		
1400	1500		India, All India Radio	9690as	11620as	
			13710as			
1400	1500		Japan, Radio	7200as	11730as	11840pa
1400	1500		Jordan, Radio	11690eu		
1400	1500	vl	Libya, Voice of Africa	21675af		

1400	1500		Netherlands, Radio	9890as	11835as	12075as
1400	1500		New Zealand, Radio NZ Intl		6095pa	
1400	1500		Oman, Radio	15140eu		
1400	1500	DRM	Russia, Voice of	15780va		
1400	1500		Russia, Voice of	7390as	9745as	12055as
			15605as	15780as	17645as	
1400	1500		Singapore, Mediacorp Radio		6150do	
1400	1500		South Africa, Channel Africa		11825af	
1400	1500		Sri Lanka, SLBC	6005as	11930as	15745as
1400	1500		Taiwan, Radio Taiwan Intl		15265as	
1400	1500		UK, BBC World Service		6190af	6195as
			7105as 9740as	11940af	12095eu	15190ca
			15310as	15485eu	15565me	15575me
			17790as	17830af	17885af	21470af
			21660af			
1400	1500		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
1400	1500		USA, KJES Vado NM		11715na	
1400	1500		USA, KTBN Salt Lake City UT		7505na	15590na
1400	1500		USA, KWHR Naalehu HI		9930as	11565as
1400	1500		USA, Voice of America		6160va	7125va
			9760va	15160va	15425va	
1400	1500		USA, WBCQ Kennebunk ME		7415na	9330na
			17495na			
1400	1500		USA, WBOH Newport NC		5920am	
1400	1500		USA, WEWN Birmingham AL		7425na	7520na
			9355na	9955na	15745na	
1400	1500		USA, WHRA Greenbush ME		17560na	
1400	1500		USA, WHRI Noblesville IN		11670am	15105am
1400	1500		USA, WINB Red Lion PA		13570am	
1400	1500		USA, WJIE Louisville KY		7490am	13595am
1400	1500		USA, WRMI Miami FL		7385am	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		6155na	11560as
			11830na	11970na	11750na	
1400	1500		Zambia, Radio Christian Voice		9865af	
1415	1430		Nepal, Radio	3230as	5005as	6100as
			7165as			
1430	1500		Myanmar, Radio	5040do	5985do	

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1528		Vietnam, Voice of	7285va	9840va	12020va
1500	1530	s	Hungary, Radio Budapest		6025eu	9715eu
1500	1530		Mongolia, Voice of	12085eu		
1500	1530		Sri Lanka, SLBC	6005as	11930as	15745as
1500	1530		UK, BBC World Service		6190af	11860af
			11940af	15400af	15420af	17830af
			21470af	21490af	21660af	
1500	1557		Canada, Radio Canada Intl		15455as	17720as
1500	1559	as	Canada, Radio Canada Intl		9515am	13655am
			17800am			
1500	1600		Anguilla, Caribbean Beacon		11775am	
1500	1600		Australia, Radio	5995pa	6080pa	7260as
			9475as 9590as	11660as	11750as	
1500	1600		Canada, CBC Northern Service		9625do	
1500	1600		Canada, CFRX Toronto ON		6070do	
1500	1600		Canada, CFVP Calgary AB		6030do	
1500	1600		Canada, CKZN St John's NF		6160do	
1500	1600		Canada, CKZU Vancouver BC		6160do	
1500	1600		China, China Radio Intl		7160as	9610va
			9785as 11940af	13685am	13640af	15125af
			17490va	17650va		
1500	1600		Costa Rica, University Network		9725am	11870am
			13750am			
1500	1600		Germany, Deutsche Welle		6140eu	
1500	1600		Germany, Pan American 8C		15650me	
1500	1600		Guam, TWR/KTWR	12105as		
1500	1600		Japan, Radio	6190as	7200am	9505as
			11730va			
1500	1600		Jordan, Radio	11690na		
1500	1600		Myanmar, Radio	5040do	5985do	
1500	1600		New Zealand, Radio NZ Intl		6095pa	
1500	1600		North Korea, Voice of		4405eu	9335eu
			11710na	13760eu	15245am	
1500	1600		Russia, FEBA	7350as		
1500	1600		Russia, Voice of	4940me	4965me	4975me
			7325me	7390as	11500as	11985me
1500	1600		Seychelles, FEBA	7365as		
1500	1600		Singapore, Mediacorp Radio		6150do	
1500	1600		South Africa, Channel Africa		17770af	
1500	1600		UK, BBC World Service		5975as	6195as
			7105as 9740as	12095eu	15190ca	15310as
			15485eu	15565me	17790as	
1500	1600		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
1500	1600		USA, KJES Vado NM		11715na	
1500	1600		USA, KTBN Salt Lake City UT		15590na	
1500	1600		USA, KVOH Rancho Simi CA		17775as	
1500	1600		USA, KWHR Naalehu HI		9930as	11565as
1500	1600		USA, Voice of America		6160af	7125va
			9590af 9760af	9845af	12040af	15550af
1500	1600		USA, WBCQ Kennebunk ME		7415na	9330na
			17495na			
1500	1600		USA, WBOH Newport NC		5920am	
1500	1600		USA, WEWN Birmingham AL		9955na	11530na
			15745na			
1500	1600		USA, WHRA Greenbush ME		17650na	
1500	1600		USA, WHRI Noblesville IN		13760am	15105am
1500	1600		USA, WINB Red Lion PA		13570am	
1500	1600		USA, WJIE Louisville KY		7490am	13595am
1500	1600		USA, WRMI Miami FL		7385am	15725am
1500	1600		USA, WTJC Newport NC		9370na	
1500	1600		USA, WWCR Nashville TN		9475na	12160na
			13845na	15825na		
1500	1600		USA, WWRB Manchester TN		9320na	12170na
1500	1600		USA, WYFR Okeechobee FL		6280na	6155na
			11830na	17750na		
1500	1600		Zambia, Radio Christian Voice		9865af	
1505	1530	as	Austria, Radio Austria Intl		13755ca	
1515	1530		Vatican City, Vatican Radio		12065va	13765va
			15235va			
1530	1545		India, All India Radio		9910as	
1530	1550		Vatican City, Vatican Radio		12065va	13765va
			15235va			
1530	1600		Georgia, Radio Georgia		6180me	
1530	1600		Iran, Voice of the Islamic Rep		9635as	11650as
1530	1600		UAE, AWR Africa	15225as		
1530	1600		UK, BBC World Service		6190af	11940af
			15400af	17830af	21470af	21660af
1540	1555		Austria, Radio Austria Intl		13775ca	
1545	1600	a	Germany, Bible Voice Broadcasting			15680me
1555	1600	as	Austria, Radio Austria Intl		13775ca	

1500 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600	1615		Pakistan, Radio	11570va	11850va	15070va
			15725va			
1600	1627		Czech Rep, Radio Prague Intl		5930eu	17485af
1600	1627		Iran, Voice of the Islamic Rep		9635as	11650as
1600	1628		Vietnam, Voice of	7220as	9550as	11630va
			13740va			
1600	1630		Guam, AWR/KSDA	15235as		
1600	1630		UK, BBC World Service		6190af	11940af
			15400af	17830af	21470af	21660af
1600	1659		Germany, Deutsche Welle		6170as	7225as
			17595as			
1600	1700		Anguilla, Caribbean Beacon		11775am	
1600	1700		Australia, Radio	5995pa	6080pa	7220as
			7260as 9475as	11660as		
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		China, China Radio Intl		9440af	9570af
			9795af 11900af	11940af	13640af	17490va
			17650va			
1600	1700		Costa Rica, University Network		11870am	13750am
1600	1700		Ethiopia, Radio	5990af	7110af	7165af
			9560af 9704af	11800af		
1600	1700		France, Radio France Intl		6010af	6170af
			9730af 11615af	15160af	15605af	
1600	1700	a	Germany, Bible Voice Broadcasting			15680me
1600	1700	DRM	Germany, Deutsche Welle		6140eu	7125eu
1600	1700	a	Greece, Voice of	7475eu	9420eu	15630eu
			17705na			
1600	1700		Jordan, Radio	11690na		
1600	1700	vl	Libya, Voice of Africa		15660af	17695af
1600	1700		New Zealand, Radio NZ Intl		6095pa	
1600	1700		North Korea, Voice of		3560me	9975af
			11735af			
1600	1700		Russia, Voice of	5945me	9405as	11985af
			11985me	12055va		
1600	1700		South Korea, Radio Korea Intl		5975va	9870va
1600	1700		Taiwan, Radio Taiwan Intl		11550as	
1600	1700		UK, BBC World Service		3915as	5975as
			6195as 7160as	9410va	12095va	15190ca
			15310as	15485eu	15565me	17790as
1600	1700		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
1600	1700		USA, KTBN Salt Lake City UT		15590na	
1600	1700		USA, KVOH Rancho Simi CA		17775as	

1600	1700		USA, KWHR Naalehu HI	9930as	
1600	1700		USA, Voice of America	6160va	7125va
			9700va 9760va	9850af	12080af
			13600af 15205af	15225af	15255va
			15410af 15580af	17895af	
1600	1700		USA, WBCQ Kennebunk ME	9330na	17495na
1600	1700		USA, WBOH Newport NC	5920am	
1600	1700		USA, WEWN Birmingham AL	11530va	13615va
			15745va		
1600	1700		USA, WHRA Greenbush ME	17650na	
1600	1700		USA, WHRI Noblesville IN	13760am	15105am
1600	1700		USA, WINB Red Lion PA	13570am	
1600	1700		USA, WJIE Louisville KY	7490am	13595am
1600	1700		USA, WMLK Bethel PA	9465eu	15265al
1600	1700		USA, WRMI Miami FL	9955am	15725am
1600	1700		USA, WTJC Newport NC	9370na	
1600	1700		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1600	1700		USA, WWRB Manchester TN	9320na	12170na
1600	1700		USA, WYFR Okeechobee FL	6085as	6280na
			11830na 11865na	15130eu	17750eu
			18980eu 21455va	21525va	
1600	1700		Zambia, Radio Christian Voice	4965af	
1615	1630		Vatican City, Vatican Radio	15595va	
1630	1700		Egypt, Radio Cairo 9855af		
1630	1700		Guam, AWR/KSDA 11975as	15235as	
1630	1700		UK, BBC World Service	6190af	11940af
			15400af 15420af	17830af	21470af
			21660af		
1630	1700	as	UK, BBC World Service	11860af	21490af
1640	1650	mtwhfa	Turkmenistan, Turkmen Radio	4930as	
1645	1700		Tajikistan, Radio 7245irr		

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700	1715		Israel, Kol Israel 9435na	15640na	17535va
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485af
1700	1728		Vietnam, Voice of 9725au		
1700	1730		France, Radio France Intl	15605af	17605af
1700	1745		UK, BBC World Service	3255af	6005af
			6190af 9630af 15400af	15420af	17830af
			21470af		
1700	1759		Poland, Radio Polonia	7265eu	7285eu
1700	1800		Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, Radio 5995pa	6080pa	7220as
			7260as 9475as 11880as		
1700	1800		Canada, CBC Northern Service	9625do	
1700	1800		Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CFVP Calgary AB	6030do	
1700	1800		Canada, CKZN St John's NF	6160do	
1700	1800		Canada, CKZU Vancouver BC	6160do	
1700	1800		China, China Radio Intl	9570af	11670va
			11900af 11940af	13640af	13830af
			15150af		
1700	1800	DRM	China, China Radio Intl	17510va	
1700	1800		Costa Rica, University Network	11870am	13750am
1700	1800		Egypt, Radio Cairo 9855af		
1700	1800		Eqt Guinea, Radio Africa	7189af	15184al
1700	1800	a	Germany, Bible Voice Broadcasting		15680me
1700	1800	DRM	Germany, Deutsche Welle	6140eu	7125eu
1700	1800		Germany, Overcomer Ministries	17550na	
1700	1800		Japan, Radio 9535am	11970eu	15355af
1700	1800	vl	Libya, Voice of Africa	15660af	17635af
			17695af 17880af		
1700	1800		New Zealand, Radio NZ Intl	6095pa	
1700	1800		Russia, Voice of 9405as	9890eu	11510af
			11675af 11985af		
1700	1800	DRM/as	Russia, Voice of 11675eu		
1700	1800		South Africa, Channel Africa	15265af	
1700	1800	DRM	Sweden, Radio 5955eu		
1700	1800		Taiwan, Radio Taiwan Intl	11550as	
1700	1800		UK, BBC World Service	3915as	5975as
			6195as 7160as 9410eu	9510as	12095va
			15310as 15485eu	15565me	
1700	1800		USA, AFRTS 4319usb	5446usb	5765usb
			6350usb 7507usb	10320usb	12133usb
			12133usb 13362usb	13855usb	
1700	1800		USA, KTBN Salt Lake City UT	15590na	
1700	1800		USA, KVOH Rancho Simi CA	17775as	
1700	1800		USA, KWHR Naalehu HI	9930as	
1700	1800		USA, Voice of America	6020va	6160va
			7125va 9640va	9700va	9760va
			9850af 15255va 15410af	15580af	
1700	1800		USA, WBCQ Kennebunk ME	9330na	17495na
1700	1800		USA, WBOH Newport NC	5920am	
1700	1800		USA, WEWN Birmingham AL	11530va	13615va
			15685va 15745va		
1700	1800		USA, WHRA Greenbush ME	17650na	
1700	1800		USA, WHRI Noblesville IN	13670am	15665am
1700	1800		USA, WINB Red Lion PA	13570am	
1700	1800		USA, WJIE Louisville KY	7490am	13595am
1700	1800		USA, WMLK Bethel PA	9465eu	15265al
1700	1800		USA, WRMI Miami FL	9955am	15725am
1700	1800		USA, WTJC Newport NC	9370na	
1700	1800		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1700	1800		USA, WWRB Manchester TN	9320na	12170na
1700	1800		USA, WYFR Okeechobee FL	17795eu	18980eu
			21455eu		
1700	1800		Zambia, Radio Christian Voice	4965af	
1715	1730		Vatican City, Vaticon Radio	4005va	5890va
			7250va 9645va	15595va	
1730	1745	mtwhf	UK, United Nations Radio	7170af	15495me
			17810af		
1730	1800		Belgium, Radio V aanderen Intl	9925eu	11640eu
1730	1800		Bulgaria, Radio 9500eu	11500eu	
1730	1800		Georgia, Radio Georgia	11910eu	
1730	1800		Guam, AWR/KSDA 9385me		
1730	1800		Liberia, ELWA 4760do		
1730	1800	vl	Philippines, Radio Pilipinas	11720me	15190me
			17720me		
1730	1800		Swaziland, TWR 3200af	9500af	
1730	1800	mtwhfa	Sweden, Radio 6065eu		
1730	1800	mtwhf	USA, Voice of America	11975af	17895af
1730	1800		Vatican City, Vatican Radio	13765af	15570af
			17515af		
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa	
1745	1755	mtwhfa	Turkmenistan, Turkmen Radio	4930as	
1745	1800		Bangladesh, Bangla Betar	7185me	9550me
1745	1800		India, All India Radio	7410eu	9445af
			9950eu 11620eu	11935af	13605af
			15075af 15155af	17670af	
1745	1800		UK, BBC World Service	3255af	6190af
			15400af 15420af	17830af	21470af

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1810		Zanzibar, Voice of Tanzania	11734do	
1800	1828		Vietnam, Voice of 11630va	13740va	
1800	1830		Azerbaijan, Voice of 6112me		
1800	1830		Egypt, Radio Cairo 9855af		
1800	1830	a	Germany, B ble Voice Broadcasting		15680me
1800	1830	s	Germany, Universal Life	15675af	
1800	1830		South Africa, AWR Africa	3215af	3345af
			12130af		
1800	1830		UK, BBC World Service	3255af	5975as
			6190af 6195eu 9410eu	9510as	12095me
			15310me 15400af	15420af	17830af
			21470af		
1800	1850		New Zealand, Radio NZ Intl	6095pa	
1800	1856		Romania, Radio Romania Intl	11940eu	15380eu
1800	1859		Canada, Radio Canada Intl	9530af	11770af
			13730af 15255as		
1800	1900		Anguilla, Caribbean Beacon	11775am	
1800	1900	mtwhf	Argentina, RAE 9690eu	15345eu	
1800	1900		Australia, Radio 6080pa	7220as	7240va
			7260as 9475as 11880as		
1800	1900		Australia, Voice Intl 6115as		
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	11670va	11940va
			13640va 13760va	15150af	
1800	1900	DRM	China, China Radio Intl	17510va	
1800	1900		Costa Rica, University Network	11870am	13750am
1800	1900		Eqt Guinea, Radio Africa	7189af	15184al
1800	1900		Germany, Overcomer Ministries	17550na	
1800	1900		Greece, Voice of 7475eu	9420eu	15630eu
			17705eu		
1800	1900		India, All India Radio	7410eu	9445af
			9950eu 11620eu	11935af	13605af
			15075af 15155af	17670af	
1800	1900		Latvia, Laser Radio 9290eu		
1800	1900		Liberia, ELWA 4760do		
1800	1900	vl	Libya, Voice of Africa	15205af	15660af
			17635af 17695af		
1800	1900		Netherlands, Radio 6020af	9895af	11655af
1800	1900	vl	Philippines, Radio Pilipinas	11720me	15190me
			17720me		
1800	1900		Russia, Voice of 9480af	9745eu	9820eu
			11510eu		
1800	1900		Sierra Leone, Radio UNAMSIL	6139af	
1800	1900		Swaziland, TWR 3200af	9500af	
1800	1900		Taiwan, Radio Taiwan Intl	3965eu	
1800	1900		USA, AFRTS 4319usb	5446usb	5765usb
			6350usb 7507usb	10320usb	12133usb
			12133usb 13362usb	13855usb	
1800	1900		USA, KJES Vado NM	15385na	

1800	1900		USA, KTBN Salt Lake City UT	15590na	
1800	1900		USA, KVOH Rancho Simi CA	17775as	
1800	1900		USA, Voice of America	6040va	9760va
			9770va	9850af	11975af	15410af
			15580af	17895af		
1800	1900		USA, WBCQ Kennebunk ME	9330na	17495na
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	11530va	13615va
			15685va	15745va	
1800	1900		USA, WHRA Greenbush ME	17650na	
1800	1900		USA, WHRI Noblesville IN	13760am	15665am
1800	1900		USA, WINB Red Lion PA	13570am	
1800	1900		USA, WJIE Louisville KY	7490am	13595am
1800	1900		USA, WMLK Bethel PA	9465eu	15265al
1800	1900		USA, WRMI Miami FL	9955am	15725am
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCR Nashville TN	9475na	12160na
			13845na	15825na	
1800	1900		USA, WWRB Manchester TN	9320na	12170na
1800	1900		USA, WYFR Okeechobee FL	13700eu	17795eu
			18980eu		
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1800	1900		Zambia, Radio Christian Voice	4965af	
1815	1900		Bangladesh, Bangla Betar	7185eu	9550eu
			15520eu		
1830	1855		Greece, Voice of	12105eu	
1830	1900		Georgia, Radio Georgia	11760eu	
1830	1900		Serbia & Montenegro, Intl Radio	6100eu	
1830	1900		South Africa, AWR Africa	12130af	
1830	1900		Turkey, Voice of	9785eu	
1830	1900		UK, BBC World Service	3255af	6055af
			6190af	9630af	15400af	15420af	17820af
			21470af				
1845	1900	mtwhfa	Albania, Radio Tirana Intl	7210eu	9520eu
1845	1900		Congo, RTV Congolaise	4765af	5985af
1851	1900		New Zealand, Radio NZ Intl	9845pa	

1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

1900	1915		Congo, RTV Congolaise	4765af	5985af
1900	1920		Turkey, Voice of	9785eu	
1900	1925		Israel, Kol Israel	15615eu	15640eu	17535eu
1900	1928		Vietnam, Voice of	11630va	13740va	
1900	1930	s	Germany, Universal Life	13820me	
1900	1930	mtwhfa	Hungary, Radio Budapest	3975eu	6025eu
			11720eu		
1900	1930	vl	Philippines, Radio Pilipinas	11720me	15190me
			17720me		
1900	1945		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af	13605af
			15075af	15155af	17670af	
1900	1950		New Zealand, Radio NZ Intl	9845pa	
1900	1959		Germany, Deutsche Welle	13590af	15545af
			17770af		
1900	2000		Anguilla, Caribbean Beacon	11775am	
1900	2000		Australia, Radio	6080pa	7220as	7240va
			9500as	11650as	11880as	
1900	2000		Australia, Voice Intl	6115as	
1900	2000		Canada, CBC Northern Service	9625do	
1900	2000		Canada, CFRX Toronto ON	6070do	
1900	2000		Canada, CFVP Calgary AB	6030do	
1900	2000		Canada, CKZN St John's NF	6160do	
1900	2000		Canada, CKZU Vancouver BC	6160do	
1900	2000		Canada, Radio Canada Intl	17765am	
1900	2000		China, China Radio Intl	7145af	9430af
			9585af	11940af	13760va	
1900	2000	DRM	China, China Radio Intl	12080va	
1900	2000		Costa Rica, University Network	11870am	13750am
1900	2000		Eqt Guinea, Radio Africa	7189af	15184al
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do
1900	2000	vl/asmtwh	Italy, IRRS	5755va	
1900	2000		Latvia, Laser Radio	9290eu	
1900	2000		Liberia, ELWA	4760do	
1900	2000	vl	Libya, Voice of Africa	15205af	15315af
1900	2000		Malaysia, Radio Malaysia	7295do	
1900	2000		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
1900	2000		Netherlands, Radio	7120af	9895af	11655af
			17810af		
1900	2000	as	Netherlands, Radio	15315na	17660na	17735na
1900	2000		Nigeria, Radio/Enugu	6025do	
1900	2000		Nigeria, Radio/Ibadan	6050do	
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do
1900	2000		Nigeria, Radio/Lagos	3326da	4990da
1900	2000		North Korea, Voice of	4405eu	13760eu
			15245eu		
1900	2000		Russia, Voice of	7310eu	7440eu	9890eu
1900	2000		Sierra Leone, Radio UNAMSIL	6139af	
1900	2000		Sierra Leone, SLBS	3316do	
1900	2000	vl	Solomon Islands, SIBC	5020do	9545do
1900	2000		South Africa, Channel Africa	3345af	
1900	2000		South Korea, Radio Korea Intl	5975va	7275eu
1900	2000	a	Sri Lanka, SLBC	6010eu	
1900	2000		Swaziland, TWR	3200af	
1900	2000		Thailand, Radio	7155eu	
1900	2000		Uganda, Radio	4976da	5026do	7196do
1900	2000		UK, BBC World Service	3255af	6005af
			6190af	6195eu	9410eu	9630af	12095af
			15310me	15400af	17830af	
1900	2000		USA, AFRTS	4319usb	5446usb	5765usb
			6350usb	7507usb	10320usb	12133usb
			12133usb	13362usb	13855usb	
1900	2000		USA, KAIJ Dallas TX	13815va	
1900	2000		USA, KJES Vado NM	15385na	
1900	2000		USA, KTBN Salt Lake City UT	15590na	
1900	2000		USA, KVOH Rancho Simi CA	17775as	
1900	2000		USA, Voice of America	4950af	6040va
			9760va	9770af	9850af	11975af
			13670af	15410va	15445af	15580af
			17895af			
1900	2000	mtwhf	USA, Voice of America	5965va	9840va
			11720va	11970va	13725va	15205va
1900	2000		USA, WBCQ Kennebunk ME	7415na	9330na
			17495na		
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Birmingham AL	11530va	13615va
			15685va	15745va	
1900	2000		USA, WHRA Greenbush ME	17650na	
1900	2000		USA, WHRI Noblesville IN	13760am	15665am
1900	2000		USA, WINB Red Lion PA	13570am	
1900	2000		USA, WJIE Louisville KY	7490am	13595am
1900	2000		USA, WMLK Bethel PA	9465eu	15265al
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCR Nashville TN	9475na	12160na
			13845na	15825na	
1900	2000		USA, WYFR Okeechobee FL	6085af	7350eu
			15130eu	17750eu	17795va	17845va
			11890va			
1900	2000	vl	Vanuatu, Radio	4960do	7260do
1900	2000		Zambia, Radio Christian Voice	4965af	
1900	2000	vl	Zimbabwe, ZBC Corp	5975do	
1915	1925		Rwanda, Radio	6005do	
1930	2000	t h	Belarus, Radio Belarus Intl	7105eu	7210eu
1930	2000		Belgium, Radio Vlaanderen Intl	9925eu	
1930	2000	vl	Georgia, Radio Georgia	11760me	
1930	2000	mtw	Germany, AWR	15175eu	
1930	2000		Iran, Voice of the Islamic Rep	9800af	11750eu
1930	2000		Nigeria, Voice of	7255af	15120af	17800af
1930	2000		Papua New Guinea, NBC	4890do	9675irr
1930	2000		Sweden, Radio	6065va	
1930	2000		USA, Voice of America	7260me	9680me
			13635me		
1935	1955		Italy, RAI Intl	5970eu	9605eu
1945	2000	mtwhfa	Armenia, Voice of	4810eu	9960eu
1951	2000		New Zealand, Radio NZ Intl	11725pa	

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2027		Czech Rep, Radio Prague Intl	5930eu	11600va
2000	2027		Iran, Voice of the Islamic Rep	9800af	11750eu
2000	2030	f	Germany, Universal Life	5775va	
2000	2030	vl/asmtwh	Italy, IRRS	5775va	
2000	2030	vl	Libya, Voice of Africa	11635af	15315af
2000	2030		Mongolia, Voice of	12015eu	
2000	2030		USA, Voice of America	4950af	6040va
			6095va	9760va	9770va	9850af
			11855af	11975af	13670af	15410af
			15445af	17745af		
2000	2030		Vatican City, Vatican Radio	9660eu	11625eu
			13765eu		
2000	2030		Vietnam, Voice of	7220as	9550as	
2000	2045		Swaziland, TWR	3200af	
2000	2050		New Zealand, Radio NZ Intl	11725pa	
2000	2059		Canada, Radio Canada Intl	5850eu	7235eu
			11690af	13700eu	17870eu	
2000	2059		Germany, Deutsche Welle	7130af	13820af
			15205af		
2000	2059	mtwhf	Spain, Radio Exterior Espana	9570va	15290va
2000	2100		Anguilla, Caribbean Beacon	11775am	
2000	2100		Australia, ABC NT Alice Springs	2310do	4835irr
2000	2100		Australia, ABC NT Katherine	2485do	
2000	2100		Australia, ABC NT Tennant Creek	2325do	
2000	2100		Australia, Radio	6080pa	7220as	9500as
			11650as	11880as		
2000	2100		Australia, Voice Intl	6115as	
2000	2100		Canada, CBC Northern Service	9625da	
2000	2100		Canada, CFRX Toronto ON	6070da	
2000	2100		Canada, CFVP Calgary AB	6030da	
2000	2100		Canada, CKZN St John's NF	6160da	
2000	2100		Canada, CKZU Vancouver BC	6160do	
2000	2100		Canada, Radio Canada Intl	17765am	
2000	2100		China, China Radio Intl	7145eu	9440eu

Shortwave Guide

			9600eu 13760af	11640va	11940af	13630af
2000	2100	DRM	China, China Radio Intl		12080va	
2000	2100		Costa Rica, University Network		13750am	
2000	2100		Eqt Guinea, Radio Africa		7189af	15184al
2000	2100	vl	Ghana, Ghana BC Corp		3366do	4915do
2000	2100		Indonesia, Voice of	9525as	11785as	15150al
2000	2100		Latvia, Laser Radio	9290eu		
2000	2100		Liberia, ELWA	4760do		
2000	2100		Malaysia, Radio Malaysia		7295do	
2000	2100		Namibia, Namibian BC Corp 6060af		3270af	3290af
2000	2100		Netherlands, Radio 17810af	7120af	9895af	11655af
2000	2100	as	Netherlands, Radio	15315na	17660na	17735na
2000	2100		Nigeria, Radio/Enugu		6025do	
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	15120af	17800af
2000	2100		Papua New Guinea, NBC		4890do	9675irr
2000	2100		Russia, Voice of	7310eu	11980eu	
2000	2100		Sierra Leone, Radio UNAMSIL		6139af	
2000	2100		Sierra Leone, SLBS	3316do		
2000	2100	vl	Solomon Islands, SIBC		5020do	9545do
2000	2100		South Africa, AWR Africa		7170af	
2000	2100		Uganda, Radio	4976do	5026do	7196do
2000	2100		UK, BBC World Service 6190af 6195eu 15400af	9410eu 17830af	3255af 9630af	6005af 12095af
2000	2100		USA, AFRTS 6350usb 12133usb	4319usb 7507usb 13362usb	5446usb 10320usb 13855usb	5765usb 12133usb
2000	2100		USA, KAIJ Dallas TX	13815va		
2000	2100		USA, KTBN Salt Lake City UT		15590na	
2000	2100		USA, KVOH Rancho Simi CA		17775as	
2000	2100		USA, KWHR Naalehu HI		11565as	
2000	2100		USA, WBCQ Kennebunk ME 17495na		7415na	9330na
2000	2100		USA, WBOH Newport NC		5920am	
2000	2100		USA, WEWN Birmingham AL 15745va		11530va 17595va	13615va
2000	2100		USA, WHRA Greenbush ME		17650na	
2000	2100		USA, WHRI Noblesville IN		13760am	15665am
2000	2100		USA, WINB Red Lion PA		13570am	
2000	2100		USA, WJIE Louisville KY		7490am	13595am
2000	2100		USA, WMLK Bethel PA		9465eu	15265al
2000	2100		USA, WRMI Miami FL		9955am	15725am
2000	2100		USA, WTJC Newport NC		9370na	
2000	2100		USA, WWCR Nashville TN 13845na		9475na 15825na	12160na
2000	2100		USA, WWRB Manchester TN		9320na	12170na
2000	2100		USA, WYFR Okeechobee FL 17750eu		7350sa 17795eu	17575eu 18980eu
2000	2100	vl	Vanuatu, Radio	4960do	7260do	
2000	2100		Zambia, Radio Christian Voice		4965af	
2000	2100	vl	Zimbabwe, ZBC Corp		5975do	
2005	2100		Syria, Radio Damascus		12085eu	13610eu
2025	2045		Italy, RAI Intl	6185af	9570af	11880af
2030	2045		Thailand, Radio	9680eu		
2030	2058		Vietnam, Voice of 13740va	9725va	11630va	11775va
2030	2100	t h	Belarus, Radio Belarus Intl		7105eu	7210eu
2030	2100		Cuba, Radio Havana		9505ca	11760na
2030	2100		Egypt, Radio Cairo	15375af		
2030	2100	vl	Libya, Voice of Africa		11635af	
2030	2100		Turkey, Voice of	7170as		
2030	2100	f	UK, Wales Radio Intl	7150eu	7325eu	
2030	2100	as	USA, Voice of America 11975af 17745af	13670af	4950af 15410af	9850af 15445af
2030	2100		Uzbekistan, Radio Tashkent Intl 11905eu		5025eu	9545eu
2040	2100	mtwhfa	Armenia, Voice of	4810eu	9960eu	
2040	2100		Vatican City, Vatican Radio		6185eu	
2045	2100		India, All India Radio 9910au	9950au	7410eu 11620eu	9445eu 11715au
2050	2100		Vatican City, Vatican Radio 5890eu	7250eu	4005eu	5890eu
2051	2100		New Zealand, Radio NZ Intl		15720pa	
2055	2100	DRM	Vatican City, Vatican Radio		9800eu	

2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

2100	2115	DRM	China, China Radio Intl		12080va	
2100	2120		Turkey, Voice of	7170as		
2100	2130		Australia, ABC NT Katherine		2485do	
2100	2130		Australia, ABC NT Tennant Creek		2325do	
2100	2130		Australia, Radio 11650as	7220as 11880as	9500as 17715pa	9660pa 21740as
2100	2130		China, China Radio Intl		11640af	13630af
2100	2130		Cuba, Radio Havana		9505ca	11760na
2100	2130	mtwhfa	Hungary, Radio Budapest		6025va	11830va
2100	2130		Serbia & Montenegro, Intl Radio		6100eu	
2100	2130		South Korea, Radio Korea Intl		3955eu	
2100	2130	DRM	Vatican City, Vatican Radio		9800eu	
2100	2157	DRM	Netherlands, Radio	15150eu		
2100	2159	DRM	Canada, Radio Canada Intl		9800na	
2100	2159		Germany, Deutsche Welle 15205af		9440af	11865af
2100	2159	as	Spain, Radio Exterior Espana		9570eu	9640eu
2100	2200		Anguilla, Caribbean Beacon		11775am	
2100	2200		Australia, ABC NT Alice Springs		2310do	4835irr
2100	2200		Austria, AWR Europe		15130af	
2100	2200		Bulgaria, Radio	5800eu	7500eu	
2100	2200		Canada, CBC Northern Service		9625do	
2100	2200		Canada, CFRX Toronto ON		6070do	
2100	2200		Canada, CFVP Calgary AB		6030do	
2100	2200		Canada, CKZN St John's NF		6160do	
2100	2200		Canada, CKZU Vancouver BC		6160da	
2100	2200		Costa Rica, University Network		13750am	
2100	2200		Egypt, Radio Cairo	15375af		
2100	2200		Eqt Guinea, Radio Africa		7189af	15184al
2100	2200	vl	Ghana, Ghana BC Corp		3366do	4915do
2100	2200		Guyana, Vo ce of	3290do	5950do	
2100	2200		India, All India Radio 9910au	9950au	7410eu 11620eu	9445eu 11715au
2100	2200		Japan, Radio 11855af	6035pa	6055eu 17825pa	6180eu 21670pa
2100	2200		Latvia, Laser Radio	9290eu		
2100	2200		Liberia, ELWA	4760do		
2100	2200		Malaysia, Radio Malaysia		7295do	
2100	2200		Namibia, Namibian BC Corp 6060af		3270af	3290af
2100	2200		New Zealand, Radio NZ Intl		15720pa	
2100	2200		Nigeria, Radio/Enugu		6025do	
2100	2200		Nigeria, Radio/Ibadan		6050do	
2100	2200		Nigeria, Radio/Kaduna		4770do	6090do
2100	2200		Nigeria, Radio/Lagos		3326do	4990do
2100	2200		Nigeria, Voice of	7255af	15120af	17800af
2100	2200		North Korea, Voice of 15245eu		4405eu	13760eu
2100	2200		Papua New Guinea, NBC		4890do	9675irr
2100	2200		Sierra Leone, Radio UNAMSIL		6139af	
2100	2200		Sierra Leone, SLBS	3316do		
2100	2200		Syria, Radio Damascus		12085eu	13610eu
2100	2200		UK, BBC World Service 5975ca 6195va 17830af	6005af 9410eu	3255af 12095ca	5965as 15400af
2100	2200		Ukraine, Radio Ukraine Intl		7420eu	
2100	2200		USA, AFRTS 6350usb 12133usb	4319usb 7507usb 13362usb	5446usb 10320usb 13855usb	5765usb 12133usb
2100	2200		USA, KAIJ Dallas TX	13815va		
2100	2200		USA, KTBN Salt Lake City UT		15590na	
2100	2200		USA, KVOH Rancho Simi CA		17775as	
2100	2200		USA, KWHR Naalehu HI		11565as	
2100	2200		USA, Voice of America 15410af		11975af 15445af	13670af
2100	2200		USA, WBCQ Kennebunk ME 9330na		5105na 17495na	7415na
2100	2200		USA, WBOH Newport NC		5920am	
2100	2200		USA, WEWN Birmingham AL 15745va		11530va 17595va	13615va
2100	2200		USA, WHRA Greenbush ME		17650na	
2100	2200		USA, WHRI Noblesville IN		13770am	15665am
2100	2200		USA, WINB Red Lion PA		13570am	
2100	2200		USA, WJIE Louisville KY		7490am	13595am
2100	2200		USA, WMLK Bethel PA		9465eu	15265al
2100	2200		USA, WRMI Miami FL		9955am	15725am
2100	2200		USA, WTJC Newport NC		9370na	
2100	2200		USA, WWCR Nashville TN 13845na		9475na 15825no	12160na
2100	2200		USA, WWRB Manchester TN		9320na	12170na
2100	2200		USA, WYFR Okeechobee FL 17595sa 18980va	17795eu	6155sa 17845va	7350eu 18930va
2100	2200	vl	Vanuatu, Radio	4960do	7260do	
2100	2200		Zambia, Radio Christian Voice		4965af	
2100	2200	vl	Zimbabwe, ZBC Corp		5975do	
2115	2130		UK, BBC World Service		11675ca	15390ca
2115	2200		Egypt, Radio Cairo	9990eu		
2130	2145	tf	UK, BBC World Service		11680ca	
2130	2156		Romania, Radio Romania Intl 11750eu		7285eu 15285eu	9725eu
2130	2200	mtwhfa	Albania, Radio Tirana Intl		7130eu	9540eu
2130	2200		Australia, ABC NT Katherine		5025do	
2130	2200		Australia, ABC NT Tennant Creek		4910do	
2130	2200		Australia, Radio 12080va	9660pa 17715pa	11650as 17585pa	11880va 21740as
2130	2200		Guam, AWR/KSDA	11850as	11980as	
2130	2200		Sweden, Radio	6065va	9880va	

2130	2200		Uzbekistan, Radio Tashkent Intl 11905eu	5025eu	9545eu

2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

2200	2205		Syria, Radio Damascus	12085eu	13610eu
2200	2229		Canada, Radio Canada Intl 15170am	5960am	13785am
2200	2229		Germany, Deutsche Welle	9800na	
2200	2230		Belgium, Radio Vlaanderen Intl	11635na	
2200	2230	vl	Croatia, Croatian Radio	9925sa	
2200	2230		India, All India Radio 9910au 9950au	7410eu 11620eu	9445eu 11715au
2200	2230		Liberia, ELWA 4760do		
2200	2230	smtwhf	Serbia & Montenegro, Intl Radio	7230pa	
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2250		Turkey, Voice of 9830va		
2200	2257	DRM	Netherlands, Radio 15525na		
2200	2259		Germany, Deutsche Welle	7115as	9720as
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek	4910do	
2200	2300		Australia, Radio 11880va 17715pa	13620pa 17585pa	15320pa 21740as
2200	2300		Canada, CBC Northern Service	9625do	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300		China, China Radio Intl	9880eu	
2200	2300		Costa Rica, University Network	13750am	
2200	2300		Eqt Guinea, Radio Africa	7189af	15184al
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3290do		
2200	2300		Malaysia, Radio Malaysia	7295do	
2200	2300		Namibia, Namibian BC Corp 6060af	3270af	3290af
2200	2300		New Zealand, Radio NZ Intl	15720pa	
2200	2300		Nigeria, Radio/Enugu	6025do	
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos	3326do	4990do
2200	2300		Nigeria, Voice of 7255af	15120af	17800af
2200	2300		Papua New Guinea, NBC	4890do	9675irr
2200	2300		Sierra Leone, Radio UNAMSIL	6139af	
2200	2300		Sierra Leone, SLBS 3316do		
2200	2300	vl	Solomon Islands, SIBC	5020do	9545do
2200	2300		Taiwan, Radio Taiwan Intl	15600eu	
2200	2300		UK, BBC World Service 7105as 9605as 9740as 17830af	5965as 11955as	6195va 15400af
2200	2300		USA, AFRTS 4319usb 6350usb 7507usb 12133usb 13362usb	5446usb 10320usb	5765usb 12133usb 13855usb
2200	2300		USA, KAIJ Dallas TX 13815va		
2200	2300		USA, KTBN Salt Lake City UT	15590na	
2200	2300		USA, KVOH Rancho Simi CA	17775as	
2200	2300		USA, KWHR Naalehu HI	17510as	
2200	2300		USA, Voice of America 15290va 15305va	7215va 17740va	15185va 17820va
2200	2300		USA, Voice of America 15290va 15305va	7215va 17740va	15185va 17820va
2200	2300		USA, WBCQ Kennebunk ME 9330na 17495na	5105na	7415na
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL 13615na 15745na	9355na	9975af
2200	2300		USA, WHRA Greenbush ME	17650na	
2200	2300		USA, WHRI Noblesville IN	9495am	13770am
2200	2300		USA, WINB Red Lion PA	13570am	
2200	2300		USA, WJIE Louisville KY	7490am	13595am
2200	2300		USA, WMLK Bethel PA	15265eu	
2200	2300		USA, WRMI Miami FL	9955am	15725am
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN 13845na	7465na	12160na
2200	2300		USA, WWRB Manchester TN 6890na	5050na	5085na
2200	2300		USA, WYFR Okeechobee FL 15770na	11740na	15695na
2200	2300	vl	Vanuatu, Radio 4960do	7260do	
2200	2300		Zambia, Radio Christian Voice	4965af	
2205	2230		Italy, RAI Intl 11895as		
2229	2259		Canada, Radio Canada Intl 12035as	9525as	11810as
2230	2257		Czech Rep, Radio Prague Intl	7345na	9415na
2230	2300		Australia, HCJB 15525as		
2230	2300		Germany, Bible Voice Broadcasting		5925me
2245	2300		India, All India Radio 11620as 11645as	9705as 13605as	9950as

2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek	4910do	
2300	0000		Australia, HCJB 15525as		
2300	0000		Bulgaria, Radio 9700na	11700na	
2300	0000		Canada, CBC Northern Service	9625do	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		China, China Radio Intl 13680ca	5990na	6145am
2300	0000		Costa Rica, University Network	13750am	
2300	0000		Egypt, Radio Cairo 11725na		
2300	0000		Germany, Bible Voice Broadcasting		5925me
2300	0000	DRM	Germany, Deutsche Welle	9800as	
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3290do		
2300	0000		India, All India Radio 11620as 11645as	9705as 13605as	9950as
2300	0000		Malaysia, Radio Malaysia	7295do	
2300	0000		Namibia, Namibian BC Corp 6060af	3270af	3290af
2300	0000		New Zealand, Radio NZ Intl	15720pa	
2300	0000		Papua New Guinea, NBC	4890do	9675irr
2300	0000		Sierra Leone, Radio UNAMSIL	6139af	
2300	0000		Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vl	Solomon Islands, SIBC	5020do	9545do
2300	0000		USA, AFRTS 4319usb 6350usb 7507usb 12133usb 13362usb	5446usb 10320usb	5765usb 12133usb 13855usb
2300	0000		USA, KAIJ Dallas TX 13815va		
2300	0000		USA, KTBN Salt Lake City UT	15590na	
2300	0000		USA, KVOH Roncho Simi CA	17775as	
2300	0000		USA, KWHR Naalehu HI	17510as	
2300	0000		USA, Voice of America 12055as 13755as	9725as 15145as	11965as
2300	0000		USA, WBCQ Kennebunk ME 9330na	5105na	7415na
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL 13615na 15745na	9355na	9975af
2300	0000		USA, WHRA Greenbush ME	7580va	
2300	0000		USA, WHRI Noblesville IN	9495am	13770am
2300	0000		USA, WINB Red Lion PA	9320am	
2300	0000		USA, WJIE Louisville KY	7490am	13595am
2300	0000		USA, WRMI Miami FL	7385am	9955am
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000		USA, WWCR Nashville TN 13845na	7465na	12160na
2300	0000		USA, WWRB Manchester TN 6890na	5050na	5085na
2300	0000		USA, WYFR Okeechobee FL 11855na 15255na 17750na	5985na	11740na
2300	0000		USA, WYFR Okeechobee FL 17750na	5985sa	11855ca
2300	0000	vl	Vanuatu, Radio 4960do	7260do	
2300	0000		Zambia, Radio Christian Voice	4965af	
2300	2306		Nigeria, Radio/Lagos	3326do	
2300	2330		Australia, Radio 9660pa 15320as 17585pa 21740as	12080va 17715as	13620as 17795va
2300	2330	vl	Croatia, Croatian Radio	9925sa	
2300	2330		Cuba, Radio Havana	9550ca	
2300	2330		UK, BBC World Service 6195as 9605as 9740as 15280as	3915as 11945as	5965as 11955as
2300	2356		Romania, Radio Romania Intl 9645au 11940au	7280au	9590au
2300	2359		Canada, Radio Canada Intl	5960am	13785am
2300	2359		Germany, Deutsche Welle 15135as	7115as	9890as
2305	2330	as	Austria, Radio Austria Intl	9870sa	
2315	2330		Austria, Radio Austria Intl	9870sa	
2330	0000		Australia, Radio 9660pa 15320as 17585pa 17795as 21740as	12080va 17715pa	13620as 17750as
2330	0000		Lithuania, Radio Vilnius	9875na	
2330	0000		UK, BBC World Service 6035as 6195as 9605as 11955as 15280as	3915as 9740as	5965as 11945as
2330	0000		USA, Voice of America 11805as 15145as 15205as	7225as 11965as	7260as 12055as 13725as
2330	2358		Vietnam, Voice of 9840as	12020as	
2330	2359	DRM	Sweden, Radio 9800na		
2335	0000	as	Austria, Radio Austria Intl	9870sa	

Selected Shortwave Guide Programming

Headnotes:

1. **Deutsche Welle** is heard in North America (at least in upstate NY).
   0400-0500* 7225, **9630**, 11945 kHz.
   0500-0500* **9630**, 9770 kHz.
   0600-0700* 6140, **7170** kHz.
   1900-2000 **13590**, **15545**, 17770 kHz.
   2000-2100 13820, **15205** kHz.
   2100-2200* **11865**, **15205** kHz.
2. Best observed frequencies are in bold. *The Guide* includes listings for the broadcasts marked with an *. The 1900 broadcast is identical to the 2100. The 2000 is identical to that of the 0400 and 0600 broadcasts, except that programs air one day earlier in the 2000
3. **BBC(am)** indicates the **BBC World Service** Americas stream.
4. **Please report errors/corrections to** *johnfigliozzi@monitoringtimes.com* Stations please send schedules to the same address.

0000 UTC/ 8pm E/5pm P - Page 45 Freqs

SUNDAY
0000 .... R. Canada Int. The World This Weekend (CBC weekend news magazine)
..... R. Netherlands Europe Unzipped (the week's events in Europe, some unusual)
..... WBCQ(7415kHz) The Peacock Project (a variety of music eras, styles and talk)
0005 .... R. Prague Magazine (refer to 0105 S)
..... R. Australia Keys to Music (Graham Abbott with how to enjoy classical music)
0006 .... BBCWS(am) Top of the Pops (the British rock & pop charts)
0010 .... R. Japan Hello from Tokyo (listener letters, music & short features)
..... R. Prague Letter from Prague (refer to 0110 S)
0012 .... R. New Zealand Int. .....The Week in Parliament (NZ political news)
0015 .... R. Prague One on One (refer to 0115 S)
0018 .... R. Netherlands Insight (Rob Green comments on the past week's headlines)
0030 .... R. Canada Int. Radio Nomad (stories, drama, music & sound around a theme)
..... R. Netherlands Amsterdam Forum (interactive discussion of topical issues)
0033 .... R. New Zealand Int. .....Spectrum (people, places & events around NZ)
0035 .... R. Ext. de Espana Radio Waves (a weekly program for radio enthusiasts)

MONDAY-FRIDAY
0000 .... R. New Zealand Int. .....Midday Report (news updates & in-depth reports)

MONDAY
0000 .... R. Canada Int. The World This Weekend (refer to 0000 S)
..... R. Netherlands Wide Angle (a single issue examined in-depth)
..... WBCQ(7415kHz) Radio New York International (Johnny Lightning & classic rock)
0005 .... R. Prague Mailbox (refer to 0105 M)
0006 .... BBCWS(am) Everywoman (a weekly magazine about the world's women)
0010 .... R. Australia Awaye! (Aboriginal arts & culture program)
..... R. Japan Weekend Japanology (a multifaceted exploration of Japan)
0015 .... R. Prague Czech Books (or) Encore (or) Magic Carpet (refer to 0115 M)
0018 .... R. Netherlands Insight (refer to 0018 S)
0022 .... R. Netherlands The Week Ahead (on RN)
0030 .... R. Canada Int. Maple Leaf Mailbag (Ian Jones w/listener mail; CIDX Report fortnightly)
..... R. Netherlands Vox Humana (stories about the power of the "human voice")
0032 .... BBCWS(am) Westway Omnibus (the previous two episodes of this radio light drama)
0040 .... R. Ext. de Espana Radio Club (rebroadcast of A 0035 program)
0054 .... R. Japan Japan Music Scene

TUESDAY-SATURDAY
0000 .... R. Canada Int. The World At Six (the CBC's flagship evening newscast)
..... R. Netherlands Newsline (news, anclysis & background reports)
0010 .... R. Japan Songs for Everyone
0015 .... R. Ext. de Espana Spain Day by Day (daily magazine of reports, music & features)
..... R. Japan 44 Minutes (daily current affairs magazine about Japan & Asia)
0030 .... R. Canada Int. As It Happens (interviews with eyewitnesses to news in the making)

TUESDAY
0006 .... BBCWS(am) Dirty Wars (bio/chem weapons—Aug 31st/ Sept. 8th)
..... Documentaries (15th/22nd/29th)
0010 .... R. Australia The Science Show ("a science program about ideas, not just facts")
0030 .... R. Netherlands The Research File (the relevance of science to all our lives)
0032 .... BBCWS(am) The Music Feature (features & documentaries on current musical genres)

WEDNESDAY
0006 .... BBCWS(am) Masterpiece (exploring major cultural ideas & great artistic endeavors)
0010 .... R. Australia The National Interest (Terry Lane's round-up of the week's major issues)
0030 .... R. Netherlands EuroQuest (a magazine placing Europe in context)
0032 .... BBCWS(am) White Label (forthcoming pop music releases)

THURSDAY
0000 .... WBCQ(7415) Radio Six International (Tony Currie w/small & independent label music)
0006 .... BBCWS(am) The Real Far East (Russia, China, Korea, Alaska in 21st century-exc. 30th)
..... Documentary (30th)
0010 .... R. Australia Background Briefing (ABC Radio's award-winning documentary program)
0015 .... R. Prague Czechs in History (or) Czechs Today (fortnightly)
..... Spotlight (traveling around the Czech Republic)(fortnightly)
0030 .... R. Canada Int. Dispatches (documentaries on international issues)
..... R. Netherlands The Weekly Documentary (RN's award-winning sound essays)
0032 .... BBCWS(am) Charlie Gillett (music from around the globe)

FRIDAY
0006 .... BBCWS(am) Assignment (BBC correspondents with stories behind the headlines)
0010 .... R. Australia Hindsight (Australian social history from the memories of who were there)
0030 .... R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)
0032 .... BBCWS(am) The Music Biz (the global music industry)

SATURDAY
0000 .... WBCQ(7415kHz) Allan Weiner Worldwide (the station manager's show)
0005 .... R. Australia Inside Out (the Pacific islander communities inside and outside Australia)
0006 .... BBCWS(am) Sports International (the issues & personalities behind the headlines)
0010 .... R. New Zealand Int. .....Focus on Politics (a report on government & politics in NZ)
0030 .... R. Netherlands A Good Life (how development affects societies)
..... R. New Zealand Int. .....The Sampler (Nick Bollinger casts a critical ear over the latest CDs)
0032 .... BBCWS(am) John Peel (with his own unique & eclectic mix of new music)
0045 .... R. Australia Ockham's Razor (a "sharp" commentary on a science-related issue)

0100 UTC/ 9pm E/6pm P - Page 45 Freqs

SUNDAY
0100 .... R. Canada Int. Radio Nomad (continues—refer to 0030 S)
..... R. Netherlands Europe Unzipped (refer to 0000 S)
..... WBCQ(7415kHz) Marion's Attic (rare & vintage recordings w/Marion Webster)
0101 .... BBCWS(am) Play of the Week (classic & contemporary drama for radio)
0105 .... R. Australia Correspondents Report (the ABC's overseas reporters analyze)
..... R. Austria Int. Report from Austria—The Week in Review (includes letter segment)
..... R. New Zealand Int. .....At the Movies (a weekly report on cinema with Simon Morris)
..... R. Budapest Insight Central Europe (refer to 2235 A R. Prague)
..... R. Prague Magazine (Czech news stories you might have missed)
0110 .... R. Prague Letter from Prague (a personal view of life in & around the Czech capital)
0111 .... Voice of Russia Moscow Mailbag (Joe Adamov answers listener questions)
0115 .... R. Prague One on One (an informal interview with an interesting Czech)
0118 .... R. Netherlands Insight (refer to 0018 S)
0120 .... China R. Int. CRI Roundup
0122 .... R. Netherlands The Week Ahead (on RN)
0130 .... China R. Int. In the Spotlight (Chinese arts & cultural magazine)
..... R. Australia In Conversation (Robyn Williams looks at how science affects our lives)
..... R. Netherlands Amsterdam Forum (refer to 0030 S)
..... R. New Zealand Int. .....Bookmarks (NZ books, literature & writers)
..... R. Sweden Network Europe (a magazine about Europe) (1st S)
..... Sweden Today (George Wood presents the voices of Sweden) (2nd S)
..... Spectrum (Bill Schiller covers the Swedish cultural scene) (3rd S)
..... Studio 49 (ideas & trends in Sweden & the Nordic region) (4th S)
0132 .... Voice of Russia Moscow Yesterday & Today (the history of the city)
0135 .... R. Austria Int. Report from Austria—The Week in Review (includes letter segment)
..... R. Habana Cuba DXers Unlimited (Arnie Coro presents a program for radio enthusiasts)

MONDAY-FRIDAY
0100 .... R. Australia Asia-Pacific (RA's flagship regional current events & business report)
..... R. Canada Int. As It Happens (continues—refer to 0030 T-A)
0105 .... R. New Zealand Int. .....Wayne's Music (a nostalgic mix of popular music by decades)

MONDAY
0100 .... R. Habana Cuba Weekly Review (Cuba's perspective on current events)
..... R. Netherlands Wide Angle (refer to 0000 M)
..... WBCQ(7415kHz) Radio New York International (cont'd from 0000)
0105 .... R. Austria Int. Report from Austria—The Week in Review (includes letter segment)
..... R. Budapest Spotlight (a monthly magazine)
..... Europe Unlimited (Hungary's relations with the rest of Europe)(monthly)
..... Heading for Hungary (a monthly travelogue)
..... And the Gatepost (listener letters)(monthly)
..... R. Canada Int. Writers & Co. (the Canadian literary scene)
..... R. Prague Mailbox (replying to listener letters)
0106 ... BBCWS(am) The Ticket (the arts & entertainment around the globe)
0110 ... Voice of Vietnam Sunday Show (variety magazine with local reports & music)
0111 .... Voice of Russia Moscow Mailbag (refer to 0111 S)
0115 ... R. Prague Czech Books (a fortnightly look at Czech writing today)(fortnightly)
..... Encore (a monthly review of Czech classical music)(monthtly)
..... Magic Carpet (monthly Czech world music program)(monthly)
0122 ... R. Netherlands The Week Ahead (on RN)
0130 .... China R. Int. People in the Know (prominent Chinese shaping the nation's future)
..... R. Australia The Health Report (Dr. Norman Swan's weekly report on health issues)
..... R. Netherlands Vox Humana (refer to 0030 M)
..... R. Sweden In Touch with Stockholm (listener contact w/Nidia Hogström) (1st S)

..... Sounds Nordic (youth music & trends magazine w/Gaby Katz)(exc. 1st S)
0132 .... Voice of Russia Timelines (Estelle Winters' insight into life in Moscow)
0135 .... R. Austrio Int. Report from Austria—The Week in Review (includes letter segment)
0140 .... R. Habana Cuba The Mailbag Show (listener letters)
0150 .... R. Habana Cuba Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY
0100 .... R. Canada Int. As It Happens (continues—refer to 0030 T-A)
..... R. Netherlands Newsline (news, analysis & background reports)
0105 .... R. Budapest Hungary Today (daily magazine covering current events in Hungary)
..... Voice of Russia Commonwealth Update (comment on domestic developments)
0115 .... R. Austria Int. Report from Austria (focusing on Austria & central & eastern Europe)
0130 .... R. Sweden Sixty Degrees North (reports, interviews & analysis on the Nordic region)
0145 .... R. Austria Int. Report from Austria (repeat of 0115)

TUESDAY
0105 .... R. Slovakia Int. Insight Central Europe (refer to 2235 A R. Prague)
0106 .... BBCWS(am) Health Matters (reports on the latest research)
0130 ... China R. Int. Biz China (Chinese business & economic development magazine)
..... R. Australia The Law Report (Damien Carrick presents breaking legal stories)
..... R. Netherlands The Research File (refer to 0030 T)
0132 .... BBCWS(am) Inspiration (a lighthearted science quiz)
..... Voice of Russia Folk Box (traditional music drawn from Russia & the CIS)
0145 .... R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

WEDNESDAY
0106 .... BBCWS(am) Go Digital (technology journalist Tracey Logan explains the latest in IT)
0130 .... China R. Int. China Horizons (life in China outside Beijing)
..... R. Australia The Religion Report (the way religion & societies interact)
..... R. Netherlands EuroQuest (refer to 0030 W)
0132 .... BBCWS(am) Music Review (personalities, views & issues from the world of music)
..... Voice of Russia The Jazz Show (recordings from the Russion world of jazz)
0135 .... R. Habana Cuba DXers Unlimited (refer to S 0135)
0145 .... R. Sweden Close Up (profiles of people in Sweden from all walks of life)(1st W)

THURSDAY
0100 .... WBCQ(7415) Radio Six Internationol (continues from 0000)
0106 .... BBCWS(am) Discovery (in-depth exploration of ideas & discoveries in sci/tech)
0115 .... R. Prague Czechs in History [or] Czechs Today [or] Spotlight (refer to 0015 H)
0130 .... R. Australia The Media Report (a critical look at the communications industries)
..... R. Netherlands The Weekly Documentary (refer to 0030 H)
0132 .... BBCWS(am) Westway (the week's first episode of this radio light drama)
..... Voice of Russia Musical Tales of St. Petersburg
0145 .... BBCWS(am) A Sikh Season (challenges they face today) (2nd/9th/16th)
..... Heart & Soul (how beliefs, values, religion influence lives) (23rd/30th)
0154 .... Voice of Russia Russia: People & Events (history through events & personalities)

FRIDAY
0106 .... BBCWS(am) One Planet (the human impact on the natural world)
0130 .... R. Australia The Sports Factor (the cultural significance of sport)
..... R. Netherlands Dutch Horizons (refer to 0030 F)
0132 .... BBCWS(am) The Word (novels/theatre/poetry/journalism/biography/history) [or] World Book Club (from the Edinburgh International Book Festival)
..... Voice of Russia Moscow Calling (popular contemporary Russian music)
0145 .... R. Sweden Nordic Lights (a monthly magazine on Scandinavio—1st F)
..... Greenscan (Azariah Kiros highlights Swedish environmental concerns-2nd)
..... Heart Beat (Gaby Katz hosts a monthly health & medical magazine-3rd)
..... The S-Files (the Sweden behind the headlines-4th)

SATURDAY
0100 .... WBCQ(7415kHz) Tasha Takes Control (upbeat progressive music)
0105 .... R. Australia Asia-Pacific Weekend Edition (regional reports)
..... R. New Zealand Int. ..... Go Digital (refer to 0106 W BBCWS)
0106 .... BBCWS(am) Science in Action (current developments in sci/tech) .....
0120 .... R. Budapest DX Corner (a report for radio habbyists)
..... China R. Int. Cutting Edge (science & technology in China)
0130 .... China R. Int. Listeners Garden (letters, language lesson & other features)
..... R. Australia The Chat Room (Heather Jarvis converses with Australians)
..... R. Netherlands A Good Life (refer to 0030 A)
..... R. New Zealand Int. ..... The Saturday Comedy Zone
0132 .... BBCWS(am) Westway (the week's second episode of this radio light drama)
..... Voice of Russia Christian Message from Moscow (the Russian Orthadox Church)
0145 .... BBCWS(am) What's the Problem? (advice about common problems)
..... VOA Special Eng. American Stories (short stories by American authors)

0200 UTC/ 10pm E/7pm P - Page 46 Freqs

DAILY
0200 .... BBCWS(am) The World Today (the BBC's agenda-setting global news program)

SUNDAY
0200 .... WBCQ(7415kHz) Pan Global Wireless (satire, humor, variety)
..... WWCR(5070kHz) DX Partyline (HCJB's program for DXers/SWLs w/Allen Graham)
0205 .... R. Australia Margaret Throsby (a guest is interviewed & presents favorite music)
..... R. New Zealand Int. ..... A music documentary, series or feature
0211 .... Voice of Russia News & Views (Russia's views on news developments)
0215 .... R. Korea Int. Worldwide Friendship (RKI's interactive contact with listeners)
0230 .... R. New Zealand Int. ..... Health Matters or Environment Matters
..... R. Sweden Network Europe [or] Sweden Today [or] Spectrum [or] Studio 49 (refer to 0130 S)
..... WRMI(7385kHz) Voice of the NASB (program by NA's private sw broadcasters)
..... WWCR(5070kHz) World of Radio (the week in international broadcasting)
0232 .... BBCWS(am) Global Business (trends & ideas shaping business)
..... Voice of Russia Songs from Russia (melodies & novelties from Russia's past)
0235 .... R. Budapest Insight Central Europe (refer to 2235 A R. Prague)
..... R. Habana Cuba The World of Stamps (philatelic matters)
..... R. New Zealand Int. ..... The Band Programme (brass band music)
0246 .... Voice of Russia You Write to Moscow (listeners comment about VoR)

MONDAY-FRIDAY
0205 .... R. New Zealand Int. ..... In Touch with NZ (afternoon variety w/Wayne Mowat)
0210 .... R. Australia The World Today (the ABC's lunchtime current affairs program)

MONDAY
0200 .... WBCQ(7415kHz) Radio New York International (continues from 0000)
0205 .... R. Habana Cuba From Havana (contemporary Cuban music & musicians)
0211 .... Voice of Russia Sunday Panorama (a magazine focusing on the past week in Russia)
0215 .... R. Korea Int. Korean Pop Interactive (Korean pop music, oldies & artist interviews)
0220 .... R. Taiwan Int. Discover Taiwan
0230 .... R. Habana Cuba The Jazz Place (the very best of Cuban jazz-fortnightly)
..... Top Tens (contemporary Cuban hits-fortnightly)
..... R. Sweden In Touch with Stockholm [or] Sounds Nordic (refer to 0130 M)
..... WHRA(7580kHz) DXing with Cumbre (Marie Lamb with the latest DX catches)
..... WHRI(5745kHz) DXing with Cumbre (see above)
0232 .... BBCWS(am) World Business Review (analysis of global business developments)
0235 .... R. Budapest (refer to M 0105)
0245 .... BBCWS(am) The Instant Guide (concise explanations of tapical subjects)

TUESDAY-SATURDAY
0215 .... R. Korea Int. Seaul Calling (daily feature magazine of Korean people, places & events)
0211 .... Voice of Russia News & Views (refer to 0211 S)
0230 .... R. Sweden Sixty Degrees North (refer to 0130 T-A)
0235 .... R. Budapest Hungary Today (refer to 0105 T-A)

TUESDAY
0232 .... BBCWS(am) World Business Report (the main business issues of the day)
..... Voice of Russia Kaleidoscope (economic & social events in Russia & the CIS)
0245 .... BBCWS(am) Analysis (backgraund to the stories in the news)
..... R. Korea Int. Korea Today & Tomorrow (developments on the Korean peninsula)
..... R. Sweden Sports Scan (refer to 0145 T)

WEDNESDAY
0220 .... R. Taiwan Int. Jade Bells & Bamboo Pipes (Carson Wong w/traditional Chinese music)
0232 .... BBCWS(am) World Business Report (refer to 0232 T)
..... Voice of Russia Musical Tales of St. Petersburg
0245 .... BBCWS(am) Analysis (refer to 0245 T)
..... R. Korea Int. Korean Kaleidoscope (Korean social & economic life)
..... R. Sweden Close Up (refer to 0145 W) (1st W)
0254 .... Voice of Russia Russia: People & Events (refer to 0154 H)

THURSDAY
0232 .... BBCWS(am) World Business Report (refer to 0232 T)
..... Voice of Russia Moscow Yesterday & Today (refer to S 0132)
0245 .... BBCWS(am) From Our Own Correspondent (background to international events)
0245 .... R. Korea Int. Wonderful Korea (a travelogue)

FRIDAY
0232 .... BBCWS(am) World Business Report (the main business issues of the day)
..... Voice of Russia Russian by Radio (a language lesson)
0245 .... BBCWS(am) Analysis (refer to 0245 T)
..... R. Korea Int. Seoul Report (interviews with Koreans & visitors to Korea)
..... R. Sweden Nordic Lights [or] Greenscan [or] Heart Beat [or] The S-Files (refer to 0145 F)

SATURDAY
0205 .... R. Australia Background Briefing (refer to 0010 H)
..... R. New Zealand Int. ..... Eureka! (reports on science in NZ with Vernonika Meduna)
0230 .... R. New Zealand Int. ..... Health Matters [or] Environment Matters
0232 .... BBCWS(am) World Business Report (refer to 0232 T)
..... Voice of Russia Audio Book Club (Russian classic & contemporary literature)
0245 .... BBCWS(am) Analysis (refer to 0245 T)

0300 UTC/ 11pm E/8pm P - Page 46 Freqs

SUNDAY
0300 .... WBCQ(7415kHz) Michael Ketter (satire in the

Shortwave Guide

tradition of Firesign Theatre)
..... WRMI(7385kHz) World Radio Network relay
0305 .... R. Australia Australian Express (Roger Broadbent with reports on life in Australia)
..... R. New Zealand Int. ..... RPM (NZ & international acoustic features & documentaries)
..... R. Prague Magazine (refer to 0105 S)
0306 .... BBCWS(am) From Our Own Correspondent (background to the news)
0310 .... R. Prague Letter from Prague (refer to 0110 S)
0311 .... Voice of Russia Music & Musicians (concerts)
0315 .... R. Prague One on One (refer to 0115 S)
0320 .... China R. Int. CRI Roundup
0330 .... China R. Int. In the Spotlight (refer to S 0130)
..... R. Australia Jazz Notes (with Ivan Lloyd)
0332 .... BBCWS(am) The Interview (the people, ideas & trends shaping our world)
0335 .... R. Habana Cuba DXers Unlimited (Arnie Coro w/ a program for radio enthusiasts)

MONDAY-FRIDAY
0300 .... VOA Africa Daybreak Africa (morning news, music & features magazine for Africa)
0308 .... R. New Zealand Int. ..... Dateline Pacific (news from the Pacific with interviews & features)
0320 .... R. Australia Life Matters (social change & day-to-day life in Australia)
0345 .... BBCWS(am) Off the Shelf (serialized readings of novels, stories & other literature)

MONDAY
0300 .... KWHR(17510kHz) DXing with Cumbre (refer to 0230 S)
..... R. Habana Cuba Weekly Review (Cuba's perspective on current events)
..... WBCQ(7415kHz) Radio New York International (continues from 0000)
..... WRMI(7385kHz) Wavescan (AWR's program for dxers & swls)
0305 .... R. Prague Mailbox (refer to 0105 M)
0306 .... BBCWS(am) Talking Point (listeners & internet users question guests on current affairs)
0310 .... Radio Taiwan Int. Taiwan Economic Journal
0311 .... Voice of Russia This is Russia
0315 .... R. Prague Czech Books [or] Encore [or] Magic Carpet (refer to 0115 M)
0330 .... China R. Int. People in the Know (refer to 0130 M)
..... R. New Zealand Int. ..... New Music Releases
..... WRMI(7385kHz) World Radio Network relay
0332 .... Voice of Russia Moscow Calling (refer to 0132 F)
0335 .... R. Habana Cuba The Mailbag Show (listener letters)

TUESDAY
0306 .... BBCWS(am) Outlook (topical magazine of people & places)
0311 .... Voice of Russia Musical Tales of St. Petersburg
0320 .... R. Taiwan Int. Mailbag Time (listener letters to RTI)
0330 .... China R. Int. Biz China (refer to 0130 T)
..... R. New Zealand Int. ..... RNZI Talk (RNZI staff, developments, projects & programs) [or] Mailbox (letters, DX news, & answers to swl technical questions)
0332 ... Voice of Russia The River of Time (significant events & prominent personalities)

WEDNESDAY
0306 .... BBCWS(am) Outlook (topical magazine of people & places)
0311 .... Voice of Russia Moscow Mailbag (refer to 0111 S)
0320 .... R. Taiwan Int. Jade Bells & Bamboo Pipes (refer to 0220 W)
0330 .... R. New Zealand Int. ..... Tradewinds (Walter Zweifel on Pacific business & economics)
0335 .... R. Habana Cuba DXers Unlimited (refer to S 0340)

THURSDAY
0306 .... BBCWS(am) Outlook (topical magazine of people & places)
0311 .... Voice of Russia Science Plus
0315 .... R. Prague Czechs in History [or] Spotlight (refer to 0115 H)
0330 .... R. New Zealand Int. ..... The World in Sport (Dmitri Edwords presents highlights of the world's sporting week with emphasis on NZ & the Pacific)
0332 .... Voice of Russia The River of Time (refer to 0332 T)
0345 .... R. Taiwan Int. Instant Noodles (news of "the wacky")

FRIDAY
0306 .... BBCWS(am) Outlook (topical magazine of people & places)
0311 .... Voice of Russia Newmarket (analyses of Russian business)
0330 .... China R. Int. Life in China (refer to F 0130)
..... R. New Zealand Int. ..... Pacific Correspondent (political & social issues)

SATURDAY
0305 .... R. Australia Rural Reporter (reports from the ABC's rural correspondents)
0306 .... BBCWS(am) Pick of the World (a revue of the BBC's best)
..... R. New Zealand Int. ..... Home Grown (Liz Barry plays contemporary Kiwi music)
0311 .... Voice of Russia Moscow Mailbag (refer to 0111 S)
0330 .... R. Australia Australia Country Style (Aussie country music w/John Nutting)
..... R. New Zealand Int. ..... Musical Chairs (a featured NZ musician)
0332 .... Voice of Russia The River of Time (refer to 0332 T)
0345 .... BBCWS(am) Write On (Dilly Barlow & Penny Vine read your letters to BBC)

0400 UTC/ 12am E/9pm P - Page 47 Freqs

DAILY
0400 .... BBCWS(am) World Briefing (a comprehensive report on the latest news)

SUNDAY
0400 .... R. Netherlands Europe Unzipped (refer to 0000 S)
..... R. Vlaanderen Int. Music from Flanders (Flemish music, musicians & performances)
..... WBCQ(7415kHz) Tom & Darryl (satellite, sw, low power FM & the Internet)
..... WRMI(7385kHz) World Radio Network relay
..... WWCR(5070kHz) Cyberline (discussion about digital communications)
0405 .... Deutsche Welle Inside Europe (the issues shaping the continent)
..... R. Australia The Europeans (perspectives on European societies)
..... R. New Zealand Int. ..... Sunday Drama (classic & contemporary radio drama)
0411 .... Voice of Russia Musical Tales of St. Petersburg
0418 .... R. Netherlands Insight (refer to 0018 S)
0420 .... China R. Int. CRI Roundup
0430 .... China R. Int. In the Spotlight (refer to 0120 S)
..... R. Australia The Chat Room (refer to 0130 A)
..... R. Netherlands Amsterdam Forum (an interactive discussion of topical issues)
0432 .... BBCWS(am) Letter (a global broadcaster writes of life in his/her locale)
..... Voice of Russia Kaleidoscope (refer to 0232 T)
0445 .... BBCWS(am) The Instant Guide (refer to 0245 M)

MONDAY-FRIDAY
0400 .... WBCQ(7415kHz) Amos 'n Andy (classic radio comedy)
0405 .... Deutsche Welle Mailbag Africa (contact program for DW's African audience)
..... R. New Zealand Int. ..... In Touch with New Zealand (cont'd from 0205)
0410 .... R. Australia Bush Telegraph (Australian rural & regional issues)
0430 .... R. New Zealand Int. ..... What's Going On? (NZ's arts & entertainment scene)
0432 .... BBCWS(cm) The World Today (the BBC's agenda-setting flagship news program)

MONDAY
0400 .... R. Netherlands Wide Angle (a single issue examined in-depth)
..... R. Vlaanderen Int. Radio World (Frans Vossen's report about international radio)
..... WRMI(7385kHz) World Radio Network relay
0410 .... R. Habana Cuba From Havana (refer to M 0210)
0411 .... Voice of Russia Musical Tales of St. Petersburg
0415 .... WBCQ(7415kHz) World of Radio (refer to 0230 S WWCR)
0418 .... R. Netherlands Insight (refer to 0418 S)
0422 .... R. Netherlands The Week Ahead (on RN)
0430 .... China R. Int. People in the Know (refer to M 0130)
..... R. Habana Cuba The Jazz Place [or] Top Tens (refer to M 0230)
..... R. Netherlands Vox Humana (stories about the power of "the human voice")
0432 .... Voice of Russia Audio Book Club (refer to 0232 A)

TUESDAY-SATURDAY
0400 .... R. Netherlands Newsline (refer to 0000 T-A)
..... R. Vlaanderen Int. Flanders Today (various reports from around the country)
0405 .... Deutsche Welle Newslink Africa (current affairs magazine w/emphasis on Africa)

TUESDAY
0411 .... Voice of Russia Moscow Mailbag (refer to 0111 S)
0430 .... China R. Int. Biz China (refer to T 0130)
..... Deutsche Welle Insight (putting the news in perspective)
..... R. Netherlands The Research File (refer to 0030 T)
0432 .... Voice of Russia Music Around Us (refer to 0132 F)
0445 .... Deutsche Welle Business German (the German language in the world marketplace)
0447 .... Voice of Russia Music At Your Request

WEDNESDAY
0411 .... Voice of Russia Science Plus (refer to 0311 H)
0430 .... Deutsche Welle World in Progress (a fresh look at development issues)
..... R. Netherlands EuroQuest (refer to 0030 W)
0432 .... Voice of Russia Moscow Yesterday & Today (refer to 0132 S)

THURSDAY
0411 .... Voice of Russia Newmarket (refer to 0311 F)
0430 .... Deutsche Welle Money Talks (a weekly finance & economics magazine)
..... R. Netherlands The Weekly Documentary (refer to 0030 H)
0432 .... Voice of Russia Folk Box (refer to 0132 T)

FRIDAY
0411 .... Voice of Russia Moscow Mailbag (refer to 0111 S)
0430 .... China R. Int. Life in China (refer to F 0130)
..... Deutsche Welle Living Planet (examining major environmental developments)
..... R. Netherlands Dutch Horizons (refer to 0030 F)
0432 .... Voice of Russia Audio Book Club (refer to 0232 A)

SATURDAY
0405 .... R. Australia Books & Writing (Ramona Koval talks with authors)
..... R. New Zealand Int. ..... Home Grown (cont'd from 0306)
0411 .... Voice of Russia This is Russia
0430 .... Deutsche Welle Spectrum (developments in the fields of science & technology)
..... R. Netherlands The Good Life (refer to 0030 A)
0432 .... BBCWS(am) Reporting Religion (Trevor Barnes on religion & the world)
..... Voice of Russia Timelines (refer to 0132 M)
0434 .... R. Australia Book Talk (Amanda Smith with reviews & critical discussions)

0500 UTC/ 1am E/10pm P - Page 47 Freqs

SUNDAY
0500 .... WBCQ(7415kHz) Juliet's Wild Kingdom (in the pirate radio tradition)
..... WRMI(7385kHz) World Radio Network relay
0505 .... Deutsche Welle Religion & Society (insight into global religious events)
..... R. Australia All in the Mind (the mind, the brain & behavior with Natasha Mitchell)
0510 .... R. Japan Pop Joins the World (Asian

countries through their popular music)
..... R. New Zealand Feature on religion & spirituality in NZ
0515 .... Deutsche Welle German by Radio (a weekly language lesson)
0520 .... Chino R. Int. CRI Roundup
0530 .... Chino R. Int. In the Spotlight (refer to S 0130)
..... Deutsche Welle Africa This Week (a comprehensive look at Africa)
..... R. Australia The Ark (Rochoel Kohn examines religious history)
0535 .... R. Habana Cuba DXers Unlimited (refer to S 0135)
0540 .... R. New Zealand Int. ..... Jazz Spotlight

MONDAY-FRIDAY
0505 .... R. New Zealand Int. ..... Checkpoint (RNZ flogship evening news—repeats at 0705)
0510 .... R. Australia Pacific Beat (RA's daily Pacific current events & features magazine)
0515 .... R. Japan 44 Minutes (a doily current affairs magazine about Japan & Asia)

MONDAY
0500 .... R. Habana Cuba Weekly Review (refer to S 0100)
..... WRMI(73B5kHz) World Radio Network relay
0505 .... Deutsche Welle Hard to Beat (the latest in sports from Germony & the world)
0515 .... Deutsche Welle Inspired Minds (creative & industrious people)
0530 .... China R. Int. People in the Know (refer to M 0130)
..... Deutsche Welle Hits in Germany (w/ Debarah Friedman) (or)
..... Melody Time (light classical favorites w/Diane Erickson)
0535 .... R. Habana Cuba The Mailbag Show (listener letters)

TUESDAY-SATURDAY
0505 .... Deutsche Welle Newslink Africa (refer to T-A 0405)

TUESDAY
0530 .... Chino R. Int. Biz China (refer to T 0130)
..... Deutsche Welle A World of Music (concerts of all types of music)

WEDNESDAY
0530 .... Deutsche Welle Arts on the Air (an award-winning weekly cultural magazine)
0535 .... R. Habana Cuba DXers Unlimited (refer to S 0135)

THURSDAY
0530 .... Deutsche Welle Living in Germany (aspects of life in Germany)
0545 .... Deutsche Welle Europe in Capitals (profiles of Europe's capital cities)

FRIDAY
0530 .... China R. Int. Life in China (the lives of ordinary people in China)
..... Deutsche Welle Cooll (the latest in youth culture in Germany & abroad)

SATURDAY
0500 .... WHRI DXing with Cumbre (Marie Lomb with the hottest DX catches)
0505 .... R. Australio Australion Express (refer to 0305 A)
0510 .... R. Japan Hello from Tokyo (listener letters, music & short features)
..... R. New Zealand Int. ..... Tagata o te Moana (Anita Purcell w/NZ & regional Pacific news, issues, information & music)
0530 .... Deutsche Welle Focus on Folk (Angelika Ditscheid with some real German folk)
0532 .... R. Australio All in the Mind (refer to 0505 S)

0600 UTC/ 2am E/11pm P - Page 48 Freqs

SUNDAY
0600 .... WRMI(73B5kHz) World Radio Network relay (continues to 0900)
0605 .... Deutsche Welle Inside Europe (refer to 0405 S)
..... R. Australia The Buzz (technology news & issues presented by Richard Aedy)
0607 .... R. New Zealand Int. ..... Mana Korero (Maori current affairs magazine)
0610 .... R. Japan Weekend Jopanology (a multifoceted exploration of Japan)
0630 .... R. Australia In Conversation (refer to 0130 S)
..... WHRI(5745kHz) DXing with Cumbre (Morie Lamb with the hottest DX catches)
0654 .... R. Japan Japan Music Scene

MONDAY-FRIDAY
0607 .... R. New Zealand Int. ..... Worldwatch (the stories behind international headlines)
0610 .... R. Japan Songs for Everyone
0615 .... R. Japon Asian Top News (the day's major stories reported by the region's radio)
0622 .... R. New Zealand Int. ..... Pacific Report (news of the Pacific Region)
0645 .... R. New Zealand Int. ..... Storytime (children's stories)

MONDAY
0600 .... WRMI(73B5kHz) World Radio Network relay (continues to 0900)
0605 .... Deutsche Welle Mailbag Africa (refer to M 0405)
0610 .... R. Habana Cuba From Hovona (refer to M 0210)
0620 .... R. Australia Ockham's Razor (refer to 0030 A)
0625 .... R. Japan Japan Music Treasure Box (classic Japanese popular music)
0630 .... R. Habana Cuba The Jazz Ploce or Top Tens (refer to M 0230)
..... R. New Zealand Int. ..... Letter (refer to 0432 S BBCWS)
0633 .... R. Australia Hit Mix (refer to 0630 A)

TUESDAY-SATURDAY
0605 .... Deutsche Welle Newslink Africa (refer to T-A 0405)

TUESDAY
0620 .... R. Australia In Conversation (refer to 0130 S)
0625 .... R. Japan Basic Japanese for You (a Japanese languoge lesson for beginners)
0630 .... Deutsche Welle Insight (refer to T 0430)
..... R. New Zealand Int. ..... Today in Parliament
0633 .... R. Australia Music Deli (Paul Petran with music from around the world)
0645 .... Deutsche Welle Business German (refer to T 0445)

WEDNESDAY
0620 .... R. Australia Lingua Franca (refer to 1C45 A)
0625 .... R. Japan Japan Musicscape (life in Japan through music & writings on a theme)
0630 .... Deutsche Welle World in Progress (refer to W 0430)
..... R. New Zealand Int. ..... Today in Parliament
0633 .... R. Australia Jazz Notes (with Ivan Lloyd)

THURSDAY
0620 .... R. Australia The Ark (refer to 0530 S)
0625 .... R. Japan Brush Up Your Japanese (an intermediote course in Japanese)
0630 .... Deutsche Welle Money Tolks (refer to H 0430)
..... R. New Zealand Int. ..... Todoy in Parliament
0633 .... R. Australia Australion Country Style (refer to 0330 A)

FRIDAY
0620 .... R. Australia Inside Out (the personal views of Pacific communities)
0625 .... R. Japon Music Beat (contemporary Japonese popular music)
0630 .... Deutsche Welle Living Planet (refer to F 0430)
..... R. New Zealand Int. ..... Focus on Politics

SATURDAY
0600 .... KWHR(17780kHz) DXing with Cumbre (refer to 0630 A)
0605 .... R. Australia Verbatim (oral histories with David Mark)
0607 .... R. New Zealand Int. ..... The Music Mix (interviews & live recordings from contemporary rock musicians)
0610 .... R. Japan Pap Joins the World (Asian countries through their popular music)
0630 .... Deutsche Welle Spectrum (refer to A 0430)
..... R. Australia Hit Mix (Brendon Telfer with what's new on the Australian music scene)
..... WWCR(3210kHz) World of Rodio (refer to 0230 S)

1000 UTC/6am E/3am P - Page 49 Freqs

DAILY
1000 .... Chino R. Int. Realtime Beijing (daily mogazine for English-speaking residents of Beijing)

SUNDAY
1005 .... R. Australio Keys to Music (refer to 0005 Sun.)
1006 .... BBCWS(am) The Real Far East (refer to 0006 H)
1012 .... R. New Zealand Int. ..... Mediawatch (onalyses of recent media events & trends in NZ)
1115 .... China R. Int. Chino Beat (popular music in China)
1032 .... BBCWS(am) In Praise of God (services of worship)
103B .... R. New Zealand Int. ..... Sunday Supplement (the views of New Zealanders)

MONDAY
1030 .... R. Australia The Health Report (Dr. Norman Swan on health & medical issues)

MONDAY-FRIDAY
1000 .... BBCWS(am) World Briefing (a comprehensive report on the latest news)
..... R. New Zealand Int. ..... Late Edition (major domestic evening news magazine)
..... WRMI (15725) Viva Miami (bilingual listener magozine)
1005 .... R. Australia Asia-Pacific (refer to 0100 M-F)
1032 .... BBCWS(am) World Business Report (a guide through the day's business issues)
1045 .... BBCWS(am) Sports Roundup

TUESDAY
1030 .... R. Australia The Law Report (breaking legal stories in Australia & overseas)

WEDNESDAY
1030 .... R. Australia The Religion Report (the way religion & societies interact)

THURSDAY
1030 .... R. Australia The Media Report (a critical look at the communications industry)

FRIDAY
1030 .... R. Australia The Sports Factor (the cultural significance of sport)

SATURDAY
1000 .... WRMI(15725) Viva Miami (refer to 1000 M-F)
1005 .... R. Australia Inside Out (refer to 0005 A)
1006 .... BBCWS(am) Assignment (refer to 0006 F)
1012 .... R. New Zealand Int. ..... Deep Purple (relaxing, thoughtful & nostalgic music)
1015 .... China R. Int. China Roots (traditional Chinese music)
1030 .... WWCR(5070kHz) World of Radio (refer to 0230 S)
1032 .... BBCWS(am) World Football (Alan Green reports on football around the globe)
1045 .... R. Australia Lingua Franca (language & its social, cultural & historical ramifications)

1100 UTC/ 7am E/4am P - Page 50 Freqs

DAILY
1100 .... BBCWS(am) World Briefing (a comprehensive report on the latest news)
..... China R. Int. Realtime Beijing (daily magazine for English-speaking residents of Beijing)
1120 .... BBCWS(am) British News

SUNDAY
1100 .... R. Netherlands Wide Angle (a weekly in-depth look at a news topic)
1105 .... R. Australia Sunday Profile (Geraldine Doogue with in depth analysis of the news)

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..... R. New Zealand Int. ..... New Zealand Forces Program (for NZers stationed in the Pacific)
1110 .... R. Japan Hello from Tokyo (listener letters, music & short features)
1115 .... China R. Int. China Beat (popular music in China)
1125 .... R. Netherlands The Week Ahead (on RN)
1130 .... R. Australia Speaking Out (a program about Aboriginal & Torres Strait Islander people)
..... R. Netherlands Vox Humana (stories about the power of the "human voice")
1132 .... BBCWS(am) Letter (refer to 0432 S)
1145 .... BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

MONDAY-FRIDAY
1100 .... R. Netherlands Newsline (news, analysis & background reports)
1105 .... BBCWS(am) Caribbean Morning Report (the latest news in the Caribbean)
..... R. Australia Asia-Pacific (refer to 0100 M-F)
1108 .... R. New Zealand Int. ..... Dateline Pacific (refer to 0308 M-F)
1110 .... BBCWS(am) Sports Caribbean
..... R. Japan Songs for Everyone
1115 .... BBCWS(am) Caribbean Magazine (a regional current affairs & feature program)
..... R. Japan Asian Top News (as reported by the region's radio stations) ..

MONDAY
1125 .... R. Japan Japan Music Treasure Box (refer to M 0625)
1130 .... R. Australia Innovations (showcasing Australian invention, enterprise & ingenuity)
..... R. Netherlands The Research File (the relevance of science to all our lives)
..... R. New Zealand Int. ..... RNZI Talk [or] Mailbox (refer to 0330 T)
1132 .... BBCWS(am) The Instant Guide (refer to 0445 S)
1145 .... BBCWS(am) Sports Round-up

TUESDAY
1125 .... R. Japan Basic Japanese for You (refer to T 0625)
1130 .... R. Australia Earthbeat (environmental issues w/Jackie May)
..... R. Netherlands EuroQuest (a magazine placing Europe in context)
..... R. New Zealand Int. ..... Tradewinds (refer to 0330 W)
1132 .... BBCWS(am) Analysis (background to stories in the news)
1145 .... BBCWS(am) Sports Round-up

WEDNESDAY
1125 .... R. Japan Japan Musicscape (refer to W 0625)
1130 .... R. Australia Rural Reporter (people & places in country Australia)
..... R. Netherlands The Weekly Documentary (RN's award-winning sound essays & in-depth investigations)
..... R. New Zealand Int. ..... The World in Sport (refer to 0330 H)
1132 .... BBCWS(am) Analysis (refer to 1132 T)
1145 .... BBCWS(am) Sports Round-up

THURSDAY
1125 .... R. Japan Brush Up Your Japanese (refer to 0625 H)
1130 .... R. Australia Smart Societies (refer to 1505 A)
..... R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)
..... R. New Zealand Int. ..... Pacific Correspondent (refer to 0330 F)
1132 .... BBCWS(am) From Our Own Correspondent (refer to 0306 S)
1145 .... BBCWS(am) Sports Round-up

FRIDAY
1125 .... R Japan Music Beat (refer to 0625 F)
1130 .... R Australia The Chat Room (refer to 0130 A)
..... R Netherlands A Good Life (how development affects societies)
..... R New Zealand Int. ..... Sports Story (a sport profile or documentary)
1132 .... BBCWS(am) Analysis (refer to 1132 T)
1145 .... BBCWS(am) Football Extra (the main matches of the weekend)

SATURDAY
1100 .... R. Netherlands Europe Unzipped (the events of the past week in Europe, some unusual)
1105 .... R. Australia Asia Pacific Weekend Edition (refer to 0105 A)
..... R. New Zealand Int. ..... New Zealand Forces Program (refer to 1105 S)
1110 .... R. Japan Pop Joins the World (refer to A 0610)
1115 .... China R. Int. China Roots (traditional Chinese music)
1125 .... R. Netherlands Insight (Rob Green casts a critical & humorous eye on the past week's headlines)
1130 .... R. Australia All in the Mind (refer to 0505 S)
..... R. Netherlands Amsterdam Forum (an interactive discussion of topical issues)
1132 .... BBCWS(am) Analysis (refer to 1132 T)
1145 .... BBCWS(am) Sports Round-up

1200 UTC/ 8am E/5am P - Page 50 Freqs

DAILY
1200 .... BBCWS(am) Newshour (an hour of news & analysis from around the globe)

SUNDAY
1205 .... R. Australia The Spirit of Things (Dr. Rachael Kohn explores contemporary values & beliefs as expressed through ritual, art, music, & sacred texts)
..... R. New Zealand Int. ..... Sportsworld (a round-up of the weekend's sporting events in & around NZ)
1210 .... R. Korea Int. Korean Pop Interactive (Korean cutting edge pop music, oldies & artist interviews)
1230 .... R. Sweden In Touch with Stockholm (refer to 0130 M) (1st S)
..... Sounds Nordic (refer to 0130 M) (exc. 1st S)

MONDAY-FRIDAY
1200 .... WRMI(15725) World Radio Network (relay)
1205 .... BBCWS(am) Caribbean Business (a report on regional commerce & economics)
..... R. New Zealand Int. ..... Late Edition (repeat of 1005 program)
1210 .... BBCWS(am) Caribbean Morning Report (the latest news in the Caribbean)
1210 .... R. Canada Int. The Current (Anna Maria Tremonti with perspectives, ideas & voices)
1215 .... R. Korea Int. Seoul Calling (daily feature magazine of Korean people, places & events)
1220 .... BBCWS(am) Caribbean Magazine
1230 .... R. Sweden Sixty Degrees North (refer to 0130 T-A)

MONDAY
1205 .... R. Australia Late Night Live (Philip Adams interviews the major newsmakers, philosophers, artists & trendsetters in Australia & around the world)
1245 .... R. Korea Int. Korea Today & Tomorrow (latest developments on the Korean peninsula)
1245 .... R. Sweden Sports Scan (refer to 0145 T)

TUESDAY
1205 .... R. Australia Late Night Live (refer to M 1205)
1245 .... R. Korea Int. Korean Kaleidoscope (a magazine of Korean social & economic life)
..... R. Sweden Close Up (refer to 0145 W)(1st T)

WEDNESDAY
1205 .... R. Australia Late Night Live (refer to M 1205)
1245 .... R. Korea Int. Wonderful Korea (touring Korea)

THURSDAY
1205 .... R. Australia Late Night Live (refer to M 1205)
1245 .... R. Korea Int. Seoul Report (interviews with Koreans & visitors to Korea)
..... R. Sweden Nordic Lights [or] Greenscan [or] Heart Beat [or] The S-Files (refer to 0145 F)

FRIDAY
1205 .... R. Australia Sound Quality (Tim Ritchie seeks out the interesting, the evolutionary, the inaccessible & the wonderful in music)

SATURDAY
1200 .... WRMI(15725kHz) World Radio Network relay
1205 .... R. Australia The Music Show (Andrew Ford w/music, interviews & developments in the music field)
..... R. New Zealand Int. ..... New Zealand Forces Program (cont'd from 1105)
1210 .... R. Korea Int. Worldwide Friendship (RKI's interactive contact with listeners)
1230 .... HCJB Ecuador DX Partyline (for DXers & SWLs hosted by Allen Graham)
..... R. Sweden Network Europe [or] Sweden Today [or] Spectrum [or] Studio 49 (refer to 0130 S)
..... WHRI(9495kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)

1300 UTC/ 9am E/6am P - Page 51 Freqs

SUNDAY
1305 .... R. Australia Encounter (connections between religion & life in multicultural Australia)
1306 .... BBCWS(am) From Our Own Correspodent (refer to 0306 S)
1310 .... R. Canada Int. The Sunday Edition (politics, society & culture w/Michael Enright)
1320 .... China R. Int. CRI Roundup
1330 .... China R. Int. In the Spotlight (Chinese arts & cultural magazine)
..... R. Sweden In Touch with Stockholm (refer to 0130 M) (1st S)
..... Sounds Nordic (refer to 0130 M) (exc. 1st S)
1332 .... BBCWS(am) The Interview (refer to 0332 S)

MONDAY-FRIDAY
1300 .... WRMI(15725) World Radio Network (relay)
1305 .... R. Australia The Planet (Lucky Oceans w/ jazz, blues, folk styles, art music & more)
1306 .... BBCWS(am) Outlook (topical magazine of people, places & events)
1310 .... R. Canada Int. Sounds Like Canada (a lively mix from all over the country)
1330 .... R. Sweden Sixty Degrees North (refer to 0130 T-A)
1345 .... BBCWS(am) Off the Shelf (readings of novels, stories & other literature)

MONDAY
1330 .... China R. Int. People in the Know (prominent Chinese shaping the nation's future)
1345 .... R. Sweden Sports Scan (refer to 0145 T)

TUESDAY
1330 .... China R. Int. Biz China (refer to T 0130)
1345 .... R. Sweden Close Up (refer to 0145 W)(1st T)

THURSDAY
1345 .... R. Sweden Nordic Lights [or] Greenscan [or] Heart Beat [or] The S-Files (refer to 0145 F)

FRIDAY
1330 .... China R. Int. Life in China (the lives of ordinary people in China)

SATURDAY
1300 .. . WRMI(15725kHz) World Radio Network relay
1305 .... BBCWS(am) Pick of the World (refer to 0306 A)
..... R. Australia The Music Show (cont'd from 1205)
1310 .... R. Canada Int. The House (a review of the week in Canadian national politics)
1330 .... R. Sweden Network Europe [or] Sweden Today [or] Spectrum [or] Studio 49 (refer to 0130 S)
1345 .... BBCWS(am) Write On (refer to 0345 A)

1400 UTC/ 10am E/7am P - Page 51 Freqs

SUNDAY
1400 .... WRMI(15725kHz) World Radio Network (relay)
1405 . .. R. Australia The Science Show (with Robyn

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Williams)
..... R. Canada Int. The Sunday Edition (cont'd from 1310)
1406 .... BBCWS(am) Talking Point (live, global phone-in with expert guests)
1410 .... R. Japan Pop Joins the World (Asian countries through their popular music)
1420 .... China R. Int. In the Spotlight (Chinese arts & cultural magazine)

MONDAY-FRIDAY
1400 .... WRMI(15725) World Radio Network (relay)
1405 .... R. Australia Margoret Throsby (refer to 0205 S)
..... R. Canada Int. Sounds Like Canada (continues from 1310)
1415 .... R. Japan 44 Minutes (current affairs magazine about Japan & Asia)

MONDAY
1406 .... BBCWS(am) Dirty Wars (refer to 0006 T—30th/5th)
..... Documentary (12th/19th/26th)
1430 .... China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
1432 .... BBCWS(am) The Music Feature (features & documentaries on current musical genres)

TUESDAY
1406 .... BBCWS(am) Masterpiece (refer to 0006 W)
1430 .... China R. Int. Biz China (refer to T 0130)
1432 .... BBCWS(am) White Label (refer to 0032 W)

WEDNESDAY
1406 .... BBCWS(am) The Real Far East (refer to 0006H) (2nd/9th/16th/23rd)
..... Documentary (30th)
1432 .... BBCWS(am) Charlie Gillett (refer to 0032 H)

THURSDAY
1406 .... BBCWS(am) Assignment (refer to 0006 F)
1432 .... BBCWS(am) The Music Biz (refer to 0032 F)

FRIDAY
1406 .... BBCWS(am) Sports International (refer to 0006 A)
1430 .... China R. Int. Life in China (the lives of ordinary people in China)
1432 .... BBCWS(am) John Peel (refer to 0032 A)

SATURDAY
1400 .... WRMI(15725kHz) World Radio Network relay
1405 .... R. Australia Background Briefing (refer to 0005 H)
..... R. Canada Int. The Vinyl Cafe (Stuart McLean plays music & weaves tales)
1406 .... BBCWS(am) Sportsworld (live commentary on major sports events & fixtures)
1410 .... R. Japan Weekend Japanology (a multifaceted exploration of Japan)

1500 UTC/ 11am E/8am P - Page 52 Freqs

SUNDAY
1500 .... WRMI(15725kHz) World Radio Network (relay)
1505 .... R. Australia The National Interest (refer to 0010 W)
..... R. Austria Int. Report from Austria—The Week in Review (includes letter segment)
..... R. Canada Int. The Sundoy Edition (continues from 1310)
1506 .... BBCWS(am) The Real East Asia (refer to 0006H)
1510 .... R. Japan Hello from Tokyo (refer to S 1110)
1530 .... WHRI(15105kHz) DXing with Cumbre (refer to 1230 A)
1532 .... BBCWS(am) In Praise of God (refer to 1032 S)
1535 .... R. Austria Int. Report from Austrio—The Week in Review (includes letter segment)

MONDAY-FRIDAY
1500 .... WRMI(15725) World Radio Network (relay)
1505 .... R. Australia Asia-Pacific (refer to 0100 M-F)
1510 .... R. Austria Int. Report from Austria (refer to 0115 T-A)
..... R. Japan Songs for Everyone
1515 .... R. Japan Asian Top News (the doy's major stories as reported by the region's rodio stations)
1540 .... R. Austria Int. Report from Austria (repeat of 1510)

MONDAY
1506 .... BBCWS(am) Health Matters (refer to 0106 T)
1525 .... R. Japan Japon Music Treasure Box (classic Japonese popular music)
1530 .... R. Australia The Health Report (refer to 0130 M)
1532 .... BBCWS(am) Inspiration (refer to 0132 T)
1545 .... R. Canada Int. Out Front (a place for new ideas, new ways of making radio & new voices from across Canada)

TUESDAY
1506 .... BBCWS(am) Go Digitol (refer to 0106 W)
1525 .... R. Japan Basic Japanese for You {a language course for beginners)
1530 .... R. Australia The Law Report (refer to 0130 T)
1532 .... BBCWS(am) Music Review (refer to 0132 W)
1545 .... R. Canada Int. Out Front (refer to M 1545)

WEDNESDAY
1506 .... BBCWS(am) Discovery (refer to 0106 H)
1525 .... R. Japan Japon Musicscape (life in Japan presented through music & writings on a selected theme)
1530 .... R. Australia The Religion Report (refer to 0130 W)
1532 .... BBCWS(am) Westway (refer to 0132 H)
1545 .... BBCWS(am) A Sikh Seoson (refer to 0145 H) (1st/8th/15th)
..... Heart & Soul (refer to 0145 H) (22nd/29th)
..... R. Canada Int. Out Front (refer to M 1545)

THURSDAY
1506 .... BBCWS(am) One Planet (refer to 0106 F)
1525 .... R. Japon Brush Up Your Japanese (an intermediate language course)
1530 .... R. Australia The Media Report (refer to 0130 H)
1532 .... BBCWS(am) The Word (refer to 0132 F) {or}
..... World Book Club (refer to 0132 F)
1545 .... R. Canada Int. Out Front (refer to M 1545)

FRIDAY
1506 .... BBCWS(am) Science in Action (reports on science & technology)
1525 .... R. Japon Music Beat (contemporary Japanese hits)
1530 .... R. Australia The Sports Factor (refer to 0130 F)
..... R. Canada Int. C'est Lo Vie (a program about life in Quebec & French-speaking Canada)
1532 .... BBCWS(am) Westway (refer to 0132 A)
1545 .... BBCWS(am) What's the Problem? (refer to 0145 A)

SATURDAY
1500 .... WHRI(13760kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
..... WRMI(15725kHz) World Radio Network relay
1505 .... R. Australia Smart Societies (concluding an 11 part series on social development)
..... R. Austria Int. Report from Austria—The Week in Review (includes letter segment)
..... R. Canada Int. Quirks & Quarks (what's new & next in science)
..... R. Japan Hello from Tokyo (refer to S 1110)
1506 .... BBCWS(am) Sportsworld (continues from 1406)
1532 .... R. Australia Australian Express (refer to 0305 S)
1535 .... R. Austria Int. Report from Austrio—The Week in Review (includes letter segment)

1600 UTC/ 12pm E/9am P - Page 52 Freqs

SUNDAY
1600 .... VOA Africa Nightline Africa (Ted Roberts with news & sports from Africa)
..... WRMI(15725kHz) World Radio Network (relay)
1605 .... R. Australia Books & Writing (refer to 0405 A)
1606 .... BBCWS(am) Sunday Sportsworld (refer to 1406 A)
1634 .... R. Australia Book Talk (refer to 0434 A)

MONDAY-FRIDAY
1600 .... BBCWS(am) Europe Today (news, analysis & comment on issues & events on the continent)
..... VOA Africa News Now (continuous rolling newscast)
1605 .... R. Australia Morgaret Throsby (refer to 0205 S)
1630 .... VOA Africa Africa World Tonight (live evening news magozine)

SATURDAY
1600 .... VOA Africa Nightline Africa (refer to S 1600)
..... WBCQ(17495kHz) Allan Weiner Worldwide
..... WRMI(15725kHz) World Radio Network relay
1605 .... BBCWS(am) Sportsworld (cont'd from 1405)
..... R. Australia Hindsight (refer to 0005 F)

1700 UTC/ 1pm E/10am P - Page 53 Freqs

DAILY
1700 .... R. Japan News (a round-up of Asian & world news)

SUNDAY
1700 .... WRMI(7385kHz) World Radio Network relay (continues to 2000)
1705 .... R. Australia Sound Quality (refer to 1205 F)
..... VOA Africa Reporters Roundtable (Ashenafi Abedje moderates this lively roundtable of VOA journalists, bringing you analysis of the major news developments in Africa)
1710 .... R. Japan Pop Joins the World (refer to S 1410)
1730 .... VOA Africa Music Time in Africa (Rita Rochelle with the best of traditional & modern African music)(two editions; part two at 1930)

MONDAY-FRIDAY
1705 .... R. Australia Australio Talks Bock (o daily countrywide coll-in on topical national issues)
..... VOA Africa Talk to America (o worldwide call-in show featuring American decisionmakers, personalities & experts)
1710 .... R. Japan Songs for Everyone
1715 .... R. Japan 44 Minutes (current affairs magazine about Japan & Asia)

SATURDAY
1700 .... VOA Africa News Now (continuous rolling newscast)
..... WBCQ(17495kHz) Zombo's Mondo Record Party
..... WRMI(15725kHz) World Radio Network relay (continues to 2300)
1705 .... R. Australia The Spirit of Things (refer to 1205 S)
1710 .... R. Japan Hello from Tokyo (refer to S 1110)
1733 .... VOA Africa Press Conference USA (journalists question newsmakers)

2100 UTC/ 5pm E/2pm P - Page 55 Freqs

SUNDAY
2100 .... WBCQ(7415kHz) Radio Free Euphoria (Captain Ganja's unique form of "variety" show)
..... WHRI(5745kHz) DXing with Cumbre (Marie Lomb with the hottest DX catches)
..... WRMI(15725) Wavescan (refer to 0300 M)
2105 .... Deutsche Welle Hard to Beat (the latest in sports from Germany & the world)
2106 .... BBCWS(am) Everywoman (refer to 0006 M)
2110 .... R. Australia AM (ABC Radio's flagship morning news magozine)
2115 .... Deutsche Welle Inspired Minds (profiles of & interviews with creative & industrious people)
2130 .... Deutsche Welle Hits in Germany (with Deborah Friedman)(fortnightly)
..... Melody Time (light classical favorites with Diane Erickson) (fortnightly)
..... R. Australia Dateline Pacific (RNZI's daily newsmagazine)
..... WRMI(15725) Voice of the NASB (refer to 0230 S)
2132 .... BBCWS(am) Westway Omnibus (refer to 0032 M)

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MONDAY-FRIDAY
2105 .... Deutsche Welle — Newslink Africa (refer to 0405 T-A)

MONDAY
2100 .... WBCQ(7415kHz) — Jean Shepherd (the noted humorist's classic radio programs from the 60s & 70s)
2106 .... BBCWS(am) — Health Matters (refer to 0106 T)
2110 .... R. Australia — AM (refer to 2100 S)
2130 .... Deutsche Welle — A World of Music (refer to 0530 T)
..... R. Australia — Dateline Pacific (refer to 2130 S)
2132 .... BBCWS(am) — Inspiration (refer to 0132 T)

TUESDAY
2106 .... BBCWS(am) — Go Digital (refer to 0106 W)
2110 .... R. Australia — AM (refer to 2100 S)
2130 .... Deutsche Welle — Arts on the Air (refer to 0530 W)
..... R. Australia — Dateline Pacific (refer to 2130 S)
2132 .... BBCWS(am) — Music Review (refer to 0132 W)

WEDNESDAY
2106 .... BBCWS(am) — Discovery (refer to 0106 H)
2110 .... R. Australia — AM (ABC Radio's flagship morning news magazine)
2130 .... Deutsche Welle — Living in Germany (refer to 0530 H)
..... R. Australia — Dateline Pacific (refer to 2130 S)
2132 .... BBCWS(am) — Westway (refer to 0132 H)
2145 .... BBCWS(am) — A Sikh Season (refer to 0145 F) (Aug. 31/Sep. 6/13)
..... — Heart & Soul (refer to 0145 F) (20th/27th)
..... Deutsche Welle — Europe in Capitals (refer to 0545 H)

THURSDAY
2106 .... BBCWS(om) — One Planet (refer to 0106 F)
2110 .... R. Australia — AM (ABC Radio's flagship morning news magazine)
2130 .... Deutsche Welle — Cool! (refer to 0530 F)
..... R. Australia — Dateline Pacific (refer to 2130 S)
2132 .... BBCWS(am) — The Word (refer to 0132 F) (3rd/10th/17th)
..... — World Book Club (refer to 0132 F) (24th)

FRIDAY
2100 .... WHRA(17650kHz) — DXing with Cumbre (Marie Lamb with the hottest DX catches)
2105 .... R. Australia — Verbatim (refer to 0605 A)
2106 .... BBCWS(am) — Science in Action (refer to 0106 A)
2130 .... Deutsche Welle — Focus on Folk (real German folk music)
..... R. Australia — In Conversation (refer to 0130 S)
..... WBCQ(7415kHz) — Pab Sungenis Project (stand-up comedy & sketches)
2132 .... BBCWS(am) — Westway (refer to 0132 A)
2145 .... BBCWS(am) — What's the Problem? (refer to 0145 A)

SATURDAY
2100 .... R. Australia — Australia All Over ("Macca" w/a celebration of Australiana)
..... WBCQ(9330kHz) — Allan Weiner Worldwide (refer to 0000 A)
..... WRMI(15725kHz) — World Radio Network relay
2101 .... BBCWS(am) — Play of the Week (refer to 0106 S)
2105 .... Deutsche Welle — Religion & Society (refer to 0405 S)
2115 .... Deutsche Welle — German by Radio (refer to 0415 S)
2130 .... Deutsche Welle — Africa This Week (refer to 0430 S)
..... WHRI(9495kHz) — DXing with Cumbre (refer to 2100 F)

2200 UTC/ 6pm E/3pm P - Page 56 Freqs

DAILY
2200 .... BBCWS(am) — The World Today (agenda-setting flagship global news program)

SUNDAY
2200 .... R. Canada Int. — The World This Weekend (CBC weekend news magazine)
..... R. Vloonderen Int. — Radio World (refer to 0400 M)
2210 .... R. Australia — AM (refer to 2110 S)
2230 .... R. Canada Int. — Maple Leaf Mailbag (refer to 0030 M)
2235 .... R. Prague — Mailbox (refer to 0105 M)
2240 .... R. Australia — Australia Wide (a roundup of "home" news from ABC Newsradio
2245 .... R. Prague — Czech Books [or] Encore [or] Magic Carpet (refer to 0015 M)

MONDAY-FRIDAY
2200 .... R. Canada Int. — The World at Six (the CBC's flagship evening newscast)
..... R. Vloonderen Int. — Flanders Today (refer to 0400 T-A)
2230 .... R. Canada Int. — As It Happens (interviews with eyewitnesses to news in the making)

MONDAY
R. Australia ..... AM (refer to 2110 S)
2240 .... R. Australia — Australia Wide (refer to S 2240)

TUESDAY
2210 .... R. Australia — AM (refer to 2110 S)
2240 .... R. Australia — Australia Wide (refer to S 2240)

WEDNESDAY
2210 .... R. Australia — AM (refer to 2110 S)
2230 .... WBCQ(7415kHz) — Think Tank North America (the "bizarre")
2240 .... R. Australia — Australia Wide (refer to S 2240)

THURSDAY
2210 .... R. Australia — AM (refer to 2110 S)
2230 .... WBCQ(7415kHz) — Uncle Ed's Musical Memories
2240 .... R. Australia — Australia Wide (refer to S 2240)

FRIDAY
2205 .... R. Australia — Asia-Pacific Weekend Edition (regional news & business report)
2230 .... R. Australia — AM Saturday (ABC Radio's weekend morning news magazine)
..... WBCQ(7415kHz) — Wanton Display of Control & Disruption
2232 .... BBCWS(am) — People & Politics (a weekly report on the British Parliament)
2245 .... R. Prague — The Arts (cultural life in the heart of Europe)

SATURDAY
2200 .... R. Canada Int. — The World This Weekend (CBC weekend news magazine)
..... R. Vlaanderen Int. — Music from Flanders (refer to 0400 S)
..... WBCQ(7415kHz) — Radio Timtron Worldwide (comedy, rock music & skits)
..... WRMI(7385kHz) — World Radio Network relay
2205 .... R. Australia — Correspondents Report (refer to 0105 S)
2230 .... R. Australia — Music Deli (refer to 0640 T)
..... R. Canada Int. — Radio Nomad (refer to 0030 S)
2232 .... BBCWS(am) — The Interview (refer to 0332 S)
2235 .... R. Prague — Insight Central Europe (joint news project of east Europe broadcasters)

2300 UTC/ 7pm E/4pm P - Page 56 Freqs

SUNDAY
2300 .... WBCQ(7415kHz) — Le Show (Harry Shearer with a tour-de-force variety show)
2305 .... R. Australia — Asia-Pacific (refer to 0100 M-F)
..... R. Austria Int. — Report from Austria—The Week in Review (includes letter segment)
..... R. Canada Int. — Writers & Co. (refer to 0105 M)
2306 .... BBCWS(om) — Dirty Wars (refer to 0006 H—5th/12th)
..... — Documentary (refer to 0006H—9th/26th)
2320 .... China R. Int. — CRI Roundup
2330 .... China R. Int. — In the Spotlight (Chinese arts & cultural magazine)
..... R. Australia — Verbatim (refer to 0605 A)
2332 .... BBCWS(am) — Inspiration (refer to 0132 T)
2335 .... R. Austria Int. — Report from Austria—The Week in Review (includes letter segment)

MONDAY-FRIDAY
2305 .... R. Canada Int. — As It Happens (continues from 2230)
2306 .... BBCWS(om) — Outlook (refer to 0306 T)
2315 .... R. Austria Int. — Report from Austria (refer to 0115 T-A)
2345 .... BBCWS(am) — Off the Shelf (refer to 0345 M-F)
..... R. Austria Int. — Report from Austria (repeat of 0145 T-A)

MONDAY
2310 .... R. Australia — Asia-Pacific (refer to 0100 M-F)
2330 .... China R. Int. — People in the Know (prominent Chinese shaping the nation's future)
..... R. Australia — The Europeans (refer to 0405 S)

TUESDAY
2310 .... R. Australia — Asia-Pacific (refer to 0100 M-F)
2330 .... China R. Int. — Biz China (refer to T 0130)
..... R. Australia — Rural Reporter (refer to 0305 A)

WEDNESDAY
2300 .... WBCQ(7415kHz) — Off the Hook (a hacker's view of emerging technology)
2310 .... R. Australia — Asia-Pacific (refer to 0100 M-F)
2330 .... R. Australia — The Arts on RA (an arts-related interview & film review)
..... R. Canada Int. — Dispatches (a Canadian perspective on international news topics)

THURSDAY
2310 .... R. Australia — Asia-Pacific (refer to 0100 M-F)
2330 .... R. Australia — The Buzz (refer to 0605 S)

FRIDAY
2300 .... WBCQ(7415kHz) — The Lost Discs Radio Show (obscure "B" sides from 1955-70)
2305 .... R. Australia — Country Breakfast (Australia beyond the urban fringe)
2330 .... China R. Int. — Life in China (the lives of ordinary people in China)
..... R. Australia — Hit Mix (refer to 0630 A)

SATURDAY
2300 .... WBCQ(7415kHz) — The Real Amateur Radio Show
2305 .... R. Australia — The Europeans (refer to 0405 S)
..... R. Austria Int. — Report from Austria—The Week in Review (includes letter segment)
..... R. Canada Int. — Radio Nomad (continues—refer to 0030 S)
2306 .... BBCWS(am) — Pick of the World (refer to 0306 A)
2330 .... R. Australia — Innovations (refer to 2130 T)
..... WBCQ(7415kHz) — Fred Flintstone's Music Show
2335 ... R. Austria Int. — Report from Austria—The Week in Review (includes letter segment)
2345 .... BBCWS(am) — Write On (refer to 0345 A)

Thank You ...

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Is HFGCS switching to digital voice?

Ask any military or utility radio enthusiast, "if they could only monitor one frequency in the shortwave radio spectrum which one would that be?" The most likely response would be 11175.0 kHz USB (Upper Sideband), the U.S. Air Force HF Global Network primary frequency used and heard worldwide.

But this network is just one of four HF radio networks supported under the HF Global Communications System (HFGCS). The HFGCS is truly the face of military communications within the HF radio spectrum. But that face has undergone many changes over the last two decades. From its early days to its present configuration, as technology has marched forward, so have these premier military radio networks.

❖ What is HFGCS?

The HF Global System is an Air Force acquired and managed network that supports a myriad of Department of Defense beyond-line-of-sight communications missions. The high-power HF network provides long-range voice coverage of approximately 2,000 miles and data coverage of 2,500 miles from each of its 15 worldwide HF stations.

Primary customers of the HF Global Communications System are the Air Force's Air Combat Command, Air Force Space Command, Air Mobility Command, and the Navy's E-6 fleet.

They also support the following organizations/groups: Foreign Dignitaries, State Department, White House, Joint Chiefs of Staff (JCS), Defense Information Systems Agency (DISA), U.S. Air Forces Europe (USAFE), Pacific Air Forces (PACAF), Air Weather Service (AWS), and North Atlantic Treaty Organization (NATO).

HFGCS also provides alert broadcasts of Emergency Action Messages. EAMs can be sent over the HFGCS network directly from United States Strategic Command through a dedicated circuit to the Centralized Network Control Station (CNCS) at Andrews AFB, MD, or from the CNCS after receiving the alert from any of several means.

❖ More than one HF mission

As mentioned above, the most visible element of the HFGCS is the HFGCS, but there are other missions of this system not as highly visible. The High Frequency Global Communications System supports the following four missions:

- *HF Global Communications System* – Supports a wide range of users by providing air-ground-air, ship-to-shore, broadcast, and Automatic Link Establishment (ALE) capability to various DoD customers.
- *Mystic Star* – Provides HF/UHF military satellite communications for the President, Vice President, cabinet members, and other senior government and military officials while aboard Special Air Mission aircraft.
- *Defense Communications System (DCS) HF Entry* – Provides HF communications services for tactical units in areas of the world where DCS connectivity is unavailable or insufficient.
- *Systema de Informatica y Telecommunicaciones de las Fruerzas Aereas Americanas (SITFAA)* - Information and Telecommunications System of the American Air Forces – A Spanish/English/Portuguese language network supporting North, Central, and South American Air Force users in 18 countries. Provides voice and data HF links.

"HFGC system is used primarily to support these four different missions," said Col. Caesar Sharper, SPO director, Tinker Air Force Base's High Frequency Global Communications System Program Office Director, in a recent Air Force interview.

"The primary mission, or global mission, is command and control for mobility air forces such as Air Mobility Command's C-17 (Globemaster IIIs) and (KC-135 Stratotankers)," Sharper said. The system also supports the presidential special airlift fleet, the chief of staff and other special airlift missions known as Mystic Star missions. "As they are out flying to other countries, operators make sure they have an open line of communication established on our HF network," Sharper said.

❖ This is Not Your Grandfather's HF!

One of the more fascinating aspects of the HFGCS is that the Air Force is using one of the oldest telecommunications mediums to pass modern electronic mail to aircraft deployed around the world – HF radio frequencies. Table one below gives you some frequencies for the various missions of the HFGCS.

HF radio is notorious for passing noisy voice and very low speed data at 75- to 300-bits per second on a good day, whereas fiber optic cables allow e-mail to be transferred at trillions of bits of data per second through phased light waves. With that in mind, it is amazing that anyone would use e-mail and high frequency radio in the same sentence. It is even more amazing that e-mail and high frequency radios are working effectively together as part of a modernization of command and control communications to DoD forces deployed around the world.

The Air Force modernized its HF Global Communications System under a program commonly referred to as "SCOPE Command." A portion of this modernization included HF e-mail. With modernized radios, automatic link establishment (ALE), and new wave forms, HF systems can now routinely transfer data at rates of 2,400 bits per second. Occasionally, data transfer rates of 4,800 bits per second can be achieved.

The modern SCOPE Command HF radio system consists of several HF radio stations around the world with advanced radios switched to various public and DoD networks. For HF e-mail, the connection is to either the DoD Nonsecure Internet Protocol Router Network (NIPRNET), better known as the Internet's military domain or dot mil domain, or the Secure Internet Protocol Router Network (SIPRNET). The radios relay ground NIPRNET/SIPRNET data signals to the aircraft in the HF frequency range from 3- to 18-MHz. HF e-mail uses the NATO STANAG 5066 standard which provides detailed protocols for over-the-air data transfers via HF radio.

The modernized radios purchased for SCOPE Command contain ALE technology. ALE provides computer-driven scanning of available frequencies. The computer then builds a database of the frequencies through which each aircraft has the best contact. The data measures the real time performance of a given frequency to ensure an optimum path from the aircraft to the ground station. Compared with manual tuning methods of changing frequency on literally thousands of variables after a signal already is degraded, ALE reliably establishes a quality connection the first time. ALE constantly checks frequencies, rates the quality of the signal on each frequency scanned, then uses the best quality frequency for each call.

Besides helping to select the best frequency, ALE also determines the best SCOPE Command ground station through which an aircraft can connect. An aircraft located hundreds of miles away from any of the SCOPE Command ground stations might have three or four stations through which it could access public and DoD switched voice and data networks. ALE will likewise measure the quality of the signals from those ground stations and make the connection to the ground station with the best quality path.

The Air Force has been collaborating with the Navy in the maintenance of the ground stations. This partnership, coupled with the Navy's

initial effort to field ALE-capable radio systems has led to an increase in the ALE customer base.

"HF e-mail is a mission enabler to allow the warfighter to be able to communicate air tasking orders, a quick response capability that is not easy for them to do today," Sharper said. "The information pathway will be encrypted for classified material."

◆ AWACS aircraft first on HF for e-mail

The newly integrated HF e-mail system allows aircrews from the Airborne Warning and Control System (AWACS) the ability to send and receive classified messages 24 hours a day. Previously, aircrews had to transcribe information through voice communication. This integration into the HFGCS proved successful.

Since its first use, the system has been invaluable to the success of the war in Iraq. HF e-mail provided U.S. Central Command the ability to electronically mail classified Air Tasking Orders to AWACS aircraft to direct the air campaign during Operation Iraqi Freedom. With this system, aircrews were able to concentrate on other important duties.

In the past, there have been instances where AWACS was required to launch without the latest updates to the Air Tasking Order, Air Control Order or other mission essential data. On these occasions, the aircrews have been forced to use voice communications to contact operations personnel on the ground and transcribe the information by hand. Not only does this method tie up critical Ultra High Frequency Satellite Communications channels, but it also distracts aircrew members from accomplishing their mission essential tasks – a potentially dangerous combination.

To address this problem, the 552nd Air Control Wing at Tinker, home base for the Air Force AWACS fleet, worked with Headquarters, Electronic Systems Center at Hanscom AFB, Massachusetts, and the High Frequency Global Communications System program office to deploy High Frequency Messenger (HFM). HFM gives aircrews the ability to send and receive classified electronic mail while airborne, connecting aircrews with commanders that may be hundreds or even thousands of miles away. HFM uses the HFGCS and radios capable of adaptive high frequency communications techniques to establish and maintain a highly reliable wireless link from an E-3 to a SIPRNET gateway on the ground. In effect, HFM extends some SIPRNET capabilities to the airborne mission platform.

No longer are aircrews required to squander valuable time and resources transcribing mission data relayed over voice channels. The beauty of the system is its simplicity. The operator uses Microsoft Outlook to compose and read e-mail as naturally as one might use a desktop PC in the office. The computers also have touch screens to use in place of the mouse. The operator can use a stylus, a pen or even a finger to make selections and launch applications.

In its primary mode of operation, HFM communicates using the HFGCS. Message traffic on the radio link is encrypted and the signal is sent directly or via other remote ground stations to the 789th Communications Squadron's Central Network Control Station (CNCS) at Andrews AFB, Maryland. From there, the message passes through a gateway linked with the SIPRNET, thus giving the aircrew the capability to securely communicate on a global scale.

◆ Will HFGCS Switch to Digital Voice?

In an exclusive interview with Major Rob Hartmann and Frazier Simmons of the HFGCS program office at Scott AFB, Illinois, "we are actively looking at that possibility." Another HFGCS official told *MT* that a Digital Voice capability was being explored by the program and their civilian support companies.

The next few years should be interesting as the face of military communications in the HF spectrum continues to evolve and the High Frequency Global Communications System leads the way.

◆ Eglin AFB Trunk System LMR Update

In the last edition of this column (August 2004) we wrote about the new DoD UHF LMR band and a brand new trunk system in this band at Eglin AFB, Florida. According to Charles Maloney of the Eglin 96th Comm Group, the new trunk system in the 380-399.9 MHz band is a Motorola ASTRO APCO-25 Smartzone system. It consists of five sites and 35 frequencies.

We are especially interested in receiving reports from monitors in the area on whether the new 5th generation Uniden scanners (BC-296D/796D) can handle decoding and trunk duties on any of these new DoD trunk systems.

And that will do it for this month. Until next time, 73 and good hunting.

Table One: High Frequency Global Communications System

HF Global Communications System Mission
Voice (USB): 8992.0 11175.0 primary 24 hours, 13200.0 15016.0 back-up day, 4724.0 6739.0 back-up night

ALE Network: 3137.0 4721.0 5708.0 6721.0 9025.0 11226.0 13215.0 15043.0 18003.0 23337

SIPR (Secret Internet Protocol Router) Network Frequencies
ALE/USB/Data: 5702.0 6715.0 8968.0 11181.0 17976.0 27870.0

NIPR (Non-Secure Internet Protocol Router) Network Frequencies
ALE/USB/Data: 3068.0 4745.0 5684.0 8965.0 11199.0 13242.0 17973.0 20631.0

HF Mystic Star Mission
Voice (encryption)/data (USB/LSB):

F003 8036.0	F005 9120.0	F007 4850.0
F009 17972.0	F020 16117.0	F033 15962.0
F039 10881.0	F046 13823.0	F054 8058.0
F058 4742.0	F061 23265.0	F063 14870.0
F064 11214.0	F066 15036.0	F078 18532.0
F080 15677.0	F084 13205.5	F085 6993.0
F086 9461.0	F089 13204.0	F090 6716.0
F094 9017.0	F098 14585.0	F099 13247.0
F101 12106.0	F102 11118.0	F103 11488.0
F108 7316.0	F114 6986.0	F117 6993.0
F124 11217.0	F126 12087.0	F128 23242.0
F134 4942.5	F136 5429.5	F146 9027.0
F153 8063.0	F171 18403.5	F173 14420.5
F174 20650.0	F182 3078.0	F184 10648.0
F186 3046.0	F194 13825.0	F195 20631.0
F197 4982.0	F202 16014.0	F204 12057.0
F211 11056.0	F220 11181.0	F226 5435.5
F228 7735.0	F236 15041.0	F243 18590.0
F248 5398.0	F249 4731.0	F250 15091.0
F251 13217.0	F262 10717.0	F264 7693.0
F265 15733.0	F266 7997.0	F267 6730.0
F268 7325.0	F271 18320.0	F277 11153.0
F287 11226.0	F290 8026.0	F291 13960.0
F292 9414.5	F295 11460.0	F300 15707.0
F301 7500.5	F311 11220.0	F326 14864.0
F327 18716.0	F337 18761.0	F341 16083.0
F350 5043.0	F354 11053.0	F356 7827.0
F360 7919.5	F363 15018.0	F365 11059.0
F369 20397.0	F370 17177.0	F372 16123.0
F380 3144.0	F382 15094.0	F395 9057.0
F400 6728.0	F404 7690.0	F405 6972.0
F406 18393.0	F417 4992.0	F419 11407.0
F420 7933.0	F432 6731.0	F433 20972.0
F435 3821.0	F437 5684.0	F441 17440.0
F444 19267.0	F451 13248.0	F452 5026.0
F453 19063.0	F461 13211.0	F463 4610.0
F464 16157.0	F465 8040.0	F466 14864.5
F467 9023.0	F481 7605.0	F483 18626.0
F486 5152.0	F487 24483.0	F489 5437.0
F496 11059.5	F497 5411.0	F498 8032.0
F499 4442.0	F500 8989.0	F505 9006.0
F516 4645.0	F517 9270.0	F521 11484.0
F522 11232.0	F523 9215.0	F529 8077.0
F530 23325.0	F533 18675.0	F540 5404.5
F542 5431.0	F543 8083.0	F545 10580.0
F546 18400.0	F551 18331.0	F555 4894.0
F561 11052.0	F567 13565.0	F569 18387.0
F574 11413.0	F575 10427.0	F576 11153.5
F577 10544.0	F595 10877.0	F600 13878.0
F611 14863.0	F614 4488.8	F616 9320.0
F622 5817.0	F623 18317.0	F624 13241.0
F626 19343.0	F627 7910.0	F631 18755.0
F633 18290.0	F639 7469.0	F642 18218.0
F644 15821.0	F646 13440.0	F649 8053.0
F655 11053.0	F662 15048.0	F667 6817.0
F673 3064.0	F690 3032.0	F700 4490.0
F701 11058.0	F702 9323.0	F703 9991.5
F706 8057.0	F707 10589.0	F708 23377.0
F709 9317.0	F710 4458.0	F713 16246.0
F717 10883.0	F722 12270.0	F723 18323.0
F728 11236.0	F731 6683.0	F732 15011.0
F734 4757.0	F736 11494.0	F741 7873.0
F748 6756.0	F752 8047.0	F754 11627.0
F758 4452.0	F777 3113.0	F778 18023.0
F784 9043.0	F785 15687.0	F790 16323.0
F809 5700.0	F814 6989.0	F823 11229.0
F832 18267.0	F846 13822.0	F864 16008.0
F867 6830.0	F868 9218.0	F869 16090.0
F873 13248.0	F875 6717.0	F877 4721.0
F885 13207.0	F891 11053.5	F895 5710.0
F904 10202.0	F906 4524.0	F909 7687.0
F910 19671.0	F912 7330.0	F915 12107.0
F917 10205.0	F918 13482.0	F919 11159.0
F920 7927.0	F924 16317.0	F935 7922.5
F940 11445.0	F943 19002.0	F948 15038.0
F957 6761.0	F965 11466.0	F974 10586.0
F980 15724.0	F987 10583.0	F988 4763.0
F997 15667.0		

Defense Communications System (DCS) HF Entry
Selected reported frequencies (various modes):
2001.0 2582.0 2618.0 2664.0 2797.0 3373.0 4445.0 4505.0 4528.0 4562.5 4595.0 4985.0 5370.0 5400.0 5434.0 5817.5 5820.0 5835.0 6830.0 6897.5 6905.0 6912.5 6989.0 7362.5 7469.0 7690.0 7935.0 8000.0 8039.0 8041.0 8060.0 8064.0 8162.0 8170.0 9145.0 9190.0 9259.0 9320.0 9417.5 9958.0 9970.0 10586.0 10690.0 10720.0 10730.0 11410.0 11422.5 11482.5 11513.5 11535.0 11995.0 12045.0 12060.0 12090.0 12105.0 12240.0 12255.0 12324.0 13545.0 13610.0 13680.0 14375.0 14385.0 14646.0 14667.0 14867.5 15595.0 15895.0 16090.0 16100.0 16170.0 16225.0 16340.0 16422.5 17410.0 17460.0 17480.0 17500.0 17519.0 18036.0 18060.0 18162.5 19005.0 19047.0 19160.0 19510.0 20035.0 20050.0 20075.0 20124.0 20151.0 20350.0 20400.0 20425.0 20438.0 20550.0 20763.0 20950.0 21856.0 21886.0 21918.0 23180.0 23500.0 23600.0 23690.0 23700.0 24120.0 24510.0 25360.0 25425.0 25516.0 26575.0 26650.0 26750.0 26850.0

Systema de Informatica y Telecomunicaciones de las Fruerzas Aereas Americanas (SITFAA)
ALE/USB/Data: 4764.0 7317.0 7935.0 8061.0 8067.0 11547.0 13217.0 13897.0 13921.0 14640.0 14643.0 14646.0 14649.0 15675.0 18367.5 18370.5 18373.5 18376.5 19497.0 19500.0 20597.0 20860.0 24860.0

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DHS – New Agency, New Frequencies

In *Hammerheads*, a 1990 novel by Dale Brown, the growing problem of drug interdiction, customs enforcement, immigration control and border security was addressed in a very creative way, fueled by recommendations and bureaucratic war stories from field agents who survived the drug wars of the 1980s.

Set in the "near future," the Hammerheads were the Air Wing of the newly formed border security department that combined the Customs Service, Coast Guard and other agencies into a one-stop border surveillance and control agency. The Hammerheads scrutinized all inbound air and sea traffic, quarantining suspicious aircraft and vessels at offshore facilities far removed from valuable mainland assets and potential terrorist targets.

Eleven years after this book was published and after the terrorist attacks of September 11, 2001, President Bush asked for the formation of the Department of Homeland Security, or DHS. It was believed that federal agencies in charge of protecting the US could do a better job if they were all under the same direction, rather than operating under separate and sometimes competing departments.

The DHS consists of four directorates, with each supervising a different area of Homeland Security. These four directorates are Border and Transportation Security, Emergency Preparedness and Response, Science and Technology, and the Information Analysis and Infrastructure Protection directorates. More details on each directorate and representative agencies can be found on the DHS website, **http://www.dhs.gov**

The big question for us federal monitors is, "Where do we listen now?" Will there be a whole raft of new frequencies being used by the DHS and its various agencies, or will they continue on the frequencies they have been using for years? At this time, the answers to these questions are still a little cloudy, but there are indications from unofficial sources that at least some the original agency frequencies will continue to be used.

❖ US Customs

One agency that has started to make changes is US Customs, now part of DHS under the Border and Transportation Security Directorate. In the past, we have heard Customs VHF frequencies noted as "A-1" or "B-3". Those have all been changed to NET and TAC channels. The NET channels are all repeaters and TAC channels all appear to be simplex. Here is a rundown of the new Customs NET

Repeater Out	PL	Repeater In	PL	Channel name
165.2375	100.0	166.4375	100.0	NET 1
169.4500	100.0	171.0750	100.0	NET 2
165.2375	100.0	166.5875	100.0	NET 3
165.6875	100.0	166.2250	100.0	NET 4
164.6000	100.0	166.4875	100.0	NET 5
165.2375	100.0	166.4875	100.0	NET 6
165.4625	100.0	166.5875	100.0	NET 7
165.4875	100.0	166.5625	100.0	NET 8
165.6875	100.0	166.4375	100.0	NET 9
163.1250	100.0	164.3250	100.0	NET 10
165.7625	100.0	166.5875	100.0	NET 11
166.5875	100.0	169.5500	100.0	NET 12
165.4125	100.0	166.2250	100.0	NET 13
165.4375	100.0	166.3000	100.0	NET 14
162.0500	100.0	164.5750	100.0	NET 15
164.7750	100.0	165.9750	100.0	NET 16
165.2375	100.0	166.5375	100.0	NET 17
163.6250	100.0	162.8500	100.0	NET 18
163.6750	100.0	162.9250	100.0	NET 19
163.6250	100.0	162.8250	100.0	NET 20
163.6250	CSQ	162.8250	100.0	NET 21
163.6750	CSQ	162.9250	151.4	NET 22
163.6750	CSQ	166.5875	123.0	NET 23
165.6875	94.8	166.4375	100.0	NET 24
165.4875	100.0	166.9750	100.0	NET 25
166.3000	100.0	165.4125	100.0	NET 26
166.2000	100.0	168.0000	100.0	NET 27
163.1750	100.0	166.4875	100.0	NET 28
169.5500	100.0	166.1250	100.0	NET 29
163.2250	100.0	164.1000	100.0	NET 30
170.1000	100.0	166.4875	100.0	NET 31
165.4125	100.0	166.5875	100.0	NET 32
169.5500	100.0	170.1000	100.0	NET 33
162.3000	100.0	164.1000	100.0	NET 34
163.1250	131.8	166.5875	131.8	NET 35
170.7250	100.0	173.5000	100.0	NET 36
165.6875	100.0	170.1000	100.0	NET 37
166.1250	100.0	169.5500	100.0	NET 38
165.2375	100.0	166.4375	100.0	NET 39
165.2375	100.0	164.2500	100.0	NET 40
165.6875	100.0	170.1000	167.9	NET 41
165.5125	100.0	168.8000	100.0	NET 42
165.2375	94.8	166.4375	100.0	NET 43
162.6625	100.0	164.1000	100.0	NET 44
165.4375	156.7	166.3000	100.0	NET 45
164.1000	100.0	169.5500	167.9	NET 46
165.2375	100.0	172.3500	100.0	NET 47
169.4125	100.0	165.4125	100.0	NET 48
165.6875	100.0	166.5875	100.0	NET 49
162.2500	100.0	166.2000	100.0	NET 50
163.3000	100.0	169.4125	100.0	NET 51
165.2375	100.0	166.8750	100.0	NET 52
166.4625	CSQ	166.4625	100.0	DHS COMMON
166.4625	CSQ	166.4625	CSQ	DHS INTEROP

165.2375	100.0	TAC 1
169.4500	100.0	TAC 2
164.6000	100.0	TAC 4
163.1250	100.0	TAC 7
165.4125	100.0	TAC 10
169.5500	100.0	TAC 19
165.7375	100.0	TAC 26

and TAC channels.

As you look over this list you will notice many frequencies that Customs has used previously, but also some new frequencies, too. You should also notice that our old favorite frequency of 166.4625 MHz, known for years as *Treasury Common* is now labeled *DHS Common*. This indicates it is now a common use frequency for all the DHS agencies.

Most of these frequencies are still being used in the analog mode, with the possibility of DES encryption. In some areas of the country they have started using APCO P-25 digital mode, which is receivable with the newest generation of digital scanners.

Keep an ear on these frequencies and let us know what you hear in your area. I would like to thank *MT* reader Ty Logan for passing along this information.

❖ New Federal Wireless Networks

Recently there have been developments in the arena of federal trunked systems that should interest everyone. I mentioned in the last Fed Files that the Bureau of Prisons was upgrading all of their facilities with 5 channel Motorola ASTRO trunked systems. Now there are signs of a "wide area" federal VHF trunking system starting to take shape in the Pacific Northwest. The system is officially known as the Justice Integrated Wireless Network, or JIWN. It is apparently going to serve western Washington State, and the repeater sites are sharing towers belonging to the Washington State Patrol.

The JIWN appears to be using the Motorola 9600 baud P-25 digital standards, with the voice channels mostly un-encrypted, at least during testing. This means that listeners will require the newest versions of the digital trunking scanners to track these systems. The sites are still in the installation and testing phase, so I haven't been able to determine talk groups or how to track these systems with a scanner. I have been able to gather some information while scanning from the Portland, Oregon area. All the sites for this system are in Washington State:

167.2375 MHz – 9.6k control channel, Baw Faw Peak site
167.4375 MHz – 9.6k control channel, Vancouver site
167.6375 MHz – Possible 9.6k control channel reported north of Seattle
168.8250 MHz – Voice channel at Vancouver site
168.8875 MHz – Voice channel at Kalama site
169.4125 MHz – Voice channel at Vancouver site.
170.6750 MHz – 9.6k control channel, Kalama site.

Both the Justice Department and the Treasury Department have started planning for these wide-area systems to supplement their existing radio networks. Although these systems are being planned for various areas of the country, these systems are not "nationwide" in that they are not all interconnected, so don't expect to hear units from California talking to units in New York, at least not yet.

You can read more about the planning for these systems in this on-line article, **http://iwce-mrt.com/ar/radio_feds_accelerate_network/** Check out the VHF federal bands your area for more of these systems that may be springing up in other areas of the country and let us know what you hear.

❖ Secret Service - Super Secret?

Since we are nearing date of the presidential election, it is a good time to keep an ear out for activity on the frequencies used by the US Secret Service and the White House Communications Agency (WHCA). Even though the majority of Secret Service protective details are encrypted and usually cannot be monitored, some of us still like to keep an ear on these frequencies.

There have been reports for years now that the Secret Service has changed frequencies, or gone to some super-secret form of radios, since scanner users were not hearing activity on the usual frequencies when the President came through town. From what I have seen and heard personally, I don't think they have changed frequencies, but there are some changes in the Secret Service communications setups that we should be aware of.

I can confirm that when President Bush visited the Daytona 500 auto race in Florida earlier this year, the usual VHF Secret Service and WHCA frequencies were as busy as ever, but with a change. It appears that they are updating radios to comply with the new mandate for narrow-band and APCO P-25 compliant equipment. For this visit, most of the Secret Service frequencies were using encrypted P-25 digital mode, while WHCA channels appeared to still be using DES or a similar form of analog encryption. I will guess that WHCA will soon be moving to the same form of digital communications.

Here is a list of what was active in Daytona:

162.6875 MHz	Yankee
164.4000 MHz	Papa
164.8875 MHz	Oscar
165.3750 MHz	Charlie
166.5125 MHz	Sierra
166.7000 MHz	November
167.0250 MHz	Whiskey
167.9000 MHz	Hotel
168.3500 MHz	Federal Wide Area Common
169.9250 MHz	Delta
171.2875 MHz	Zulu

Now, let's talk about why listeners are not hearing very much (or in some cases nothing at all) during a visit by the President. I remember that in past years WHCA would show up days ahead of the POTUS arrival, setting up various radio transmitters and even repeaters on some of the VHF channels they use. This provided wide-area communications that was used during the visit of the dignitaries. Before the WHCA started using encrypted radio systems, you could hear most all the activities and movements of the parties.

In recent years, however, WHCA communications philosophy seems to have changed. Instead of setting up high-powered radio systems in order to cover a large area, they seem to be concentrating their communications assets in the specific areas were the dignitaries would be spending their time.

In the events I have been involved in personally, I noted that WHCA technicians installed small portable radio set-ups inside closets or offices in the building where the protected dignitary would be visiting. These transportable base stations would be hooked to a T1 data line linked back to the command post and would be controlled by operators there. The portable system could provide excellent communications with the Secret Service agents in the immediate area around where it was installed, but does not carry much further than it has to.

Another reason that the amount of radio traffic has dropped is cell phones. In past years, most Secret Service agents carried only their agency issued radio. These days, all agents appear to be carrying radios, pagers and cell phones. Movements of the dignitaries can be sent out to agents via text messages or pages that are nearly impossible to monitor and many of the supervising agents can be seen using cell phones almost constantly. Radio traffic is almost always encrypted and usually very brief, so it is also possible that we're just missing some of the traffic because we're not close enough or not listening at the right time.

Something new in WHCA communications has popped up lately. It appears that the transportable UHF trunking system that has been known to exist, but had not been not heard, has finally made it to air. An anonymous source has reported hearing this WHCA trunked system in Florida recently. In this case, the system was in a plain white RV with a 50-foot pneumatic mast. Here are the frequencies that this system uses:

406.4500 MHz
407.1250 MHz
407.8000 MHz
408.5250 MHz
408.9250 MHz

Our source also reports that the system can be tracked using a trunk-tracking scanner with the settings of 406.100 for the BASE and 25 for the step. The system was using all DES encrypted analog mode, but I will bet that it will eventually move to P-25 digital.

❖ A New Day

As we wrap up this edition of *Fed Files*, operations changes such as DHS and technical changes such as P-25 have now made their way into the federal monitoring arena. Digitally capable scanners have become mandatory monitoring tools instead of limited-use novelties. It's time again to search the federal government bands, look for new control channels and start logging frequency assignments and talk groups.

Federal radio usage appears to be experiencing a long-awaited resurgence after a decade of diminished use through cell phones and Nextel subscriptions. Keep listening and who knows; we may even hear some "Hammerheads" out there!

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Bye-bye, licenses

Broadcasting licenses are valuable. It's relatively rare for one to be cancelled, and much rarer for one to be cancelled against the will of the licensee. Last month, I mentioned a petition asking the FCC to revoke three broadcasting licenses in California. This month, we have news of the cancellation of four more licenses, and 24 licenses in grave risk of loss.

In a day and age when a station can intentionally run day power all night – after being warned by the FCC – and not lose its license; when a station can run a contest that encourages listeners to have sex in church (and then explicitly describes the winners' behavior...) and remain licensed; what does it take to lose your license? Levi Willis, Sr. of Norfolk, Virginia can now answer this question...

Willis wholly or mostly controls thirteen corporations which in turn owned 28 radio stations. These stations are spread across the South, and mostly carry religious programming. Beginning in 1999, FCC inspections of Willis' stations began to show some serious violations, and a number of fines were issued:

WBOK-AM, New Orleans: $14,000 for failing to register their tower and not replying to a Notice of Violation;
KVLA-AM, Vidalia, Louisiana: $12,000 for no Emergency Alert System (EAS) equipment and not replying to a Notice of Violation;
WGRM-FM, Greenwood, Mississippi: $22,000 for no EAS equipment, no tower registration, no public inspection file, and no reply to a Notice of Violation;
WJNS-FM, Yazoo City, Mississippi: $14,000 for tower light violations and no reply to a Notice of Violation.

According to a Consent Degree between the FCC and Willis, as of January 2004 these fines were still unpaid. Finally, a "pre-designation letter" was sent, warning that the violations "...raised serious questions about Willis's qualifications to remain a licensee." All 28 of his licenses could be revoked.

This correspondence got a reply! Willis argued that he suffered from a severe illness during the period, and had been unable to deal with these matters. He also argued that the violations cited had since been corrected. (The FCC doesn't consider that an excuse; and in any case the Commisison says later inspections found numerous new violations.)

Willis and the FCC agreed to a "Consent Decree." The licenses of four of his AM stations have been surrendered for cancellation. At the time, applications to sell two other stations were pending; these applications were granted on the condition that the sales be consummated within ten days. (They were. If they hadn't, six additional licenses would be cancelled, as well as the two that were to be sold.)

Next, the money from the sale of the two stations (WWCA-1270 and WJNS-92.1) was to be placed in escrow. This money was to be spent first on payment of outstanding fines, taxes, and license fees. Any money left over was to be spent only on bringing Willis' remaining stations into compliance with FCC regulations. Failure to spend the sale proceeds in this way would result in the cancellation of the six additional licenses.

Within 60 days of the sale of WWCA and WJNS (i.e., by early September) the six additional stations were to certify compliance with FCC regulations. Any station unable to do so will lose its license. A month later, Willis' remaining stations are to certify compliance or surrender their licenses. Every six months thereafter, for the remainder of each station's license term, the station is to certify compliance or surrender their license.

This is an unprecedented action by the Commission. In the past, serious violations of this nature have resulted in either the outright revocation of licenses or "distress sales" where the licensee is required to transfer all licenses to a new, "clean" licensee. As of deadline, the word is that Willis is in compliance with the Consent Decree, and no further licenses will be lost. I think you can assume these stations will be closely watched by the Commission, and any violations they do find will result in more stations disappearing.

Cancelled!
Licenses forfeited in the Willis Consent Decree:

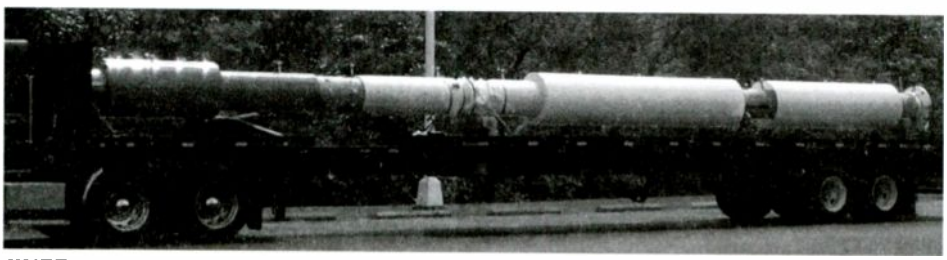
KLRG-1150	North Little Rock, Arkansas
KVLA-1400	Vidalia, Louisiana
WCRY-1460	Fuquay-Varina, North Carolina
WSVE-1280	Jacksonville, Florida

❖ Bits and Pieces

Mexicans Move - The Mexican stations mentioned last month are changing frequency. XEKTT-560 has moved to 1700. XESS-780 is moving to 620. And another station, XESDD, which had been planning to operate on 920, is going to use 1030 instead. Observers seem to think these moves will clear up the interference issues mentioned last month, except for the 1030 station interfering with KURS-1040 in San Diego. However, the person behind the three Mexican stations also owns KURS, so presumably he won't object to the interference!

Loopy TIS - Two readers report new Traveler's Information Stations on the air, neither of them actually airing anything relevant to travelers! David Warrick reports WPZY431 on the air on 1670 in Livonia, Michigan. The station is running NOAA weather radio and a "loop" of information about Livonia; they promise to provide official information in case of emergency. And from Arlington, Virginia, Kraig Krist KG4LAC reports WQAE877 on 1700 kHz. This station calls itself "Arlington Alert AM Radio." WQAE877 is testing, trying to select the most effective transmitter site.

The cancellation of four AM licenses should open some channels for AM DXing in large cities, including Little Rock, Raleigh, and Jacksonville. Are you hearing anything new in any of these cities? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!



KNZZ-1100's three-tower array along U.S.-50 near Grand Junction, Colorado.

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
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Many North American Pirates on FM, Not Shortwave

Every month, *Monitoring Times* contains information about many dozens of unlicensed North American pirate radio stations that broadcast on shortwave frequencies. These stations can be heard at a considerable distance from the station transmitter, so they are very attractive targets for DX radio listeners.

At the same time, a considerable number of North American pirate radio stations use transmitters inside the FM radio broadcasting band. Those signals have a considerably smaller coverage area, but they create considerable interest in the local communities and neighborhoods where their signals can be heard.

Our regular contributor Artie Bigley has become an excellent sleuth of these local FM pirates. He has discovered that the stations often generate press coverage in local newspapers and on local television news broadcasts. This month's harvest of local FM pirates includes two typical examples of this genre.

In Seattle, WA, **Radio Beat** on 93.7 MHz has developed a local following for its eclectic format of rap, reggae, and rock music. This FM channel in Seattle had been vacant recently, given the prior FCC bust of **Deez Nutz**, another pirate that formerly used 93.7 MHz in Seattle until the FCC shut it down. According to the Seattle *Post Intelligencer*, this pirate has an unusually good signal range, with its signal reportedly audible throughout most of the southern part of King County, Washington.

In San Diego, CA, **Pirate Radio** appears to be a casual identification of the station broadcasting on 96.9 MHz. In another example of an eclectic format, this one programs gospel, classical, and world music, apparently on whim of the DJ's, including a fellow named "Bob Ugly." Channel 7 NBC television news in San Diego reported that the signal is audible from downtown San Diego to Chila Vista.

In Tennessee, two different pirates have been gathering media attention. One, **Fun 100**, apparently operates out of Millersville in the area near Goodletsville, north of Nashville, TN, with an eclectic format of jazz, blues, gospel, and Caribbean music. A second station, **KFAR** in Vestal, near Knoxville on 90.9 MHz, uses a slogan of "Free Access Radio" from their call letters. They feature local news and very diverse music shows, with all DJs paying $10 in "dues" to get their airtime.

A bill introduced in the United States Senate by Senator John McCain (R- AZ) and Senator Patrick Leahy (D-VT) would permit the expansion of licensed low power FM stations across the United States, but it appears that this bill has little chance of passage during the current session of Congress.

❖ La Voz de la Resistencia

The golden years of North American political clandestine radio broadcasting are now long gone. But, citing a report by Bjorn Malm in Quito, Ecuador, that ran in the *ConexionDigital* bulletin, *DXplorer* notes that the anti-Colombian clandestine **La Voz de la Resistencia** has been noted by South American DXers on 6120 kHz in parallel to 6239.83 kHz around 0000 UTC. Bjorn's web site at **http://www.malm-ecuador.com/** actually contains audio clips of his reception of this rarely heard clandestine. With fall approaching, and with earlier sunsets in North America, this one is well worth checking out on days of good propagation to South America. Have any of our readers been hearing them? Malm notes that the station is frequently jammed, so it may sometimes be possible to hear the jamming transmitter, even if the clandestine station is inaudible.

In 1999, **Clandestineradio.com** reported that this station had an address. It is not known if Comision Internacional, Apartado Postal 27552, C.P. 06761, Mexico D.F., Mexico is valid anymore for reception reports to this FARC clandestine station. The lyrics to the station's ballad theme song are posted on the internet at the **http://www.lafogata.org/libros/li_voz.htm** URL. Those lyrics praise the resistance being supported by the Labor Movement.

❖ What We Are Hearing

In contrast to the locally heard FM pirate broadcasters, *Monitoring Times* readers heard all of these North American shortwave pirate broadcasters this month. Pirate broadcasting increases noticeably on weekends and major holidays. The new primary North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, remains the best place to scan for the pirates. There are occasional broadcasts near the old 6955 and 6950 kHz frequencies.

Ann Arbor Radio- The young boy announcer on this new one has concentrated on rock music programming. (None; solicits reports via FRN)

Big Thunder Radio- Almost all of the programming on this one is rock music. (bigthunderradio@hotmail.com e-mail)

Captain Morgan- The Captain mixes rock music and theme songs from old TV shows with occasional country tunes during his broadcasts. (None, says to send reports to *ACE*, and has QSLed lately)

Indira Calling- They somehow pull off a combination of East Indian music and Beach Boys music. (Providence)

Ironman Radio- Scuffy Swab's station solicits reports via a maildrop, but Rich D'Angelo received a QSL from them for a logging in a DX bulletin. Their recent contest was won by John T. Arthur, who also wins all of the bingo games on **Radio Bingo.** Chris Lobdell also got a QSL for a report to Belfast, and he came in second in the contest. (Belfast)

Radio Free Speech- Bill O. Rights has been active again with advocacy for pirate radio and political freedom. Rock music and comedy are always mixed in. (Belfast)

Radio Nova- This Europirate claims to be "Europe's first new age radio station on shortwave." Their new web site is visibile at http://www.listentoradionova.com/novaqslcard/index.html on the internet. We picture their QSL here this month. (Beilen)

Ragnar Radio- Their rock music "from the Great Lakes" has occasionally been supplemented by Morse Code transmissions. (Uses rangarradio@yahoo.com e-mail)

Take it Easy Radio- Rock music by many artists predominates here, although they tend to sign off with their namesake tune by the Eagles. (Merlin and uses takeiteasyradio@yahoo.com e-mail)

The Border Radio- This one is primarily a rock music pirate. (None, asks for reports to the Free Radio Network)

United Patriot Militia Bingo- Their bingo gomes still make fun of Steve Anderson's defunct **KSMR** right wing clandestine station in Kentucky. (None)

WHYP- James Brownyard, a one man broadcoster on a licensed station in North East, PA, remains the driving force behind this very active pirate. His weather reports and mumbling are mixed in with pirate porodies and other well produced content here. (Providence)

WMPR- The techno rock "dance porty" format at micro power radio is easy to recognize. (Still none)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 28413, Providence, RI 02908; PO Box 128, 9410 Beilen, The Netherlands; 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 remain *The ACE* ($2 US for sample copies via the Belfast address above) the e-mailed Free Radio Weekly newsletter, via niel@ican.net and the Free Radio Network web site, found at http://www.frn.net. 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: Skip Arey, Beverly, NJ; Kirk Baxter, North Canton, OH; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Jerry Coatsworth, Merlin, Ontario; Rich D'Angelo, Wyomissing PA; Mike Fanderys, Parma, OH; Marlin Field, Hillsdale, MI; Harold Frodge, Midland, MI; David Gibson, Monroeville, PA; Harry Helms, Las Vegas, NVChris Lobdell, Stoneham, MA; Larry Magne, Penn's Park, PA; Greg Majewski, Oakdale, CT; Kevin Mikell, Chicago, IL; Ira Paul, Royal Oak, MI; Lee Reynolds, Lempster, NH; Fred Roberts, Germany; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; Niel Wolfish, Toronto, Ontario, and Robert Zeller, Knoxville, TN.

SATELLITE SERVICES

MT TRANSPONDER GUIDE *www.monitoringtimes.com/mtssg.html*

All Frequencies MHz

Robert Smathers
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Intelsat Americas 5

Ku-Band - 97 degrees West longitude

1(V) 11728.5 Data Transmissions / Bob Jones University Homesat (digital)
2(H) 11735.0 Data Transmissions
3(V) 11789.5 Occasional video
4(H) 11796.0 Data Transmissions
5(V) 11836.0 Pittsburgh International Telecommunications (PIT) (digital)
- IRI82 - Iranian
- IRI8 Radio - Iranian
- NTD (New Tang Dynasty) TV
- Rang-a-Rang Channel - DC
- Rang-a-Rang Channel – NY
- Al-Alam TV
- TV 7 Tunis
- Daystar Television Network
- T8N – Trinity Broadcasting Network
- JCTV
- Arabic Radio
- World Service Radio
- Quran Radio
- Life Radio 1
- Reform Radio
- Tunis Radio 1
- Tunis Radio 2
- Star Radio 1 – Scriptures for America
- Star Radio 2 – Truth Radio Network 1
- Star Radio 3 – The Overcomer Ministries – Dr. Stair
- Star Radio 4 – Reality Radio Network
- Star Radio 5 – I8C Radio Network
- Star Radio 6 – Occasional audio services

6(H) 11842.5 Data Transmissions
7(V) 11867.0 Globecast World Television (digital)
- Assyria Sat TV USA
- TV Romania
- Duna TV – Hungary
- AsiaNet USA - Malayalam
- Pictures of Croatia
- Voice of Croatia
- Horizon TV – Armenia
- ITC – Information Technology Channel
- Persian Entertainment Network (PEN) – Iranian
- Iranian Cinema Channel (ICC)
- Payam TV - Persian
- MA TV – Persian
- Jeevan TV – Malayalam
- Sneha TV - Telugu
- Nishkaam radio
- Darbar Sahib radio
- Amrit Bani radio
- Nanak Parchar radio
- Kossuth Radio - Hungary

8(H) 11873.5 Globecast World Television (digital)
- Living Asia Channel
- Abu Dhabi TV
- TDA Channel 1
- TDA Channel 2
- Canal Algerie
- Simaye Azadi
- RTV-21 - Albanian
- Radio 21 - Albanian
- Futbol DP (Futbol de Primera) Yemen TV
- Radio Sanaa - Yemen

9(V) 11898.0 „Sky Vista" (digital)
- Emirotates Dubai Television - EDTV1
- Dubai Sports Channel - EDTV2
- Saudi Channel One
- Beste Van Nederland (Dubai Business Channel)
- Arabic radio

10(H) 11904.5 Private Business Television (digital)
11(V) 11929.0 Globecast World Television (digital)
- German TV
- DW Radio - German
- TV Polonia
- Polskie Radio 1
- Polskie Radio 3
- Dandana TV
- TV Orient
- Tele 5 – Polish
- Euro 2004 Channel
- S8C - Chicago-based South-Asian programming (Hindi)
- Jordan TV
- TVP3 – Poland
- STN Radio
- Radio Tropicale
- Latin Broadcasting Corp. radio
- Mega Communications – WNUE-FM 98.1 Titusville, FL
- Asian FM Radio

12(H) 11935.5 Pittsburgh International Telecommunications (PIT) occasional video
13(V) 11960.0 Data Transmissions
14(H) 11966.5 Data Transmissions
15(V) 11991.0 Globecast World Television (digital)
- Setanta Sports
- Radio Punjab
- Radio Punjab – CA
- Radio Punjab - US
- ERI TV (Eritrea TV) - Eritrean
- Dimtsi Hafash radio - Eritrean
- Radio Zara FM – Eritrean
- MAC-TV – Macroview TV
- Pink Plus – Serbian
- Radio Pink
- Apna TV
- ATN Bangla
- TV Bulgaria
- CTN – Cambodian Television Network

16(H) 11997.5 Data Transmissions
17(V) 12022.0 Private Business Television (digital)
18(H) 12028.5 Data Transmissions
19(V) 12053.0 Globecast World Television (digital)
- BK TV – Serbia
- RSC-1 – Antena 1 and Prima TV – Romania
- RSC-2 – Realitatea TV and Etno – Romania
- RSC-3 - Pro TV International – Romania
- Euronews (languages: English, French, German, Italian, Spanish, Portuguese, Russian)
- Africa Independent TV (AIT)
- CR Sports
- SPT – Portuguese
- Telepace - Italian
- Ray Power 106.5 FM – Nigeria
- Radio Romania International
- Radio Romania News

20(H) 12059.5 Data Transmissions
21(V) 12084.0 Data Transmissions
22(H) 12090.5 A8S-C8N International (digital)
- The Filipino Channel – North America
- A8S-C8N News Channel
- Cinema Channel One
- DZMM Radio Patrol
- DWRR Radio Romance
- NITV (National Iranian TV)
- Zhong - CTN Channel North America - Chinese
- DA-I - Tzu Chi Do'I
- Pars TV Network
- Appadana International
- Tamasha International Network
- HZTV – Hwazan Satellite TV
- Channel One
- Pinoy Central TV
- PNN – Persian News Network
- Future Radio 1, 2 (encrypted)

23(V) 12115.0 CSkyNet USA (digital)
- ETTV Global
- ETTV Drama
- ETTV China
- ETTV News
- ETTV Yoyo TV
- 8LTV - Buddhism Light TV
- SET International - Sanlih Entertainment TV - Taiwan
- Unique Satellite TV
- JET-TV - Japanese Entertainment TV
- Do-Ai TV - Tzu Chi Do'I

24(H) 12121.5 Globecast World Television (digital)
- Business TV 1
- Business TV 2: HRT - Hrvatska Televizija - Croatia (shares with HIC)
- Business TV 2: HIC TV (Croation Info Center Satellite TV – Hrvatski Informativni Centar)
- Business TV 3
- DFH-1 - ATV and T8RT networks - Turkey
- DFH-2 - Star Network - Turkey
- DFH-3 - NTV, Kanal D, Teleon networks - Turkey
- KIS8 1 - Korea International Satellite Broadcast channel 1
- KIS8 2 - Korea International Satellite Broadcast channel 2
- KIS8 3 - Korea International Satellite Broadcast channel 3
- DFH-FM 1 - Turkish radio channel 1
- DFH-FM 2 - Turkish radio channel 2
- JSTV – Jesus Satellite Ministry – Korean-language
- JSTV-2 – Jesus Satellite Ministry – Korean-language
- Radio Korea

25(V) 12146.0 Globecast World Television (digital)
- Yemen TV
- Jamahiryo TV
- Syrian TV
- Syria Voice of People radio
- Radio Quran
- Sudan TV
- Sudan Radio
- Oman Radio
- Radio Omdurman Holy Koran
- Emirates FM 1
- Emirates FM 2
- Qatar TV
- Quatar Radio
- Al-Nour Radio
- Program One
- Saudi TV Channel One
- Canal Algerie
- Abu Dhabi TV (EMI)
- Al Manar TV
- Oman TV

26(H) 12152.5 Globecast World Television (digital)
- Globecast WTV promos
- Azadi Television
- IPN - International Programming Network
- Iran TV
- Tapesh TV - Iranian
- Ajara - Georgian
- Radio Sedaye Iran (KRSI Los Angeles area)
- Radio Seoul - live from L.A.
- Armenian Public TV
- Jaam-e-Jam Shabaneh – Persian-language
- Radio Kol Haneshama – Israel
- Radio 2000 Israel
- NAT-TV – Thai/Lao
- LAHSE (LA Home Shopping Entertainment) – Persian
- Hrvatski Narodni radio – Croatia
- Azadegan Radio
- Omid-E-Iran
- Tasvir Iran
- KWKW-AM 1330, Los Angeles
- Bahai Radio

27(V) 12177.0 Pittsburgh International Telecommunications (PIT) (digital)
- KurdSat
- Kurd TV
- Maharishi Open University
- KIRN-AM 670 - Radio Iran
- VTV4
- Samanyolu TV World
- World Radio Network 1 - English
- World Radio Network 2 - Multilingual
- World Radio Network 3 - French
- Kuwait Radio Network
- Kuwait Space Channel
- Back-to-Health TV
- RRSAT Slate
- Diospa TV
- TGN TV (Thai TV Global Network)
- TGN Radio (Thai Radio Global Network)
- Business TV
- TRT - Turkish Radio-TV Corp.
- World Jewish Radio

28(H) 12183.5 Spacecom Systems FM Squared / FM Cubed Services (digital)
- FM Squared Data Transmissions: .11, .26, .33, .37, .55, .59, .66, .77, .80, .83, .86, .89, .92, .98, 1.03, 1.08, and 1.19 MHz

❖ SatListeners' Update

Before I turn off the carrier and "Goodnight Satellite": Superstation WGN's uplink is doing some reconfiguration, so audio subcarrier users had to find new locations. The Classical Station, WCPE-FM 89.7 from Raleigh/Durham/Chapel Hill, NC, has moved to Galaxy 5, transponder 15 (HBO-East) at 5.58 and 6.12 discreet stereo. Yesterday USA Radio has moved to AMC-4 Ku-band in DVB digital format and also has a C-band service on Telstar 7, transponder 21 (Jewelry Television by ACN) at 5.80 MHz. WFMT-FM, a Classical music station from Chicago, is looking at creating a pay-radio service on the internet and seems to have no plans to return to satellite.

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Longwave Timeline

Early in the development of radio, it was thought that the longer the wavelength you used, the longer the transmission range that could be achieved. As a result, most radio services clamored to get on longwave, shunning the "useless" higher frequencies, except for short-range work.

Hams, of course, were relegated to the higher frequencies so they wouldn't "bother" commercial and military users. The hams soon found these frequencies to be extremely valuable, thanks to the phenomena of ionospheric "skip."

Even after the discovery of shortwave skip, the longwaves remained popular for those needing stable propagation at all times, even during solar disturbances. This was (and is) possible because of longwave's ground-hugging characteristics. Many of these original users (primarily military) continue to use the band today for the same reason.

Because of the early emphasis on longwave, many of radio's milestones were played out in this part of the spectrum. This month, we'll show a "timeline" of events on longwave and discuss their significance to the radio art. For the many historians out there, please consider this to be a starting point. If you have additions or corrections to the list, you are invited to drop me a line so we can address them in a future column. Now, let's start up the time machine...

Timeline of longwave events

1899 – East Goodwind Lightship, employing a longwave spark transmitter, makes the first recorded distress call vio wireless.

1901 – First trans-Atlantic message – the letter "S" – heard by Marconi at his receiving post in Newfoundland.

1903 – First two-way transatlantic wireless communication between Europe and the United States takes place from a Marconi spark station near Cape Cod, MA.

1906 – Reginald A. Fessenden makes the first voice broadcast using a longwave transmitter, startling marine operators, who had previously only heard Morse Code over their headsets.

1912 – Historic "CQD/SOS" distress call made from the *Titanic* on 500 kHz (600 meters). More than 700 lives are saved as a result of wireless.

1914 – With a longwave spark transmitter, Hiram P. Moxim (Hartford, MA) attempts to reach a station in Springfield, MA, without success. A station mid-way between the two cities relays the message, and the communication is made. Idea for the American Radio Relay League (ARRL) is born the next day while Maxim ponders the earlier contact.

1925 – SAQ (17.2 kHz) begins operation with an electro-mechanical Alexanderson Alternator at Grimeton, Sweden. No tubes or semiconductors are used in SAQ's operation. The station is still used today, for historical demonstrations.

1926 – Station GBR (16 kHz) opened for service, Rugby, England.

1940-1945 – WWII prompts a major increase in military use of longwave. Most naval vessels equipped with longwave receiving and/or transmitting gear.

1954 – LORAN-C navigation system (100 kHz) comes on the air. The system eventually becomes the primary navigation service for the Coastal U.S. and Alaska.

1963 – Time stations WWVB (60 kHz) and WWVL (20 kHz) are made a permanent part of the National Bureau of Standards (NBS) lineup.

1968 – First-known article on the 160-190 kHz license free "Lowfer" band appears in CQ magazine. It appeared in April, leading some readers to believe it was a hoax.

1968 – OMEGA (10-14 kHz) worldwide navigation system takes to the air. Serves as primary worldwide navigation system for nearly three decades.

1972 – Ken Cornell publishes the first of 10 editions of his *Low & Medium Frequency Radio Scrapbook*. The book becomes the "bible" of LW experimentation in the U.S.

1974 – Longwave Club of America (LWCA) founded in California. Still going strong today; see **http://www.lwca.org**).

1983 – NAVTEX Teleprinter transmissions begin from USCG Boston on 518 kHz.

1988 – First installment of *Below 500 kHz* column appears in *Monitoring Times* magazine, authored by Joe Woodlock.

1989 – U.S. Navy's Project ELF begins operation at 76 Hz to allow worldwide submarine signaling.

1991 – U.S. Coast Guard announces plan for Differential GPS (DGPS) using several retired longwave beacons. System provides 1 to 5-meter accuracy for GPS users.

1996 – U.S.-flagged vessels over 1,600 tons or those carrying passengers in open water no longer required to have 500 kHz telegraph installation.

1997 – Ken Cornell, "Longwave Wizard" becomes a silent key after 25 years of promoting the license-free experimenter's band and publishing many articles and Scrapbooks on longwave.

1997 – OMEGA (10-14 kHz) navigation system decommissioned after nearly 30 years of service.

2004 – Distance record set on 137.70 kHz by experimenters ZM2E, near Wellington, New Zealand, and UA0LE, near Vladivostok, Russia, a poth length of 6,392 miles.

New ID Resource

When Bob Foster (NC) asked me about an unidentified beacon (HB/361 kHz), I searched the Net, asked several "unid" experts, and looked through old directories thinking it might be a "re-activation" of a former station. I had no luck with any of these attempts. I was stumped.

The answer to the mystery came just a few days later, and it turned out to be as close as Bob's desktop computer. He loaded a 2004 edition of Microsoft's Flight Simulator into his PC and simulated a flight out of May's Airport near Greensboro, NC. Once he was "in the air" he clicked an icon for a map and lo, there was HB displayed as an NDB operating at 361 kHz! Entering the beacon's ID allowed him to get the coordinates and even a CW reading for the station in dits and dahs.

Why was the station not found in any of the usual places? It is probably a rather new assignment, and Microsoft pulls its data from the official FAA list that gets updated regularly. The updates are available to anyone – but at a hefty cost – so most hobbyists cannot justify having an ongoing subscription. The majority of hobbyists depend on public-domain lists, which often lag the official database.

LF Receiver Project

Comments are still coming in regarding a simple LF receiver project for *Below 500 kHz*. The comments I've received so far have been favorable, with a surprising number of people expressing a preference for a tube-type receiver. (One fellow told me: "*I never met a 6L6 I didn't like!*") Others would prefer a solid-state design because of the simplicity of construction and the ability to use the receiver under portable (battery-powered) conditions. I am exploring several designs and will have more to report next time.

73 and best LW DX!

This vintage station is used by Ward Kremer (TN) for Longwave DXing.

ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI
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September Selections

September is always a good month to clear out the pile of paper on my desk and the pile of ideas in the back of my head. It allows me to get focused for the coming radio season. Rather than sticking to one topic I will move around into the realm of loose notions. Pay attention, folks! When Old Uncle Skip starts free associating there's no telling where I might end up.

❖ Where Are You @?

Well, it wouldn't be an olio column if I didn't put on my curmudgeon hat for a few lines. I know my esteemed *MT* colleague Hugh Stegman wrote about this a bit in the July issue, but I thought I'd throw in my two cents as well. We have enjoyed the pleasure of a "new" international Morse Code character for a few months now. The code for "@" has been established as *didahdahdidahdit* or the characters "A" and "C" run together with no spacing.

I think it's a great idea, but it is still taking some time to catch on. I mostly hear folks still using the word "at" when sending e-mail addresses, and when I send the new character I often get a string of "???????".

While many hams pride themselves on being literate in all aspects of technology, I know that quite a few old timers in one of the radio clubs I attend have yet to turn their attention to personal computers. Notably, these same old timers are serious CW buffs. (It's why I like the club so much.) So don't get flustered or excited if you throw out the new "@" code and the person on the other end is wondering what you're sending.

And while we're on the subject, if you want to test the copying skills of some of your friends, try throwing out a semicolon *dahdidahdidahdit*, a parenthesis *dahdidahdahdidah*, an apostrophe *didahdahdahdahdit*, or maybe even a dollar sign *didididahdididah*.

❖ It's Not about the Bike

As I have mentioned in past columns, I am a fairly rabid amateur bicyclist. Of course I watched this year's Tour de France with great interest as I do every year.

Now, for those of you not aware of this sport, shaving weight off the equipment is everything. To bring a bike down to the legal minimum racing weight (around 14 pounds) will easily cost in the neighborhood of $5000 plus. The aerodynamic custom clothing the riders wear runs to thousands of dollars in development. A pair of basic riding shoes will go for over $300. All of the bike gear in world class racing is priced in the *unobtainium* range.

Knowing this (and dreaming and drooling over the hardware) made me all the more surprised when I learned that the basic communications package of choice used by riders to communicate with their teams is the commercial version of the standard Alinco DJ-CST "credit card" transceiver. Retailing for less than $200 per unit, it is probably the least expensive piece of gear on *Le Tour*.

Amateur Radio influences professional bicycle racing.

Why is this ham radio cousin so popular? It weighs in at just under 3 ounces. That makes it the cool tool for cycling success. Maybe the next place we need to canvas for new hams is the cycling community!

❖ BPL – Don't Go Away Mad... Just Go Away!

In Iowa, Alliant Energy ended its BPL experiments early due in large part to unresolved interference to local amateur radio operators. I continue to maintain my original position on BPL. I really think that power companies are going to discover that keeping a clean signal is going to be more trouble than it's worth in the long run. This idea has been sold to the power companies as a plug and play system with no real problems. They were very excited until interference complaints started coming in.

If we remain patient and vigilant, and if we communicate our concerns and our complaints in the proper manner, I continue to believe that other more practical (and less interfering) technologies will leave BPL in the dust.

❖ Best Ham Online Swap Meet

There are lots of places online where you can buy and sell amateur radio gear. Many folks look toward ebay.com and the other large commercial operations. Less well known but consistently the place where I do business is the Radios Online Classifieds on the American Radio Relay League site (**http://www.arrl.org/RadiosOnline/**).

The prices are both reasonable and competitive. E-mail exchanges to discuss the gear and even haggle are welcomed. Most importantly, the gear is usually posted by experienced hams. On the mainstream commercial sites, I often find equipment being offered by people who have no knowledge of the hobby. As such, they are not often able to give a good accounting of the equipment they are selling other than its appearance and maybe if it lights up when it's plugged in. By dealing on a ham site, you are more often dealing with hams who walk the walk and talk the talk.

❖ Hold That Handheld

I often mention my radio hobby posse *The Scanner Scum*. This group of radio journalists from around the country have all contributed directly or indirectly to my columns at one time or another. Recently, one of our group, John *The Big Kahuna* McColman N4RVR came up with an idea that blew me away.

How many times have you had your handheld fall over on the desk for want of a stable base? Most of my handheld gear (scanners and transceivers) have aftermarket antennas that tend to make the rigs top heavy. John came up with a solution from the shelves of his local office supply store. The common office item known as a *brochure* or *literature holder* easily doubles as a radio stand. You've probably seen these things dozens of times in doctor's offices or on the counters at many

public places and never gave them a second thought.

John was wise enough to notice that some of the more standard-sized holders were just the ticket for holding a handheld radio upright and safe from falling. I went to my local office supply emporium and grabbed a handful of 4/38 x 3/14 x 7/34 "high backed" holders. Now all my rigs are safe and sound in clear plastic holders on my desk.

Being the kind of guy that cannot let things alone for very long, I drilled out the backs to accept the recharging cables for the rigs as well. I am in debt to The Kahuna for his wisdom in many areas. I add this hint to that list.

❖ SET – It's Not Too Late To Get Involved

This year's annual Simulated Emergency Test is scheduled for October 2nd and 3rd. The SET is a great place to discover *your* place in your local emergency radio system. During the SET, individuals, radio clubs, ARES, RACES, SKYWARN, NTS and other organizations activate and join together to test their response to emergency scenarios such as chemical spills, train derailments, mass casualty events, earthquakes, etc.

In addition to testing response and performance in the face of trying circumstances, there is a mildly competitive flavor in that points can be awarded to various aspects of a group's SET activities. For example, points are awarded for the number of hams participating, the amount of third party traffic handled, membership on ARES/RACES, and the number of community agencies participating, among other things.

SET is a more formal emergency test event than Field Day, so you will want to contact your local ARRL Field Organization to find out specifics and where you best fit into the project. **(http://www.arrl.org)**.

❖ Got Scanner?

All this talk about handhelds and the SET got me thinking. Many of the new premium handheld transceivers come with broadband receive capability. Most will tune continuously (with ECPA blocking) through the entire VHF/UHF range. These rigs also tend to have ample memory channels.

In preparation for dealing with local emergencies, have you taken the time to devote some of those memory channels to your local public service frequencies? In an emergency situation, where you barely have time to grab your handheld and hit the streets, it's good to know you can hear what is going on around you, in addition to being able to be a supportive ham. Do take the time, however, to check your local laws related to scanning. Some states still get a bit twitchy about such things, but most states also have notable exceptions written into their laws for Amateur Radio activity.

A word to the equipment manufacturers... The first one of you that comes out with a dual band handheld that includes APCO 25 Digital Trunking receive capabilities is going to get my money and that of a lot of my friends!

❖ Happy Anniversary VE Program

It's hard to believe that 20 very successful years have past since the beginning of the Volunteer Examiner program. The VE program went live in mid 1984. There was a certain amount of controversy and concern, as there often is with any new endeavor. But it didn't take long to prove that hams could test hams fairly and legally. You really can claim "Old Timer" status if you remember the days of trudging down to the FCC Field Office to sit across from a stern faced Staffer who didn't even smile and shake your hand when you made the grade.

Old Uncle Skip (in addition to being one of those aforementioned Old Timers) has had the honor of being an ARRL/VEC since the very beginning. And during those years I was not only able to smile and shake many new ham's hand, I was able to say Welcome Aboard! The VE program is proof of the ongoing Amateur Radio spirit.

❖ K2ADJ SK

Talking about the VE program reminded me of someone special. Unless you are a "local" to my area of New Jersey, you probably never heard of Rod Fowler K2ADJ. Rod passed away this spring, after a long illness. Rod was the kind of guy who was more likely to be the one rolling his sleeves up than looking for personal accolades. He didn't like to draw attention to himself.

But for many hams in this area he cast a giant shadow. He was Elmer to dozens and dozens of people young and old. One of those folks was Old Uncle Skip himself. Rod, and a couple of other folks from the West Jersey Radio Amateurs, worked hard to get the concepts into my head to allow me to pass that first Novice exam way back in 1976. Years later Rod helped me and many other hams get a handle on the roots of Packet Radio.

When I learned of Rod's passing, I reached out to his son to express my sympathies. He responded by saying he knew of me and my writing in *Monitoring Times* and he commented on all I have done in and around the radio hobby. I was flattered, but I was even more honored to reply to him that none of my accomplishments in radio would have ever come to pass if it was not for the patience, persistence and friendship of his father. I am N2EI today because K2ADJ took the time to show me the way.

The point of all this, besides taking a few column inches to remember a great ham, is to invite you to take a little time to thank your Elmer while you still can. As someone once commented about flowers at a funeral... "It's better to give them while they can still smell them."

Have fun folks! I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CORNER

YLRL Howdy Days
1400 UTC, Sept 8 - 0200 UTC, Sept 10

ARRL September VHF QSO Party
1800 UTC, Sept 11 - 0300 UTC, Sept 13

North American Sprint, CW
0000 UTC - 0400 UTC, Sept 12

Tennessee QSO Party
1800 UTC, Sept 12 - 0100 UTC, Sept 13

QCWA QSO Party
1800 UTC, Sep 18 - 1800 UTC, Sep 19

QRP Afield
1500 UTC , Sep 18 - 0300 UTC, Sep 19

North American Sprint, SSB
0000 UTC - 0400 UTC, Sep 19

Alabama QSO Party
1800 UTC - 2400 UTC, Sep 25

Texas QSO Party
1400 UTC, Sept 25 - 0200 UTC, Sept 26 and
1400 UTC - 2000 UTC, Sept 26

CQ Worldwide DX Contest (RTTY)
0000 UTC, Sept 25 - 2400 UTC, Sep 26

Fall QRP Homebrewer Sprint
0000 UTC - 0400UTC, Sept 27

Clem Small, KR6A
clemsmall@monitoringtimes.com

In Search of the Ideal Antenna:

Characteristics of an Ideal Receiving Antenna, Part 1 of 3

An ideal receiving antenna would be one which maximizes its response to the signal you wish to hear, and minimizes its response to unwanted signals and noise. This month let's look at some factors which might help an antenna approach that ideal.

As always, it is useful for our understanding of antenna function to keep in mind the principle of antenna reciprocity. According to that principle, antenna variables such as gain, radiation and reception patterns, and so forth, are the same whether the antenna in question is used for transmitting or for receiving. In this three-part series we'll discuss characteristics of both ideal and practical receiving and transmitting antennas.

❖ Important Functions of Receiving Antennas

Directivity and Gain:

One important antenna function is the ability to respond well to signals from some directions while responding relatively poorly to signals from other directions. This function is known as "directivity." By appropriate design we can produce an antenna which will maximize reception of the desired signal when we point that antenna's main response lobe in the direction from which that signal is arriving.

In addition, most directional antennas have higher gain (capture more signal energy) in their favored directions than the gain from most simple antenna designs. When received-noise levels are sufficiently low, this increased gain can enhance reception of relatively-weak signals.

Horizontal Directivity: As just mentioned, increased gain can be important at times. But often, even more important for good reception is the reduction of the antenna's response to interfering signals that occupy the same frequency as the desired signal. Examples of interfering signals are radio signals you don't want to hear, noise from sparking industrial machinery, and static from lightning bolts.

Antennas can be designed with horizontal directivity such that they respond maximally in a particular compass direction or azimuth. If such interfering signals come from directions in which the antenna's response is low, then the resulting reduction of their strength leaves the desired signal more in the clear, and reception is enhanced.

Vertical Directivity at HF and MF: Antennas can be designed to concentrate their responsiveness at relatively low vertical angles (low elevation, near the horizon), or at high vertical angles (more toward the sky), or at angles in between those extremes. When conditions are appropriate, HF and lower frequency signals tend to be returned to earth, whereas VHF and higher frequencies tend to punch on through the ionosphere and be lost, unless we are communicating with space craft or relying on meteor-trail or moon-bounce communications.

Signals launched at low vertical angles travel further before striking the ionosphere and returning to earth. Thus, the ideal antenna to receive HF or MF DX signals might emphasize low vertical angles. At even lower frequencies, signal propagation tends to follow the earth's curvature. Here again, antennas which receive signals at low vertical angles well are the ideal for receiving DX signals.

Depending on propagation conditions, HF and lower frequency signals can be reflected from the ionosphere even if launched at relatively high vertical angles. This produces what is called "near vertical-incidence skywave (NVIS). Of course, NVIS signals bounce back to earth relatively close to the transmitting antenna. So this mode is useful for communications within the skip zone, or for when the propagation path between the transmitting and receiving antennas is blocked by mountainous terrain. Where NVIS is needed, ideal receiving antennas should respond well to high-angle vertical radiation.

Vertical Directivity above HF: As with the HF band, low vertical angles are also useful for maximizing distance of communication at frequencies above HF. However, since these higher frequency signals usually don't reflect from the ionosphere, just getting them out to the horizon maximizes their communication distance. So above HF, the ideal receiving antenna for distance would be one whose response is concentrated at lower vertical angles.

Steerable Vertical and Horizontal Directivity: For communications such as moonbounce or satellite work, the horizontal and vertical orientation of the antenna must sometimes change rapidly. When the beam antenna involved is small enough to make it practical, such as at UHF and higher frequencies, it may be desirable to have antennas which can be adjusted to any desired vertical angle and horizontal direction (fig. 1).

When the repositioning is accomplished by remote control rather than manually, the antenna is said to be "steerable." One example of this is a steerable satellite TV dish antenna. Obviously an ideal antenna for this kind of work is one that we can continually reposition.

When Directivity is a Drawback: In many situations it is desirable to be able to receive signals from any compass direction. Scanning a number of geographically spread out stations, dispatching taxicabs, and communicating with mobile units are examples of situations which usually require non-directional antennas.

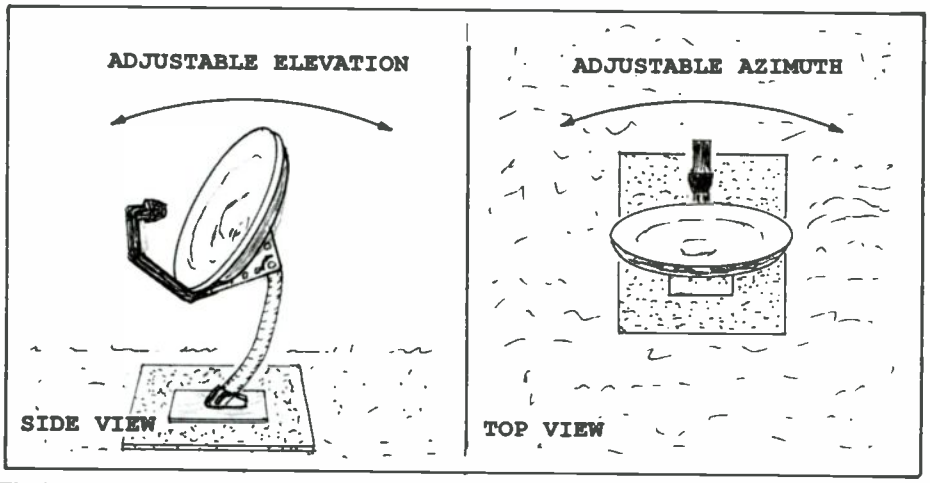

Fig 1. A satellite dish antenna which is manually adjustable in both elevation (vertical angle) and in azimuth (horizontal angle).

This Month's Interesting Antenna-Related Web site:

Check out this page from the *Ham Radio Operator's Antenna Handbook*: http://www.packetradio.com/ant.htm.

Just as with the directional antenna designs, various non-directional antenna designs may yield different gain levels. At HF and lower frequencies, gain may not be of much use due to the over-riding effect of the high received-noise level on these bands*. Thus, the relatively low-gain quarter-wave grounded-vertical antenna is a favorite with many HF DXers due to its low vertical-angle DX performance.

However, above HF, received noise is usually much lower and gain is of more value in working weak signals. Thus, on these higher bands where the shorter wavelengths result in smaller antennas, the extended ground planes such as the 1/2-wave, 5/8-wave, and the collinear designs are often selected. They provide increased gain at low vertical angles as compared to the 1/4-wave ground plane antenna. The higher the gain on these antennas, the lower the vertical angles of their radiation pattern. And, obviously, the lower the angle of the pattern, the less interference will be received due to signals arriving from higher-vertical angles.

And Gain Isn't Always Gainful: I've often discussed how increasing antenna gain may not be useful at frequencies below mid-band HF*. But in addition to that, a lot of communication is accomplished with signals strong enough to produce good reception even when very low-gain receiving antennas are utilized.

For example, when working through a repeater, the short, low-gain rubber duck, the shorter, lower-gain stubby duck, or even the extremely-short, baby-duckling with its essentially zero gain are often satisfactory antennas. In this situation, antennas which we would deem very poor for weak-signal applications are actually ideal, due to the savings in size and the convenience which they provide.

Polarization Selectivity:

The polarization of the incoming signal and the antenna's polarization must match, in order to maximize received signal strength. This also means that interference can be minimized by utilizing an antenna with a different polarity than that of interfering signals. An ideal antenna will have the same polarization as the signals it is to receive.

Cost and Size are Factors:

Ideally, the cost of the antenna we choose should be minimal. Consider a situation where your HF communications paths must shift at times between two different directions. A rotatable beam would support this. On the other hand, a couple of directional, sloper wire beams might be satisfactory, and they would probably cost much less in time, effort of construction, and money. If enough space is available for the two slopers, our pocketbook might determine that they are an ideal antenna solution here.

And So:

Obviously, there is not one ideal antenna design which will maximize quality of reception in all receiving situations. However, if we consider the requirements of a specific situation we can often be successful in maximizing our success in reception by selecting an antenna which satisfies those requirements. We'll talk about doing that in our next month's column.

RADIO RIDDLES

Last Month:

I asked: "Why do some elements of a Yagi-Uda beam function as reflectors while others function as directors? " Although our answer considers an antenna which is transmitting, keep in mind that a reciprocal process takes place during reception.

Having no load attached to them, the reflectors and directors re-radiate much of the RF energy which they receive from the driven element. The spacing between the elements and the length of the elements are designed such that the energy re-radiated from the reflector arrives at the driven element in-phase with the portion of that element's radiation which is going in the direction of its main lobe. The length and spacing of the directors is such that their re-radiation in the direction of the main lobe of the beam is in-phase with the radiation coming their way from the driven element and from the reflector. With all these signals in phase with one another, a stronger signal results than when a single element is used.

This Month:

According to the principle of reciprocity mentioned at the beginning of this month's column, antenna variables such as gain, radiation pattern, feed point impedance, radiation resistance and so forth are the same whether the antenna is used for transmitting or receiving. Does this mean that an ideal receiving antenna will also be an ideal transmitting antenna, and vice versa?

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.

*See *Antenna Topics*, Dec. 2000

Marc Ellis
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Methodical Radio Restoration: 2. Capacitor Replacement

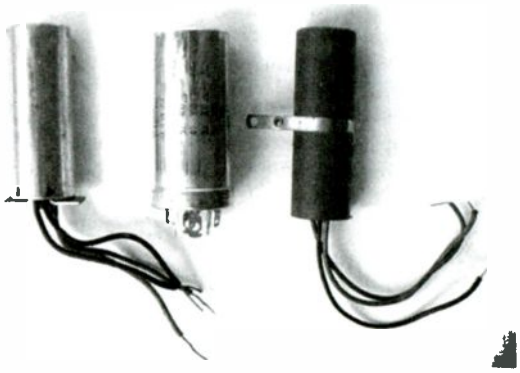
Though I do have that National NC-57 on the bench awaiting our attention, I thought I might continue with the "Methodical Radio Restoration" series I began last month. The purpose of the series is to pull together in convenient form some of the approaches that were used during the many restoration projects we've completed to date. For now, it seems appropriate to continue where we left off last month.

Last time, we covered the preliminary evaluation of a candidate for restoration, including observations and tests to make before committing to the project. We also discussed basic housekeeping issues such as testing tubes and applying cleaner/lubricant spray to tube, potentiometer and bandswitch contacts. This brings us to one of the more controversial areas of radio restoration: capacitor replacement.

◆ Recapping Issues

When I first began restoring radios for publication several years ago, my approach to capacitor replacement was very conservative. I replaced only the parts that were obviously bad. With this approach, one must power up the radio gradually when turning it on for the first time. Typically, the line voltage is increased slowly, using a Variac or other autotransformer, while monitoring the high-voltage d.c. delivered by the set's power supply. If the d.c. voltage remains abnormally low, or suddenly drops to an abnormally low value – or if a smoking or a burning smell is observed – line voltage must be cut off immediately.

The reasons for the slow startup are two-fold: the most obvious of these is to give the restorer a chance to detect short circuits and other malfunctions before the d.c. voltage becomes destructively high. The other reason stems from the characteristics of the electrolytic capacitors typically used in the filter circuit of the radio's high-voltage power supply circuit. The electrolytic design makes it possible to obtain the high capacitances required for this application in a reasonably small package.

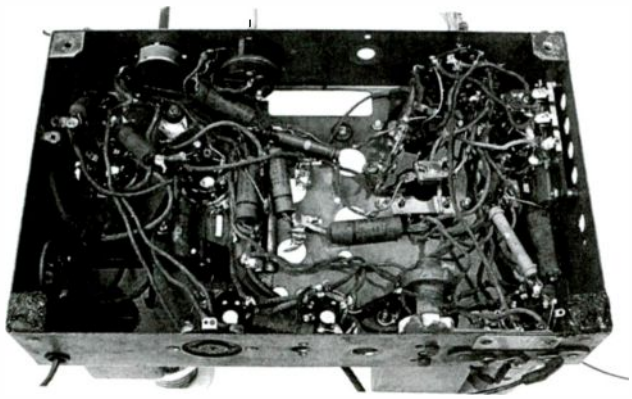


Multisection electrolytic capacitors typical of those you might find yourself replacing in your radio restoration projects.

Unlike the paper-insulated capacitors found elsewhere in the radio, the electrolytic capacitor depends on a chemical film to provide insulation between its electrodes. After long disuse, this film tends to dissociate. But it can sometimes be reconstituted by a slow ramping up of the d.c. voltage across the capacitor. This process is called "reforming." However, if the voltage is brought up too quickly, or if the capacitor is simply too far gone to reform, the result will be a short circuit.

I should mention that the earliest "plug in" radios (from the late 20s or early 30s) usually didn't use electrolytic capacitors because such capacitors were not generally available then. Can-type paper or oil-filled units having much lower capacitance were typically used. Good filtering was obtained by using filter chokes of very high inductance.

Later in my restoration career, I changed my policy. It became clear to me that the usual inexpensive paper capacitors found in most radios of the 30s, 40s or 50s were subject to water vapor infiltration that would eventually compromise the insulating qualities of the paper. Some might work okay during restoration, but were not to be trusted long term. They could fail at any moment once the restored radio was put into regular use. I felt that reformed electrolytic capacitors were not necessarily to be trusted, either. And a shorted capacitor might easily cause the destruction of other, difficult-to-replace parts.



Chassis of a Zenith 6-S-229 with original paper capacitors still in place. Note black bands indicating "outside foil" (from January 2003 issue).

Since paper and electrolytic capacitors suitable for tube radio restoration are still both inexpensive and readily available, I began replacing the complete capacitor set in all my restoration projects. Such wholesale replacement is usually called "recapping." If the radio was worth working on, I felt it was worth protecting with modern capacitors.

Over a period of time, I have found that radios that have been "houskept" as outlined in last month's column and then fully recapped quite often work when first turned on. Since both processes are simple mechanical procedures that almost anyone can perform, newcomers to the hobby can achieve a lot of success even before they acquire a lot of technical know-how. In fact, I sometimes regret that following these procedures often takes the challenge out of troubleshooting – robbing one of the fun of diagnosing bad parts through voltage and resistance analysis.

But there are purists who object on other grounds. They feel that a radio should retain as many of its original parts as possible. For them, it is a downer to open up a radio and see wholesale replacement of the original grimy wax-coated capacitors with modern plastic ones. No only that, but they don't like seeing that someone who is perhaps not to be trusted has worked on the set before them.

But I want my radios to be reliable after I'm finished, and I feel that there are enough examples of old paper capacitors around so that I don't have to be concerned about preserving them. However, those who are worried about this issue might consider melting out the insides of the old paper caps (easy to do) and epoxying modern caps inside the old cardboard tubes. That might be worth doing for a set that still has a complete set of caps branded with the radio manufacturer's name.

Failing that, one might consider leaving a note inside the radio reassuring the subsequent owner that all caps have been replaced strictly in accordance with the manufacturer's specs.

Replacement electrolytic capacitors (left, center) mounted on a terminal strip under Zenith S-S-229 chassis (from January 2003 issue). Note arrowheads identifying negative leads.

Ceramic or mica capacitors, incidentally, rarely go bad and I never change them unless subsequent problems point to the need for replacement.

❖ Replacing Paper Capacitors

It is something of a mystery to me that the capacity values of modern replacement capacitors are sometimes stated to three decimal places. Perhaps there are modern applications where this is necessary, but the practice can be confusing to radio restoration newcomers. Certainly such precision is not required in the sizing of capacitors to replace the paper units in old tube radios.

For example, a .047 mFd cap can definitely be used to replace a capacitor that is marked .05 mFd. For that matter you could probably use a .04- or a .06-mFd unit (if such could be found) with equally good results. Variations of +/- 20% or so are usually perfectly okay. Capacitor values generally are critical only in the frequency-determining circuits in the radio's front end, but these are usually mica or ceramic capacitors rather than paper units.

The voltage rating of a replacement paper capacitor is even less critical. It's only important that it be at least as high as that of the original. For example, these days it's difficult to find 150- or 250-volt units to replace such ratings in a.c.-d.c. radios. But the commonly-found 630-volt caps will work just as well.

You'll probably notice a black band, or perhaps the words "outside foil" printed on one end of an original paper capacitor. The reason: a paper capacitor is essentially a rolled-up sandwich of two metal foil strips separated by a paper strip. One lead of the capacitor (the "outside foil" or black band lead) is connected the end of the strip that winds up on the outside of the roll; the other to the end of the strip that winds up on the inside.

For signal shielding purposes, it was good practice to connect the outside foil to the side of the circuit closest to ground. Modern capacitors are constructed quite differently, and there is no "outside foil" to be concerned about. Both leads are equivalent as far as shielding considerations are concerned.

❖ Replacing Electrolytic Capacitors

The considerations for replacing electrolytic capacitors are a little bit different. First, there are some physical issues. Quite often, all of the electrolytic capacitors used in a radio are contained in a single can, or perhaps a couple of cans, mounted on the chassis. Sometimes they are in a cardboard tube mounted under the chassis. Units containing several electrolytics in one container are called "multisection" electrolytics. It's not unusual for one of these units to contain two or three filter capacitors and perhaps the cathode bypass capacitor for the audio output stage.

In the old days, one could go into any well-stocked parts store and buy a multisection electrolytic having the right physical dimensions and containing the exact capacitor sizes required. Those days are gone forever, and the easiest alternative is to purchase individual electrolytic capacitors in the required sizes and wire them onto a terminal strip mounted under the chassis. If the old capacitor can(s) were mounted on the chassis, they are left in place for looks after disconnection.

Modern electrolyic caps are incredibly small compared to the originals and are very easy to mount. Before disconnecting the old unit(s), pay close attention to the listing of capacitor specs and the code identifying the terminal or lead connected to each capacitor. With metal cans, the code will usually be a geometric figure such as a triangle, square, etc. that matches a similar figure located on or near the proper terminal. However, such caps might have color-coded leads instead. Cardboard tube multisections most often have color coded leads, but might also have terminals with geometric codes.

Disconnect the old leads one by one, keeping careful records of the capacitor size to be connected to each one. With most of these units, one lead (or the metal can) will be designated as "common negative." This is the cue for you to connect the negative leads of each of your replacement capacitors to the same lug of your new terminal strip. This will usually be the one grounded via the terminal strip mounting screw.

But watch out! Some radio circuits (often found in Philcos) have the common negative insulated from ground. In such cases, the common negative base of the metal capacitor can will have an insulating jacket or bushing to keep it from contacting the chassis. Note where the "floating" common negative lead is to be connected in the circuit. And, of course, be sure to NOT connect the common negative leads of your new capacitors to the grounded lug of the terminal strip.

Electrolytic capacitors are usually available in voltages of 50, 160 and 450. Pick ones that are at least as high as those of the units they are to replace and as close to them in value as possible. Unlike paper capacitors, electrolytics will not develop their full capacity ratings unless the working voltage is reasonably close to the rated voltage.

Capacity ratings should also be at least as large as the those of the units to be replaced and as close as possible to them in value. Capacities can be up to, perhaps, 50% higher than the originals without causing problems.

Finally, unlike paper capacitors, electrolytics have polarities that must be observed. The positive and negative leads of each of your replacements will be clearly marked. Be sure to connect them to match the wiring on the original capacitor. As mentioned, this will usually be with all of the individual negative leads connected together and either grounded or connected to a common circuit point. If you should happen to reverse any of the polarities, the capacitor involved will immediately burn out when you applying power.

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Uniden BC80XLT Portable Scanner

I've reviewed some pretty sophisticated scanners in this column. Each model is packed with more features than its predecessor. The prices are stiff, too. The digital trunktracking portables are now in the $500 price range.

So it was with some trepidation that I asked the folks at C. Crane Company to lend me a Uniden BC80XLT portable scanner for review. Of what interest could a simple, 50 channel, conventional scanner be? I spent the next few weeks with the BC80XLT and can tell you it is fun to use due to its simple programming and decent performance.

❖ Battery Options

The BC80XLT is powered by four AA batteries – a simple, yet flexible power arrangement.

An AD70U AC wall wart power supply is included and plugs into side of the radio. You can charge NiCd cells while they are installed inside the BC80XLT's battery compartment. A two position switch inside the battery compartment selects either alkaline or NiCd batteries. The switch permits the wall wart to recharge NiCd batteries and prevents it from interacting with nonrechargeable alkaline batteries.

❖ Mode and Frequency Coverage

The BC80XLT's frequency coverage is basic. It tunes the VHF-low, VHF-high, UHF, and 800 MHz land mobile bands, as well as the upper portion of the 10 meter amateur band. There is no AM detector nor coverage of the VHF civilian air frequencies.

Step sizes are fixed and cannot be overridden. The step size is 5 kHz below 174 MHz and 12.5 kHz above.

❖ Memory

The BC80XLT has 50 memory channels divided across five banks. The memory capacity is dwarfed by more upscale 1000 channel models, but is adequate for a basic model.

Programming memory is as easy as it gets. The BC80XLT uses the same keypad sequence as the old Electra/Bearcat models, like the BC250 and BC210. Press the Manual key, the channel number, then E(nter). That gets you to the channel you want to program. Then, type the frequency digits and E(nter).

The BC80XLT is smart enough to recognize duplicate memory channels and flashes the channel number if you try to program a frequency which is already programmed in another memory channel, regardless of bank. You can override the warning by a second press of the E(nter) key.

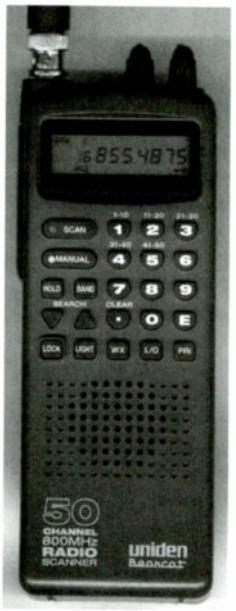
❖ Scanning and Searching

Channels may be bypassed during a memory scan by using the L/O (lockout) key.

The BC80XLT does not support a limit search feature. A less powerful, but easier to use band search is provided instead. Repeated presses of the band key lets you select one of these bands to search: 29 - 29.7, 29.7 - 50, 50 - 54, 137 - 144, 144 - 148, 406 - 420, 420 - 450, 450 - 470, 470 - 512, and 806 - 956 MHz.

A few seconds after the band is selected, the BC80XLT starts to hunt up or down the band, looking for an active frequency. The search direction can be controlled using one of the arrow keys. You can pause the search and hold a single frequency by pressing the Hold key. Pressing E(nter) writes the displayed frequency to the current memory channel.

A built-in rescan delay keeps the BC80XLT on the same frequency for 2 seconds after the last transmission before resuming a scan or search. More sophisticated models permit you to defeat the rescan delay, but the BC80XLT does not.



Pressing the WX key searches through the set of preprogrammed NWR weather frequencies.

When priority is enabled, the BC80XLT samples a priority channel every 2 seconds. Priority is available in Manual or memory scan mode, but not during band searches.

The first channel of each bank is marked as a priority channel, but you can designate a different channel within each bank if you wish. The priority channels appear to be nested, with the lower priority channels having higher priorities.

❖ Other Features

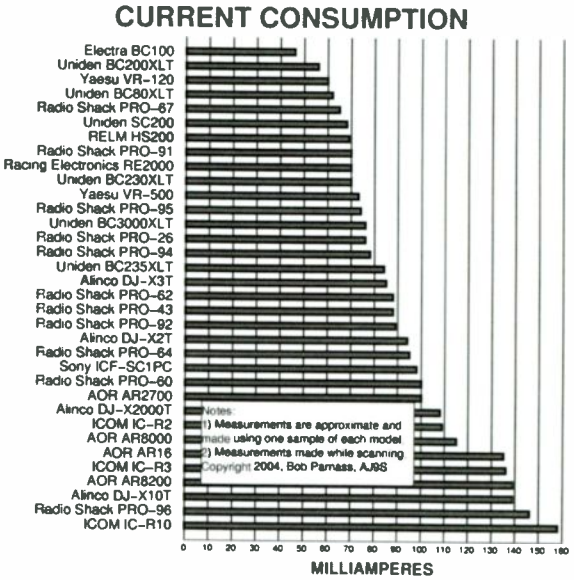
The frequency digits displayed on the LCD screen are large enough to view, though the display "washes out" when viewed at an angle from above. Pressing the LIGHT key illuminates the LCD display for 15 seconds. There is control to turn the lamp on continuously.

❖ Performance

My sample BC80XLT has adequate sensitivity, though the 137 - 140 MHz range could use a boost.

The BC80XLT's audio quality is ample in volume and pleasing in tone.

I measured a 60 millisecond squelch tail (noise burst) at the end of each transmission of a 1 µV signal when the squelch control is



Measurements

Uniden BC80XLT Scanner
S/N 34028626

Uniden America Corp.
4700 Amon Carter Blvd.
Fort Worth, TX 76155
tel. (800) 554-3988
http://www.uniden.com

Frequency coverage (MHz):
29 - 54
137 - 174
406 - 512
806 - 823.9875
849.0125 - 868.9875
894.0125 - 956
Step sizes:
fixed, not user selectable
5 kHz below 174 MHz
12.5 kHz above 174 MHz
Modes: NFM
NFM modulation acceptance: 12 kHz
Audio output: 0.165 watts into
8 ohms @ 10% distortion
Attenuator: none
Intermediate Frequencies:
380.7 (approx.), 10.85, 0.45 MHz
Squelch tail near threshhold (1 uV @ 155 MHz): 60 ms.
Current Consumption (mA):
0.25, off
62, scanning
153, open squelch, max volume
Practical memory scan speed: 19 channels/sec.

set just past the threshold. That's a little longer than I like, but close to the BCT8, BC9000XLT, and ICOM IC-R8500. As with most Uniden scanners, the squelch tail is shortened with tighter settings of the squelch control. A stronger signal is required to "break" the tighter squelch.

Alkaline batteries might last longer and rechargeable batteries could require less frequent charging when used in the BC80XLT than in most other models. Without a lot of fancy circuitry to rob power, the BC80XLT is economical in current consumption. It draws only about 62 mA while scanning, which is lower than most scanners I measured (see chart). It is bested only by my Yaesu VR-120 and the older BC100 and BC200XLT.

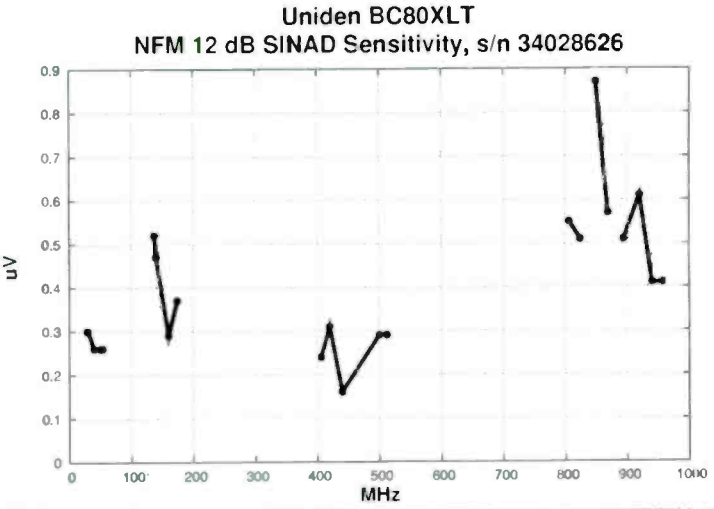
❖ Summary

One of the toughest problems facing the scanner radio industry is making radios which are too complicated for customers to use. Nothing can discourage a hobbyist faster than a radio too complex to understand. This is especially true for newcomers to the hobby who may be forever turned off by purchasing "too much" radio the first time.

The first few generations of keyboard programmable scanners were much easier to use than their high end, modern descendants. The BC80XLT is as simple as the earlier model scanners, but is a better performer due to its triple up conversion circuitry. The early model scanners used a 10.7 or 10.8 MHz first IF and had poor image rejection.

If you keep in mind the lack of air band coverage, the BC80XLT is a good first scanner for people new to the hobby or as a second "knock around" scanner for those who already own a high end model.

The BC80XLT is available for $174.95 from C. Crane Company, 1001 Main St., Fortuna, CA 95540-2008, tel. (800)522-8863, Web site **http://ccrane.com**



John Catalano, PhD
johncatalano@monitoringtimes.com

ICOM's IC-PCR1000 Re-Visited

In my three-part feature, "Radio in the 21st Century," we discuss the radical new developments in radio communication methods and hardware. After doing the series I thought we might revisit a radio which helped set the pace for the current radio hardware technology – computer controlled radios.

The ICOM IC-PCR1000, or the "black brick" was one of the first mass-produced, computer-controllable radios introduced back in the 1990s. Today it is still an excellent choice for listeners who are looking for wide frequency coverage, computer control and operational flexibility.

I've picked some programs to look at which I have enjoyed using with the PCR-1000. We will look at the latest versions of this software and show you how they can make the PCR-1000 perform.

PCR-1000 Revisited

Although we have spoken about the PCR1000 many times in this column over the past years, let's do a brief refresher. Figure 1, a view of the rear panel, shows why the IC-PCR1000 is nicknamed the "brick." The lightweight, 2-1/4 pound (1kg) receiver consists of a small 8 inch x 5 inch x 1 inch black box (126(w) x 30(h) x 199(d) mm) with no controls other than an on/off switch on the front panel.

A small speaker resides on the top cover. The rear panel has five connectors, DC IN (supplied from an included 12 volt DC wall wart), a BNC antenna connector, external speaker output jack, packet and a nine-pine RS-232 serial port which connects to your PC's serial port via an included cable. Nothing could be more simple to set up.

A Use for that 486 PC?

ICOM suggests that the minimum computer requirements for the PCR-1000 is a 486DX4 or later CPU (Pentium100 or later recommended), running Windows version 3.1, 95 or 98, a minimum of 10 MB of free hard drive space, a minimum 16 MB of RAM, a CD drive, a serial interface and a display with at least 640 x 480 pixel resolution. I recently sold a working laptop with these specs for $6 at a ham show! These minimum requirements are a bit deceiving. Why?

Well, the PCR1000 does include ICOM control software (which we will look at in a minute), and it is true that for the ICOM software these are the minimum requirements. However, for more advanced PCR-1000 programs, such as RadioCom 4.5, which is now supplied along with the ICOM software, the 486 will not do. To utilize RadioCom the minimum system you will need is a 150 MHz Pentium/Celeron processor, with 32 MB RAM, 300 MB of hard drive space, a bi-directional sound card with a line-in port, a serial-port, Windows 95/98/ME/2000/XP/NT, and a graphics card with 800x600 (16 bit color) resolution. This is not surprising, since the functionality of the software will determine the minimum computer requirements. When we look at RadioCom you'll see what I mean.

Figure 1 - The IC-PCR-1000 - Simplicity in Design, Flexibility in Function

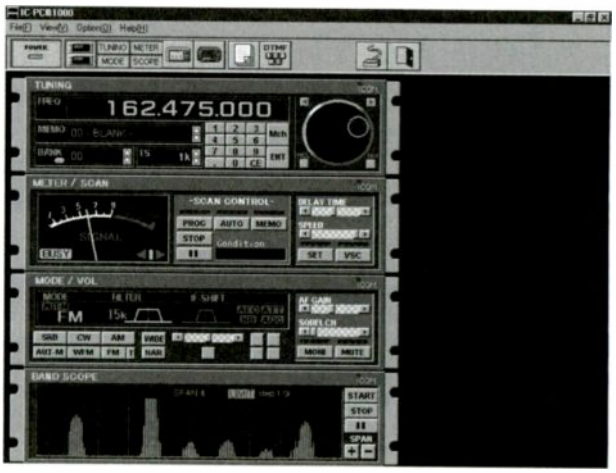


Figure 2 – The Basic Included ICOM Control Software Configured As Rack Components

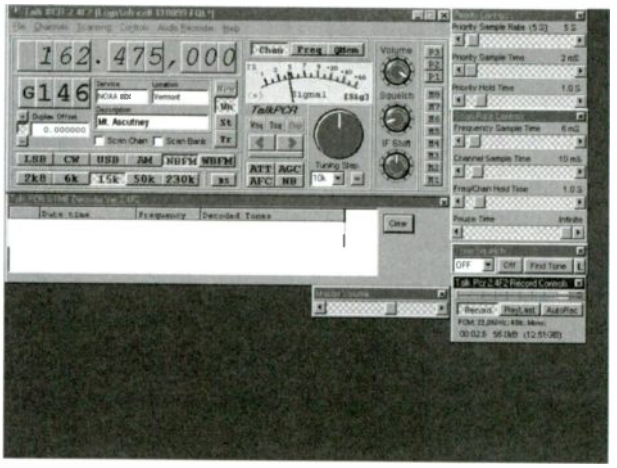


Figure 3 - PCR Talk - Seamless Control and Real Scanning Performance

For this column we'll use an old 233 MHz Pentium I, running Windows 98SE, with 128 megs of RAM and over 1gigabyte of hard drive space. Actually, it is an upgraded HP Pavilion 3268 desktop. Similar computers may be had at yard sales for under $30 so we are really talking "state of the *ark*" computer requirements.

Look At Those Specs !

The PCR-1000's specs are impressive for its small size and price. The USA version covers: 0.010000 - 1300.000 MHz with breaks in the 800 MHz cellphone band. It has a frequency resolution of 1 Hz and a frequency stability of +/- 3 ppm at 1300 MHz. Just connect the "brick" to a PC and you can monitor WFM, FM, AM SSB and CW modes.

With this wide frequency range and choice of modes, the 1000 can cover shortwave broadcast listening, shortwave utility monitoring, shortwave signal decoding and VHF/UHF scanner duties – four types of monitoring. The question is, which software should we use for which monitoring?

Pick a Program

PCR1000 users are very lucky since there are many programs that they can use. We'll just touch on some of my personal favorites in order to answer the question we just posed. We will also give you their websites if you are stimu-

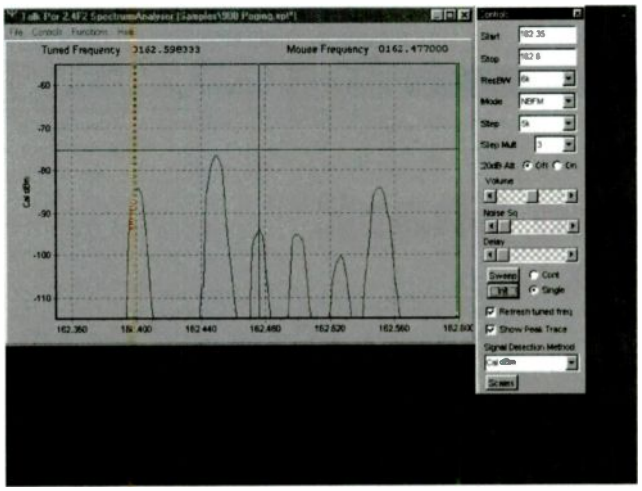


Figure 4 - PCR Talk's Spectrum Display Showing Same Six Stations As In Figure 1

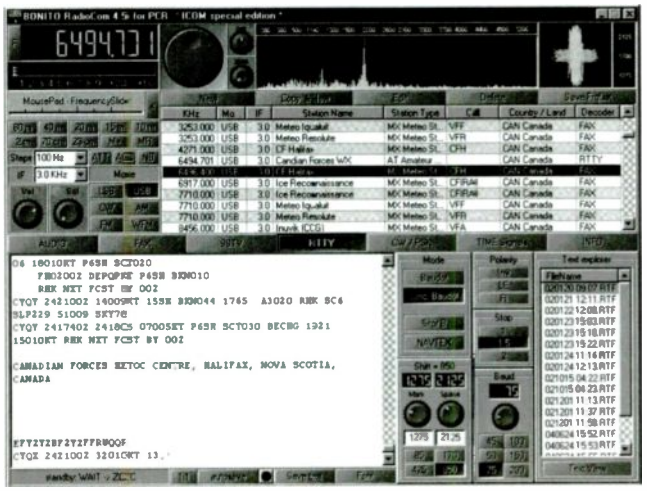


Figure 5 – RadioCom 4.5 Decoding RTTY From Canadian Forces

lated to discover more details.

Let's start with the included ICOM control program version 2.2 which operates under Windows 98, 98SE, 2000, ME and XP. The program has four basic modules: Tuning, Meter (and Scanning), Mode (and Audio) and Band Scope Display. These modules can be configured to look like an R9000 communication receiver, a scanner receiver or a rack of components. The rack configuration is shown in Figure 2.

At the top of Figure 2, we can see that we are monitoring a NOAA weather station on 162.475 MHz with an S-6 signal level. The Band Scope at the bottom of the figure displays six peaks. These correspond to six NOAA weather stations on different frequencies in the 162 MHz band. The height of a peak gives us a relative signal strength of that station with the station we are tuned to displayed in the center.

Up to 1000 memory channels can be saved per disk file. No shortage of memory channels here, since the number of files is only limited by hard disk space.

The ICOM software allows a number of methods of operation from standard receiver to scanner. There is much more to this program, however, so in summation let's just say that the ICOM program is simple to operate and is a good place to start learning the capabilities of the PCR1000. It does an okay job on all types of monitoring except signal decoding, since it does not have this built-in capability. Of course, you could always use an external hardware decoder or try running a software decoder program in parallel. Check the ICOM site at **http://www.icomamerica.com** for updates to their PCR1000 program.

Now, Free To You

Until recently this program required a payment for use. However, as of midnight, March 31, 2004, **PCR Talk** version 2.4F2 is free for the downloading.

PCR Talk is, in my opinion, a great program for the PCR1000. On the shortwave side it provides a more user-friendly intuitive interface than the ICOM program. But, if you want to perform real VHF/UHF scanning, PCR Talk is the only way to go.

In Figure 3 we are again tuned to NOAA weather on 162.475 MHz. If we look to the right of the Figure 3 we can see the various scan rate and priority control settings that PCR Talk puts at the user's disposal. With these settings you can easily tailor your scanning to any band, mode type and propagation conditions. Instead of a constant fight with program parameters, scanning is a pleasurable experience with PCR Talk.

Some imbedded audio recorder programs which I have tried seem to be fussy about which soundcard is being used. I have never had a problem with PCR Talk's audio recorder, seen at the bottom right of Figure 3, on any computer that I've used.

Inherent PCR1000 Problem

Many PCR1000 programs develop strange behaviors when a spectrum is being displayed simultaneous to the receiver being operated at a particular IF setting and mode. ICOM even makes mention of this situation in their help file. ICOM suggests that when this occurs that the user should close the spectrum display.

PCR Talk gets around this problem that sometimes bugs PCR-1000 users in a simple manner. PCR Talk only allows either the radio or the spectrum to be displayed, but not both. Figure 4 displays the PCR Talk spectrum display showing the same six NOAA weather stations shown by the ICOM software at the bottom of Figure 1.

For aircraft, public service, military airband, and all other VHF/UHF applications PCR Talk makes the PCR1000 sing, not just talk. PCR Talk is available for downloading at **http://www.qrosoft.co.uk/tpv20/tpv24f02.zip**. I suggest you get it if you can!

Another Included Program

For the past year or so ICOM has been also including a PCR1000-only version of **Bonito's RadioCom** program. RadioCom version 4.5 was made expressly for use with the PCR1000. We have previously reviewed the general version of RadioCom in a past *Computers & Radio* column and were quite impressed with its capabilities. Although RadioCom can do many of the functions of the ICOM program, its strength lies in signal decoding. RadioCom 4.5 can decode RTTY, CW, FAX, SSTV, PSK and NAVTEX without the need of any additional hardware.

Figure 5 shows RadioCom 4.5 decoding RTTY from Canadian Forces. Received text can be easily stored and retrieved using the window at the lower right, which displays stored text files. RadioCom does a great job decoding RTTY and an even better job on FAX. Once you tune in a station and determine its decode parameters, all details can be stored by RadioCom. Then, the next time you want to tune the station, it is just a single click on the stored station line, seen in the center/right of Figure 5, and decoding starts immediately! RadioCom makes monitoring digital signals more about decoding and less about tweaking adjustments.

On my computer I had some strange results using the AM mode and narrow bandwidths. The audio stopped until I opened up the IF bandwidth or changed to another mode. This may be a result of my soundcard, CPU limitations, or another manifestation of the simultaneous display/receive problem.

However, in my opinion, for decoding digital signals with the PCR-1000, RadioCom 4.5 is the way to go ... and it comes free with the PCR-1000. You can check out RadioCom 4.5 at **http://www.bonito.net** .

Honorable Mention

These three programs form the backbone of my PCR-1000 software. However, for ease of use, and for use with many other radios, not just the PCR-1000, RadioMax should also be considered. This is a receiver control program that has many useful features and is one of my all time favorites. You can find RadioMax at **http://www.datadeliverydevices.com/RadioMax.htm** The cost is $45.

Staying Power

There is little question that the ICOM IC-PCR1000 helped usher in the era of PC-controlled radios almost a decade ago. It is still a great performer today and will be for a number of years to come.

This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.

Setting up a Radio Shack

By Ian Poole G3YWX

The radio room or radio shack is a place where any shortwave listener or licensed ham will spend many hours enjoying the hobby. To make the most of the time spent in the shack, it is crucial to ensure that it is comfortable and easy to use. The layout of the equipment along with the furniture that is used can make all the difference to the enjoyment of the hobby. In addition to this, an easy to use shack will also help gain better results, because the equipment can be used more effectively.

With a little thought when the shack is being planned and installed, it is possible to make any time spent there as pleasurable as possible. In fact, time and effort put into planning the shack from the very beginning will pay dividends later as it will be possible to gain the most from it in terms of enjoyment, comfort, and convenience.

❖ Requirements for the shack

Before looking at the actual location for the shack, it is worth considering a few of the basic requirements.

Ideally the shack should be self contained so that it does not interfere with the rest of the house, and also so that the activities going on in the rest of the house do not interfere with the shack. External noise can be very distracting for both parties. The continual background noise coming from an HF receiver, for example, can be very annoying when trying to watch the TV!

Having a shack that is separate or at least contained helps keep it from spreading to other corners of the house. Construction projects can be undertaken more easily and do not have to be cleared away when you break off to do something else.

Another requirement for the shack is that it should be large enough to contain everything. It is amazing how much can be accumulated over even a short period of time. Space is needed for the equipment itself, as well as books, components and spare pieces of equipment. If it is possible, all of this should be contained within the shack so that when anything is needed it is close at hand.

Electrical power is another obvious requirement. Most areas within a house will have electrical outlets at hand. However, if the shack is located somewhere else, then power may not be available and will have to be installed. The cost and difficulty of bringing power to the shack should be taken into consideration.

It should also be possible to route aerial feeders into the shack without too much difficulty. In most shacks this is not too much of a problem, but in certain locations it may mean routing unsightly feeders around the house. This is unlikely to meet with much approval from the rest of the household.

❖ Location

One of the first choices to make when establishing a shack is its location. The ideal for many people is a room in the house. Often a basement may be ideal, or any spare room in the house. However, this type of luxury may not be possible for many people. This is where some ingenuity may be required.

Many very good shacks have been created using various nooks and crannies around the house. I have seen UK stations with shacks installed in cupboards or closets, the roof space, garden sheds and even spaces in a garage. While each solution has its own problems, sometimes these can be turned to advantage to create a compact and efficient shack.

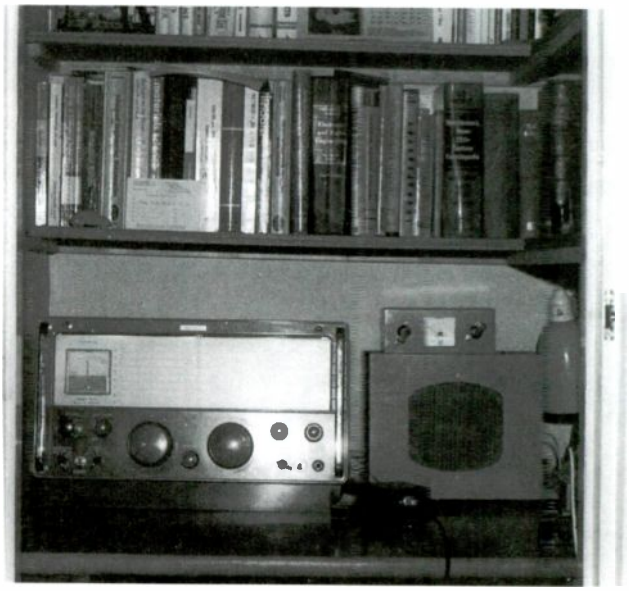


Figure 1 - A closet or even a bookshelf can be made into a radio shack

One idea that I have used is to convert a large walk-in closet into a shack. A table surface is placed between the two walls, and the chair can be fitted under the table surface and the door closed when it is not in use. Although there is not room for a large array of equipment, it is convenient and self-contained.

Other people have converted wooden outhouses or sheds into useful shacks. Access for feeders and earth connections are normally very good, but security can be a problem and should be addressed if expensive equipment is to be kept there. It may also be necessary to prevent damp and condensation affecting the equipment

Figure 2 - A shack of this size can easily be accommodated in a walk-in closet

when the temperatures fall.

Whatever solution is considered, it is well worth investigating all the work that would need to be done to convert the area into a workable shack. Any costs can also be considered in advance.

The table

One of the most important pieces of furniture for the shack is the table. It can either be bought or made to fit the available space. Whatever solution is adopted, it should be sturdy enough to carry the weight of all the equipment. It is surprising how heavy even modern equipment can be when several items are accumulated. Older equipment can be even more weighty, and the table surface should be reinforced suitably.

Typical modern office desks may not be adequate, and may sag under even relatively modest weights. Modern composite boards are renowned for bending when weights are applied. Plywood or block board is generally a far better option if the table is to be constructed, but even then suitable reinforcement is required.

One solution is shown below. Screws through from the top side of the table top, can be used to fix the reinforcing boards to the underside of the table top. It is then possible to hide these screws by finishing the table surface with a table surface laminate that can be bought from a local hardware store.

Before making a choice about the size of the surface, it is necessary to ensure it has sufficient depth. Often insufficient depth is allowed for the table surface and this can restrict the room in front of the equipment for log books, reference books, frequency charts and the like.

To calculate the depth required, allow around six inches or possibly more behind the equipment for cable routing. Check the cable bend radius of any coaxial cables used. Next is the depth of the current equipment used; remember, this may change as the station is updated. Finally, allow around eighteen inches in front of the equipment for the log books, etc.

It is also worth remembering to have sufficient space between the wall and the table surface to pass not only the cables, but the cables with their connectors up and down. This can be easily forgotten and is particularly important if the table surface is attached to the wall.

Electrical power

Any radio station is likely to have several units requiring connection to a power source.

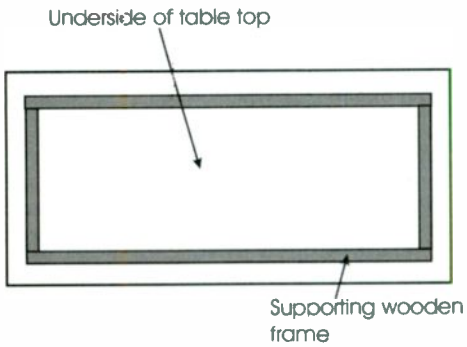


Figure 3 - Underside view of a table top showing the reinforcing framework

When installing the shack, an multiple outlet panel can be installed to enable several pieces of equipment to be plugged in at the same time.

Additionally, it is always worth installing a circuit breaker. Breakers that trip on earth leakage or "residual current" should be installed according to local safety regulations. In fact, safety should be considered at every stage of the construction of any shack, and obviously electrical wiring is one of the primary concerns.

Lighting

The lighting within the shack is also very important. The whole table needs to be well illuminated so there are no shadows and everything on the table can be seen easily. This is particularly important when construction projects are undertaken.

Good lighting is also needed so that the equipment can be operated satisfactorily. Therefore, the lighting should be above the table and not behind the operator nor behind the equipment so that no shadows will fall on the work area.

Lamps which can be angled and moved are ideal to provide extra light. They come in very useful for construction projects, because they can provide a high level of light right where it is needed.

When choosing the primary light source for the whole room, careful consideration should be given to the kind that is used. Fluorescent lights emit significant levels of radio frequencies (RF) and can be a troublesome source of interference. Although this may not be a problem, it is worth avoiding them in the shack if at all possible.

Equipment Layout

Having built the shack, it is worth giving thought to the actual layout of the equipment, as this can contribute a lot to the ease with which it can be used and hence the enjoyment of the whole shack. Although there are no hard and fast rules, there are a number of guidelines which should be borne in mind when planning the layout.

The main receiver or transceiver should be placed centrally on the table with the tuning dial only a couple of inches above the table surface. This means that one's arm can rest on the table while the receiver is tuned. This saves a lot of arm ache during extended periods of operation.

A second receiver or transceiver can be placed to the right of the main one. With it placed in this position it is again easily accessible without having to reach across the table from right to left.

If a transmitter that is separate from the main receiver is used, then this should be placed to the left of the main receiver. This position is ideal because enables the microphone to be held in the left hand while using the other hand for writing in the log book or making notes. If a separate transmitter is not used, then this position can be used for a linear amplifier.

If a Morse operation is envisaged then the key should be placed on the right hand side of the table as the right hand will be used to operate this. It is also worth bearing in mind that there should be sufficient space in front of it for resting one's arm.

Obviously these positions have been mentioned with a right handed person in mind. For any one who is left handed the positions should be reversed and the same logic applied.

It may also be worth building a shelf above the main table to accommodate items such SWR meters, ATUs, spare power supplies and the like. In this way they can be conveniently situated above the other equipment.

The other major piece of equipment that is found in shacks these days is a computer. This should be located in a convenient position so that it can be operated without any strain. The keyboard should not be too high nor right on the edge of the desk, and it is often recommended that the monitor should be at arm's length and on eye level. Full details of ideal computer seating and working positions can be found on many websites.

These are only broad guides and ideas about shacks, and they are by no means "rules." The main objective is to make the shack easy to use and a pleasure to spend time in. It is hoped these ideas may provoke some thought and enable these aims to be achieved.

Further information about radio and electronics topics can be found at the author's website at **http://www.radio-electronics.com** See also the author's *Monitoring Times* articles on receiver specifications in the online reference library at **http://www.monitoringtimes.com**

MT REVIEW

ARD25 Data Receiver

By Dan Veeneman

The term 'Software Radio' has become common these days when discussing the latest developments in receiver technology. Instead of hard-wiring a device to perform a specific function, software radios use microprocessors and programmable logic to acquire, tune, and demodulate signals. The flexibility of simply upgrading software allows the addition of new features (and the correction of shortcomings) without having to replace any hardware.

Four years ago AOR displayed a prototype software radio, the JT2000, which was designed from the ground up to process radio signals digitally. Although that product has yet to be completed, AOR subsequently demonstrated a less ambitious device called the ARD5000, which hooked up to the 10.7 MHz IF (Intermediate Frequency) output of some high-end receivers and used a DSP (Digital Signal Processor) to demodulate various types of signals. Production of this device also appears to be a long way off, if ever.

◆ APCO Project 25 Decoding

However, earlier this year AOR introduced the ARD25 Multimode Data Receiver, marketed as a stand-alone decoder for APCO Project 25 (P-25) transmissions. Project 25 is a set of standards for digital radio systems, used extensively in the United States by public safety agencies. As these agencies move away from their old analog radios to new Project 25 systems, scanner listeners are forced to find a way to monitor P-25 signals. AOR hopes to address this need with the ARD25.

The paperback-sized (6 x 4 x 1.3 inches) black box takes a 10.7 MHz IF (intermediate frequency) signal from your receiver and decodes non-trunked, unencrypted P-25 signals. The audio is sent to a built-in speaker or to an external audio device via a 3.5mm mini audio jack. Talkgroups and other decoded data are sent out by an RS-232 serial port, which can also be used to control the device.

My review package came with the ARD25 unit, an AOR AR8600 AC power supply, a BNC to BNC cable for the IF signal, a 3.5 mm mini-plug audio cable and a 10-page manual. The two-piece metal box has a solid, quality feel to it, with clearly marked controls, plugs and connectors.

The compact front panel of the ARD25 has the power switch, three LED indicator lights, an AF (audio frequency) gain knob (basically a volume control) and a headphone jack. As you would expect, the "Power" LED comes on when the AC adapter is in place and the power switch is on. The LED marked "P-25" will light when the ARD25 is decoding Project 25 signals. The "Busy" LED will be lit when the unit is receiving signals in either analog or digital mode, regardless of whether it is successfully decoding or not.

The rear panel offers five connectors: one for the IF from the receiver, audio in and out, a nine-pin male serial data connector and the DC power jack.

◆ Performance Summary

The ARD25 easily connects to receivers that have a standard 10.7 MHz IF output, including the AOR AR5000 series and AR-ONE, the ICOM R7100 and R8500, and the Yaesu VR-5000. Other receivers may be modified to provide a proper 10.7 MHz IF output, including the AOR AR3000A and AR8600 series.

Hook-up to any of these receivers is a quick operation. The toughest part will be making sure your receiver is actually putting out a 10.7 MHz IF signal. I tested the ARD25 with an AOR AR5000, which has an external 10.7 MHz IF output on the back panel but requires activation through a configuration menu.

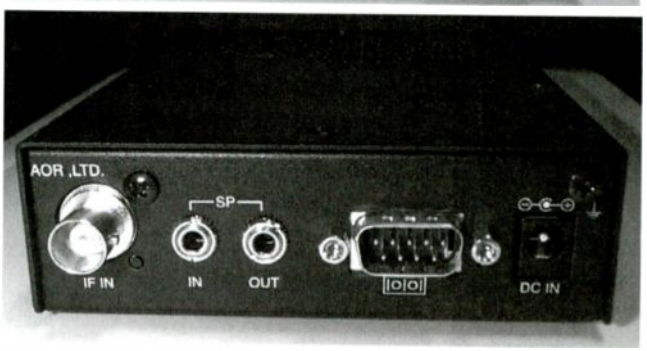
Besides the list price of nearly $400, the greatest drawback of the ARD25 is its lack of trunking capability. Not only is it unable to following transmissions across different frequencies (trunk-track), but it is also incapable of decoding the audio from transmissions on trunked systems. In my region, in the Washington, D.C. area, nearly all Project 25 systems are trunked. However, there are many conventional (non-trunked) P25 systems including the Los Angeles Police Department and the New Hampshire Department of Safety. The ARD25 works well on these systems, with audio quality comparable to the Radio Shack PRO-96.

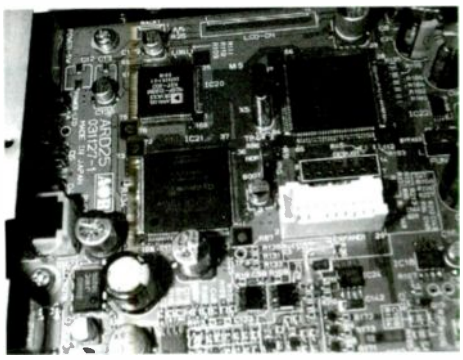
◆ Under the Hood

The ARD25 contains quite a bit of computing hardware, based around three main integrated circuits. First is a Renesas (formerly Hitachi) microprocessor containing a high-speed central processing unit. This chip holds its programming in on-board flash memory, meaning it can be updated after it has left the factory. The second computing device is an Analog Devices Digital Signal Processor (DSP), optimized for performing mathematical functions. As the name implies, it is often used to handle the workload of processing and analyzing digital signals. It is also driven by software.

Third is an Altera Cyclone Field Programmable Gate Array (FPGA), which is a specialized device that provides custom hardware functions. Those functions are determined by the equivalent of a schematic held in a "configurator." By changing the schematic in the configurator, the FPGA can be changed to perform different functions.

For a consumer device this is an impressive amount of computational capability, similar to some sophisticated military radios. It is, frankly, overkill for decoding P-25 transmissions. This leaves me wondering what AOR might have in mind for the ARD25 in the future.





Enhancements

Despite the shortcomings of the current product, the design itself has the possibility of enhancements in the future. Each of the computing chips is controlled by software, which can certainly be updated to provide new capabilities. In addition, an examination of the printed circuit board itself reveals two connectors: a 14-pin "Debug" port and a 20-pin header labeled "Expand."

Bottom Line

If you're in an area with large, trunked Project 25 systems, my recommendation would be to purchase a PRO-96 or one of the Uniden digital scanners, since the ARD25 won't be of much value. However, if you have conventional P-25 systems nearby and already have a receiver with a 10.7 MHz IF output, the ARD25 is a nice way to add digital capability to your shack. In either case, keep an eye on AOR to see what enhancements they come out with for this potentially very capable device.

DWM "Yo-Yo Tenna"

By Bob Grove W8JHD

When you're operating VHF/UHF portable, it's really no big deal to find an adequate antenna. Resonant elements are short, and a gain antenna doesn't require vast expanses of real estate. But for the HF ham operator or shortwave listener, a resonant element can easily be 60-100 or more feet in length, and a multiband antenna can impose a daunting challenge. Often, a transmatch ("tuner") is employed to cancel the reactance of an impedance-mismatched antenna system.

And what about restricted apartments, camping locations, business trips, or even Field Day? And how about long-distance emergency comms after a natural disaster or other unforeseen event? Wouldn't it be nice to have a compact HF antenna that folds up to a few inches to fit in a pouch?

The military has done it in the past with interchangeable elements, inductively-wound elements, or even reeled metal tape measures which can be unfurled to an appropriate length for the band chosen. Perhaps it's the latter approach that may have inspired this interesting product from DWM.

Multiband Antenna to Go

The dipoles are assembled around pairs of enclosed, fishing-style reels which resemble a "Yo-Yo," as first observed by Jeffrey Lauterbach, the son of DWM's owner, Bill Lauterbach (WA8MEA). Each reel can release up to 40 feet of insulated, stranded, #22 wire; a pair can effect a dipole for 40-meter operation (7 MHz), or shorter for higher-frequency bands up through two meters (148 MHz).

The basic "Deluxe" pair YYTD-259 includes a pigtail PL-259 male connector for transceivers; the YYTD-PHN is equipped with a 1/8" (3.5 mm) phone plug for popular multiband portables like most Radio Shack, Sony, Grundig and Sangean radios; and the YYTD-RCA provides an RCA phono plug for models like the Sangean ATS-803 and Radio Shack DX-394, DX-440 and some older receivers and transceivers. All "Deluxe" models are $29.95 each plus $7.95 shipping.

For multiband operation, the new, four-reel, dual-band, model Yo-Yo-Vee model 4 ($49.95 plus $7.95 shipping) or six-reel, tri-band, model 6 ($59.95 plus $9.95 shipping) may be in order. The multiband pairs of reels are connected to a popular Budwig center insulator affixed with a standard SO-239 female "UHF" connector for transmission-line attachment.

If you have a transmatch handy, you can trim the VSWR very low, even on lower frequencies than 7 MHz. Or simply use the transmatch with the basic YYTD-259.

The Budwig insulator also has a center hole to support the dipole and relieve the strain on the deployed wire.

Erecting the antenna

The reels are encapsulated, not open, to resist moisture intrusion and prevent unraveling. Each reel has a handy, molded loop to facilitate tying it to a support (tree limb, building eave, pole hook, etc.). When erecting both ends of the dipole, you will need to provide lengths of tether cord; these can be used to tie down securing stakes for the poles as well.

A tie-off tab is provided on each reel for wrapping a turn of wire to keep it from unraveling further once the proper resonant length is established. The reel is equipped with a spinner knob which assists in both deploying and spooling the wire.

The six reels which comprise the tri-band dipole are colored by pairs, assisting the operator to equalize lengths on each side of the center insulator. Actually, this isn't really necessary since all three pairs are electrically connected to the same point on the center insulator, but it's a thoughtful touch.

While the small-gauge wire may appear skimpy, it is sufficient for both receiving and transmitting (100 watts or so).

If you don't have trees or eaves to support the dipole, you will need to provide masts. DWM suggests telescoping lengths of rigid PVC; it's strong, cheap and lightweight. Try to get it up as high as possible, since a horizontal dipole will react reflectively with the ground, distorting the radiation pattern to favor overhead instead of the desired horizon.

It's best to feed the antenna with lightweight RG-58/U coax; larger-diameter, heavier RG-8/U will provide no significant improvement except when in very long runs (well in excess of 100 feet) at HF.

And one final tip: You may wish to measure off correct lengths for the band(s) of operation, wrapping a small piece of contrasting-color tape at those points, or brushing on a swath of paint. This makes it much easier to deploy the right length of wire in the field.

For more information including ordering, contact DWM Communications, P.O. Box 87, Hanover, MI 49241; or phone them at (517) 563-2613 (orders) or (517) 563-9022 (business). Email: *tinytenna@hotmail.com* or visit their website: **http://qth.com/dwm**.

Jock Elliott KB2GOM
jockelliott@monitoringtimes.com

Monitoring Times Reader has *Bright* Idea!

About a year ago, Alan Woodman, W9RUV, emailed me:

"Your most recent column on LED flashlights prompted me to write you since I particularly appreciate such tools. So much so that I've recently started to sell a new type of LED flashlight light that I am enamored with.

"Being an electrical engineer I've always been fascinated watching semiconductor science relentlessly improve the efficiency and light output of the LED. With the advent of white light devices, I started to adapt flashlights for myself and friends.

"What really lit my fire was the Luxeon LED series from a new startup venture, Lumiled Corporation in San Jose, CA. Lumiled is a joint venture of Philips and Agilent and they have developed the absolute brightest and most outstanding LEDs you can presently behold. Having been involved in engineering positions for many years, I'm not so easy to impress with new technology. But when I first began working with these Luxeon white LEDs, I must confess, I was truly surprised.

"To make a long story short, I'm presently selling two models of flashlights using these Luxeon parts. Their designs make any other LED flashlights quite literally pale by comparison . . . I've always contended that flashlights made with panel indicator type LEDs does not make an efficient illuminator. No matter how bright they may be, the lens in these LEDs is not meant to project light any appreciable distance. After all, they are meant to be indicators, not illuminators."

Well, to be honest, when I first heard from Woodman, it sounded to me like he was making these flashlights as a hobby, and I didn't investigate any further. But in April of this year, I contacted him to find out if he was still making the flashlights. "Oh sure," he said, "I have a company in the Far East manufacturing them for me. Would you like to have a look at them?" Of course!

Tough Enough

Not long after, the UPS guy dropped off a package, and what came out of it truly impressed me. There are two flashlights: the small light and the long light. Both have cases machined out of solid aluminum, black anodized, and highly water resistant. They are sealed with o-rings, and, while you can't go diving with them, they will easily withstand a dunking in a puddle or a bucket of water without failure.

Both lights use the 1-watt white Luxeon LED. This LED has an integral heat shield and is far brighter than the conventional LEDs used in flashlights. Fifty percent of the light that is emitted by the Luxeon LED comes from the edge, and an aspheric polycarbonate lens is used to capture, redirect and focus the light so that it comes out of the flashlight in a 10-degree cone. Ninety percent of the light generated by the Luxeon LEDs gets used for illumination. By comparison, almost half of the light from a conventional "indicator" LED never makes it off the chip. And unlike other high-performance LED flashlights, Woodman offerings do *not* require expensive lithium cells, but instead use ordinary alkaline batteries.

These flashlights with Luxeon LED bulbs are bright, tough, and highly recommended.

The small light measures about an inch in diameter and a hair over 4 inches long. A pushbutton switch is at the aft end and the special lens is at the other. In between is a checkered surface for easy gripping. Unscrew the rear end cap and out slides a battery carrier that holds three AAA cells. The battery carrier is precision-made and put together with machine screws. It's clear that it is designed to not warp or loose shape over time; it's built to last.

The long light, which uses three alkaline C cells, stretches about 9.25 inches from end to end and measures about an inch and one-eighth in diameter. A pushbutton switch is located about two inches to the rear of the lens and just aft of that is a textured grip section.

Both of these lights are incredibly tough – tough enough for use by tactical teams. The small light, for example, is sized so that it can be fitted into a 30mm scope mount and attached to an Armalite weapon. It can withstand the blast when attached to a shotgun. And the long light? Woodman has been known to turn one of the long lights on, then use it to drive a nail while the light continues shining. (This is, however, considered misuse of the product!)

Beyond Bright

How bright are they? With fresh batteries, both flashlights output about 30 lumens of light. That's so bright that I can't stand to look directly into the bulb. The small light will run for about 35 hours continuously until the light output drops down to a few foot candles that might be suitable for reading a map. The long light will run for much longer, and both lights will run for about 10 times as long as a filamentary bulb with the same power source. (Incidentally, a filamentary bulb actually uses *more* power as the battery begins to weaken. That explains why flashlights with filamentary bulbs die so precipitously.)

I can heartily recommend both these flashlights. They are bright, probably tough enough to include in your will, and each comes with a belt holster and a lanyard. The small light is $49.95 and the long light is $55.00. To order one, visit **http://www.ecustomware.com**. Ecustomware.com, PO Box 749, Prospect Heights, IL 60070-0749

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This triple-conversion receiver is acclaimed for its strong-signal handling, high sensitivity, sharp selectivity, extraordinary frequency coverage (10 kHz-3000 MHz), compact size, frequency accuracy, long-term stability, and durability. Superior quality and selectivity to 1 Hz !

Featured in the +3 versions are Automatic Frequency Control (tunes to center frequency), Noise Blanker (useful to block ignition noise in mobile applications), and Synchronous AM Detector (combats fading on HF). Memory is upgraded from 1000 to 2000 channels, organized in 10 banks. Twenty search banks are available with auto-store of search-discovered frequencies.

The AR5000A receives the following modes: AM, AM Synch, NFM, WFM, USB, LSB/CW, has a DTMF decoder, and five independent VFOs. An RS-232C port allows selectable baud rates of 4800, 9600, 19200. A 10.7 MHz IF output allows connection to optional signal processing, spectrum display operation, or decoder such as the ARD25, reviewed in this issue of *MT*.

Until FCC approval was received in June, this top-level radio was not available on the consumer market. Even so, you need deep pockets for this one – It's selling at Grove Enterprises for $2,569.95. Call Grove at 1-800-438-8155 for more information or visit **http://www.grove-ent.com/RCV42.html** or **http://www.aorusa.com**

County Com SW Receiver

The County Comm GP-4 is a tiny (3.4x2.5x.83 inch) AM/FM/SW (5.2-18.3 MHz) Chinese-built radio that appears well suited to listening while walking or for use as an emergency pack. It operates on two AA size batteries or 3-4.5 volt A/C adapter (neither supplied) and includes a small (40mm), but clear (.25 watt) speaker and earbuds.

Shortwave is arranged in two bands and the FM band is super wide, extending down to 76 MHz. A digital clock in 12 hour format is displayed when the radio is not in use, and a one event alarm/timer is included, with a wake-up to radio option.

There is no dial light, frequency readout on SW is coarse (only to 10 kHz) and its inexpensive design means tuning among closely spaced stations is challenging. But the digital readout is accurate, the stronger stations are well received and, for around $20, it's perfectly adequate for what it is – a way to access SW (and AM/FM) on the go with very minimal heft. Go to **http://www.countycomm.com/digitalsw.htm** or write County Comm, Government Products Group, 1190 Homestead Road, Santa Clara, CA 95059 for further info.

– Reviewed by John Figliozzi

Sangean ATS-818ACS

If you're looking for a mid-priced, versatile shortwave receiver, consider Sangean's ATS-818ACS. This attractive portable provides continuous coverage of all shortwave bands, as well as domestic AM/FM bands. Single side band mode allows reception of CW and utility communications as well as shortwave broadcasting, and a choice of wide or narrow AM filter adjusts selectivity as needed.

Best of all, the 818ACS includes a built-in cassette recorder, which is programmable for unattended recording. As this month's feature article attests, this is the only such receiver currently on the US market with a built-in cassette. The 818 includes 54 memory presets and dual time display, so you can keep track of both local and UTC time. The radio also includes an alarm and variable sleep switch.

New to the Grove catalog, the Sangean 818ACS is $199.95 plus shipping from Grove Enterprises (1-800-438-8155 or visit **http://www.grove-ent.com**) for more information.

New Scanner Master "Remote"

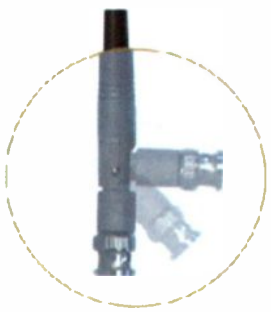
At the Dayton Hamfest Scanner Master announced the 780 Remote Head Kit is finally here after nearly three years of development. The remote head kit allows you to mount the front-head of your 780 anywhere in the cab of your vehicle (on-dash, under-dash, on-ceiling, etc.) with either Velcro or a Uniden-supplied mounting bracket – No soldering required.

Five custom-programmed microprocessors multiplex the front head kit signals back and forth from the receiver itself. 14 feet of black Cat5e cable is supplied to connect the two units, at least 50 feet can be used with no problem. This allows other options such as remoting the receiver at your outside antenna in a weatherproof enclosure to negate any loss through coax cable.

Scanner Master says versions for the 785 and the 796 will be available before the end of the year. The Remote Head Kit is $369.95. SM says quantities are limited, so contact them at 1-800-SCANNER or visit **http://www.scannermaster.com**.

Angling for an Antenna

When handheld scanners aren't in a holster or held in the hand, they are usually laid down so the display can be read and keys can be punched without knocking the radio over. But then the antenna runs into all the other equipment and papers on the desk, and it loses its responsiveness to vertically-polarized signals.



What's NEW

Tell them you saw it in Monitoring Times

What you need is GRE's new rubber-ducky antenna. Designed for the 800 MHz band, this 8-1/4 inch flex antenna with BNC connector swivels to three positions – straight, 45, or 90 degrees – to keep your antenna vertical. Look for it at your favorite scanner dealer.

Milestone Technologies Acquisition

Milestone Technologies is really making a name for itself. Several names, in fact. Milestone Technologies owns Morse Express which sells telegraph keys and related equipment. Several years ago, after the death of Doug DeMaw, renowned in amateur radio circles and in Monitoring Times, Milestone Technologies acquired DeMaw's Oak Hills Research company specializing in QRP kits.

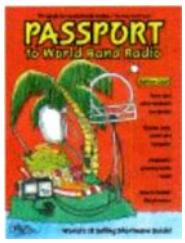
Now, Marshall Emm N1FN, president, announces Milestone has acquired the assets of AMECO Corporation, one the oldest names in amateur radio. Milestone will be resuming production of several AMECO products which have been off the market for some time. AMECO was noted for code training equipment, telegraph keys, code practice oscillators, and HF preamplifiers.

The acquisition coincides with Milestone's move into new premises with a retail showroom and enhanced production facilities. You can order AMECO products from most amateur radio stores, and direct from the website at **http://www.MorseX.com** or call toll-free (800) 238-8205 to order by phone.

Milestone Technologies, Inc., Morse Express, Oak Hills Research, 10691 E. Bethany Dr., Suite 800, Aurora, CO 80014 (303) 752-3382; Fax 303-745-6792

Got Your Passport?

As we inaugurate the beginning of yet another SW DX season, it's time to think about updating your annual guide to the shortwave bands – *Passport to World Band Radio*. Edited by Lawrence Magne, *Passport* provides at-a-glance world broadcasters by frequency and time, indicating station power and language as well. Readers rely on *Passport* for QSL information, program profiles, receiver reviews, and much, much more.



Passport will be released in October, and dealers such as Grove Enterprises are taking advance orders. See ads in this issue or visit **http://grove-ent.com** or **http://passband.com** for more information.

Satellit 800 Discontinued

Eton Corporation announced in July that the Grundig Satellit 800 has been discontinued. No units are left in stock. The Satellit 900, which is going to be called the E-One is planned for release in the 4th quarter 2004.

Ham Software for Mac Users

Black Cat Systems' Morse Mania 2.6 is a Morse code tutor that helps you learn Morse at speeds ranging from 5 to 30 words per minute, with options for different learning systems. The new version adds the new Morse code character @, divides punctuation practice into two groups, and fixes several bugs. Morse Mania is $19.99 for Mac OS X and Classic Mac OS.

The company also released minor bug-fix updates to Elmer 5, its ham radio practice exam software, and Audiocorder 4, its audio recording software.

http://www.blackcatsystems.com/software/morsemania.html

http://www.blackcatsystems.com/software/elmer.html

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com

Lawrence Harris
lawrenceharris@monitoringtimes.com

Equipment Ups and Downs

Nothing lasts for ever; my HRPT (high resolution picture telemetry) receiving dish is mounted on elevation and azimuth motors, and a few weeks ago the elevation motor started to stick. During early parts of each pass, the motor was unable to raise the dish any further unless it was reversed a little and then driven at high speed upwards, through the problem region. Then finally a couple of weeks ago, it failed completely. The unit is several years old, so I can't complain about a short life span. I decided to investigate its internals myself, in order to see whether I might be able to fix it. I am perhaps the most mechanically inept person that I know, so this idea didn't come easily!

I stalled at the first problem: I could not get the screws undone that separate the two halves of the Yaesu G5500 motor. Even with the correct tool, I could not undo them. I walked along to a local garage, carrying the motor, and after explaining what it was for (had they even heard of weather satellites?), one of the mechanics took the unit onto the workbench. Within seconds he had undone the first screw. He proceeded to remove the other screws while colleagues gathered around to enquire of its nature. The job was completed within about two minutes – at no charge! I promised to deliver a printed picture if I was able to repair the internals.

Inside the unit I found it to be remarkably free of rust, but a little dirty. Some particles of plastic and a metal copper connector were found, but otherwise nothing seemed broken. I removed the debris and sprayed some WD40 around the cogs and wheels. My next plan is to re-assemble the unit and try it out. More next month.

❖ Weather Satellite Launches – 2004 - 2018

In case anyone was wondering whether it was worth investing a dollar or two buying WXSAT receiving equipment, here is a list of satellite launches scheduled over the next decade and more. Of course there will be changes as time passes, and some entries may be a little out-of-date – but the trend is clearly seen. Check my advisory note at the very end!

US Polar satellites:
- NOAA-17 - Launched June 24, 2002. Mid-morning orbit.
- NOAA-N - February 11, 2005
- NPOESS Preparatory Project - October 31, 2006
- NOAA-N' - 2008 pending repairs
- NPOESS C1 - October 2009
- NPOESS C2 - October 2010
- NPOESS C3 - October 2011
- NPOESS C4 - June 2013
- NPOESS C5 - June 2016
- NPOESS C6 - June 2018

US Geostationary satellites:
- GOES-M - Launched July 23, 2001
- GOES-N - December 2004
- GOES-O - July 2007
- GOES-P - October 2008
- GOES-Q - Cancelled
- GOES-R - April 2012

Acronyms:
- NOAA – National Oceanic and Atmospheric Administration
- NPOESS – National Polar-orbiting Operational Environmental Satellite System
- GOES – Geostationary Operational Environmental Satellite. See end entry concerning transmission formats.

European: (EUMETSAT)
- Meteosat Second Generation (MSG-1) - Launched August 28, 2002
- MSG-2 - 2005 (approximately eighteen months after MSG-1)
- MSG-3 - 2008 (approximately four years after MSG-2)
- METOP-1 – January - December 2005
- METOP-2 – July - June 2010

[METOP – Meteorological Operational Polar satellite (EUMETSAT)]

Russia:
- Meteor 3M-N1 - launched December 10, 2001
- Meteor 3M-N2 - December 2004
- GOMS-N2 – 2005 (geostationary)

Japan:
- Multifunctional Transport Satellite (MTSat)
- MTSat-1R - 2004
- MTSat-2 - 2005

China:
- FY-1D polar orbiter launched May 15, 2002
- China FY-2B geostationary satellite launched June 26, 2000
- China FY-2C - 2004
- China FY-2D - 2006
- China FY-2E - 2009

The list shows both polar orbiters and geostationary WXSATs where schedules are available. I have excluded the Indian launches because their transmission downlinks are significantly different from WXSAT downlinks due to their multi-function purpose. Some downlinks are expected to be encrypted. From any single location on earth, one cannot receive all the geostationary satellites due to their spread around the world, but several selected transmissions are included in the downlinks from GOES.

❖ Good Viewing

http://users.adelphia.net/~hlulofs/

Hendricus Lulofs seems to have found the perfect location for monitoring WXSATs. He resurrected his APT reception site after moving house, and is receiving "stunningly clear images" The reason for this is that the new area that he lives in has underground utilities, and the result appears to be a noise free environment! He is receiving signals from 3 (degrees) elevation in the south to 3 (degrees) in the north. From his new location Hendricus can monitor satellites from Central America northwards, well into Canada. Should make for some good tropical cyclone images.

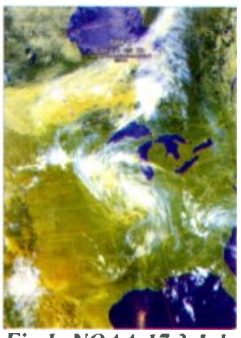


Fig 1: NOAA-17 3 July from Hendricus Lulofs

❖ Full Disk image from GOES-11

GOES-11 is currently the backup satellite, being stored at 95° west. NOAA/NESDIS took GOES-11 out of storage until June 30 to complete a series of tests of the satellite and ground systems. This image is one of the full disc images taken by GOES-11 during the test.

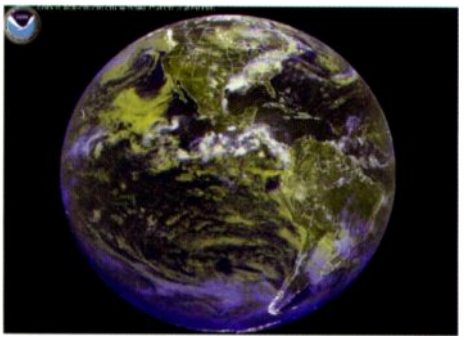


Fig 2: GOES-11 25 June 2004 Full disc image tests

Frequencies:

NOAA-12 and -15 transmit APT on 137.50 MHz ['Stop Press' information.: NOAA-12 suffered a major power problem on 26 July and transmissions ceased. Full details in next edition.]

NOAA-17 transmits APT on 137.62 MHz

[APT is the low resolution imagery from polar orbiters that can be received with low cost hardware.]

GOES-10 (west) and GOES-12 (east) use 1691 MHz for WEFAX

[WEFAX is low resolution imagery from geostationary satellites and is due to be replaced by a new telemetry format (LRIT and HRIT) during the next several months. I would therefore suggest considerable caution before considering the purchase of WEFAX equipment! Daily time-share transmissions of WEFAX and LRIT on GOES East now active. LRIT broadcasts for 29 minutes every hour starting at 45 minutes past the hour.]

Stock Exchange

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NON-COMMERCIAL SUBSCRIBER RATE: *FREE* up to 25 words! Send via email, fax or letter ONLY. No phone ads accepted.
NON-COMMERCIAL, NON-SUBSCRIBER RATES: $.25 per word. All merchandise must be personal and radio-related.
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$50 per issue if camera-ready copy or, $85 if copy to be typeset. Photo-reduction $5 additional charge. For more information on commercial ads, contact Beth Leinbach, 828-389-4007.

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For grect deals on pre-owned radios and discontinued models, make sure to check out Bob's Bargain Bin at:
http://www.grove-ent.com/hmpgbbb.html

INDEX OF ADVERTISERS

These line ads are *FREE* for subscribers! Check out the ad on page 3 for more details on all the great benefits of being a *Monitoring Times* subscriber!

Ala Scar Email List, covering North Alabama and Southern Middle Tennessee - http://groups.yahoo.com/group.AlaScan

SCANNER RADIO, Bearcat Trunk Tracker II, 300 channel with charger, used very little, in perfect condition. $75 (free shipping) Fla, 352-628-4522

Miami Valley DX Club. Covering HF/Scanning. Sample issue $1.00. $10.00 for 12 issues. MVDXC Dept. 3, Box 292132, Columbus, Ohio 43229.

FOR YOUR MUSEUM: Build working replica of 1954 "Boys First Receiver." One tube DXer. Easy project. Complete plans 32 page booklet reprint, $5 postpaid. Bob Ryan, 1000 S. Gilbert St., Apt. 132, Hemet, CA 92543-7065

New free internet discussion forum board. Meet people with similar interests. Join in at: http://www.activesignals.com

Want more? Check out the *Monitoring Times* Website at www.monitoringtimes.com and make sure to stop by the Messageboard to chat with fellow hobbyists and get the latest news!

Closing Comments

The Dismantling of America's Voice Abroad

By Alan Heil Jr.

A fresh call for a congressional investigation of the board overseeing VOA, the removal of its courageous news director Andre de Nesnera, and massive cuts in its English broadcasts around the world add up to the most serious crisis in U.S. international broadcasting since the early 1950s.

All this is occurring as a strong and substantive American broadcast voice to other countries is more important than ever. Although broadcast hours have been increased to the Middle East and Islamic world, these newly created, American taxpayer funded entertainment style networks seem jarringly out of place to influential listeners and viewers in those regions. Many there count on Western media to offer accurate, reasoned, objective food for thought as their countries struggle for survival amid poverty, terrorism and war.

The Voice, the nation's largest publicly funded network, is in greater danger of being nibbled to death by a thousand cuts than at any time during the past five decades. Nearly half of the VOA staff – 450 managers, editors, broadcasters and producers – petitioned Congress July 6 to halt the "dismantling (of) the nation's radio beacon." In their letter to influential Senate and House leaders, they called for an investigation of the nine-member panel which oversees the Voice, the U.S. Broadcasting Board of Governors (the BBG.)

Five days earlier, VOA's news director of the past four and a half years, Andre de Nesnera, was removed from his post after resisting persistent pressures by Voice Director David Jackson to alter news copy – the first presidentially appointed head of the network to practice such a hands-on approach to the newsroom since the early 1950s.

The director of the International Press Institute, Johann P. Fritz, said: "I am worried that this is a first step in dismantling the VOA's news structure. As news director, de Nesnera stood for the fundamental right of editors and journalists to set the news agenda themselves... By taking this route, I am afraid the good work of U.S. international broadcasting services will be undermined. The U.S. government should remember that it takes decades of hard work to build a solid reputation for balanced and fair news reporting but only seconds to lose it."

Since 9/11, the BBG also has:

* *Ordered reductions of VOA English program hours and frequencies or planned these for later in 2004.* Between October 2003 and October 2004, VOA will have reduced its English schedule from 24 to 14 hours a day. The Board already has scaled back weekly frequencies for VOA English from 354 hours in 1999 to 228 hours in 2003, more than 33 percent. At the end of March 2004, VOA went dark in English to Central and South America. Small wonder that listeners in North America have increasing difficulty in hearing America's Voice.

Consider, as well, how damaging that dead air is to our nation's public diplomacy efforts overall:

VOA now is fourth among international broadcasters in English, our own language and the lingua franca of business and commerce worldwide. By the end of the year, it will be sixth or seventh, barely edging out Adventist World Radio. English is spoken or understood by more than a billion people. Today, more people in China are learning the language than there are native speakers of English in North America.

Reductions of English broadcasts during a U.S. election year will seriously diminish VOA's ability to reflect what some have called "the world's greatest festival of democracy." U.S. citizens overseas will be denied complete coverage of campaign 2004, with only small regional segments of fast-paced news and limited coverage of America available to them.

A listener in South Africa remarked that he now depends on the BBC World Service for news of the United States. Recently, he said, six items about America led a BBC newscast he heard. Is the U.S. government prepared to abdicate reflection of our nation and its thought and institutions to the BBC?

Over the years, the Voice has been a lifeline of essential information on evacuations of American citizens abroad when this was necessary for their safety. If 40 percent of the VOA broadcasts in English are eliminated, this vital public, security service for U.S. citizens abroad will be seriously impaired. Nor will VOA be on the air in more than a single area for English live coverage if another catastrophe on the scale of 9/11 occurs in the U.S. or elsewhere.

The BBG also has:

* *Introduced 24/7 formats on radio, heavy on music, light on content in the Arab and Islamic worlds.* The Board, at the insistence of its multimillionaire member Norman J. Pattiz of California, is determined to convert many Middle East and South Asia languages to largely pop music, youth oriented formats – this when solid, substantive news, interactive discussion and information programs are vital in that "arc of crisis." Britney Spears is "in." Informed reportage on democracy, globalization and political reforms is "out."

The latest proof of the Board's interest in lightweight programming is the fact that Radio Free Europe's information-rich Arabic language Radio Free Iraq will cease broadcasting September 30, and the remnants of its staff may be absorbed by the Pattiz-driven networks, Alhurra-TV and Radio Sawa.

* *Launched a 24/7 Alhurra Television network in Arabic last February, to mixed reviews in the Middle East and among Middle East specialists in the West.* The new service is entering a market of 170 Arabic language satellite TV stations. Its first year cost, including an enhancement for Iraq, will exceed $100 million. *Al Hurra* means "the free one" in Arabic. One Arab journalist called this "an insult."

BBG officials have said the new network is specifically designed to "combat hate radio and bias" now present on television in the region. Critics have pointed to the airing, on the new network, of cooking and fashion shows and documentaries on monkeys during live broadcasts by its competitors displaying death and destruction in Fallujah, Iraq, and the Rafah refugee camp in Gaza.

* *Abolished European language services at VOA and RFE/RL.* The closure of ten VOA languages on February 27 was the most sweeping at the Voice since the early 1950s. Languages which went dark were Estonian, Latvian, Lithuanian, Polish, Czech, Slovak, Hungarian, Bulgarian, Romanian and Slovene. At RFE/RL, the three Baltic Services and Bulgarian and Slovak were abolished, along with Croatian to the Balkans. Fifty RFE staff members were fired or reassigned.

In a moving farewell note to the VOA news staff, de Nesnera wrote: "The last thing I would like to reiterate as I leave this job – though I know I am preaching to the choir – is that our Charter is the cornerstone of the work we do each day. We must continue to be objective, to present all sides of the story and to tell the unflinching, unvarnished truth. That is the basis of our credibility. We cannot permit anyone to spin a story, omit a fact, slant a viewpoint. Though the government pays our salary, it has never bought our conscience.. To quote Edmund Burke, 'All that is necessary for evil to triumph is for good men to do nothing.' Or in the words of my countryman Voltaire: 'I may not agree with what you say but I will defend to my death your right to say it'."

Alan L. Heil Jr. is a former deputy director of VOA and author of Voice of America: A History *(Columbia University Press, 2003)*

This page is open to thoughtful opinions on radio-related topics. Views expressed on this page do not necessarily reflect the opinion of Monitoring Times or Grove Enterprises.

MOBILE SCANNING AT ITS BEST
FROM GROVE ENTERPRISES

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What makes this unit so different?

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The IC-R20 covers 150kHz to 3304.999MHz* in SSB, CW, AM, FM and WFM modes. This covers AM/FM radio and TV broadcasts, wireless communications for boaters, aviation, conventional public safety and many other commercial services. (* Depending on version, U.S.A. version is cellular blocked.)

4-hour digital recorder

The IC-R20 has an internal 32MB digital recorder capable of storing received communications. This feature is useful in a variety ways, like recording a wireless microphone audio at a meeting. There is also a USB port to download to a computer for storage or to forward to a friend. (PC playback not possible)

See your signals

Sometimes hearing a signal is not enough, so the IC-R20 includes a band scope. The bandscope enables you to see signals around a monitored frequency. An additional function of the bandscope is the ability to hear the signal while sweeping a range, so you can see if the signal is modulated.

Order SCN20
ONLY $519.95!*

The AOR AR8200 MarkIII B

One of the Best Just Got Better.

The AR8200 Mark III leaves others behind, with a new Temperature Compensated Crystal Oscillator that maintains frequency stability without regard to changing ambient temperatures. A new keyboard layout, improved illumination allow easy operation in a variety of conditions and new telescopic antenna included for better reception. Attractive new black case and includes high capacity Ni-Cad batteries.

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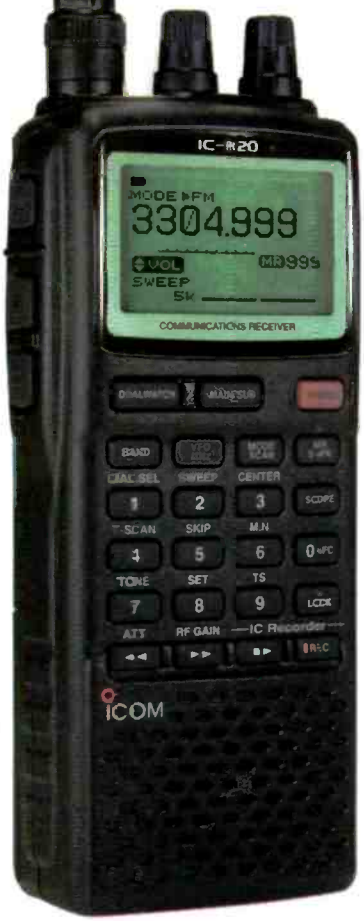

- **150kHz – 3.3GHz** (cellular blocked)
- **SSB/CW/AM/FM/WFM**
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- **1650 mAh Li-Ion battery** – powerful, lightweight, and lasts for many hours of listening pleasure. Recharger included
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- **CTCSS/DTCS/DTMF Decode** – listen in on the repeaters and "channelized" transmissions
- **Pre-Set Most Popular Memories** – fast access to all broadcast TV and FM radio frequencies
- **And Much More!** – Auto Squelch, Noise Blanker, Auto Noise Limiter, Attenuator and RF Gain controls, Multiple Scan functions (including Voice Scan Control), CI-V ready, and still more! Even a USB cloning cable is included!

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*1, 2 or 4 hours, depending on record compression level.
This device has not been approved by the FCC. It may not be sold or leased, or offered for sale or lease, until approval of the FCC has been obtained.