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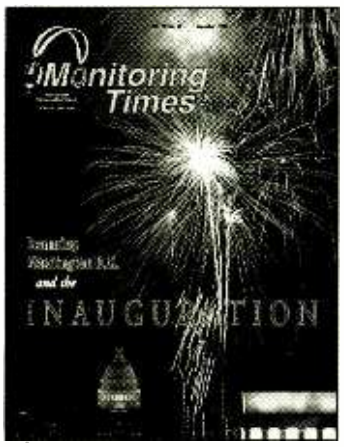

Cover Story

A Guide to Scanning Inauguration 1997

By Willard Hardman and Alan Henney

January's presidential inauguration, like the fifty-two before it, will attract hordes of visitors to the nation's capital, and that equates to premium scanner listening. Even if you wait until warmer weather to visit Washington, D.C., you'll want to take along this invaluable compilation of scanner frequencies, put together by the editors of the *Capitol Hill Monitors* newsletter. They even provide the number to call to make your hotel reservations . . . along with the frequencies to monitor for hotel operations!

Reviews:

As promised last month, Bob Parnass puts AOR's AR-5000 through more rigorous tests. He finds the general coverage receiver very versatile, with only a few complaints (p.100). Larry Magne, who, in September, complimented Sangean on their ATS 909, scolds them this month for their retrogressive ATS 303 (p. 98).

The ultimate in VHF/UHF gadgetry is the new Optoelectronics Xplorer. The Xplorer provides something monitors have longed for—a frequency counter which displays the frequency, while also monitoring the signal content. This combination would seem ideal for the scannist or traveler exploring new territory. Bob Grove puts this monitor's tool to the test (p.96).

DEPARTMENTS

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LETTERS

HAARP Strikes a (dis)Chord

"I am a public affairs officer at Hanscom AFB, Mass., one of the people Wayne Mishler talked to for his article 'Who's Playing Hell With HAARP?' (Oct '96) During our conversations Wayne promised unbiased reporting on the HAARP project and he delivered. If there is something wrong with one of our programs, we want to know about it so we can fix the ailment. But much (or maybe most) of the previous so-called scientific reporting has instead been science fiction in this case.

"Wayne's piece was fair and well-written. Good job."

—Roy Heitman via e-mail

"Wayne Mishler pokes fun at HAARP hysteria by reporting a crank call to an Anchorage paper about RF-zapped caribou walking backwards. This was a good lead into an article that, unfortunately, walked back into the paranoid 50s itself with his argument that if *we*, of the "Free World," don't build HAARP and EISCAT and HIPAS, etc., then *they* will. Right now I don't see *them* blowing a whole lot of money on much of anything.

"Mishler's argument is that HAARP is only one of several ionospheric heaters, so it doesn't matter anyway. This neatly dismisses the real questions raised by the entire ionospheric heating initiative. He uncovers no new facts, and criticizes those who want them. He does nothing to dispel ongoing speculations, rumors, or conspiracy theories.

"How much has been learned since Eastlund's patents? Can the effect be made with less power? Will there ultimately be a chain of these throughout the auroral zone, controlled from an underground room in Nebraska? Will the ionosphere, which currently belongs to everyone, become a military property?

"At this point, Mishler has done what he most likely wanted to avoid. He repeats the government's PR and convinces no one. By repeating platitudes, he makes the project look even more sinister. He does all thinking hams/SWLs a major disservice, and probably only increases HAARP hysteria."

—Hugh Stegman via e-mail

"Mr. Mishler puts out the government-military line on HAARP. The ELF transmissions are the key to the dangers of this project. The government-military didn't tell you because they don't want the world to know. Dr. Begich is telling about them, and you try to discredit him, because that's what they need you to do. If Sweden is building a bigger one, that's an even more urgent reason for this to be stopped and internationally banned and enforced.

"Readers, please examine both sides of this issue and make up your own minds. I am a concerned person; something we all should be when our government and military are tampering with the atmospheric layer that protects *all* life on this planet!"

—Michael McCarty, Columbus, OH

"I received no factual evidence from any of my sources (which included credible members of the international science community), that there is any sort of a threat or conspiracy in the HAARP project. If the international science community isn't worried about HAARP, then maybe we shouldn't worry either.

"Do we really want to stop the U.S. government's experiments and allow other governments to proceed unquestioned? Do we really want to prevent research that could revolutionize worldwide communications? The HAARP hysteria we've seen portrayed to date is, in my findings, based on speculation. I believe that we as thinking SWLs, scanner listeners, and hams should rely on facts.

"Fact: the Eastland project (on which most HAARP criticism is based) was never built; it existed only on paper. The Eastland patents, to the best of my knowledge, were based on theory. Fact: the ionosphere is formed and controlled by the Sun. I'm convinced that any force capable of dominating the ionosphere would have to be bigger than the Sun itself."

—Wayne Mishler

A View of Things to Come

"The problem with all radio hobbies today is that the sort of demonstration that made us go 'gee whiz!' when we were kids, now makes people go 'so what?'

"I can still recall how electrified I was the first time I saw ham radio in action, and how nervous I was when I was able to speak over the microphone to say hello to a ham all the way up in Toronto. Of course, that was back before communications satellites, back when you had to go through an operator to make a long distance telephone call, back when most television was black and white, Charlotte had only two TV stations, the FM band was empty, and most AM stations signed off at sunset.

"Would talking to someone in Toronto or hearing a radio station in Ecuador have the same impact on a similar eleven-year-old kid? I doubt it.

"How are people are supposed to be impressed by a demonstration of how you can autopatch through a repeater with a two-meter handie-talkie, when you can take out your pocket cellphone and talk with someone in London! And you don't have to pass a test, and you can talk about business! Now *that's* impressive!

"Radio-related hobbies will never go away entirely, but they will become smaller and more focused, and the total number of participants will drop. So should we all just quit and go home while we're ahead? Hell no! This is a great time for everyone interested in personal communications if we're willing to be adaptable and not fear change.

"With many HF signals heading for VHF and above, and many VHF and above signals heading for satellites and cable, we can expect a reduction in today's interference and crowding on the bands. What's so bad about that? With a little creative wiggling, we could probably get some additional 'unwanted' HF allocations for hobby use.

"The Web is where 'gee whiz!' experiences are now found. A couple of days ago, I installed a Connectix QuickCam and CU-SeeMe software on my Toshiba notebook PC and tried it out. My first 'contact' was with a guy named David in Capetown, South Africa. Real-time audio and one-frame-per-second video with a guy on the other side of the world through a phone call to a local ISP until we both 'timed out' the site in our excitement...

"Gee whiz!"

"... And yet, that morning I was up before sunrise listening to AM broadcast band signals from across the Pacific, and thrilling to the sound of Japanese, Korean, and Chinese making it in between the North American 10-kHz channels. Most mornings such signals aren't there; that morning they were.

"Radio propagation isn't reliable. Maybe that unpredictability will be what keeps a smaller group still interested in radio hobbies. Maybe we can use the reliability of the Web to lure them into radio hobbies. Add some audio files of various stations to a Web page for downloading . . . what better way to promote a hobby that's audio-based?

"We just have to be flexible, creative, and proactive in our approach rather than defensive and reactive. We have to keep in mind that what sold us on radio hobbies isn't what will sell a new generation of potential hobbyists. We change our selling and recruitment techniques. We adapt to changed circumstances. And we go forward with confidence."

—Harry L. Helms, AA6FW,
High Text Publications

Letters are edited by Rachel Baughn for brevity and clarity. Send to P.O. Box 98, Brasstown, NC 28902 or *mteditor@grove.net.*

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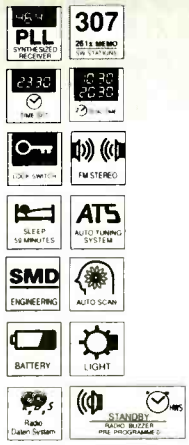

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You're Live on WKIL

Donald McDougall, a convicted child-killer, was beaten to death at the Avon Park Correctional Institute near Tallahassee, Florida. McDougall, 40, had been the subject of a local talk radio program marking the 14th anniversary of the torture slaying of his victim, 5 year old Ursula Sunshine Assaid. Despite being sentenced to a 34 year term, McDougall was to be released next spring. A caller to the talk show, upon hearing this, offered a $1,000 bounty on the killer's head. He was killed by other inmates within hours of being let out of a secure cell.

Another Dumb DJ Trick

KSOL disc jockey Erich "Mancow" Muller's lampoon of President Clinton was a little offbeat, but the end result could mean three days of toll-free driving for motorists on the San Francisco-Oakland Bay Bridge. We'd better explain.

KSOL parked a van across the westbound lanes of the bridge while an employee got a haircut. The idea was to make fun of President Clinton, who tied up Los Angeles airport traffic when he got a $300 haircut on Air Force One as the plane sat on the busy airport's runway.

Presidents can get away with such things. Disc jockeys can't.

While Muller's trick only took a few minutes, it tied up traffic all morning. Muller pleaded no contest to creating a public nuisance and was fined $500. The station, we are told, will pay $1.5 million, an amount that may be given to motorists in the form of three free days of bridge crossings.

"There, now—just $million or two off the top should do it."

No More Boat or Plane Licenses

Based on the 1996 Telecommunications Act, the FCC has eliminated maritime and aviation services rules that previously required individual ship and aircraft radios to be licensed. All such radios will now be "blanket licensed" under the rule.

The FCC took the action to ease the administrative burden of both the public and the Commission. There were some 600,000 individual ship station and 150,000 aircraft station licensees that fall under the ruling. The FCC last exercised its ability to "de-license" a service in 1986 when CB and Radio Control (R/C) licenses were dropped.

In a related action, the Commission has mandated new VHF aircraft radios with 25 kHz spacing, effective January 1, 1997. Older 50 kHz channelized radio are usually found in private, single-engine aircraft.

Feds Hand Off CB

Senator Russ Feingold, a Democrat from Wisconsin, has introduced a bill into the US Senate that will punch a hole in the Communications Act of 1934, allowing state and local governments to handle complaints of CB interference. The Communications Act of 1934 gives the federal government all authority over radio regulation, preempting local and state authority.

Feingold calls the interference problem "extremely distressing" and wants local governments to be able to regulate CB because the FCC is no longer up to the job. Some ham operators smell trouble coming, saying that such an exemption may cause local governments to begin looking at the possibility of regulating amateur radio. Feingold's bill is S.2025.

Signed, Sealed, Delivered

Do you collect stamps? How about radio-related issues? A new stamp issued by Pitcairn Island shows Andrew Young, VR6AY, operating a Morse key in 1938. Young was the island's first ham. Other issues list the call signs of this year's members of the Pitcairn Amateur Radio Club and VR6IM on the air.

Cellular Satellites

Cellular phone service provided by a fleet of 66 low-earth orbiting (LEO) satellites came one step closer to reality. Iridium LLC completed a $750 million credit agreement with 62 banks to finance the project.

Earlier this year, there was speculation that some portion of the amateur radio bands might be taken for a LEO project. The American Radio Relay League is taking advantage of this sort of fear to increase membership. A recent promotional mailer titled, "Can Ham Radio Survive?" was targeted to No Code Technicians, a class of amateur licensee that, according to the *W5YI Report*, "has shown little interest in joining the [American Radio Relay] League."

The League told potential members that the cash-starved federal government was teaming up with corporate interests to take over the 2-meter and 450 MHz bands. All this was somehow tied into a reduction in the gasoline tax. "If you think the threat isn't serious," said the League, "think again."

Next come the black helicopters and a UFO invasion. Save the ham bands!

Smoke This!

"So there's a new radio show about smoking cigars, huh? I'm thinking royalties here!"

One of the hottest new radio talk shows in syndication these days is called, "Smoke This!"—a two-hour program about stogies. When David Zeplowitz—now known as "Cigar Dave"—started the show in the summer of 1995, he was afraid that he wouldn't have any callers. But the stogie show exploded and is now on the air in over 20 cities.

Each show begins with a reading of the rules, then the traditional lighting ceremony of his own and his listeners' cigars. Callers greet each other with the words, "Long ashes to you!"

Outlets include WIOD-AM Miami, KFI Los Angeles, KEX Portland, KOH Reno, WCNN Atlanta and WWNZ Orlando.

Save the ARRL

Glenn Baxter, (K1MAN), is about to kick off a "for-profit" alternative to the American Radio Relay League, the often-criticized self-proclaimed "voice" of amateur radio. Baxter's American Amateur Radio Association (AARA) will also compete with *QST* via a

monthly newsletter called the *American Amateur Radio Digest* (*AARD*). According to Baxter, the purpose of the AARA will be to market amateur radio directly to the public and to represent all those who are not members of the ARRL "and...therefore...the majority of radio amateurs."

Cellular Call for Help

A 17 year old girl, trapped inside a wrecked car next to her dead sister, used her cellular phone to guide rescuers to their vehicle. Anjurle Duchaussee was in good condition at Stanford University Hospital one day after her 18 year old sister veered off the freeway, hit a tree and crashed through a chain link fence. Anjurle was unconscious for four hours, but when she awakened, realized the car was so far off the road that no one would find them and used the cell phone. The incident occurred in Fremont, California.

Airwave Auction Not Going Well

Reed Hundt, the FCC Commissioner who has been widely publicized for his crowing about FCC frequency auctions as a "pot of gold" and his agency as a "cash cow," may have to take up a different tune. After skyrocketing earlier this year, prices for a slice of the public airwaves have veered back to earth. Bids at the FCC's latest sale of wireless phone permits have been running at nearly a tenth of the value of the bids at the auction held in May of this year.

"The prices are extraordinarily low by any standard," said Jonathan Foxman of BIA Consulting, Inc., in Chantilly, Virginia. Analysts say the lower prices may be caused by the fact that the PCS market is becoming overcrowded and that earlier bid winners are finding it difficult to raise the money to fund their ventures.

Kids in the Brig

Two teens are in hot water with the FCC, the Coast Guard, and their parents—who face a possible $250,000 fine plus costs. The Coast Guard in Atlantic City, New Jersey, it seems, was plagued with phoney distress calls on the marine emergency channel. Worse, someone was actually jamming real distress calls. But the perpetrators were slick. They kept their activities short and intermittent. So the Coast Guard called in the FCC.

No problem, they said. We have Precise Direction Finders in the area. Within a startlingly short period of time, the feds had closed in on the source of the transmissions, a boat

"Far out, Howie, my man! Did we get the Feds' goat, or what?"

docked at the rear of a residence. The transmitter was tested and found to be a match with the ID of the false distress calls. This information, together with tapes of the calls, were reviewed with the parents and their children. Confronted with the volume of evidence, a confession came forth. In addition to the $250,000 fine, the kids face up to six years in prison. The Coast Guard can also assess $400 an hour for the cost of expenses associated with deploying search aircraft and marine vessels.

Meanwhile, the BBC-TV has reported that the present GMDSS system is in near collapse. More than 95 percent of all distress calls received are false, but most are caused by unskilled personnel and careless handling, not malice. One Coast Guard station received 959 false calls in 1995.

New FCC Appointee

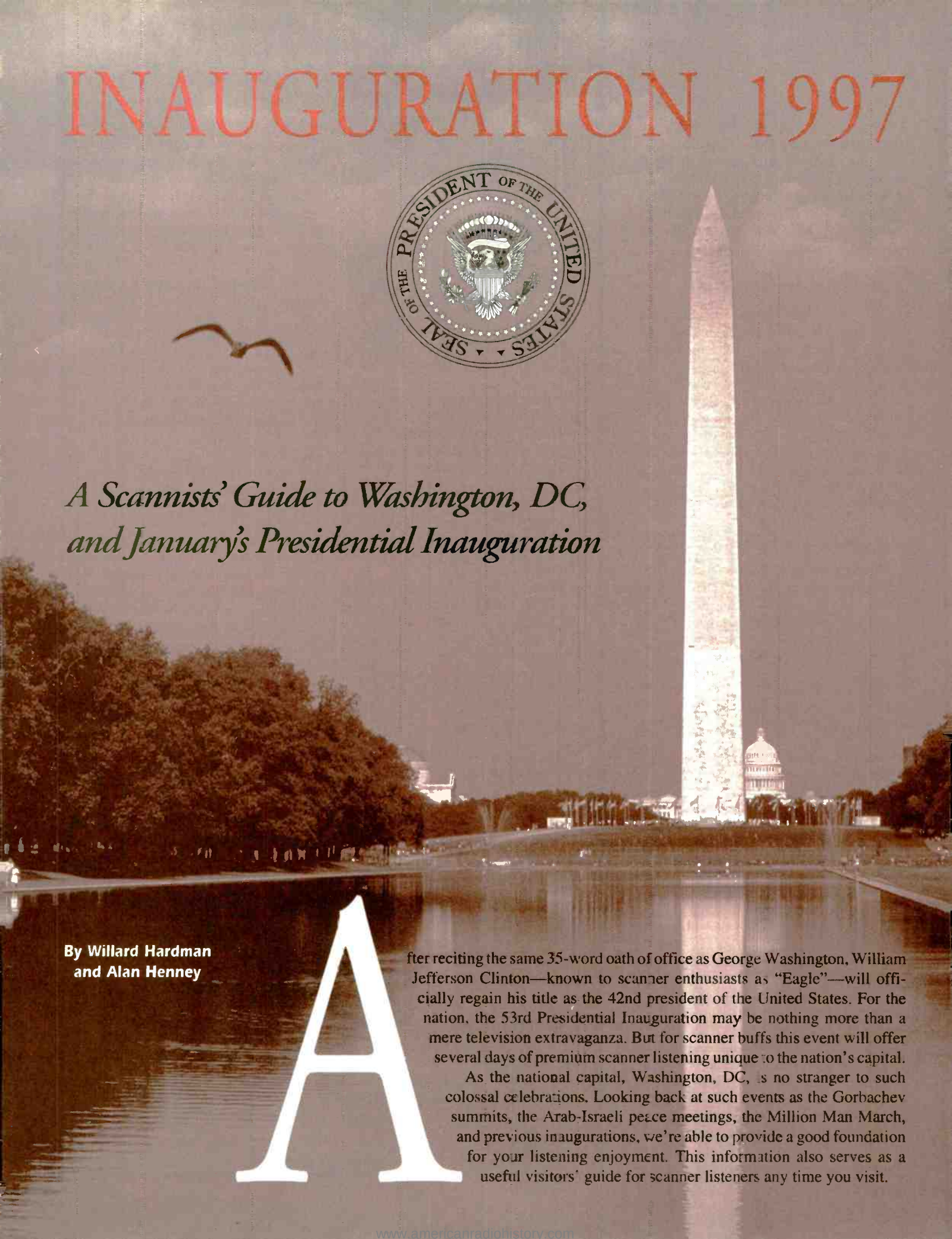
President Clinton has nominated lawyer Regina Keeney to a spot on the Federal Communications Commission. Keeney will replace Andrew Barrett, who left last April. Keeney is a Washington insider, previously holding positions as chief of the FCC's Common Carrier Bureau, chief of the FCC's Wireless Telecom Bureau, and as a lawyer for the Senate Commerce Committee.

"Communications" is written by Larry Miller with help from a whole team of people: our nationwide team reporters who look for, clip out, and send in suggested story topics. They're people just like you: Jim Allen, Columbia, SC; Mr. (or Mrs.) Anonymous; Harry Baughn, Brasstown, NC; Gerald Burns, Shreveport, LA; Brian Cathcart, Coconut Creek, FL; Glenn Finney; Norman Hill, Arlington, VA; Maryanne Kehoe, Atlanta, GA; Kevin John Klein, Appleton, WI; Jim Moodie, Portland, OR; Steven Odden, Highland, NY; Edward Schwartz, Chicago, IL; (Rev.) David Shearman, Blackstock, ON; Richard Sklar, Seattle, WA; and Phil Yasson, Vancouver, WA. Thanks to the regulars and welcome to the newcomers!

Then there's *Monitoring Times* editor Rachel Baughn who makes sure I don't get into too much trouble with what I say, Larry Van Horn who edits for accuracy, and John Bailey who creates the wonderful graphics that acompany this column. Without any one of you, this column would be a whole lot less fun.

Lest we forget, we also have consulted the following publications and we list their names in appreciation: *National Scanning, Radio World,* and the always interesting *W5YI Report.*

INAUGURATION 1997



A Scannists' Guide to Washington, DC, and January's Presidential Inauguration

By Willard Hardman and Alan Henney

After reciting the same 35-word oath of office as George Washington, William Jefferson Clinton—known to scanner enthusiasts as "Eagle"—will officially regain his title as the 42nd president of the United States. For the nation, the 53rd Presidential Inauguration may be nothing more than a mere television extravaganza. But for scanner buffs this event will offer several days of premium scanner listening unique to the nation's capital.

As the national capital, Washington, DC, is no stranger to such colossal celebrations. Looking back at such events as the Gorbachev summits, the Arab-Israeli peace meetings, the Million Man March, and previous inaugurations, we're able to provide a good foundation for your listening enjoyment. This information also serves as a useful visitors' guide for scanner listeners any time you visit.

We encourage you to take the next step and seek out additional frequencies we have yet to discover. Send us e-mail or write if you seek any last minute updates or questions. We also like to know what new frequencies you may have discovered. Coded squelch tones were omitted to conserve space. If you need any of that information, just let us know.

As overwhelming as it might be, if you're a scanner fanatic, you cannot beat scanning on the US Capitol grounds while a president takes the oath of office. Scanner enthusiasts generally have few problems carrying scanners onto US Capitol property, especially since nearly everyone these days has a cellphone or at least a pager.

If you haven't done so already, contact your Congressional representative and request inaugural passes (don't forget to request a 1997 "We, the People" calendar as well). Call the US Capitol operator at 202-224-3121 and ask for your representative. During the day of the oath, you might want to visit your representative's office and take advantage of any freebies he/she has to offer. Politicians who are up for re-election tend to be the most generous!

★ Federal Agencies ★

The presidential inauguration is a major production that involves nearly every federal agency. We have listed only the primary players because of space limitations. Explanations of their various roles are also limited.

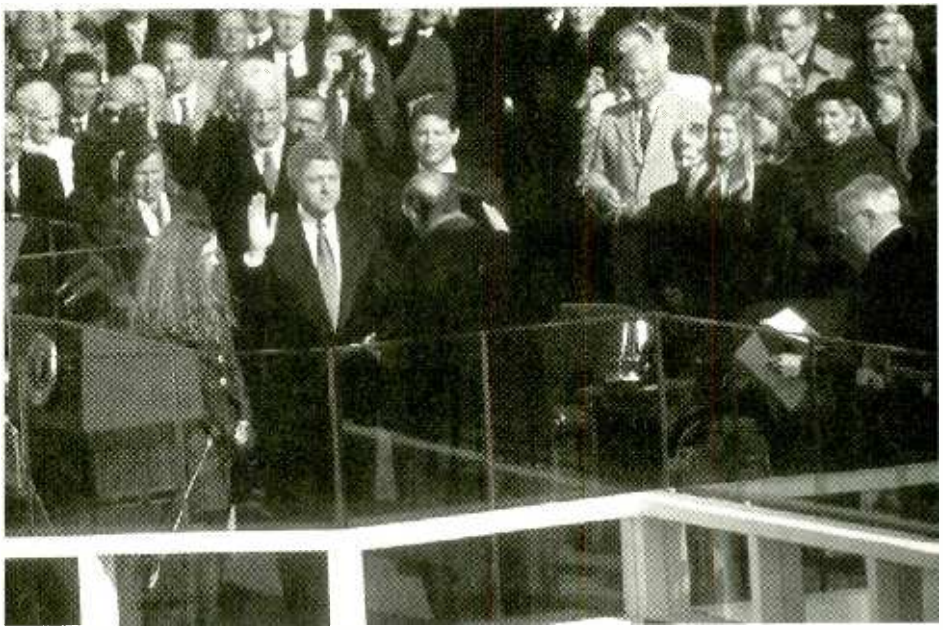
163.1, 168.35, 408.4, 418.05, 418.075, and 418.575 MHz are intermittent wide-area transient and common-use frequencies available for use on a shared basis by all US Government agencies. All six frequencies are used in Washington by multiple agencies, and are good candidates for scanning inaugural activities.

The following frequencies are the best known at this time. They are "subject to change without notice." This is particularly true of the Military District of Washington and other military frequencies, as various units arrive to augment local troop support.

US Capitol Police (USCPD)

Freq (MHz)	Mode*	Channel
169.2250	r/s	CH1 & CH6
165.5375	r/s	CH2 & CH7
170.1750	r/s	CH3 & CH8
162.2500	r/s	CH4 & CH9
162.6125	r/s	CH5 & CH10

Capitol Police channel usage varies from day to day. The department tends to use the first three channels for routine dispatch operations, and the last two are normally used by



William Jefferson Clinton takes the oath of office to become the 42nd president of the United States of America. (Photo by PH2 T. Witham, Armed Forces Inaugural Committee 1993)

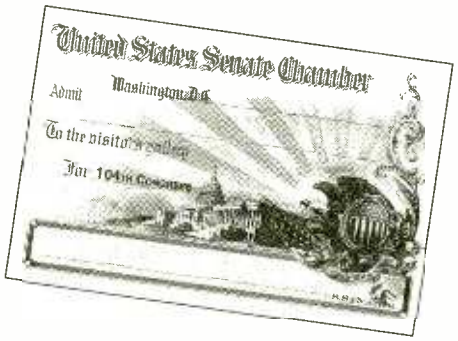
specialized units, command staff, and personal protection personnel. The Capitol Police equivalent of a SWAT unit is called CERT (Containment and Emergency Response Team). The department has a First Responder Unit (FRU) that responds to emergencies, and a Civil Disturbance Unit (CDU), both of which will be busy with inaugural events.

Capitol Hill Voice Pagers

169.5750	p	House Republican Pager
170.3750	p	House Democrat Pager
171.1750	p	Senate Democrat Pager
171.9750	p	Senate Republican Pager
406.6750	p	Senate Republican Pager
406.8000	p	Senate Democrat Pager
416.1500	p	Architect of the Capitol Pager

Other Capitol Hill Radio Users

414.8750	r/s	CH1 & CH2 Architect of the Capitol (r/in 409.175)
418.0750	s	Parking Enforcement
410.2000	r	Government Printing Office Security
408.1250	r/s	CH1 & CH2 Library of Congress Security
163.1000	r/s	CH1 Supreme Court Security
163.2750	r/s	CH2 Supreme Court Security



National Park Service (NPS)

The NPS is divided into 12 management units in the capital area. Only those directly involved in the inauguration are listed. Many of these frequencies, however, are shared, so you may hear traffic from other locations.

US Park Police (NPS)

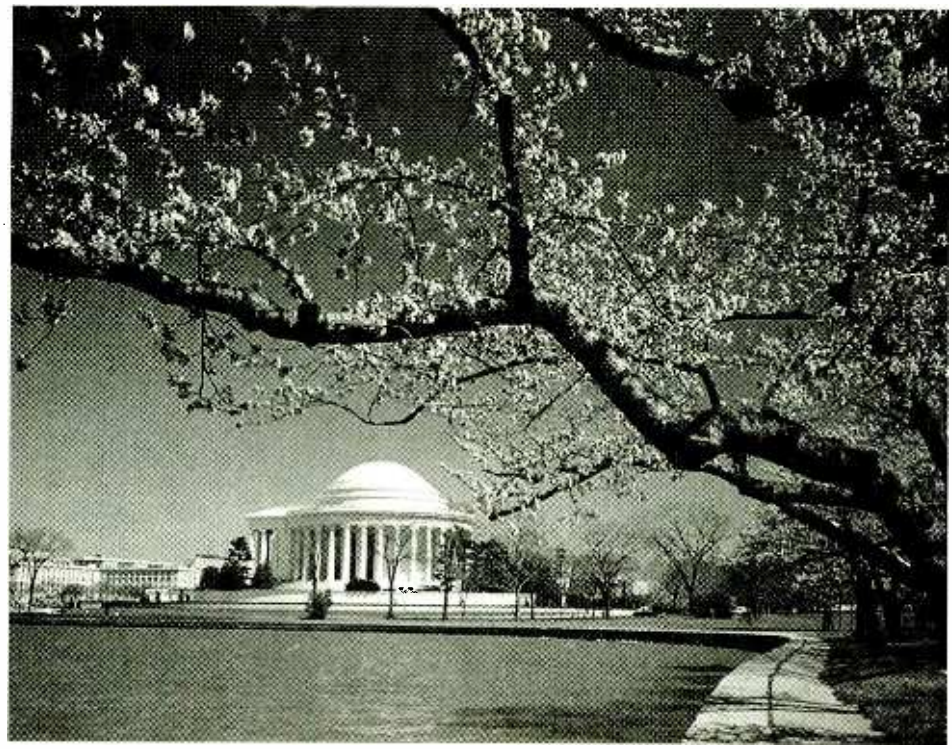
166.7250	r/s	CH1 & CH6 Secondary
166.9250	r/s	CH2 & CH7 Dispatch
167.0750	r/s	CH3 & CH8 Administrative
166.8500	s	CH4 Tactical

The old UHF system is officially no longer used. However, 411.625 and 411.725 could be activated. The other two frequencies will probably not be used for technical reasons.

National Park Operations - National Capital Area

168.4250	s/r	NPS-Parks East (Fort Washington)
172.4750	s/r	NPS-Parks Central/Rock Creek Park (includes National Mall)
172.7500	s/r	White House Maintenance Unit
171.6500	s	White House Visitor Control Ops
411.6750	r	White House Liaison
166.9500	s/r	C&O Canal Park Rangers
168.3000	s/r	GW & Clara Barton Parkways Maintenance
411.8250	s/r	Kennedy Center (Park Police)
461.3250	s/r	Kennedy Center (Contract Security)
464.8875	s	Kennedy Center (Staff)
464.775	s	National Building Museum (Pension Bldg)

C&O Park Rangers routinely operate on the Parkway maintenance channels (168.3).



US Park Police have often used 411.825 when providing traffic control and support during major affairs at the Kennedy Center. However, this frequency is now used by a government trunked system in the area.

Smithsonian Institution

150.2000	s	Personal Protection
169.0500	s	Motor Pool
169.2000	r/s	CH1 & CH2 Security
169.7250	s	National Zoo Security

National Gallery of Art

168.3500	r	Administration
406.5500	r	CH1 Security
408.0000	s	CH2 Security & Safety

US Marshals Service

163.2000	r/s	DC, Maryland & N. Virginia District Court Ops
163.8125	s	Tactical
162.7875	r/s	DC Superior Court Ops
162.7125	r/s	Special Ops

Channel numbers vary depending upon the radio. Other channels that could be assigned for use include 170.75, 170.8, 170.85, 170.875, and 170.925.

General Services Administration

163.0750	s	GSA HQ Administration
168.5750	s	GSA Region Building Maintenance
415.2000	r/s	CH1 & CH3 Federal Protective Service
417.2000	r/s	CH2 & CH4 Federal Protective Service
414.4750	r/s	CH5 & CH6 Federal Protective Service

FPS has additional frequencies that are used at specific sites. The above frequencies will be those most active and involved directly with the inauguration.

State Department (DOS)

The State Department, including its Washington Field Office (WFO), will be busy providing security to foreign official visitors, except heads of state, who are protected by the Secret Service.

DOS-Washington Field Office

418.4500	r/s	CH1 & CH2 Primary
411.1500	r/s	CH3 & CH4 Secondary

DOS-Protection Ops

411.4250	r/s	CH1 & CH2 Escort Ops
415.9000	r/s	CH3, CH5 & CH8 Escort Ops
417.8500	r/s	CH4 & CH7 Escort Ops
411.0750	s	CH6 Agent to Agent

Other DOS Nets

408.6000	s	Building Security
409.6250	s	Motor Pool (sedans)
164.1250	s	Motor Pool (general)
168.2250	s	Admin & Maintenance

Secret Service

165.7875	s	Baker
165.3750	s	Charlie
165.2125	s	Mike
164.8875	s	Oscar
164.4000	s	Papa
164.6500	s	Tango
165.6875	r/s	Washington Field Office
166.4625	s	Treasury Common

The Secret Service will be busy protecting past presidents and foreign heads of state. Much of the traffic will be encrypted. You may expect to hear the agents using additional frequencies. Try the White House Communications Agency channels listed in the military section first.

Uniformed Division, Secret Service (UDSS)

418.7750	s	CH1
418.3500	s	CH2
414.6750	r/s	CH3 & CH4
415.9750	r/s	CH5 & CH6
414.8500	r/s	CH7 & CH8
415.6500	r/s	CH9 & CH10
407.9250	s	K-9 Unit to Unit

The UDSS was created during the Nixon administration to provide external guard services for the White House and selected US and foreign facilities in the Washington area. The first two channels, which are mostly encrypted, are used by the White House Branch.

Selected Executive Branch/Congressional Security/Driver Details

162.6125	r/s	Speaker of the House & President Pro Tem of Senate (USCPD)
173.0250	r/s	Attorney General (FBI, also 170.625)
415.2250	r/s	Sec'y of Agriculture
414.6250	r/s	Sec'y of Commerce
413.4250	r/s	Sec'y of Health and Human Services
162.9000	r/s	Sec'y of Labor
411.4250	r/s	Sec'y of State (Diplomatic Scty Bureau)
171.3625	r/s	Sec'y of Transportation

Many of these frequencies will be encrypted. Not all cabinet departments have a security detail, and in some cases, a specially trained driver doubles as the security detail. Security for Supreme Court justices, when required, is provided by the US Marshals Service, usually using 162.7125. The Army CID provides security for the Secretary of Defense and most senior military figures as well. They use encryption on the Fort Belvoir trunked system listed below. The Secretary of Interior detail operates on the US Park Police channels listed with the Interior Department frequencies (above).

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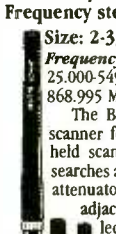

Size: 2-3/4" Wide x 1-1/2" Deep x 7-3/8" High
Frequency Coverage:
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The Bearcat 3000XLT is the ideal handheld radio scanner for communications professionals. This handheld scanner scans at 100 channels per second and searches at a rate up to 300 steps per second. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas. Selectable AM, Wide FM and Narrow FM modes allow you to change the default receiving mode of the BC3000XLT. For maximum scanning pleasure, order the following optional accessories: **UA502** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **LC3000** Deluxe swivel leather carrying case $34.95; **BP2500** rechargeable nickel-cadmium battery pack for up to five hours of dependable use $29.95; **ANTMMBNC** Magnetic mount scanner antenna with BNC jack and 12 feet of cable $29.95. **ANTSGBNC** Glass mount scanner antenna with BNC cable $29.95. The BC3000XLT comes with AC adapter, belt clip, flexible rubber antenna, earphone, owner's manual and limited one year Uniden warranty. Order today.

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500 Channels · 20 banks · Alpha numeric display
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High
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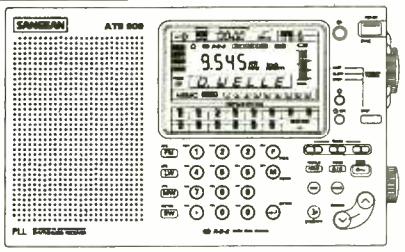
The Bearcat 9000XLT is superb for intercepting communications transmissions with features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. **Hi-Cut filter** to help eliminate unwanted static noise. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **BC005** CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and limited one year Uniden warranty.

Shortwave Radio



Sangean ATS909-Z Shortwave Receiver

Mfg. suggested list price $399.95/**Special $283.95**
Size: 8-1/4" Wide x 1-1/2" Deep x 5" High
Frequency Coverage: **LW: 153-513 KHz.; MW: 520-1710 KHz.; SW: 1711-29999 KHz.; FM: 87.5-108.0 MHz.**

Now...monitor the world on the most advanced shortwave receiver available from CEI. The Sangean ATS909 features 306 memories. Also features automatic tuning to automatically find all local stations with the push of a button, five tuning methods, eight character alphanumeric display, upper and lower single side band reception. Radio Data System (RDS) automatically shows station call letters on RDS equipped FM stations. RF Gain control, adjustable sleep timer, 42 world city times, dual time system, selectable manual tune steps, wide/narrow filter reduces adjacent station interference. Battery & Signal Strength indicator, 9KHz./10 KHz. switch. Lighted LCD Display, Lock Switch, separate audio recorder output & stand-by control jacks allows user to program tape recorder to turn on at three different times. Uses 4 AA batteries. When you order the ATS909 from us, you'll get a complete package deal including external AC adapter, portable antenna, carrying case and limited one year Sangean warranty.

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BC002 Bearcat CTCSS tone board for BC760/890XLT	Save $20.00
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BC005 Bearcat CTCSS tone board for Bearcat 9000XLT	Save $20.00
EX711 Bearcat scanner external speaker	Save $10.00
LC3000 swivel deluxe leather carrying case	Save $10.00
BP2500 Bearcat ni-cad battery pack for BC3000XLT	Save $10.00
MB001 Mobile mounting bracket for BC9000/890XLT	Save $10.00
ANTSGBNC glass mount antenna with BNC	Save $10.00
ANTMMBNC magnet mount antenna with BNC	Save $10.00
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Uniden GRANTXL SSB CB mobile	Save $10.00

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Cobra 29LTDWX-Z CB with weather alert	$114.95
Cobra HH40-Z CB 40 channel handheld transceiver	$79.95
Cobra 2010GTLWX-Z SSB CB Base (†$25.00 shipping)	$299.95
Maxon GMRS210+3-Z1 GMRS transceiver/SPECIAL	$161.95
Maxon MCB60AW-Z CB with weather alert	$92.95
Ranger RC12950-Z 25 watt 10 meter transceiver	$219.95
Uniden Washington-Z SSB Base (†$25.00 shipping)	$199.95
Uniden GRANTXL-Z SSB CB Mobile	$139.95
Uniden PRO538W-Z CB & Weather	$59.95

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Monitor fire, police, weather, marine, medical, aircraft and other transmissions with your Bearcat scanner.

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Bearcat 3000XLT-Z handheld	$333.95
Bearcat 890XLT-Z base/weather alert	$222.95
Bearcat 860XLT-Z 100 channel base	$141.95
Bearcat 760XLT-Z base/mobile	$182.95
Bearcat 560XLA-Z base/mobile	$72.95
Bearcat 220XLT-Z handheld/SPECIAL	$199.95
Bearcat 178XLT-Z base with weather alert	$119.95
Sportcat 150-Z handheld with 800 MHz.	$151.95
Bearcat 148XLT-Z base with weather alert	$83.95
Bearcat 120XLT-Z handheld	$119.95
Bearcat 80XLT-Z handheld with 800 MHz.	$134.95
Bearcat BCT7-Z information mobile	$152.95
Bearcat BCT10-Z information mobile	$139.95

Digital voice logger

Why miss any radio or telephone transmissions when you can record everything with an affordable Eventide brand digital communications logger? You get powerful performance with a single DDS-2 DAT drive that records more than 500 channel hours of storage. When you want to record trunking systems, for even more recording time, the Eventide VR240 Mark III logger gives you over two months of unattended recordings on up to 24 channels when ordered with *dual* 8 mm. high density CT tape drives. All systems include 60 channel hours (250 & 500 hours optional) of instant recall. Ideal for quickly replaying emergency calls or radio traffic. FCC approved telephone interface is built-in and beeps are selectable on a channel-by-channel basis. Other options include GPS time sync.

VR204DAT4 4 channel, single DAT drive, 500+ channel hours	$7,395.95
VR240DAT8 8 channel, single DAT drive, 500+ channel hours	$12,295.95
VR240DAT16 16 channel, single DAT drive, 500+ channel hours	$14,490.95
VR240DAT24 24 channel, single DAT drive, 500+ channel hours	$16,685.95
VR2408MM8 8 channel, single 8 mm. drive, 875+ channel hours	$15,595.95
VR2408MM16 16 channel single 8 mm. drive, 875+ channel hours	$17,790.95
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Option-ECW40, satellite chronometer GPS for external time sync.	$1,895.95
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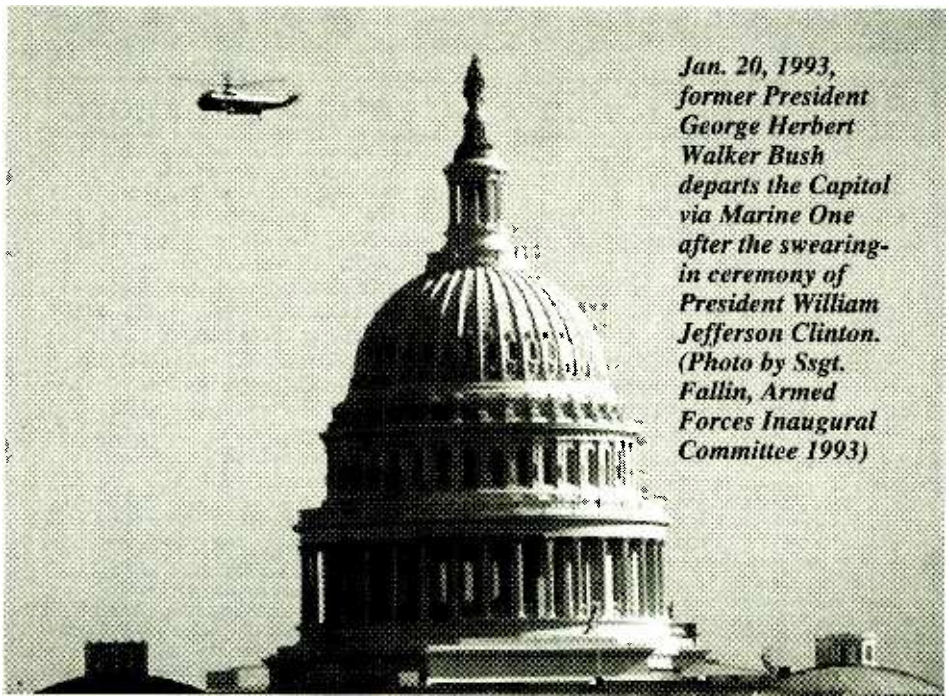


Jan. 20, 1993, former President George Herbert Walker Bush departs the Capitol via Marine One after the swearing-in ceremony of President William Jefferson Clinton. (Photo by Ssgt. Fallin, Armed Forces Inaugural Committee 1993)

★ Military Agencies ★

White House Communications Agency (WHCA)

32.2300	s	Alpha
169.9250	s	Delta
407.8500	d	Echo, Air Force 1 & 2 Uplink
415.7000	d	Foxtrot, Air Force 1 & 2 Downlink
167.9000	s	Hotel, White House Motor Pool
166.7000	s	November
166.5125	s	Sierra
167.0250	p	Whiskey
162.6875	d	Yankee, Phone Patch (base)
171.2875	d	Zulu, Phone Patch (mobile)
375.0000	s	Helipad Comms

WHCA personnel routinely use Secret Service channels. Other frequencies may be added as required. WHCA also makes use of frequencies outside the range of most scanners. Administrative operations are on the Fort Belvoir trunked system listed below.

Military District of Washington (MDW)

The Army's MDW has overall responsibility for the coordination and operation of Defense Department participation in government ceremonies in the capital area. MDW will be busy in almost every aspect of the ceremonies from security to transportation to logistical support.

The MDW formed a joint task force in January 1996 to begin planning for the inauguration. The task force will expand to encompass several thousand personnel from all five branches of the armed forces. At the time of this writing, the communications plan is not available. The frequency plan for the last inauguration is included below. It may or may not be valid, in whole or part. There is a high degree of likelihood that one or more of the area military trunked systems—Belvoir and Andrews in particular—may be used.

The command, operations, and logistics nets of the MDW (known as "State Sword") will undoubtedly be in use. The routine frequencies used by the various installations are not usually used in support of special events, except for units with a specific executive support mission such as Marine Executive Squadron 1 (HMX-1). "TMP" stands for transportation motor-pool.

Military District of Washington

139.0750	r/s	State Sword-Transportation Net
139.1750	r/s	State Sword-Operations Net
139.3500	s	State Sword-Public Affairs Net
139.1000	r/s	State Sword-Ceremonies & Spl Events Net
139.0500	r/s	State Sword-Logistics Net
32.8700	d	TMP-Dispatch Base Military Taxis
32.5300	d	TMP-Mobiles Military Taxis
36.9100	s	TMP-Support Bus Dispatch
407.5250	r/s	TMP-VIP Sedans
143.1750	r/s	3rd Infantry-Ceremonies & Spl Events Net
143.0000	s	3rd Infantry Support Net
148.5500	s	3rd Infantry Ceremonial Spl Events Net

1993 Inauguration Frequency Use

138.3250	r/s	Command Net
149.7750	r/s	Public Affairs Net
148.7000	r/s	Special Events Operations
149.2750	r/s	VIP Escort Net 1
150.4250	r/s	VIP Escort Net 2
143.8750	r/s	Capitol Control Net
142.3250	s	Capitol Ushers
143.3750	r/s	Parade Control
148.8750	r/s	Parade Route Control Net
141.9250	s	Parade Dispersal Net
149.1250	r/s	Logistics Net
149.8750	r/s	Rapid Trans. Net 1
142.4000	r/s	Rapid Trans. Net 2
148.5500	r/s	Executive Trans. Net 1
142.4750	r/s	Executive Trans. Net 2
142.4500	r/s	Executive Trans. Net 3
148.3750	r/s	Transportation Support Net

Fort Belvoir Trunked System

406.2000	406.3000	406.7750
407.0250	408.8500	411.2000
406.5250*	407.9500*	409.2500*

* *Control channels: others are currently voice only*

Andrews AFB Trunked System

406.3500	Control/Voice
406.9500	Control/Voice
407.1500	Control/Voice
407.4250	Control/Voice
408.0250	Voice
408.2000	Voice
408.7500	Voice
408.9500	Voice
409.3500	Phone Patch
409.7250	Phone Patch

Andrews Command Post Operations

118.4000	Tower
289.6000	Tower
122.8500	Pilot to Dispatch
372.2000	Pilot to Dispatch
141.5500 AM	Command Post & Wing Op.
378.1000	Command Post & Wing Op.
344.6000	Metro

1st Helicopter Squadron (89th Air Wing) ("Muscle")

141.7000 AM	Squadron Operations
292.2000	Squadron Operations
297.5000	Air to Air
163.5125	Maintenance and Operations

USMC Executive Flight Squadron, HMX-1 ("Nighthawk; Marine 1 & 2")

265.8000	Squadron Common (Quantico)
276.4000	Squadron Operations
273.9500	Squadron Operations
320.4000	Squadron Maintenance (Quantico)

★ Local Government ★

Numerous agencies are involved in staging this every-four-year extravaganza. Although it is a federal function, local government becomes heavily involved as well. Of primary concern to the District government will be crowd control, general law enforcement, providing fire and EMS services, creating a more positive city image by keeping homeless and prostitutes off the streets, and assisting federal authorities with the protection and movement of US and foreign dignitaries.

The District's public works crews will be involved in cleaning streets, facilitating VIP movements, blocking roads, and assisting the National Park Service and the Architect of the Capitol. The following public safety frequencies have proven to be the most active during past events.

DC Mayor's Command Center

45.6000	s	CH1 Primary
45.5600	s	CH2 Secondary
464.3500	r	Hypothermia Vans

DC Fire & EMS

154.1900	r/s	CH1 & CH5 Dispatch
154.2350	s	CH2 EMS Coordination
154.2800	s	CH3 Fire Mutual Aid 2
154.2050	s	CH4 Fireground
154.2950	s	Fire Mutual Aid 1
463.1250	d	EMS Med 6 (468.125 mobile)
852.6125	r	CH1 EMS Dispatch "1A"
852.6375	r	CH2 EMS Post-Dispatch Ops "2A"
852.6875	r	CH3 EMS Supervisors
852.7375	r	CH4 EMS Hospital Patch
852.7875	s	EMS Supervisors Tactical

EMS and fire apparatus from area jurisdictions will likely assist the District with inaugural activities using DC fire and their own frequencies. The fire mutual aid channel, 154.28, is often used during such special events for coordination. Listen for command post activity on 154.205, 154.28, 852.6875, and perhaps 852.7375. On the day of the inauguration, the hazard materials and foam trucks will likely stage on (or near) the Mall for rapid response and will probably communicate on one of the alternate channels.

Metropolitan Police Department (MPD)

158.7900	r	CH1 Support Services
158.8500	r/s	CH2 & CH3 CID
155.3100	s	CH4 Surveillance 4
155.4150	s	CH5 Surveillance 5
154.8900	s	CH6 Surveillance 6
453.5500	r	Police Mutual Aid
460.3500	r	1st District "A1"
460.2500	r	2nd District "A2"
460.1000	r/s	NW Tactical
460.4000	r/s	SE Tactical
460.4500	r	Tactical & Station Ch "A8"
460.4250	r	Command Channel
460.2750	r	Special Operations Div "A11"
465.0000	s	SOD Tactical "D11"
460.3250	r	Citywide 1 "A12"

Most federal, state, and local law enforcement agencies listed in this article have access to 453.55, the police mutual aid radio system.

460.1, 460.275, 460.325, 460.4, and 460.45 MHz, which are routinely used as tactical and citywide channels, will be reassigned to various details and elements as required, including MPD's Civil Disturbance Units (CDU), Traffic Division, vending, prisoner control, and Special Operations Division (SOD) officers, and the Command and Information Center (CIC). Officers from MPD's Intelligence Division (a "must" to monitor), operate on 158.79 (funding permitting) and identify as cruisers (or radios) in the 170 and 560 series. Officers assigned to prostitution patrols will probably operate on 158.85. The VHF surveillance channels are alternates for 158.79 and 158.85.

While scanning MPD, you'll want to keep an ear open for the 600-series SOD cruisers—especially for 670 through 674, which are bomb technicians—and for the command bus, Cruiser 675. Cruisers in the 400's are assigned to Traffic Division; 300's are Criminal Investigations Division (CID). "Roadrunner" refers to a motorcade.

Channel plans for MPD's UHF frequencies vary depending upon the radio. Frequencies for only two of the seven MPD police districts are listed, since most inaugural sites and visitor locations are within the 1st and 2nd districts.

DC Public Works

37.1000	s	Fleet Mngt/Inspectors/Str Cleaning
37.9400	s	Construction/Repair
453.4500	r	CH1 Signal Shop/Snow Room
453.7500	r	CH2 Bridges/Streets/Trees
453.8750	r	CH3 Motor Pool/Parking Enfo-Booters
495.4625	r	CH1 Parking Enforcement-Tickets
495.4375	r	CH2 Parking Enforcement-Towing

Armory Board (RFK Stadium & Armory)

153.9800	s	
453.5250	s	DC Protective Service
464.3750	r	CH1
464.6750	s	CH2
852.6625	s	DC Fire & EMS Detail

Washington Convention Center

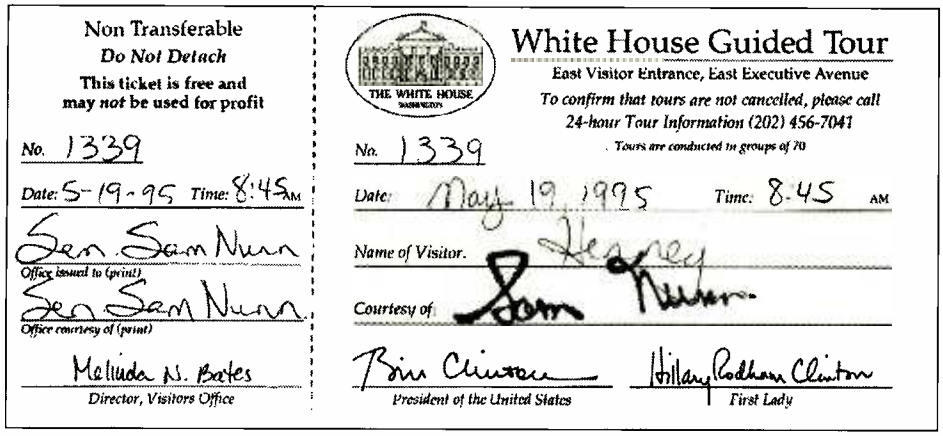
453.1125	r	CH1 Security, Primary
453.9125	r	CH2 Security
469.4250	s	Catering
469.9250	s	Catering

Washington Metropolitan Area Transit Authority

161.3850	r/s	CH1 & CH2 Metrobus/rail Police
496.6125	r	CH7 Bus Supervisors/ Maintenance
496.4375	r	CH8 Bus Supervisors (detours)
496.3375	r	CH9 Bus Special Use

Amtrak and Union Station

160.2900	r	CH1 Yardmaster
160.3500	r	CH2 Train Maintenance
160.4400	r	CH3 Station Ops



Non Transferable
Do Not Detach
This ticket is free and may *not* be used for profit

No. 1339
Date: 5-19-95 Time: 8:45 AM
Sen Sam Nunn
Office issued to (print)
Sen Sam Nunn
Office courtesy of (print)
Melinda N. Bates
Director, Visitors Office

THE WHITE HOUSE WASHINGTON

White House Guided Tour
East Visitor Entrance, East Executive Avenue
To confirm that tours are not cancelled, please call 24-hour Tour Information (202) 456-7041
Tours are conducted in groups of 70

No. 1339
Date: May 19, 1995 Time: 8:45 AM
Name of Visitor. Hegney
Courtesy of Sam Nunn
Bill Clinton
President of the United States
Hillary Rodham Clinton
First Lady

161.2950	r	Amtrak Police
452.9000	s	Terminal Services

Also see Union Station Shops listings, below.

Public Safety Aircraft

122.7500	s	Air to Air

Police Department (Condor and Juno), US Park Police (Eagle), and Maryland State Police (Trooper) often exchange information over 122.75 along with traffic planes. Through their respective dispatchers the helicopters request "P-56 clearance" from the Secret Service when entering the restricted airspace over the Mall, US Capitol, and White House.

Prince George's County, MD

494.7875	r/s	CH3 & CH5 South Fireground
94.9375	r/s	CH7A & B South Police Tactical

Prince George's County will likely have more involvement than other jurisdictions, mainly because of escorts to/from Andrews Air Force Base and perhaps an inaugural detail at the USAir Arena.

★ News Media ★

During the 1993 inauguration, the FCC allowed the local media frequency coordinator to temporarily assign frequencies from an unused UHF TV channel to broadcast users. Frequencies assigned were from the range allocated for TV channel 15 (477-482 MHz). Other bands to check for temporary users include channel 16 (482-488 MHz) and 19 (500-506 MHz).

IFB (interruptable feed-back or fold-back) channels are used to relay broadcast audio to crews in the field. The feed can be interrupted by the director to provide instructions and cues. Channels used by engineering crews (electronic news gathering) channels are listed as ENG.

Television Networks

450.4125s		ABC IFB
455.0875	s	ABC CH1 Desk
455.5875	s	ABC CH2 ENG
450.5875	s	ABC CH3 Couriers
450.1500	s	CBS CH1 Alternate
450.4875	s	CBS CH2 Production
450.0500	s	CBS CH3 ENG
450.2875	s	CBS CH4 Desk
450.8000	d	CBS CH5 IFB & CBS Radio
450.5125	r	CBS CH6 ENG
450.6125	s	CBS CH7 IFB
161.6700	s	NBC Desk
450.5500	s	NBC CH2 IFB
455.8500	s	NBC CH4 IFB

Radio Networks

455.3500	s	ABC CH1 Primary
450.8500	s	ABC CH2 Alternate
455.7000	s	ABC CH3 Remotes
450.6500	s	ABC CH4 Remotes
455.4500	s	AP Radio Desk
450.8000	s	AP Radio Remotes
450.4875	r/s	NPR Radio CH1 & CH2 ENG/Master Control
450.4500	r/s	NPR Radio CH3 & CH4 IFB/ ENG
450.6500	r/s	NPR Radio CH5 & CH6 IFB/ ENG
161.6400	s	Westwood One Desk
450.3125	s	Westwood One CH1 IFB
455.4125	s	Westwood One CH2 Primary
450.9500	s	Westwood One Remotes
455.9500	s	Westwood One Remotes
164.7000	s	VOA Two-Way
416.3125	s	VOA IFB & Two-Way
416.3375	s	VOA IFB
416.3625	s	VOA IFB
416.6125	s	VOA IFB & Two-Way
418.0500	s	VOA Remotes
418.5750	s	VOA Remotes

Cable and Satellite News Gathers (SNG)

450.1875	r/s	CNN CH1 & CH2 ENG
450.8875	r/s	CNN CH3 & CH4 Desk
450.5625	r	C-SPAN Field Base
463.5000	r	C-SPAN Base
455.2875	s	ConUS SNG

During past events CNN imported radios on 450.3, 450.3375, 450.675, 450.775, and 450.825 from its other bureaus. 452.975 and 453.0 were frequencies formerly used by CNN's Washington bureau.

Print Media

463.5000	r	Newsweek
452.9750	r/s	Time CH1 & CH2
464.5250	r	US News & World Report CH1
464.5500	r	US News & World Report CH2
852.5125	r	Washington Post CH1

Local TV Stations

455.5500	s	WJLA CH1 Desk
455.1125	s	WJLA CH2 ENG
153.0500	s	WRC Desk
450.4500	s	WRC CH1 ENG
455.1500	s	WRC CH3 IFB
161.7300	s	WTTG CH1 Desk
161.7600	s	WTTG CH2 Alternate
450.7500	s	WUSA CH1 ENG
450.2125	s	WUSA CH2 Desk
450.0875	s	WUSA CH3 Desk/ Encryption
450.5125	s	WUSA CH4 Alternate

Local Radio Stations

455.9125	r/s	Metro Traffic Control
450.2375	s	Shadow Broadcast Services
455.2125	s	WMAL Reporters
450.3500	s	WTOP Desk "A5"
455.6500	s	WTOP Remotes "D4"
455.0500	r	WWRC CH1 ENG
455.7500	s	WWRC CH2 IFB

★ Inaugural Sites ★

City, federal, and lodging facilities are listed elsewhere.

Corcoran Gallery of Art
469.825s

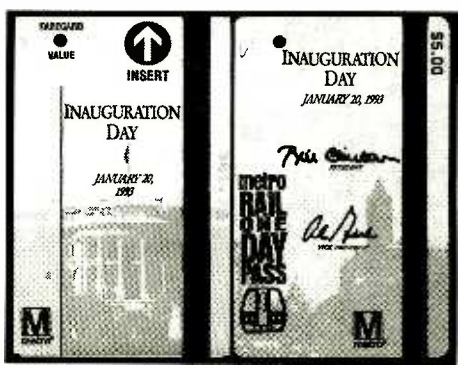
DAR Constitution Hall
464/469.025, 464/469.475

Folger Shakespeare Library
461.0625s

Georgetown Park Associates
463.95r Security

National Museum of Women in the Arts
463.3s

National Press Building
463.2r Security, 463.275s Engineering,



463.9r National Place; 461/466.9375 (1301 Assoc); 463.275s, 463.3r, and 463/468.6875 (Carr Square 254); 464.325s, 464.625s, 464.675r, 464.725s, and 469.525s (Prentiss Properties) (also see J.W. Marriott listings)

National Shrine of the Immaculate Conception

151.835s

Old Post Office Pavilion

464.525s Security

Techworld Plaza

464.425r, 464/469.475, 464.925r

Union Station Shops

464.525r CH1 Housekeeping, 464.575r CH2 Security, 464.775r CH3 Engineering, 464.825s, 464.875s Housekeeping, 464.925s; 469.425s and 469.925s (Columbus Club); 464.7375s (Dimension System II) (also see Amtrak listings)

USArena

151.895s Management; 151.685s and 151.865s (Ogden Allied Services); 159.270r/s CH3 & CH4 MD Park Police

Warner Theatre

461.3875s, 463.8875s, 464.2875s, 464.7625s, 464.775s, 464.875s, 464.925s, 464.975s

Washington National Cathedral

154.6s, 463.225r Security, 464.525s

★ Lodging ★ I

Hotels with average nightly rates of more than $100 are marked with a star.*

***ANA Hotel, Washington, DC** **

463.65r, 464.8r

Bellevue Hotel

154.6s

***Capital Hilton** **

151.775s, 464/469.6, 464/469.975

***Carlton** **

464.575s

Center City Travelodge Hotel

151.715s

Corporate Suites of Washington

151.805s, 464.5s

Days Inn of America

466.5125s

***Doubletree Guest Suites - New Hampshire Avenue** **

464.425s

Doubletree Hotel Park Terrace

464.7s

***Embassy Row Hotel** **

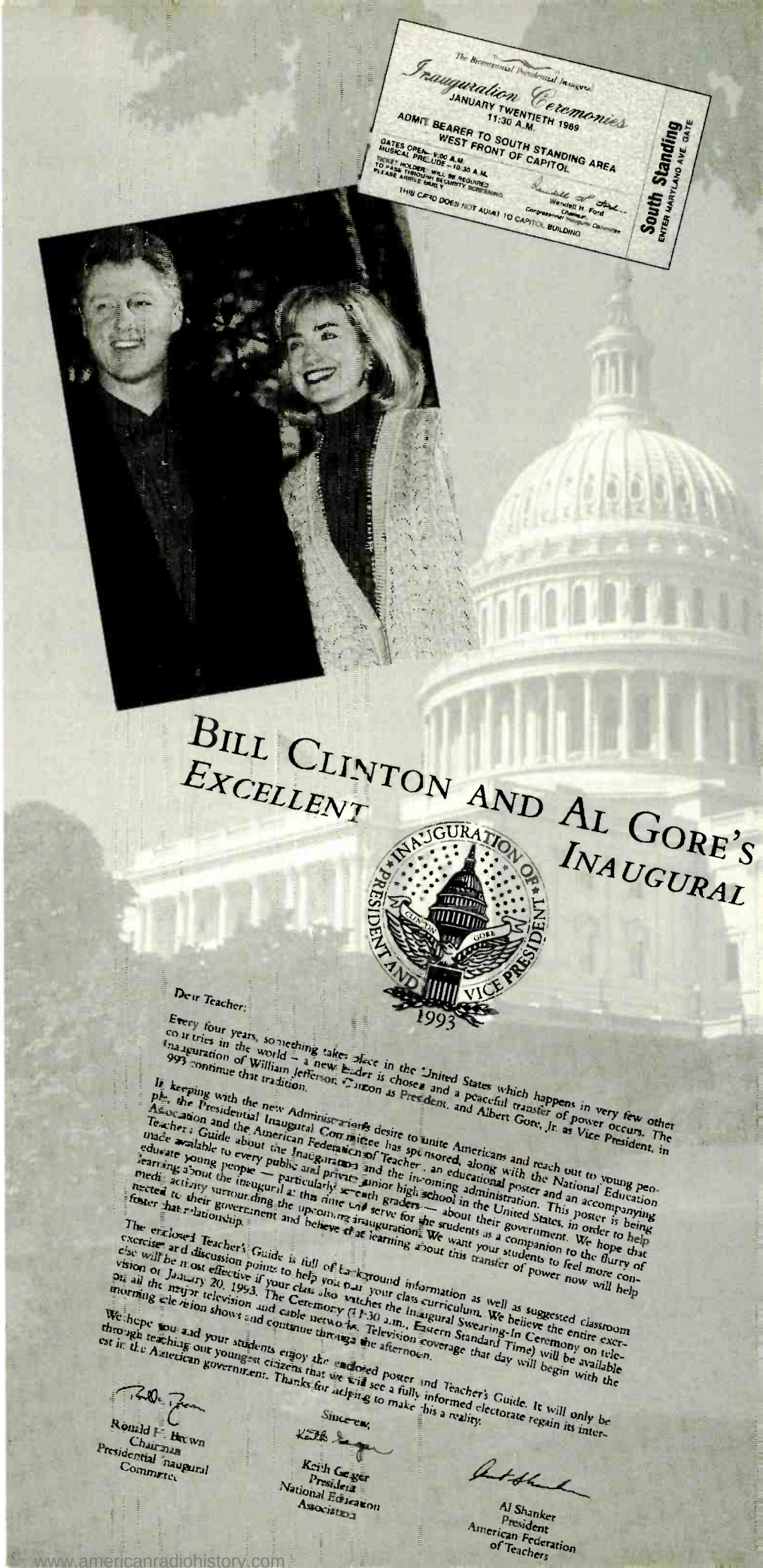
151.835, 462.8p, 463.5625s

***Embassy Square, A Summerfield Suites Hotel** **

463/468.6125, 465.0p

***Embassy Suites Hotel - Downtown** **

463.3625s, 463.9875s



***Four Seasons Hotel** **
151.895s, 152.48p
Georgetown University Conference Center
464.125r, 464.575s
***Grand Hyatt Washington** **
461.725r, 464.475r, 464.825s, 464.925r
***Hay-Adams Hotel** **
151.745s, 465.0p
Holiday Inn Capitol
464.575s, 852.0625r
Holiday Inn Georgetown
151.625s, 461.925s, 463.65r, 464.375s
Holiday Inn on the Hill
464.475s
Howard Johnson Premier Hotel
464.525s
***Hyatt Regency Washington** **
464.375s
***J.W. Marriott** **
461.575r, 461/466.6375s, 462.75p, 463.375r, 463/468.4125s, 464.375r, 464/469.6625, 464/469.9875s, 468.3375s, 469.4875s, 929.1125p (also see National Press Building listings)
Lincoln Suites Downtown
462.9p
***Loews L'Enfant Plaza Hotel** **
464.5r, 464.675r, 464.875r
***Madison** **
151.775s, 151.805s, 462.875p
Master Host Inn
464.575s
Omni Shoreham Hotel
151.955s, 464.775r, 464.825r
***Park Hyatt Washington** **
461/466.9125, 462.925p, 464.875r
Radisson Barcelo Hotel
464.525s
Ramada Plaza Hotel
151.655s
***Renaissance Mayflower Hotel** **
151.835s, 464/469.075, 464.525s, 464.775r
***Renaissance Washington, DC Hotel** **
157.74p, 464/469.325, 464/469.775, 469.2875s (also see Techworld Plaza, above)
Saint James Suites
463.2375s
Sheraton City Centre Hotel
461.1s, 461.2s, 467.7625s
Sheraton Washington
151.775s, 151.835s, 154.6s, 462.8125s, 463.5375s, 464.575s, 464.7375s, 467.875s
***Washington Court Hotel** **
463.35s, 464.425r
***Washington Hilton and Towers** **
151.715s, 464.325r, 464.375r, 464/469.5125
***Washington Marriott** **
461/466.0875, 464.325r, 464.675r, 465.0p
***Washington Marriott-Metro Center** **
461.2375s, 463.6375s, 464.5375s, 466.6875s
***Washington Vista Hotel** **
462.8p, 464.425s, 464.825s
***Watergate Hotel** **
462.825p, 463.425r, 464.375r
***Westin** **
462.875p, 464.525s
***Willard Inter-Continental** **
464.875r (Carr Square 225), 464.975r
Wyndham Bristol Hotel
464/469.175

★ Trunked, Common Low-Power, and Itinerant Allocations ★

During the last inauguration, staffers from the Presidential Inaugural Committee (PIC) communicated on a leased 20-channel Motorola 900 MHz trunked system. This system has also been used by similar groups visiting Washington. Frequencies are: 935.5125, 935.525, 935.5375, 935.55, 935.5625, 935.575, 935.5875, 935.6, 935.6125, 935.625, 936.7625, 936.775, 936.7875, 936.8, 936.8125, 936.825, 936.8375, 936.85, 936.8625, and 936.875 MHz.

The common low-power and itinerant frequencies will buzz with groups coordinating various events. Pay special attention to any temporary repeaters erected on 464.5 and 464.55.

151.6250	Red (R)
151.9550	Purple (P)
154.5700	Blue (B)
154.6000	Green (G)
462.5750	White (W)
462.6250	Black (BL)
462.6750	Orange (O)
464.5000	Brown (BR)
464.5500	Yellow (Y)
467.7625	N/A (J)
467.8125	N/A (K)
467.8500	Silver Star
467.8750	Gold Star
467.9000	Red Star
467.9250	Blue Star

★ Visitor Information ★

Based on 30,000 responses to the *Conde Nast Traveler* 1995 Reader's Choice Awards, Washington, DC, was selected as one of the top 10 US destinations and one of the world's top 10 cultural destinations. Four of the top 25 US hotels are in Washington, DC.

Each of the following organizations provide brochures and other visitor information. Also call your Congressional representative, 202- 224-3121, and ask for a copy of the *Welcome to Washington* guide and for US Capitol and White House tour passes.

Accommodations 1-800-554-2220
Chamber of Commerce 202-347-7201
Committee to Promote Washington 1-800-422-8644 (info), 202-724-5644 (free DC wall maps)
Convention & Visitors Association 202-789-7000, **http://www.washington.org**

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1) Channel modes: "r" for repeater, "s" for simplex, "d" for duplex, and "p" for pager

2) Dr. Willard Hardman (7149 Lake Cove Drive, Alexandria, VA 22315; hardman1@ix.netcom.com) and Alan Henney (6912 Prince George's Avenue, Takoma Park, MD 20912; henny@gwis2.circ.gwu.edu) are the co-authors of the *Washington-Baltimore Scanner Almanac* and edit the *Capitol Hill Monitors* Newsletter.

Smaller gifts are sometimes harder to find than the larger, more expensive ones. Here are some unique suggestions from the Grove on-line and printed Catalogs:

Stocking Stuffers

Sub-Compact Extension Speaker

Measuring just 3-1/4" in diameter, this tiny extension speaker with its black textured styling and chrome accents is ideally suited for mobile mounting. A swivel base allows proper positioning, while its 7' extension cable with standard 1/8" (3.5 mm) miniplug extends your listening area.

SPK-14 $4.95 Plus $3 shipping

New! Pillow Speaker

When room-filling sound is out of the question, and earphones are uncomfortable, a good pillow speaker is the answer! Its six-foot cord with 1/8" (3.5 mm) miniplug fits cassette recorders, many scanners and shortwave radios, and more. Includes convenient volume control.

SPK-8 $5.95 Plus $5 shipping

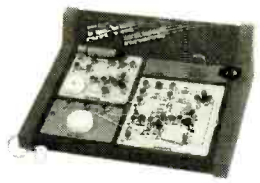
Accessories: ADP-29 3/32" (2.5 mm) microplug adaptor

Radio Kits for Experimenters!

Introduce a youngster (ages 8 to 80) to the world of radio with a shortwave, VHF, or crystal receiver kit

New!

Always wanted to make your own radio? Is there a young person in your family, neighborhood, or school who would enjoy learning about radio? Here's an excellent opportunity to assemble a working radio with little or no experience, and no soldering required! The shortwave model covers 6-8 and 12-17 MHz, while the AM/VHF model covers the 520-1620 kHz medium wave broadcast band and the 108-174 MHz aircraft and public service high band. Both models include an earphone and full instructions; a 9-volt battery is required.



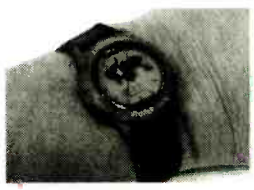
When radio was born, no batteries were required for receivers. Listeners used crystal sets, simple radios built around a crystal of galena—lead ore—to detect signals. Now you can return to those simpler times with this entry-level kit which uses a high-efficiency crystal diode for improved sensitivity. Earphone included, no battery required.

KIT-10 SW model $12.95
KIT-11 VHF/AM model $12.95
KIT-12 Crystal set $6.95
Add $6 shipping for KIT-10 and KIT-11. Add $5 for KIT 12

Accessories:
BAT-4 9 volt alkaline battery $2.25 (BAT-4 for Kits 10 and 11)
ANT-17 25' wire antenna $2.95 (for all kits above)

New! Casio Data Bank/World Time Watch

This sleek, black and grey, water resistant wristwatch combines 12/24 hour digital and analog clock readouts of local and worldwide time, stopwatch accuracy of 1/100th second, daily and hourly alarm, automatic calendar, and 20 page memory storage of names and phone numbers.



CLK-6 $44.95 Plus $5 shipping

Suspenders Support Radios Worn on Belts

Our new line of Perry Suspenders features a revolutionary belt stud that loops under the belt and won't come off like clips or buttons. Colors include red, tan, and black (available in 1-1/2" and 2" wide versions); rainbow colored (2" wide only); and camouflage (light and dark versions, 2" wide only). See our complete line on the Internet at: **http://www.grove.net/~ioi.** Please add $7.25 each for UPS 2nd Day Shipping or $3.00 each for First Class Mail.

New!

2" Red SUS 2.0R	$12.95
2" Tan SUS 2.0T	$12.95
2" Black SUS 2.0B	$12.95
2" Rainbow SUS 2.0RB	$12.95
1-1/2" Red SUS 1.5R	$11.95
1-1/2" Tan SUS 1.5T	$11.95
1-1/2" Black SUS 1.5 B	$11.95
2" Camouflage Style 1 (light) SUS 2.0C1	$13.95
2" Camouflage Style 2 (dark) SUS 2.0C2	$13.95

GROVE

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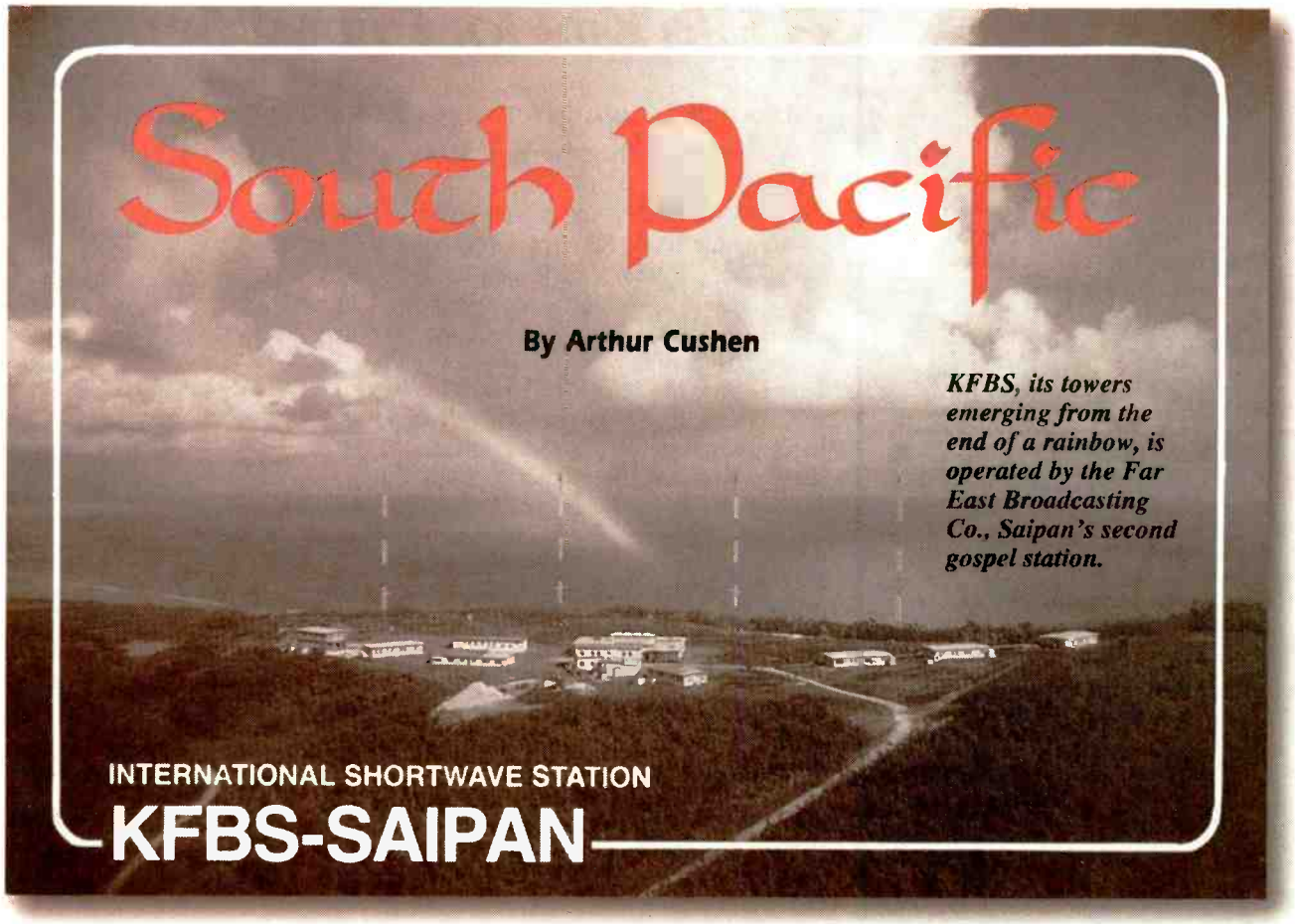
Tracking 50 Years of Broadcasting History in the ...



KFBS, its towers emerging from the end of a rainbow, is operated by the Far East Broadcasting Co., Saipan's second gospel station.

This is a unique account. Arthur Cushen, from his listening location in Invercargill, New Zealand, has been an "ear-witness" to the development of broadcasting in the South Pacific over some fifty years. The following information does not come from a book, but from his own files of verifications and loggings.

Arthur Cushen notes that on many islands, the first "wireless transmission" ever received was through an amateur radio operator, the American Armed Forces Radio Service, or a private business enterprise. And on many of those occasions, Arthur Cushen was there—catching history on his radio.

Cook Islands:

Broadcasting to the islands of the South Pacific was introduced in various ways. In the case of the Cook Islands, it was an educational radio station that set up the interest in broadcasting.

During 1954 a station commenced operating when the New Zealand Government gave a gift of post and telegraphic transmitters, plus the technical staff to set up an educational radio station from Rarotonga. The broadcasts were on an hourly basis on Wednesdays and Fridays from 2300-2400 UTC. On July 22 an entertainment transmission was added.

The station used various frequencies including 3390, 5050, and later 6180 kHz. It was on May 1, 1957, that a frequency change from 5050 to 4965 kHz was made and the broadcast was on the air on Thursdays at 0230 UTC. The transmitter was used for telegraphic communication at other times. The New Zealand Government was pressed for a commitment to extend the operating hours but they were reluctant to do so; alternatively, it was suggested that a radio amateur who had a commercial license could take over the service.

Initial broadcasts of the Cook Islands Broadcasting Service were heard on ZK1ZA Rarotonga operating on 4965 kHz on May 29,

ZKIZA was the first Cook Island radio station broadcast for educational purposes.

1957, using a power of 350 watts. In the same year the Cook Islands Broadcasting Service added new calls to its transmissions and extended its service. On 19 July 1962, ZK5 on 5045 and ZK6 3265 kHz were also heard. The former callsign of ZK1ZA was taken over by the new broadcast band transmitter on 820 kHz. ZK5 was announced as the new call on 5050 and ZK3 on 9695.

On March 21, 1981, the call ZK4 was still heard broadcasting on 11760 kHz throughout the day with a relay of the mediumwave service and using a power of 500 W. The transmission continued for some 10 years on this frequency until the transmitter building was destroyed.

■ Fiji:

The pioneer of broadcasting in Fiji was a commercial company—Amalgamated Wireless (Australasia) Ltd. based in Sydney—which operated the medium and shortwave services until the formation of the Fiji Broadcasting Commission. Amalgamated Wireless was in the field of radio receiver production, but it also operated several mediumwave stations and shortwave stations in Sydney, Melbourne, and Perth. It extended its interest overseas into Fiji by setting up a broadcasting service in the Islands as well.

In 1937 signals from ZJV Suva on mediumwave 910 kHz were heard on 9430 kHz carrying the same programming. In 1941 AWA announced a major project for Fiji with the installation of a 10 kW transmitter. Test broadcasts were heard on 9535, 11895, and 15160 kHz. The project was cancelled, however, when all shortwave transmissions were closed due to the battle in the South Pacific. Although a letter I received in 1943 indicated that there would be no shortwave broadcasting until after the war, low powered tests on 400 W were conducted in that same year.

By 1948 the Fiji Broadcasting Commission had been formed as the program provider, though AWA still maintained the operation and ownership of the transmitters. ZJV moved to 920 kHz that year. By 1953 ZJV was on 930 kHz with a new 2 kW transmitter kW and a 500 W transmitter had been installed on behalf of the Fiji Broadcasting Commission. During the same year new studio buildings were under construction and the 500 W was assigned the call VRH4 on 3980 kHz.

1960 found VRH5 testing on 5980 kHz with 250 W, but by 1962 the power had been raised to 10 kW on the frequency of 4785. The last frequency to be used from Suva was 3935 kHz.

Over the same period a network of mediumwave stations had been built up, and although the FBC was in possession of a 10 kW shortwave transmitter, this service was gradually phased out in preference of the mediumwave network. Over the years the staff of AWA in Suva, and later the FBC, have been most appreciative of reception reports and our help in finding good, clear channels so that they could be widely heard throughout the South Pacific.

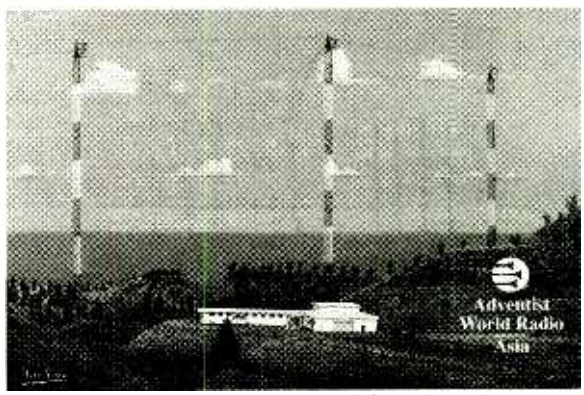
Fiji is another of the South Pacific countries that has closed its shortwave facilities and, like Tonga and the Cook Islands at the moment, is a country which is no longer heard on the lower frequency bands.

Broadcasting in Fiji was pioneered by Amalgamated Wireless, which operated MW and SW stations both in Fiji and Australia.

■ Guam:

The first signals to be heard were the mediumwave KUAM 610 and KGUM 567. Later, in September 1977, KTWR opened with two 100 kW Harris transmitters. Its first operating frequency was 15155 kHz. They ran a special DX program during the 1980's up to 1990, conducted by Bill Dimmick, who later moved to TWR Swaziland. KTWR has four 100 kW transmitters and broadcasts the programs of Trans World Radio. Plans are underway to install another 100 kW transmitter.

KSDA, operated by Adventist World Radio, is also to install another 100 kW transmitter. This will join the two current 100 kW units which were put into service when the station opened on March 6, 1987. The station broadcasts in 18 languages using 9 frequencies.



KSDA, Agat, Guam, is operated by Adventist World Radio.

■ Kiribati (Gilbert & Ellice Islands):

Our first verification from this group of islands was from WXLE Canton Island 1385 kHz on 10 July, 1954. At that time the station was owned and operated by the United States Civil Aeronautical Administration for the purpose of relaying music on gramophone records and island announcements to the inhabitants. The verification letter came from the British District Officer of Gilbert & Ellice Islands.

By 1962 the shortwave service was in operation. The Gilbert & Ellice Islands Colony Wireless Telegraph Department operated on VTW at 844 kHz with 50 W and on VTW2 at 6050 kHz with 2 kW. The broadcasts came from the studios on Betio, Tarawa Island. By 1964 the station was carrying out test transmissions on 3220 kHz with 300 W, indicating that their 2 kW transmitter would move to the 60 meter band. It eventually was heard on 4912 kHz in May 1965. In 1968 there was a call change from VTW to VXZ-2 on 4912; on mediumwave 844 kHz the call was changed to VSZ-1 with a common slogan—Radio Tarawa.

On 9 January 1970, a new 10 kW transmitter was opened on 844 kHz. Initial reports

Kiribati has been heard on several frequencies: this QSL is for reception of 9825 kHz.

indicated that it had been heard throughout the Central Pacific, including New Zealand and Hawaii. The new 10 kW transmitter was provided from funds from the British Government, which lent the station two staff members from the BBC to help develop broadcasting on the island. By December 1975, the Ellice group was renamed Tuvalu, and in 1979 the Gilbert Islands were renamed Kiribati.

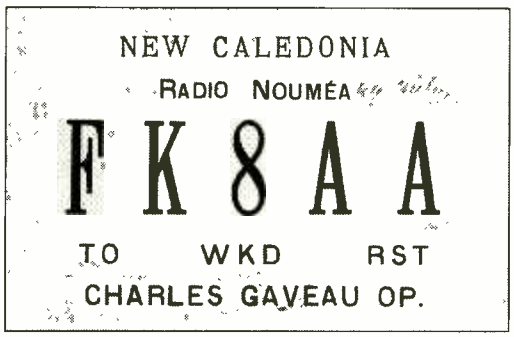
Radio Kiribati has been heard on several frequencies including 16433, 17440, 14917, and more recently on 9825 kHz. The station carries a relay of the BBC World News at 0600, English continues to 0700, and then the broadcasts are in Kiribat to sign-off at 0900 or later. The power of the shortwave transmitter is now 500 W.

■ New Caledonia

Broadcasts from Noumea were first heard in August 1939 when a radio amateur station with the call FK8AA operated a service for listeners in the area, using the frequency of 6140 kHz with a power of 50 W.

During the war there were other stations broadcasting in the area, including the Armed Forces Radio Service WVUS, which was part of the Mosquito Network and served American Forces in the South Pacific. Also during the war years, a private station known as Radio Pacifique was also heard, but as this was a commercial undertaking it did not operate for any length of time.

From FK8AA Radio Noumea was formed. By 1953 they were using 3375 and 6028 kHz. Medium-wave transmissions were heard over the period with the call sign FJP on 1500, 1400, and 670 kHz. In 1979 they moved to 666 kHz with 20 kW. Other broadcasts were heard on 3355 and 7170 with 20 kW, and on 11710 kHz with 4 kW. Later, shortwave transmissions were closed and broadcasts were continued on 666 kHz on FM.



New Caledonia's first broadcasting station in 1939 used an amateur radio call sign.

■ Papua New Guinea

Shortwave listeners were surprised recently to hear a powerful 100 kW transmitter from Port Moresby carrying the Karai National Programme on a test basis. The Government installed the equipment as a matter of urgency because of the failure of the present low-powered transmitters at Port Moresby. The outlet of 9520 kHz has been closed, while 4890 is on standby only. The new transmitter is a Continental unit using an incidence array as the aerial system, which gives good primary coverage throughout Papua New Guinea and extends from Cairns in Northern Queensland up to the Central Pacific and covers Fiji and the islands in that part of the Pacific area.

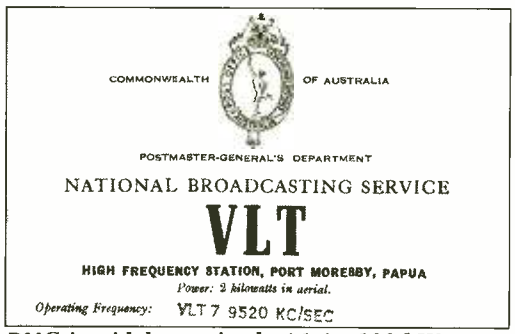
Officially opened by the Governor General, the early test transmissions were carried out on 9565 kHz; later the frequency changed to 9675. In a discussion with the Chief Engineer he informs me that the aim is to find a channel on which the broadcast can run continuously for 18 hours a day without a frequency change. The present schedule is 2000-1400 UTC. During the early test transmissions the best reception was an hour-long program mainly in English between 0800 and 0900 UTC (news in Pidgin at 0809). The Chief Engineer was keen to receive reception reports on the coverage of this high-powered transmitter. Reports should be sent to PO Box 1359, Boroko NCD, Papua New Guinea.

It is interesting to look at the Pacific Islands and note that this is the first attempt at high-powered shortwave broadcasting, though at the present time Solomons, Vanuatu, and Kiribati have low-powered transmissions which are a relay of their domestic service. Tonga and Cook Islands, which once operated on shortwave, are both temporarily off the air.

Papua New Guinea has an interesting history of broadcasting, commencing with a private operation before the war. During wartime, both the United States Armed Forces and Australian Army Amenity Service Stations were in operation. The latter had stations such as 9WK Wewak, 9LA Lae, and 9PA Port Moresby. After the war, with the assistance of the Australian Broadcasting Commission, shortwave services were begun using the callsigns VLT and VLK and a number of frequencies.

The country was divided: New Guinea was administered by Australia, and the balance by the Dutch. As a result, such stations as Radio Omroep Nieuw Guinea were heard in 1951 from Hollandia. Later, before Indonesia took it over to become what is now Irian Jaya, the United Nations operated a station from Hollandia with the title, "United Nations Temporary Executive Authority Broadcasting Services."

Gradually the broadcasting scene in the new Papua New Guinea settled, and stations in the provinces began to appear such as VL9BR Rabaul, VL9CD Wewak, VL8BK Kerema, and VL8BD Daru. In recent years the callsigns have been dropped and regional stations are now known by a slogan such as "Radio Northern District." There are 19 such stations operating in the low frequency bands with the majority of broadcasters in the 90 meter band (3200-3400 kHz), heard around 0900 and later.



PNG is widely received with its 100 kW transmitter, but this verification is from one of the early transmitters in Port Moresby.

Bougainville, which is in the Northern Solomons but is now officially part of Papua New Guinea, commenced operating as Radio Free Bougainville in January 1992. A war for independence is being waged both on the ground and in the air; see our sidebar story on the most recent developments.

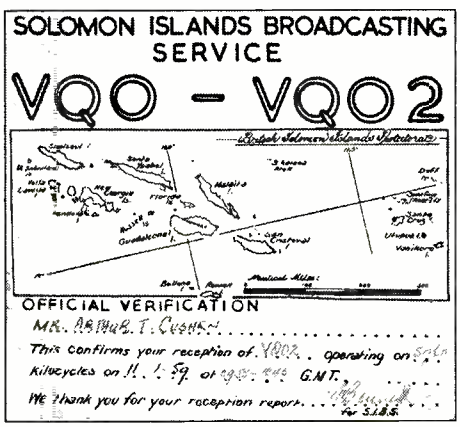
■ Saipan

The first signal noted after the war was from KSAI, operated by the Office of War Information of the US Government. It broadcast on 1010 kHz and was heard in March 1945. Subsequently the station operated on other channels for the Voice of America including 860, 960 and 1080 kHz. In August 1945, WXLD was heard, operated by the Armed Forces and using the frequency of 660 kHz with 1000 watts.

KHBS, operated by the Far East Broadcasting Company, was the first shortwave signal heard on October 1, 1983, via a 100 kW transmitter obtained from the VOA. Okinawa VOA was being closed as the island was handed back to Japan. KHBS now operates four 100 kW transmitters. Back in 1983 they also reactivated KSAI on medium-wave from the former Coast Guard transmitting site.

In 1982 Super Rock KYOI commenced broadcasting with programs in English and Japanese with the intent of carrying a commercial service towards Japan. However, obtaining advertising proved difficult, and the station was sold to the Christian Science Monitor in May 1987. Given the new call KHBI, it now operates with two 100 kW transmitters.

■ Solomon Islands:



The SIBS broadcast from Honiara is one of the easier signals to receive in North America from the South Pacific.

My first reception of the Solomon Islands came after the battle of Guadalcanal when the Japanese were defeated, and the Armed Forces set up station WVUQ at Guadalcanal. The broadcast was heard on 20 April 1944 on 690 kHz with 1000 W.

After the closing of WVUQ there was little activity in the Solomon Islands until the formation of the Solomon Islands Broadcasting Corporation. VQO2 was first heard on 11 January 1959 on 5960 kHz with 660 W. In November 1965, broadcasts were heard on 3995 kHz. The station later settled on 5020 kHz (sign-off currently noted 1130 UTC) and 9545 kHz (sign-off at 0805 UTC).

On mediumwave, broadcasts from Honiara were heard on 1030 with the call VQO on 25 April 1964. By 1984 two regional stations were put into operation using 945 and 1386 kHz.

Formerly KYOI, KHBI Saipan pioneered broadcasting in this area.

■ Tahiti:

Broadcasts from Papeete in Tahiti, French Polynesia, were first heard in 1940 when another country started broadcasts with an amateur transmitter, FO8AA, using 6980 kHz with a power of 200 W. Shortwave broadcasts were later heard from FZPS on 12080 kHz and Radio Tahiti on 7025. In the 1950s Radio Tahiti had an English language news broadcast which could be widely heard at 1900 UTC. Tahiti is still operating today and can be received on three frequencies. Papeete still uses the frequencies of 6135, 11825 and 15170 kHz, and a new radio and television building is under construction and new equipment should be put into place by 1995.

A check of my mediumwave log shows that Tahiti was first heard on 1400 kHz. Later I heard it on 740 and—after 1979 when the frequency was adjusted—on 738 kHz; it is generally well received here in the South Pacific.

■ Tonga:

The Kingdom of Tonga—a scattered island group of over 160 sub-tropical islands—was first heard with its test broadcasts on ZCO on 23 February 1961 using 1020 kHz and a power of 10 kW. On August 6 1972, it was heard with its newly allocated callsign A3Z. Transmissions in 1979 were moved from 1020 down to 1017 kHz, when the 9 kHz separation came into operation in all areas of the world except in the Americas.

A UNESCO project in 1985 sought to supplement this mediumwave service with three local FM stations for the major island

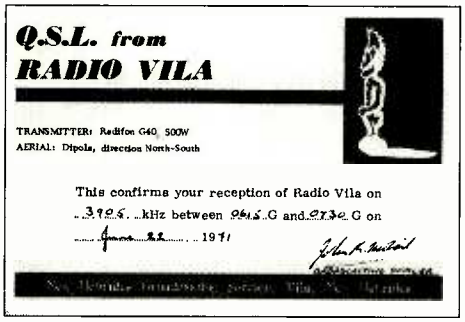
The Kingdom of Tonga is inactive on shortwave at the moment, but continues to operate on the MW frequency of 1017 kHz.

groups. However, even with high power it turned out that the population was so thinly spread over so many islands that only a small portion could be served. The next step was to provide a 1 kW shortwave transmitter to help cover the outlying islands. Another low-cost UNESCO transmitter design was used, which worked well and was widely heard on 5030 kHz.

In February 1992 the Radio Tonga shortwave transmitter was hit by a hurricane. So far, the transmitter has not returned to its shortwave frequency.

■ Vanuatu:

My first reception of the then-New Hebrides was on the 25th of March, 1945, when I picked up the Armed Forces Station operated on 1045 kHz with the call WVUR. The verification letter I received stated that, due to wartime restrictions, it was impossible to give specific technical information concerning the station,



Radio Vila on 3905 kHz is a widely heard signal from a country with an interesting radio history.

which was on Espirito Santo.

Now called Vanuatu, the country was heard again in the late 1960's. In 1971 the station received a gift from the Australian Government of a shortwave transmitter of 2 kW which operated YJB4 on 3960 and YJB7 on 7260 kHz. A mediumwave transmitter was donated by New Caledonia in late 1971 with the power of 1 kW. I first heard it on 1422, and later on 1125 kHz.

In 1976 a breakaway group on Espirito Santo formed a station known as Radio Venerama, which was heard on two frequencies—3577 and 3522 kHz. A verification letter dated 8 June 1976 confirmed the reception. Broadcasts originated from Tanafo, Santo, and the letter was signed by Mr. Jimmy Molly Stevens. The transmission later was severely jammed. The jamming signal could be noted in New Zealand during our evenings. The interference originated from a British group set up in Port Vila to block the reception of the Espirito Santo station in the New Hebrides. Subsequently, the station was captured and Jimmy Molly Stevens was jailed. In more recent times, he has been released and is living back on Santo—still clinging to the dream of an independent island.

New Hebrides was jointly controlled by France and Britain. After becoming independent, its station became known as Radio Vila in Vanuatu. It operates on 3945 and 7260 kHz, according to a verification dated March 1980. Today, Vanuatu is well received on 3945 with English news at 0900 UTC.

The Radio Battle for Bougainville

It is now seven years since the breakaway group on Bougainville declared independence, and since then, fighting both on the ground and the airwaves has continued.

Little has been accomplished in the move towards peace in the area, and despite the efforts of Australia (which sides with Papua New Guinea) and New Zealand, (which supports the Solomon Islands Government), the position has been deadlocked. Meanwhile, many continue to be killed in the jungle areas of Bougainville as the BRA (Bougainville Revolutionary Army) continues to maintain its hold on the Island. Papua New Guinea has launched several attacks to try and rectify its position but without success. Jamming of the Solomon Islands Broadcasting Corporation has been noted as the radio war heats up.

Bougainville, which is in the Northern Solomons, but which is now part of Papua New Guinea, commenced broadcasting when Radio Free Bougainville was officially opened by the Prime Minister of the Republic of Bougainville on January 21, 1992. The station operated on 3890 kHz, later 3850. The transmitter was supplied by the International Amateur Radio Network. Though it was low powered and operated under very sparse conditions, it was heard throughout the South Pacific. Reports from the Solomons indicate that the station still operates even today; however, we have not been able to receive it.

To counter the broadcasts of Radio Free Bougainville, a station has been set up on Buka, an island off the coast of Bougainville. Known as Radio United Bougainville, the station's intent is to serve as the voice of peace and unity in the area. It is not directly operated by Papua New Guinea's NBC network but is an independent station. Though mail service is difficult, I did receive a verification from them which gave some interesting details on the establishment and operation of this broadcaster located in the Northern Solomons.

Radio United Bougainville operates with only 70W; daytime transmissions are on 6010 kHz and nighttime on 3875 kHz. Signals have been heard here to closing at 1300 UTC. The station also has an FM service on 89.9 MHz which has the power of 20W. According to the Controller of Radio United Bougainville (address, P.O. Box 268, Buka), the role of the station is to disseminate relevant government information, comprehensively counteract the BRA rebels' political propaganda, and at the same time, provide musical entertainment to the listeners in the area. In his letter, the Controller, Emilouyse Tenoa, apologized for the delay in replying to my report due to the very poor mail service, and he indicated that he was the announcer that I heard when I listened to the broadcast in September 1994.

The Buka site was to have also been the site of a new 10 kW transmitter, but this proposal has not been put into effect. Instead, a high powered transmitter has been heard on 3325 kHz, belonging to the new Radio Northern Solomons, which operates from the Rabaul area. In a telephone conversation with the Controller at Port Moresby, he indicated the power was 10 kW and the transmitter was co-located with the other two NBC stations at Rabaul on mediumwave and shortwave.

The studios of the new station are on Buka. Programs are taken off air from the Port Moresby shortwave signal on 4890 kHz. The Buka studios have some programs of their own, but mainly they relay the Port Moresby service. They have been heard closing at 1200 UTC when they will relay the signal from the key station; sign-on is announced at 1930 UTC.

The transmitters in Rabaul were recently destroyed by a volcano. They are gradually being reinstalled. Signals have been heard at an earlier time in the South Pacific, due to the closeness of the Rabaul site, and that program service includes news in English at 0900 UTC.

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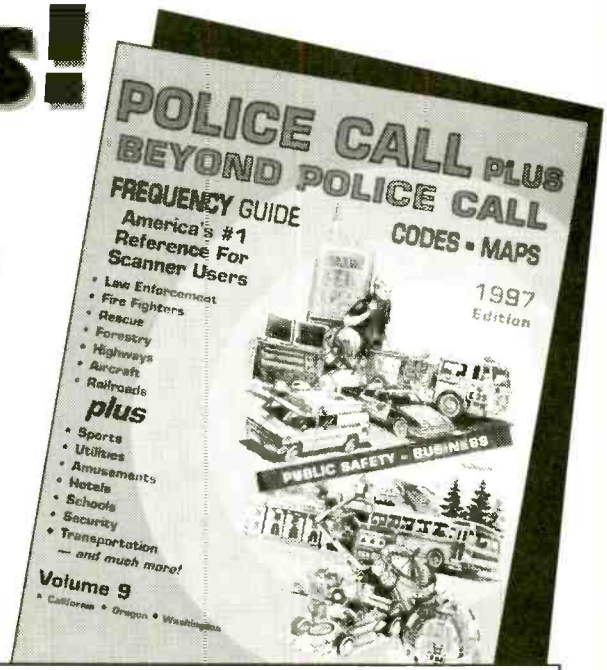

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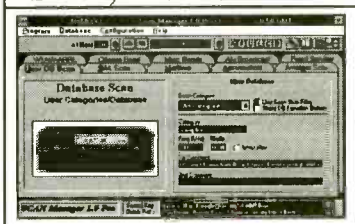

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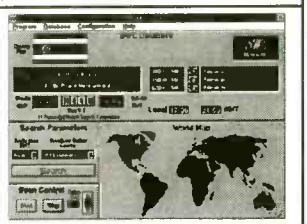

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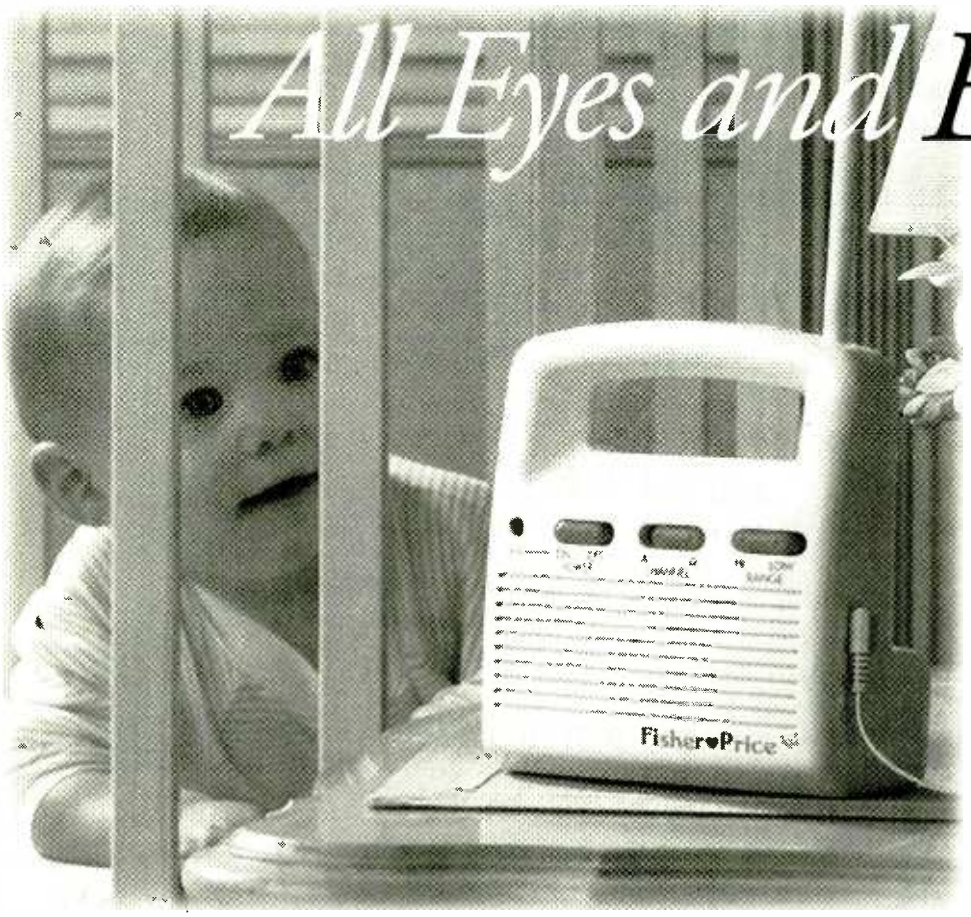


Typical baby monitor (this one by Fisher Price) with typical chief announcer.

By Karl J. Zuk

President Bill Clinton turned me into Mr. Mom! His new Family Leave Act allowed me to take a three month hiatus from work to care for my newborn daughter. However, you don't think that would stop me from DXing and experimenting, do you? Instead, I discovered a remarkable world of flea-powered products designed for microwave television and 6 meter FM. Welcome to the world of baby monitors!

My journey began with a hand-me-down baby monitor manufactured around 1990. As you might expect, the receiver was pretty insensitive and spartan. Both receiver and transmitter were designed with very short rubber-ducky-like antennas. The result was mediocrity. Too many nulls and dead-spots around the house made the system noisy and unreliable. Stronger transmission strength would make my daughter an overnight neighborhood broadcasting sensation, so I decided to improve the receiver while preserving my privacy.

Stubby six-inch-long antennas, consisting of nothing more than a coil of spring steel, are not very efficient on the two main baby monitor frequencies: 49.83 and 49.89 MHz. After all, you're broadcasting just below the six meter ham band, on which a quarter-wave element is about 56 inches long. I visited my nearest Radio Shack and bought a whip antenna of roughly that length and replaced the original antenna on the receiver with this new long whip. After the swap, reception improved dramatically!

All baby monitors all have two things in common: Heavy-handed automatic gain controls so you can hear your baby's every peep loud and clear; and no squelch. Parents want to know, without reservation, when their transmitters are off the air! Constantly turning the provided receiver on and off all day was annoying, so I put my basic Radio Shack PRO-38 scanner to work. Nearly any scanner will tune 49 MHz frequencies, and scanners are vastly more sensitive than typical baby

Okay, Dick Tracy, now you can hear your baby from your wrist! This model is by Safety 1st.

monitor receivers. A good receiver with a squelch is a godsend. (Beware! If your wife finds out about this, you may never see your scanner again!)

To improve performance further, I constructed a half-wave dipole for the six meter baby band. I cut the two active elements from some scrap steel rod. The center insulator and mount was fashioned from leftover pieces of wood. Connecting this basic antenna to my scanner allowed me to pick up baby monitors great distances away. Mounted vertically on a rooftop mast, scanner reception of the baby and nearby cordless phone frequencies resembled crowded CB channels! When one signal would drop, another would appear with excellent quality. A simple dipole antenna may prove too powerful for your scanner, especially if you live in a population-dense city.

Some are simpler than others—monitors, that is, not babies. These are from Gerry.

Let's Go Shopping

Anyone who thinks baby monitors are inexpensive and unsophisticated transmitter/receiver combos hasn't shopped for one lately. One trip to Toys 'R' Us will change your mind. Very basic models are still available, but most offer a surprising array of high-tech features for no more than $40 for a complete transmitter/receiver pair.

Nearly standard are low-battery and no-signal warning LEDs, and multi-colored LED displays acting like a simple audio VU meter. The Fisher-Price "Sound'n Lights Monitor" receiver features an eight-LED audio display with these guidelines: No LEDs lit? Sleeping baby. Three LEDs lit? A busy baby. All LEDs lit? A happy baby! Another useful addition is a two-position "Hi-Low Range" switch, allowing a reduction in transmitter power and presumably adding privacy by reducing your coverage area.

Other manufacturers feature built in digital clocks, room temperature thermometers, night lights with automatic timers, and even rechargeable battery packs with charger stands reminiscent of industrial VHF/UHF handi-talkies. One amazing model offers a motion detector system: Walk into the baby's room and you'll break an infrared light beam setting off an alarm to alert parents of an intrusion.

Calling Dick Tracy!

If you never want to be beyond earshot of your little one, you'll love the "Wrist Watch Monitor System" from Safety 1st. A miniature receiver and a digital watch are combined in one unit that comfortably straps to your wrist. The base station transmitter has a digital thermometer to track the temperature in the baby's room.

Another Safety 1st model employs a dual-purpose, voice-operated switch. The transmitter and receiver only turn on when sound is present to save electricity and batteries. If the baby cries, the unit automatically begins to play *Brahm's Lullaby* to soothe her back to sleep. It also features a soft night light, automatically activated only when the room is dark.

See in the Dark?

Similar to the trend in cordless phones, the latest models of baby monitors are now moving away from the two, crowded 49 MHz frequencies to new allocations around 900 MHz. Although these near-microwave channels are infrequently used, the reception is much more spotty and less reliable. Any metal or other dense structure will have a detrimental effect to your broadcasts. 900 MHz frequencies have one distinct advantage over the two 49 MHz narrowband FM channels, however: there is enough spectrum space available to transmit video!

Fisher-Price's innovative "Video Nursery Monitor" takes full advantage of the opportunity, and takes it a step further. A small single-chip CCD camera, fitted with a wide angle lens and microphone, sits in a pedestal you mount on the wall above your baby's crib. On either side of the camera is an array of infrared LEDs capable of illuminating a bedroom with invisible light. The CCD camera is sensitive to infrared light and magically uses it to create clear images in pitch darkness. Now you can see your baby, in a distant room, without turning the lights on and waking him up! An eerie-looking black and white image appears on a special black and white TV at the receiving end, along with the accompanying audio. When you turn on the lights, the images look even more crisp and clear.

Safety 1st has just introduced a similar unit almost identical to the Fisher-Price model, but with some refinements. They've slightly increased the television receiver's diagonal screen size from 4-1/2 to 5-1/2 inches and added a audio/video output port. Now you can record your broadcasts of your baby on your VCR, or use them with a picture-in-a-picture television.

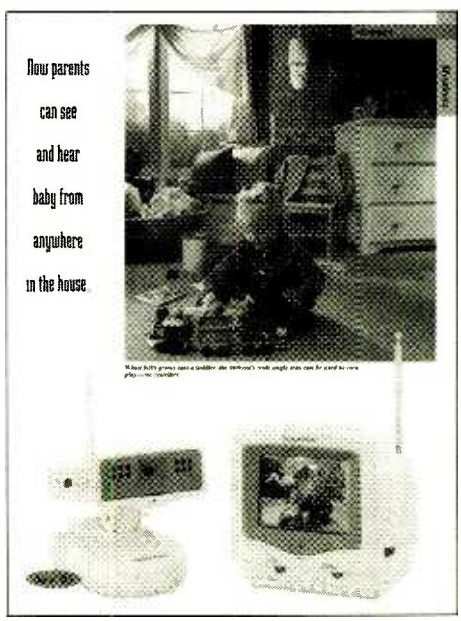
Want to have some fun? Television and VCR remote controls also use infrared light to transmit their data commands from here to there. Go into a darkened room and place yourself where a video baby monitor can "see" you. Press any button on the remote, and the CCD camera will reveal the remote control's beam of invisible light! You'll look like a Jedi warrior, complete with light sword, direct from *Star Wars*!

No Baby?

If you aren't hearing the patter of little feet around your house, there are still many ways you can utilize these devices. Any time you need another set of ears, you'll find a baby monitor a blessing. They are just as useful when caring for the elderly.

Interested in surveillance? The audio pickup sensitivity of nearly any baby monitor is exceptional. Infrared video monitors will reveal objects in pitch darkness allowing you to see what animal is raiding your trashcans, or keep a watchful eye on your car or property. You're limited only by your imagination!

Finally, a warning to DXers: Not only are these transmission hard to verify, it may be years before the young chief announcer learns to sign QSL cards! Oh, baby!



Can't take your eyes off baby? The Fisher Price video monitor, along with others, can even see them in the dark.

"Next Parish, America"

A Visit to Ireland's Mizen Head Radiobeacon

Story and photos by Finbarr O'Driscoll

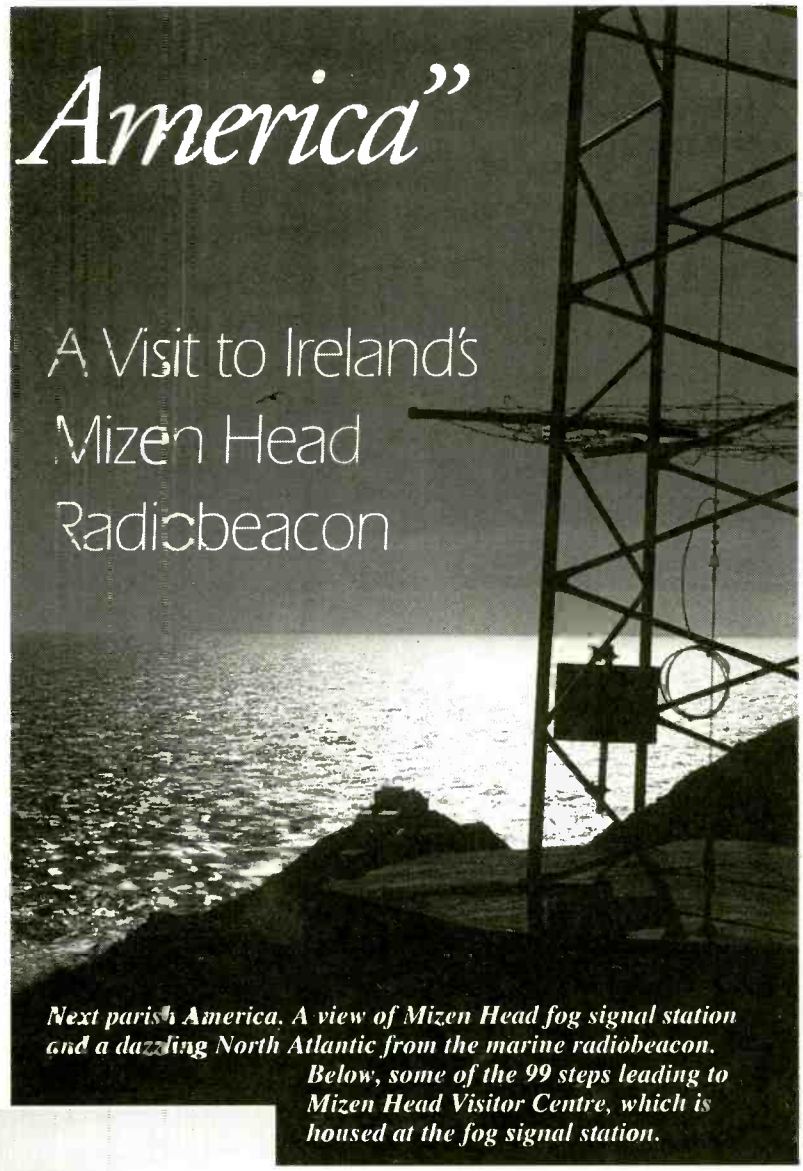
If you stand in the car-park near Mizen Head in Ireland and look out over the ocean, then the next parish is in North America. That's how the Irish see it. There is no landfall in the North Atlantic between where you stand and the New World. Because the air off the ocean is so strangely mild, you will have to remind yourself forcibly that you are about as far north on the globe as Goose Bay in Newfoundland. The warm current that bathes the south and west coast of the Emerald Isle has its origins in the Gulf of Mexico.

If you look off to your left and the weather is fair, you can see Cape Clear. That's thirteen miles away at the toe of Clear Island, where they speak Gaelic still. You cannot find a more southerly place in Ireland, except the Fastnet Light on the rock of the same name. You can see that, too, from where you stand, a little less to your left and ten miles away. It is an automated light nowadays, with a chopper pad and a light-visibility power of thirty miles.

Your eye will then be caught by the odd-looking lumps on the height of the headland that is a mile across the water from you on the other side of Barley Cove. That's Brow Head, rising three hundred and eighty feet above the swell, and the lumps are the fallen walls and masonry of the old Wireless Telegraphy Station. Marconi was the man behind that venture, because he also knew that the next parish was in America. (Never mind that his mother was Anne Jameson from County Wexford, the same place from which John F. Kennedy's people sprang.) Huddled down in the lee of Brow Head you can find the village of Crookhaven, where Marconi built a first Wireless Shipping Station in 1901. There is a bed-and-breakfast establishment in the village which commemoratively bears his name.

If you want to see the great Marconi more profoundly commemorated, then turn from the ocean vista and look behind you up along the heathery rocky mass of the Mizen Peninsula to see the modern aerial of the marine radiobeacon above you. The Commissioners of Irish Lights own and maintain it. Day and night continuously it listens attentively to satellites and sends its safety message in Morse to shipping.

Now, go down the paved path, pay the modest toll, descend the Ninety-Nine Steps, traverse the elegant old concrete footbridge (172 feet) that spans the gash in the peninsula, look down at the sea seething one hundred and fifty feet below, and finally enter the delightful Visitor Centre at the Mizen Head Fog Signal Station.



Next parish America. A view of Mizen Head fog signal station and a dazzling North Atlantic from the marine radiobeacon. Below, some of the 99 steps leading to Mizen Head Visitor Centre, which is housed at the fog signal station.

There, someone from the Mizen Tourist Co-operative will tell you that the fog signal was established in 1909, so that when visibility was poor the keepers could set off warning explosives. You will also learn that a wireless beacon was set up in 1931. The old transmitter, a tall grey AGA model of Swedish manufacture, now stands silent-key in the keepers' quarters, its twin clocks stopped, its valves cold. You may walk around on your own if you wish and view the exhibits at your leisure, or go outside to see the various automated signal lights or nature's own lights dazzling from the sky and ocean.

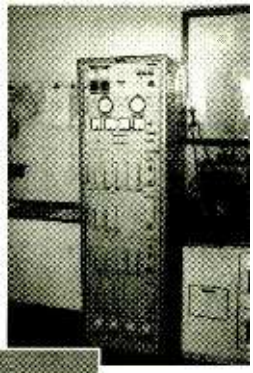
As you wind your way back to the car-park, gulls will wheel about you as they play with the air currents that rush up the cliff faces. But, if you are a radio DXer, your eye will keep returning

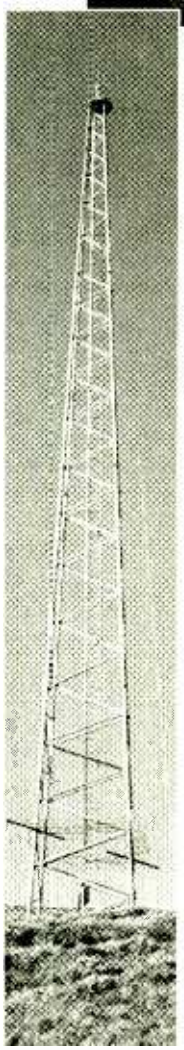
to the marine radiobeacon aerial above you, to your left.

A Crash Course in Navigation

Mizen Head is the most South-Westerly point in Ireland. Its latitude and longitude are 51 degrees 27.1 minutes North and 9 degrees 48.8 minutes West respectively. The marine radiobeacon on the hill identifies itself with the letters MZ, pumping out the signal on 300 kHz by groundwave primarily, ranging out 100 nautical miles every moment of the year. The beacon is classified as an A1A type, meaning that it has an unmodulated carrier frequency during the direction finding (DF) period and on-off keying of the unmodulated carrier during identification. (Most radiobeacons transmit their identification at least twice over a period of thirteen seconds, which is then followed by a continuous tone for forty-seven seconds. Mizen manages to pack its identification three times into the thirteen second period.)

An Amplidan transmitter (15770 system, made in Copenhagen) is the stout heart of this navigation safety outpost. It is housed in a modern stone-clad hut away from the ravages of the North Atlantic's worst winter tantrums and delivers its vital message to seafarers via a matching unit that is ring-fenced from the unwary, and centred under the three-wire T-aerial. The T-top is twenty metres in length. The centre wire on this system is the radiator; the side wires have a capacitative function. Everything is slung securely between two sturdy twenty-four metre steel towers that are locked onto the ancient rock beneath the heather with concrete and more steel.





Inside Mizen Head Visitor Centre stands the pristine but defunct AGA CW transmitter. Note every feature is in duplicate. Below, the western tower of the radiobeacon with DGPS unit on top.

On top of the western tower is a small mushroom-shaped device. This is involved in the Global Positioning System (GPS). It works like this: you are at sea in your yacht, fishing boat, or ship, and you wish to verify your position. There are a couple of radio methods that you can employ. One involves triangulating for the known positions and radio signals of three standard radiobeacons. Should you have GPS gear, you can triangulate from satellites.

This latter method, though based on state-of-the-art technology, is not always as accurate as you would like it. It depends on the powers that be—the U.S. Department of Defense. That department controls the twenty-four satellites worldwide that form the constellation of satellites in the system. Since military matters prevail over civilian, Selective Availability (SA) allows you to verify your position with a degraded accuracy only—that is, to one hundred metres or so. That's simply not good enough when the system is capable of an astonishing accuracy of ten to fifteen metres.

Here's where the mushroom-shaped apparatus comes into the picture. It uses differential techniques to overcome the defects of SA. Observed errors in the GPS operation are measured by a GPS receiver at an established point—a reference point, like Mizen Head. From there, these errors are transmitted to the seafarer and applied as corrections, so that the GPS receiver on board ship displays the most accurate position possible. Normally, this happens in real time with no intervention on the part of the seafarer. This correction is known as Differential Global Positioning System (DGPS).

The radiobeacon at Mizen Head transmits this correction data alongside its own 300 kHz signal—500 Hertz to the side, in fact. It is, as far as can be ascertained, just one of two stations on the west coast of Ireland providing this service. Stations in the U.K. also provide DGPS, so that all waters around the islands of Ireland and Britain are covered.

When you are leaving the car-park near Mizen Head, and if you are a radio enthusiast, you will muse to yourself that some of the energy from the Radiobeacon is bound to go skyward. You can never say how far it might propagate in the earth-ionosphere waveguide. You promise yourself to listen for a CW signal that goes dah-dah, dah-dah-di-dit. If sometime in the future you at last hear on your humble gear a readable Morse MZ descending from the ether, you can suspect you have snagged the best souvenir ever of a very memorable trip to the Irish coast.

(The author extends his thanks for kind assistance to Mr. Stephen O'Sullivan, Mizen Vision Project, West Cork, Ireland, and Mr. Seamus Doyle, Commissioners of Irish Lights, Dublin, Ireland.)

Memories Of Another Excellent

How does this work? Both new and used equipment was available at the Listening Post for demonstration and purchase.

EXPO

By Rachel Baughn

Astronaut Ron Parise, WA4SIR, kept us wide awake after dinner with his entertaining and educational tales of being a "ham in space."

We Came ...

"The best one yet!" was the judgment rendered by those who attended the seventh Grove Communications Expo in October at the Atlanta Airport Hilton. The Grove team always comes in for its share of compliments for smoothness of operation and organization, but it was generally expressed that the coordination of this year's event was truly outstanding. Thanks, Judy Grove.

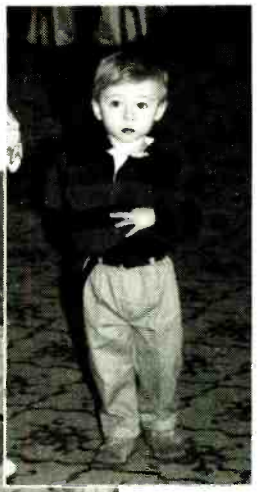
The flavor of the Expo was still informal and intimate, even though attendance was excellent—about three hundred if you add in the support staff. One factor which contributed to the deceptive impression of size was the fact that a whole new track of talks was added, resulting in the same audience size per talk as when there were three tracks. On Saturday, the Society of Amateur Radio Astronomers' talks, which were open to Expo registrants, actually comprised a fifth track!

The informal, relaxed atmosphere of this year's event can be partly attributed to some thoughtful planning of space: the exhibit hall, listening post, and seminar rooms were all in adjacent rooms forming an "L," with small tables arranged in the promenade area in between. This lounge area was a big hit for informal discussions and visiting.

We Listened ...

Friday's activities concentrated on tours, browsing the exhibits, demonstrations, and hands-on monitoring in the Listening Post. Although tours always seem to experience last-minute logistic glitches, our hosts at all the locations were gracious, informed, and obviously enthusiastic about their agencies. Participants reported outstanding trips to the

Excellent seminars on topics from dc to daylight were presented by 22 different speakers. Pictured are Bob Evans (below), and Bob Wyman (middle). The little tyke at right has never missed a Grove Expo. Wonder where radio will fit in to his future?



Although the majority of presentations were given by staff from the two Grove publications, a great effort was made to vary the subject material and to provide topics requested by last year's attendees. Registrants also took advantage of the SARA meeting, which featured some of the world's most notable names in radio astronomy.

We Bought ...

Although there was a good balance in types of exhibits, their total number was down this year, to the disappointment of attendees and those who dropped in from the Atlanta area specifically to see the displays. Those vendors who came reported excellent sales as always. We encourage you to support those merchants in the following list; those who donated prizes for drawings are marked with an asterisk. If your favorite dealer didn't come, encourage them to check out our market by taking out an ad in *Monitoring Times* or *Satellite Times*!

AMSAT*
B.A.S.E. Club
Bearcat Radio Club*
Cellular Security Group
Clarity Hearing Instruments
Computer Aided Technologies*
Dallas Remote Imaging Group*
R.L.Drake Company
Electronic Distributors (EDCO)*
Grove Enterprises*
ICOM America*
Image the Earth*
Optoelectronics*
Radio Astronomy
Society of Amateur Radio Astronomers
Scanner Master
Scan Star*
Swagur Enterprises*
Transel Technologies
Woodhouse Communications

Registrants commended the businesses and broadcasters which donated excellent prizes—"It was really exciting," confirmed prize winner Nina Jagers. Probably most excited was Robert Harris, winner of EDCO's donation, an AOR AR8000. Optoelectronics again donated prizes for the "bug" hunts—one of the traditional highlights of Saturday's activities.

Atlanta/Fulton Co. Emergency Operations Center, Atlanta Fire Dept. Communications Center, MARTA Communications Center, WSB Radio and Television station, FAA Air Route Traffic Control Center, and the Delta Airlines Communication Center.

On Saturday and Sunday the schedule was filled with seminars on shortwave and broadcasting, scanner and VHF/UHF monitoring, satellites, and computer and technology topics.

International Broadcasters Forum (l-to-r): Jeff White, Radio Miami International; Kim Hyuk Dong, Radio Korea International; Frans Vossen, Radio Vlaanderen; Ioana Masariu, Radio Romania; Ian McFarland, R. Canada Int'l, R. Japan, R. Netherlands; Sandor Laczko, Radio Budapest; Kimmo Wilska, Radio Finland; Ed Evans, Christian Science Monitor; Adrian Peterson, Adventist World Radio

We Wowed!

In a letter from Harry Helms, excerpted in this month's "Letters," he says we all look for whatever will recreate the "Wow!" felt when we first discovered radio, regardless of what aspect originally hooked us. Well, there were a lot of *wow's* to be had at Expo 96. Saturday night's keynote speaker, Astronaut Ron Parise—perhaps because he is so familiar with speaking to school children—awakened a childlike sense of awe and wonder in his audience of 172 and allowed us to experience space travel through his slides, anecdotes, and insights.

Richard Barnett, talking on public safety

monitoring, wowed his listeners when he was the first to announce Uniden's plans to market a scanner which will follow trunked communications. (See "What's New" for more.)

In the listening post, monitors were treated to hands-on opportunities to play with receivers usually reserved for catalog-gazing: ICOM's 8500, Drake's R8, AOR's AR5000, AR8000, and AR7000 (a receiver we weren't even sure existed before we saw it). For better reception, ten antennas were mounted on the roof above the listening room. The only disappointment was that an attempt to set up an INMARSAT receiving system had to be abandoned, due to the interference from local paging signals.

The bug hunt begins!

We Talked ...!

To quote Dave Simpson, "the Grove conventions have actually achieved a very great deal in bringing us face to face, and as an ongoing consequence many of us are in contact throughout the year. In that sense the Expo is our reunion." That many folks shared this view was evident by the many small groups of hobbyists one could see throughout the day, clustered in earnest conversation, or around a computer or equipment display.

As in years past, several registrants made the trek from outside the US. Dave Simpson is one of them, and remarked that the Grove Expo brings "scanner users and radio listeners together in a forum which is unique in the world." He added, "I only wish that we were legally able to have a similar event in the U.K."

The largest number of international attendees, as before, represented shortwave broadcasters. The Expo is honored by their presence and their willingness to come such distances; thanks are also due to Ian McFarland for coordinating the effort to get them here. DXers and program listeners particularly appreciate this opportunity to visit with station engineers, announcers, and other personnel involved in the daily functioning of an international shortwave station. At Friday night's forum, the audience had enough questions for the international panel to keep them going for a full two hours.

Besides the special people already mentioned, there are a few others we'd like to acknowledge. Myles Mustoe, author of a book on using shortwave radio in the classroom, and Neil Carleton, founder of The Shortwave Classroom project, were invited as resource leaders to a discussion held by the international broadcasters the day before the convention. Over the weekend, their refreshing, energetic, and optimistic outlooks gave us encouragement for the radio hobby, especially through those students and teachers touched by their enthusiasm.

There are, of course, hobbyists throughout the years who have been tremendously instrumental in furthering particular aspects of the radio hobby. Although he was not able to be present, a plaque was displayed at the banquet to honor Richard D. Baker for his contributions to the radio hobby. Baker has been an avid maritime monitor, edited the utilities column for Speedx before the club folded, and is one of the "founders" of the successful and innovative Worldwide Ute News (WUN) Club on the Internet.

Although many new faces were added to the speakers' roster with the inclusion of more satellite and radio astronomy topics, one of the pleasures of the weekend is having the opportunity to meet the department writers for both *MT* and *ST* in person. These folks are Very Special Persons indeed, and the backbone of the Expo's program.

We thank everyone who worked so hard to make the '96 Communications Expo the best and only event of its kind, and to all of you who made the effort to attend. The experience is always highly rewarding, from both sides of the podium or exhibit table. Couldn't attend? I highly recommend you go in together with other hobby friends to purchase a selection of the taped seminars as a shared resource (see page 31). It's the next best thing!

—Rachel Baughn, Editor

John Fulford consults with staff at the Optoelectronics booth. Opto has been the generous sponsor of the bug hunts.

Saving the Best for Last

By Bob Grove

No doubt about it; this year's convention was the best ever. More attendees, more sales, and more quality speakers than ever before. But it still wasn't enough. After months of meticulous preparation by Judy Grove who donated all her time and effort, and the professional dedication of the Grove staff, not to mention the input from our guest experts, the Grove Communications Expo (which started life as the Monitoring Times Convention seven years ago), still lost $5000.

While we acknowledge the benefits to attendees, we can't continue to underwrite a reunion. It costs about $30,000 to sponsor the event in Atlanta, and would cost considerably more to move our staff to a more distant venue. After much hand wringing and soul searching, it is with great sadness that we have decided to discontinue the annual Grove Communications Expo.

The Expo has received extremely loyal support from a core group of dedicated hobbyists, exhibitors, and speakers—many of whom also made substantial sacrifices in order to participate. We wish especially to thank our speakers over the past seven years, most of whom have been drawn from the *Monitoring Times* staff, and for two years from *Satellite Times* as well. We regret that the event refused to grow, but we'll always appreciate the associations we have built. Thank you for coming.

Did You Miss Us?

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TP-05	DX S/W Broadcast Bands, by Arland	9.95
TP-06	Illicit Pirate & Clandestine Broadcasting, by Zeller	9.95
TP-07	Making Propagation Work For You, by Arland	9.95
TP-08	ACARS - Aviation New World Wide Web, by Evans	9.95
TP-09	DXing the HF Utility Bands, by Van Horn	9.95
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TP-33	FM/TV: 1000 miles TV Reception - You Can Do It, by Smith	9.95
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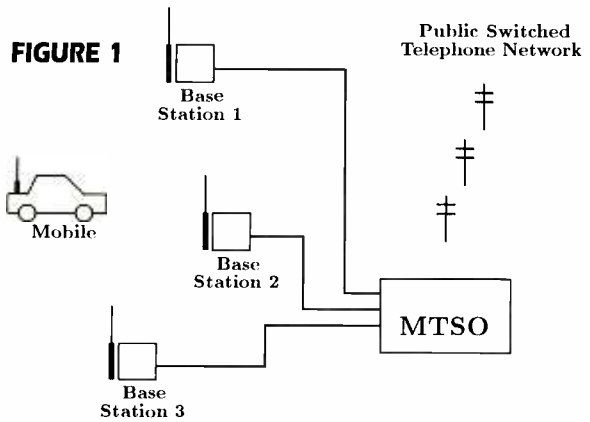
Dan Veeneman
dan@decode.com

Cellular Signalling

As discussed last month, a cellular telephone is actually a two-way radio transceiver, communicating with a network of base stations as it travels through a service area. The base stations are all connected to a Mobile Telephone Switching Office (MTSO), which links the cellular network to the land-based public switched telephone network (PSTN).

FIGURE 1



In order to make the cellular telephone behave like a wired phone, a rather involved set of signals pass between base stations and the mobile. Before going in to the details of that signalling, there are a few concepts to cover.

Since frequencies are shared in a cellular system, it is possible (although not desirable) that a mobile unit may receive signals from more than one base station at a time. It is also possible that as the mobile moves through a coverage area, the signal strength of the transmitted or received signal may fall below a usable level. Other fading and interference effects may also prevent a clear connection.

To handle these problems cellular designers incorporated supervisory audio tones (SATs). One of three tones, at 5970 Hz, 6000 Hz, or 6030 Hz, is transmitted by the base station and transponded (repeated back) by the mobile. During a conversation, the assigned SAT is sent continuously by both the base and the mobile, except during data transmissions and the intervals between voice activated transmissions (VOX). If either the base station or the mobile fails to receive the proper SAT for more than a few seconds, the call is prematurely ended, or dropped.

Since there is no wire connection from the mobile to the base station to indicate whether the switchhook is on-hook or off-hook, cellular systems use a supervisory tone (ST) instead. This 10 kHz tone is used for mobile ringing, call terminations, handoffs, and switchhook. Both the SATs and the ST are sent and received "out-of-band," and are not heard by the mobile user.

Recall from last month's column that there are two types of cellular channels: control and voice. Control channels are dedicated to digital data transmissions, providing access and paging functions. Voice channels carry the analog voice, as well as a limited amount of digital information. When a base station needs to communicate information to the mobile during a conversation, it will temporarily mute the audio path and send a burst of digital data. These periods, known as *blank-and-burst*, generally last less than half a second, and are rarely noticed by the user.

Going into Service

A cellular phone takes the following steps when it is turned on:

1. A self-test is performed to verify the hardware is functioning correctly.
2. The signal strength of each of the 21 forward control channels (FOCCs) assigned to the subscriber's selected carrier (wireline or non-wireline) is measured.
3. The receiver is tuned to the strongest FOCC and an attempt is made to decode the data stream. If the strongest channel cannot be decoded, the receiver is tuned to the second strongest FOCC and another attempt to decode the data stream is made. If this also fails, the phone indicates *No Service*.
4. The portions of the FOCC data stream that contain system information, known as *overhead* messages, are decoded. These messages report the system identification code and indicate the sets of channels to use for paging and access, as well as other local control and support information. If the identification is not the phone's home system, *roaming* is indicated.
5. If the system uses paging channels, the signal strength of each paging channel is measured, and the receiver tunes to the strongest one. Otherwise the receiver is tuned to the strongest access channel. The phone then waits on that channel, decoding each paging message, looking for its own Mobile Identification Number (MIN). Occasionally the phone re-measures the strength of each paging channel, and retunes to the strongest one.
6. Some systems request that the phone occasionally identify itself using a process known as *Autonomous System Registration*, which informs the system of the location and capabilities of the phone. This helps paging efficiency, although law enforcement agencies can use this to track a cellular telephone, even when no conversation is taking place.

Placing a Call

1. The user enters the desired number and presses SEND.
2. The phone quickly measures the signal strength on the active access channels, and tunes to the strongest one. It then transmits identifying information and the number to call to the base station, which forwards it to the MTSO.
3. The MTSO sends a voice channel and SAT assignment to the base station, which sets up the channel, begins sending SAT, and relays the assignment to the mobile. The MTSO also outpulses the called number to the PSTN (if calling a landline telephone), or sends a paging message (if calling another mobile).
4. The phone tunes to the assigned voice channel and verifies that the SAT is correct. If correct, it transponds (sends back) the same SAT and unmutes the forward audio.
5. The base detects the reverse SAT that the mobile is sending and unmutes the reverse audio. The mobile user can now hear the far end call progress (ringing, busy signal, intercept, etc) and will be able to converse if the other party answers.

Receiving a Call

1. When the phone decodes its own Mobile Identification Number (MIN), an event called a *page match*, it tunes to the strongest access channel and sends identifying information back. This also serves to inform the MTSO of the location of the phone, and therefore which base station to use.
2. The MTSO sends a voice channel and SAT assignment to the base station, which sets up the channel, begins sending SAT, and relays the assignment to the mobile via the access channel.
3. The phone tunes to the assigned voice channel and verifies that the SAT is

FIGURE 2: Cellular Power Levels

STEP	dBW ERP	MOBILE WATTS	HANDHELD WATTS
0	6	3.00	n/a
1	2	1.19	n/a
2	-2	0.475	0.631
3	-6	0.189	0.251
4	-10	0.075	0.100
5	-14	0.030	0.040
6	-18	0.012	0.016
7	-22	0.005	0.006

correct. If correct, the phone transponds (sends back) the same SAT.

4. The base station receives the SAT that the mobile is sending, and informs the MTSO that the phone is ready. The MTSO responds by sending an *alert order*, which is delivered via blank-and-burst to the phone.
5. The phone responds by transmitting the 10 kHz signalling tone, and starts ringing. When the user answers, the phone stops sending the signalling tone.
6. When the MTSO is informed that the signalling tone is no longer being received, it connects the incoming call to the serving cell site and unmutes forward and reverse audio, allowing the conversation to begin.

Call Termination

If the land-based phone ends the call, the MTSO issues a release order, which is sent by blank-and-burst. The phone responds by sending about two seconds of supervisory tone. If the mobile unit ends the call, it simply sends about two seconds of supervisory tone. In either case, the phone then turns off the transmitter, tunes to the strongest paging channel, and returns to the idle state, listening for a page.

Handoff

If the mobile unit is transmitting at maximum power yet the received power at the serving base station is near the minimum acceptable level, the base station asks the MTSO to consider a handoff. The MTSO then commands the surrounding base stations to measure and report the received signal of the mobile unit. The base station with the strongest signal and available voice channels will become the new serving base station.

When the MTSO is ready to effect the handoff, the audio is blanked and a data message containing a new voice channel and SAT assignment is bursted. The phone acknowledges the handoff by sending a very short burst of signalling tone on the old voice channel, then tunes to new voice channel and begins transmitting the new SAT.

These are the primary activities a cellular network must support. Next month we'll take a look at how criminals take advantage of this signalling to acquire free phone service.

Modern-day Scams

If you use a pager on a regular basis, do you always call the number on the display when you're paged, even if you don't recognize it? Apparently many people do, and scam artists are using this to their advantage. In a high-profile case in 1991, a man used his computer to send a premium toll number (a 212-540-nnnn number that incurs a charge for the caller, similar to a 900 or 976 number) to more than 26,000 pagers in the New York metropolitan area. When the pager user returned the call, they were connected to a recording and charged $55.

More recently, thousands of pagers in different states have received messages requesting a call back to numbers in the 809 area code, each of which apparently reaches a different recording. One particularly devious message starts out sounding like a normal conversation, with a male voice saying "hello" and asking the caller to "hang on." Expensive seconds tick by as a polite caller waits for the voice to continue. When the voice does return, it makes a demand for payment for unspecified charges.

Other messages have offered questionable and unrequested products and services. In each case the caller only learns later that a charge of up to $25 has been made on their telephone bill.

FraUdulent requests to call numbers in the 809 area code have even migrated to the Internet. In October the following electronic mail message was sent to a large number of unsuspecting people:

> Date: Tue, 1 Oct 1996 14:12:49 -0700
> From: "Global Communications"@demon.net
> Subject: Unpaid account
> Message-ID: <844184592.19166.164@[194.222.75.163]>
>
> I am writing to give you a final 24hrs to settle your outstanding account. If I have not received the settlement in full, I will commence legal proceedings without further delay. If you would like to discuss this matter to avoid court action, call Mike Murray at Global Communications on +1 809 496 2700.

The telephone number is in the British Virgin Islands, and of course there is no "outstanding account" for the recipient of this electronic mail message.

Part of the problem with these fraudulent call requests lies in the fact that most consumers are unaware that other countries are part of the North American Numbering Plan (NANP), and thus have area codes that are difficult to distinguish from domestic ones. Because of this, unscrupulous businesses located in Caribbean countries can be reached by what appears to be a United States telephone number, yet they remain immune from US law.

The 809 area code serves Puerto Rico (a US commonwealth), the Virgin Islands (both US and British), the Bahamas, Jamaica, the Dominican Republic, and other areas of the Caribbean. Long distance charges are usually much higher than to other US area codes, and additional charges apply to international calls. This will become even more confusing as new area codes become active (see table).

Several parties are benefiting from these fraudulent operations, first and foremost of which are the pay-per-call operators who induce people to call. The service bureaus which provide the equipment and numbers are paid a kickback from the local telephone company based on the amount of inbound call traffic they can generate. US long distance companies also collect their portion of the fee for the calls; although access to the 809 area is available for much less than $1.00 per minute, most major long distance carriers charge several times that amount. To their credit, however, both AT&T and Sprint have blocked access to some of the most flagrant 809 scam numbers—a temporary measure, since the scams will simply switch to new numbers.

FIGURE 2: New Caribbean Area Codes

LOCATION	NEW CODE	CONVERSION STATUS
Antigua	268	Active
Bahamas	242	Active
Barbados	246	Active
Bermuda	441	Complete
British V.I.	284	TBD
Grenada	473	TBD
Montserrat	664	Active
Puerto Rico	787	Active
St. Kitts & Nevis	869	TBD
St. Lucia	758	Active
Trinidad & Tobago	868	TBD

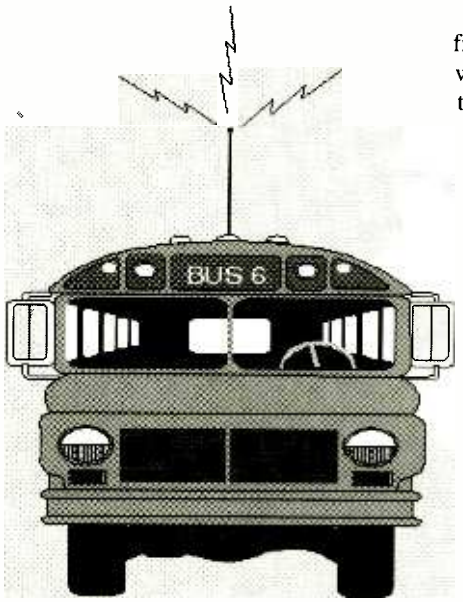
If you receive a page or e-mail for a number you don't recognize, especially with a strange area code, be sure you know what the charges will be before you return the call.

As always, comments, questions, and even criticisms are welcome at *dan@decode.com*. Until next month, happy monitoring!

Richard Barnett
ScanMaster@aol.com, Compuserve at 102354,3643

The Great School Bus Caper

Few people look forward to the first day of school. I, however, couldn't wait until September 5th, the first day of the new school year in my hometown. This would be my first chance, after an all-too-short summer, to track down that elusive local school bus frequency.



Over the summer I tried other techniques to land that bus channel. The first order of business was to call the school department and ask for the office number of the bus contractor. I then placed a call to the bus contractor and politely intoned that, as a citizen of the community, I was interested in knowing the radio frequency they used.

"We'd rather not give that information out," she somewhat sneeringly drawled. I gathered she actually didn't know the frequency and wasn't interested in finding out. Radio licenses are generally posted on an office wall for public display. I could have pushed my request with her and asked that she look up the frequency on the license. Remember the earlier part of this story from our September issue, though: this was apparently a legally unlicensed channel. In other words, the bus company was operating off an "FB6" designated community repeater. The outfit which maintains the community repeater is required to hold a license, but not the companies which rent equipment and space on the repeater.

Reaching this dead end, I placed a call to the local fire department, where an acquaintance is the Superintendent of Fire Alarm, an office which oversees radio communications. This friend did not have the answer, but he suggested I call the radio shop which provides radio repair service for the Department of Public Works. This radio shop did not provide two-way gear for the buses, but they did know which company owned the repeater that rented space to the bus company!

I was close now. While the frequency was still unknown, by researching the FCC database I came up with a list of all the community repeater licenses in the 450 - 512 MHz band that were owned by this firm. On the first day of school, I loaded up all their UHF channels into my Bearcat 760 and, within 30 seconds, 471.8625 crackled to life with, "Can you pick this kid up at the Angier School and bring him to the Bowen School?" Nailed at last!

Other transmissions were equally as conclusive, such as, "Base One to drivers X, Y, Z; make sure you turn in your keys before you leave for the morning." To ensure my good luck further, I programmed the input frequency of the repeater to see how close the mobile units were to my home. I immediately heard "S9" responses to the dispatcher on 474.8625. The case was closed.

A Short Class on History

Gene Hughes of *Police Call* fame was kind enough to share his thoughts on the school bus story, in which he described how difficult it can be to track down the a user of a shared repeater.

"Just finished your piece in *MT* about the school bus frequencies, and had to write. I was in the shared repeater business.

"Originally, FCC rules specifically prohibited anyone, except licensed common carriers, from making a profit operating a two-way radio system. This applied to public safety and all other radio services. If there was any sharing of a facility, extensive documentation was required to show that only actual shared costs were charged.

"Any firm needing the extended range of a mobile relay system (repeater) had to buy its own equipment. The repeater part was very expensive, since it not only involved the equipment, but renting a site for the repeater. A repeater system required three licenses: one for the control, one for the repeater and one for the mobiles.

"In 1956, a TV repair shop owner in Los Angeles, Chuck Crawford, bought an RCA repeater system. He started wondering if there was some way to reduce the cost so as to make it affordable for smaller businesses. Brainstorm! Check it out with the FCC and attorneys. There was no law preventing him from having site space at a mountaintop and charging rent for other radio system operators to have their repeater there. And, it was no business of the FCC's if several firms were using the same actual radio transmitter at that site so long as no one was paying for, or profiting from, its use. Any number of users could hang their licenses on it.

"Thus was born the 'shared repeater' business. Users were billed for 'site rental'—no charge for the repeater—and $50 per month became standard for systems with up to 10 to 20 mobiles. At first, each user on a specific repeater was assigned a discrete single tone to

activate the repeater. This was soon replaced by CTCSS (continuous tone-coded squelch system) as commercial tone boards for repeaters became available.

"Crawford went a step further. He purchased several hundred surplus UHF radios from the telephone company. He set up a company called Communications Rentals that rented complete systems, fully maintained: $25 per month for the control station, $10 per month for each mobile and $50 per month for repeater site rental. Installation was extra. Communications were now available to small businesses.

"By 1960, Crawford had repeater sites on five mountains in the Los Angeles area. The principal site was Mt. Wilson, where he and many other operators mounted their antennas on TV towers. Interference was vicious. Again, Crawford was ahead of his time. Some distance from the TV towers he found a building where transmitters were prohibited. He took the receivers out of his repeaters and located them there, with wireline connections to the transmitters. His frequencies were relatively 'clean.'

"Most of the first repeater operators were young, independent radio technicians, living a hand-to-mouth existence. They were also the first to operate SMR trunked systems. Many became multi-millionaires, selling their sites, customers and licenses to conglomerates

"Later, the FCC would simplify licensing and require just one license for each system. This applied to every category of land-mobile radio. In another change of rules, the FCC allowed an entrepreneur to use it for its own business. With the advent of trunking, rules for single repeaters were brought into line with those for trunking. Finally, the need for each user to have a license was eliminated, and like trunking, the repeater operator was made responsible for maintaining records of the users.

"It should be pointed out that every change, every loosening of rules, was fought by the common carrier industry, trying to protect the mobile telephone business. 'That's where we are today.'"

"YOU WON'T BE ABLE TO CALL ME BACK. I MAKE IT A RULE NOT TO GIVE MY NUMBER TO ANYONE."

■ Taking the Direct Approach

A number of *MT* readers proposed other tacks one could take in researching frequencies. Here's one example:

"I have an alternative plan for you to consider. Just ask one of the bus drivers if you can look at his radio. They usually have the frequencies printed right on the radio. Sure, it's not as much fun and doesn't give you much to do in terms of playing detective, but at least you'll get the frequencies. Plus, they may have alternate channels that are infrequently used and may be much harder to catch before an emergency situation arises.

"I've seen many public service agencies that have a printed card with all their channel assignments and frequencies taped right on the control head. All you have to do is find a parked cruiser/ambulance/etc. and peek in the window to get all the info.

"One time I was touring a State Police helicopter display with my friend who had his frequency counter with him. He asked the trooper to key up his portable radio on every channel so he could check all the frequencies, which the trooper did without any problem. Of course most were repeater inputs, but at least he verified all his information—and a lot easier than trailing the helicopter around for hours with his counter ready, hoping they would transmit on all their channels."

This writer also has an excellent suggestion for discovering frequencies which I recently employed. Having had so much fun nailing the school bus frequency, I got bold and decided to try to track down the trunked system on which the city-contracted sanitation trucks operate. The garbage trucks make their weekly run on Wednesday at our home. A few Wednesdays back, when the trash hauler was stopped out front, I walked out the house and up to the driver, Scout in hand, and pleasantly said, "I do radio research work and I'm just curious about the frequencies you use. Would you mind just keying your microphone so I could get a reading on this frequency counter?"

The driver, intently watching the Scout's frequency display, was instantly fascinated with the request. He grabbed his mike, keyed it a few times for me (to try to hit a variety of repeater frequencies on the trunk) and I had my answer. The driver was then scrolled through the channel selector to bring up the various talkgroups available to the sanitation company, such as: "Metro Trash," "Recycling One," "Supervisors," etc. It's not easy to follow their conversations on a scanner, and not that interesting either, ... but it's the *challenge*.

■ Scanners on Film

After many months of reporting on the role scanners have played in movies and television, we recently asked if our readers were bored with the topic. Surprisingly, all the mail has been strongly in favor of keeping this section. Some time back we also asked what the scanner mistake was in the Sigourney Weaver film, *Copycat*. Dan Arganbright was one of many who provided the answer:

"Hey Richard! I hope you haven't found a winner in your little contest yet. I just got my issue of *MT* today and ran out and rented *Copycat*. The problem with the BC 700A that she was listening to was that it was tuned to 147.210, which is a ham frequency, yet she was listening to the police (supposedly). Did you also notice the Shack PRO-200x on her desk between the computers at the start of the movie? Couldn't tell if it was a PRO-4, 5, or 6, though. They didn't get close enough to tell."

New York, NY, that Frequency Hungry Town

The city of New York recently acquired a slew of 480 MHz frequencies for use by public safety and local government agencies. This segment of the band was allocated for UHF television channel 16 in New York and had always been unused. (Analog television audio and video requires a wide swath of frequencies.) The Association of Public-Safety Communications Officials (APCO) created their "Project 26" at their annual meeting in Boston in 1990 to address this issue. The project's goal was to work out an arrangement with the broadcast industry to acquire this grouping of frequencies, at the very least on a temporary basis until more spectrum became available. Now, gradual use of the 480 MHz channels has begun.

Bureaucratic changes have been coming fast-and-furious in the Big Apple. The Transit Authority, as well as the Housing Authority, of the city of New York have merged into the New York City Police Department (NYPD). New York City EMS has been merged into the New York City Fire Department (FDNY). FDNY has been gradually switching a great deal of their communications to mobile data terminals and, just recently, the Fire Marshals, who had been using 460.575 MHz, have been replaced on the frequency by the Bronx Borough EMS.

A good deal of FDNY activity is also now occurring on the New York City Department of General Services trunking system, which is shared by a wide variety of state, local, and federal agencies. NYPD has been in serious need of additional channels for years. They currently use the 470-to-473 and 476-to-479 band segments, but they will also now make use of the new 480 channels the city has licensed.

Initially it was thought NYPD would trunk the frequencies. Now it appears that the frequencies will be used as precinct tactical channels, as well as for detectives in digital and/or encrypted mode.

New York City 480 MHz channels
(P=NYPD use)

482.0375R WIM-602
482.0625R WIM-602
482.0875R WIM-602
482.1125R WIM-602
482.1375R WIM-680
482.1625R WIM-680
482.1875R WIM-680
482.2125R WIM-680
482.2375R WIM-680
482.2625
482.2875R WIM-602
482.3125R WIM-602
482.3375R WIM-602
482.3625R WIM-602
482.3875R WIM-515 P
482.4125R WIM-519 P
482.4375R WIM-523 P
482.4625R WIM-527 P
482.4875R WIM-511
482.5125
482.5375R WIM-507 P
482.5625R WIM-664 P
482.5875R WIM-660 P
482.6125R WIM-658 P
482.6375R WIM-654 P
482.6625R WIM-487 P
482.6875R WIM-483 P
482.7125R WIM-479 P
482.7375R WIM-475 P
482.7625
482.7875R WIM-471 P
482.8125R WIM-676 P
482.8375R WIM-580 P
482.8625R WIM-584 P
482.8875R WIM-576 P
482.9125R WIM-638 P
482.9375 WIM-622 P
482.9625R WIM-594
483.0125R
483.0625R WIM-661 P
483.0875R WIM-491 P
483.1125R
483.1625R WIM-646 P
483.1875R WIM-626 P
483.2125R
483.2625
483.3125R WIM-662 P
483.3375R WIM-495 P
483.3625
483.4125R WIM-642 P
483.4375R WIM-630 P
483.4625
483.5125
483.5625R WIM-663 P
483.5875R WIM-499 P
483.6125
483.6625R WIM-650 P
483.6875R WIM-670 P
483.7125
483.7875
483.8125R WIM-665 P
483.8375R WIM-503 P
483.8625
483.9125R WIM-668 P
483.9375R WIM-671 P
483.9625R WIM-594
484.0125R
484.0625R WIM-666 P
483.0875R WIM-634 P
484.1125
484.1625R WIM-672 P
484.1875R WIM-673 P
484.2125
484.2625
484.3125R WIM-667 P
484.3375R WIM-564 P
484.3625R
484.3875
484.4125R WIM-674 P
484.4375R WIL-976 P
484.4625
484.5125
484.5375
484.5625R WIM-669 P
484.5875R WIM-568 P
484.6125R
484.6625R WIM-675 P
484.6875R WIL-977
484.7125R
484.7625R
484.8125R WPIT-840 P
484.8375R WIM-572 P
484.8625
484.9125R WIM-598
484.9375R WIM-598

New York City 900 MHz system
(most likely trunked)

935.4625
935.475
935.4875
935.500
936.1375
936.175
939.1875
936.4625
936.475
936.4875
936.500
937.150
938.000
938.000

(Note: The above information is courtesy of the Scanner Master New York Metro/Northern New Jersey 6th Edition Guide, available through Grove Enterprises.)

Fish-out-of-Water License

Speaking of New York, the FCC database shows a license for the New York City Transit Authority on 152.900 (IS - Special Industrial) which expires in the year 2000. The transmitter city is Green Camp in Marion County, Ohio.

It's unusual enough for the Transit Authority to have an "IS" license, but in a completely different state? What's going on here? Could this be where the TA cars are manufactured? Anyone have the answer for this head-scratcher?

Larry Van Horn, N5FPW
steditor@grove.net

Wherefore art thou, Raymond?

You're sitting in front of your favorite analog, vacuum tube shortwave receiver, tuned to 11175 kHz with the beat frequency oscillator (BFO) on, listening to the global HF radio system (GHFS). All of a sudden you hear Tuff 85 ask MacDill Global for a phone patch to Raymond 6.

The first question you ask yourself is, "Who is Raymond 6 and where are they located?"

Phone patches to command and control units from aircraft are a common occurrence on the GHFS frequencies. In fact, it is one of the primary reasons for the GHFS network being on the air. Mobile units in the field (aircraft and ships) have a constant need to be in touch with senior personnel. In the dynamic world of the military, change is constant and approval to make change is required from higher authority.

The Raymond callsigns have been around for years. I first heard the callsign on UHF frequencies associated with the old tactical air command (TAC) "Golden" command post network on 381.3 MHz. Since June of 1992 when SAC, TAC and MAC disappeared and the Air Combat Command (ACC) and Air Mobility Command (AMC) became household words, several changes have occurred in the Raymond callsign networks.

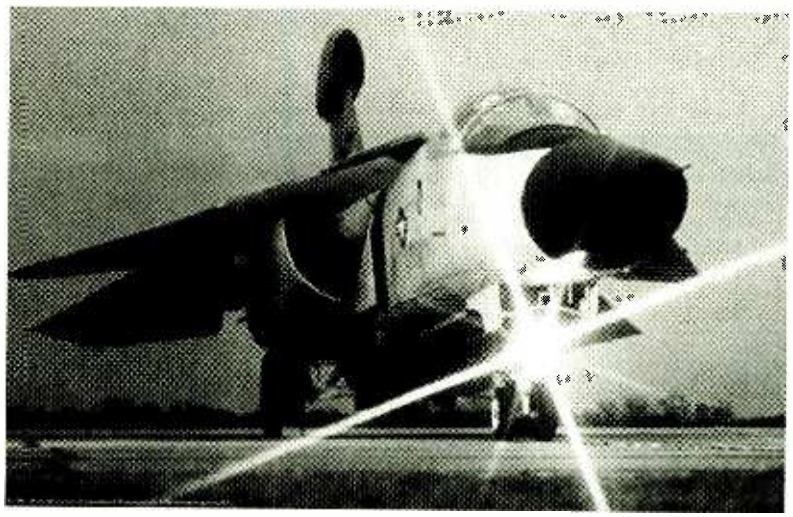


TABLE 1: Raymond Callsign List

Raymond 1	Langley AFB, Virginia
Raymond 2*	Tinker AFB, Oklahoma/Dhahran, Saudi Arabia command post
Raymond 3*	Riyadh, Saudi Arabia command post
Raymond 4*	Cairo-West, Egypt command post
Raymond 5*	Cairo-International, Egypt command post
Raymond 6	Barksdale AFB, Louisiana
Raymond 7	Cannon AFB, New Mexico
Raymond 8	Davis-Monthan AFB, Arizona
Raymond 9	Howard AFB, Panama
Raymond 10	Little Rock AFB, Arkansas
Raymond 11	Eglin AFB, Florida
Raymond 12	Minot AFB, North Dakota
Raymond 13	Beale AFB, California
Raymond 14	Holloman AFB, New Mexico
Raymond 16	Langley AFB, Virginia
Raymond 17	Moody AFB, Georgia
Raymond 18	Luke AFB, Arizona
Raymond 19	Robins AFB, Georgia
Raymond 20	Patrick AFB, Florida
Raymond 21	Offutt AFB, Nebraska
Raymond 22	Nellis AFB, Nevada
Raymond 23	Hill AFB, Utah
Raymond 24	Tinker AFB, Oklahoma
Raymond 25	Seymour Johnson AFB, North Carolina
Raymond 26	Shaw AFB, South Carolina
Raymond 27	Mountain Home AFB, Idaho
Raymond 32	Pope AFB, North Carolina
Raymond 33	Ellsworth AFB, South Dakota
Raymond 35	F.E. Warren AFB, Wyoming
Raymond 36	Fairchild AFB, Washingtan
Raymond 37	Dyess AFB, Texas
Raymond 38	Grand Forks AFB, North Dakota
Raymond 39	Whiteman AFB, Missouri
Raymond 40	McConnell AFB, Kansas

* indicates that this assignment is not a permament callsign. This callsign assignment is made on operationcl requirements.

The Raymond callsigns are now heard on the ACC family of military UHF frequencies, no longer on just 381.3 MHz. When old SAC bases were turned over to ACC, they brought their 311.0 and 321.0 MHz command post frequencies with them. As you can see in Table One, quite a few former SAC bases now have Raymond callsigns in use on their primary/secondary command post frequencies.

The military UHF frequencies are not the only place that you will hear Raymond callsigns. There are some HF discrete frequencies in use by Raymond. Raymond 7 has been recently monitored on three HF discrete channels: 3060, 6761, and 9014 kHz. Raymond 37 has been heard on 9025 kHz working Hawk aircraft.

So the next time you are parked on 11175 and hear an aircraft request a phone patch to a Raymond command post, consult Table 1 to find out who you are really listening to.

■ TACAMO Assuming Looking Glass Role

Nightwatch net and TACAMO fans might want to read the October 21, 1996, issue of *Aviation Week and Space Technology*. There is an article on page 59 titled *Tacamo Upgrade Integrates USAF Looking Glass Role*, written by Paul Proctor/Tinker AFB, Oklahoma. The article covers the "...profound change forStrategic Communications Wing One..." as related to the reporter by Capt. Vern Lochausen.

There is a quote from the beginning of the article as follows: "For the past 30 years, TACAMO (Take Charge and Move Out) forces have been responsible for passing command and control communications to the Navy's strategic missile submarines, even when they are

submerged. Since 1990, it has assumed responsibility for delivery of emergency action messages (EAM) to ICBM launch centers and strategic bombers as well..."

The E6s have been heavily involved in military HF nets since June of 1992. The above quote implies that they were also active in the HF nets on the U.S. Air Force Strategic Air Command (SAC) frequencies as well since 1990, which is very "interesting."

There is mention of "multiple-source survivable time and frequency standards...," which sounds like it is related to the time standard "ticking" activity commonly heard during "T-quad" activity on Nightwatch nets.

Toward the end of the article, the author mentions that the E-6B could serve as the U.S. military's startegic command post, and states that the E-6B would "complement" an E-8s role as a tactical command. "...while AWACs will manage theater airspace control." The article also mentions the RC135 Rivet Joint aircraft and their roles in future military operations.

The *Utility World* column has been documenting the changes in the U.S. strategic communications networks for some time and a lot of the changes we have discussed the last few years appear to be supported by the information presented in this *AvWeek* article.

I would like to thank Keith Stein from the *Satellite Times* staff and Jeff Haverlah for forwarding this corroborating article from *AvWeek*.

■ New RAF Frequencies Revealed

Our friends from the Dutch miltary aviation group SC-MAC have passed along the latest list of UK Royal Air Force (RAF) frequencies and designators. These new designators, which appear in Table Two, appear to pick up on the new 3 kHz spacing frequencies in the aeronautical OR bands. The new aeronautical OR frequency list first appeared in the February 1995 *Utility World* column

A big *Ute World* thanks to Gerbrand Diebels of SC-MAC for passing along these new RAF frequencies and designators. This list helps fill in how other areas of the world are complying with the new ITU regulations regarding these frequency ranges.

You can contact the SC-MAC group at the following address: SC-MAC, Postbus 644, 5700AP Helmond, Netherlands.

And now it is time to see what you have been monitoring this month in the *Utility World*. Hope you all have a joyous and happy holiday season.

TABLE TWO: RAF Frequencies and Designators

Desig	Frequency (kHz)
A	11205.0
AB	5693.0
AC	8156.0
AD	9010.0
AE	3939.0
AF	9022.0
AG	4745.0
AH	3930.0
AK	3038.0
AP	11181.0
AQ	2396.0
AW	4042.0
AZ	23281.0
B	6739.0
BA	17970.0
BE	18018.0
BF	3083.0
BJ	17988.0
BK	3945.0
BL	11268.0
BS	18000.0
BT	2350.0
BX	8989.0
CA	6736.0
CM	18009.0
CO	23245.0
CY	3119.0
CZ	29800.0
D	4706.0
DA	5436.0
DB	15091.0
DH	15013.0
DM	8998.0
DQ	17995.0
DS	4739.0
DT	18024.0
DW	9031.0
E	3924.0
EF	5720.0
EH	11259.0
EI	23270.0
EK	11235.0
EM	15025.0
EN	15076.0
EP	15040.0
EX	11184.0
EZ	11253.0
F	13257.0
FA	3101.0
FG	11208.0
FS	4742.0
FT	13218.0
FV	15064.0
FW	3131.0
G	3915.0
GA	15061.0
GD	2274.0
GT	26385.0
H	15031.0
HE	3942.0
HJ	8983.0
HK	9034.0
HM	6748.0
HO	13206.0
HW	11247.0
HX	23257.0
HZ	13248.0
I	13236.0
IN	17982.0
IP	27000.0
J	8980.0
KA	3380.0
KD	3867.0
KH	12057.0
KJ	4718.0
KP	2641.0
KR	4484.0
KT	5420.0
KW	2261.0
KX	2577.0
L	5447.0
LA	3036.0
LB	3092.0
LC	6701.0
LD	15046.0
LE	15072.0
MB	2266.0
MC	5270.0
MD	18850.0
ME	14460.0
MS	03218.0
NJ	5705.0
PA	3302.0
PE	6760.0
PF	10634.0
PH	8971.0
PK	5095.0
PO	6715.0
PR	3864.0
PZ	14724.0
QB	3512.0
QR	8972.0
QV	3095.0
RA	8190.0
RD	6691.0
RE	5178.0
RM	3110.0
RZ	9459.0
SA	2762.0
SE	14812.0
ST	2591.0
TG	6724.0
TO	3391.0
TQ	3345.0
TS	5684.0
TW	4709.0
UA	4724.0
UB	10919.0
UR	17979.0
UT	4540.0
VE	11217.0
W	5747.0
WG	3125.0
WM	3026.0
X	3224.0
XA	5403.0
YC	11241.0
YP	23250.0
YM	13211.0
YZ	20030.0
ZF	3763.0
ZZ	5714.0

Utility Loggings

Larry Van Horn

Abbreviations used in this column

AF	Air Force	ID	Identification
AFB	Air Force Base	INMARSAT	International Marine Satellite
ALE	Automatic Link Establishment	JRB	Joint Reserve Base
ANDVT	Advanced Narrowband Digital Voice Terminal	MAP	Maghreb Arabe Presse
ARG	Air Refueling Group	MARS	Military Affiliate Radio System
ARW	Air Refueling Wing	MERS	Mobile Emergency Response System
ASW	Anti-Submarine Warfare	MF	Medium Frequency
CG	Coast Guard	MFA	Ministry of Foreign Affairs
CW	Continuous Wave (Morse code)	NAS	Naval Air Station
CWO	Communications Watch Officer	RAAF	Royal Australian Air Force
CZ	Convergence Zone	RTTY	Radioteletype
DOE	Department of Energy	SAM	Special Air Mission
DSN	Defense Switching Network	Selcal	Selective Calling
FAA	Federal Aviation Administration	SITOR	Simplex teleprinting over radio
FEC	Forward Error Correction	SITOR-A	Simplex teleprinting over radio, mode A
FEC-A	One way traffic FEC teleprinter system	Unid	Unidentifed
FEMA	Federal Emergency Management Agency	US	United States
GHFS	Global HF System	USB	Upper Sideband
HF	High Frequency	USCG	US Coast Guard
		USCGC	US Coast Guard Cutter
		VHF	Very High Frequency

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

3203.5 Two units, one had a command net to keep track of and couldn't accomodate request. Other unit responds "10th range forward, out" at 0312. (Fowler-NY) *Best guess is the US Army-Larry.*

3295.0 WAR46 working Nightwatch 01 on Z-120 at 0732. (Jeff Jones-CA)

4092.0 C6LW2-*M/S Regal Empress*, Royal Caribbean Cruise Lines at 0323 working WOO. (Richard Baker-Austintown, OH)

4149.0 WBN3013-*Tug Century* working WPE at 0530. Also heard WBN6511-*Tug Gauntlet*, WBN2079-*Tug Daring*, WBN5040-*Tug Pioneer*, and WBN5050-*Tug Gladiator* working WPE. All these are Crowley Maritime tugs. (Baker-OH)

4472.0 Nightwatch 01 working Moosetag at 0321 on self IDed Zulu 130. (Fowler-NY)

4610.0 SAM 29000, SAM 049, and Air Force 1 working Andrews at 0204. (Jones-CA)

4721.0 Heard ANDVT comms between 01 and 08 at 2356. Talked about doing a half hour of traffic in the green. (Fowler-NY) SAM 29000 and SAM 049 working Andrews with signal checks at 0330. (Jones-CA)

4911.0 ANDVT scrambled comms noted here at 0415. (Jones-CA)

5198.5 Halifax military working Great Dane at 1310. (Harry Riddell-Rochester, NY)

5203.5 M9K working U3J. M9K32 calling M1R. Y7E calling Y2R at 1245 with request to "bring on cook to make meals for the troops." (Riddell-NY)

5211.0 Brandy-Unid station with a H171655 message for Projector at 1655. (J.L. Metcalfe-KY)

5437.0 Andrews working Executive 1 Foxtrot on possible new F489 from F117 (6993.0) at 0700. (Jones-CA)

5547.0 San Francisco Radio working EVA 12 and Citation 655CC at 1902. (Gordon Levine-Anaheim, CA)

5693.0 Detroit Air working 6536 and 6580 calling CG Group Cape May at 1455. (Riddell-NY)

5865.0 Two fisherman using salty language to discuss the weather they were going to encounter over the next three days at 2331. (Fowler-NY)

6227.0 WCF4433-*Mister Jean*, a Tidewater Marine tug, at 0809 working KZU-Harvey Marine. (Baker-OH)

6491.5 VCS-Canadian Coast Guard Halifax, NS, with final HF CW broadcast at 2359. HF CW, radiotelephone, and SITOR services have been terminated from this station. Only way to log it now is MF CW/radiotelephone, VHF or INMARSAT. (Wendall Benson-Forest Hills, NY)

6683.0 Spar 65 working Andrews with phone patch request to Ramstein command post at 1115. (Riddell-NY)

6697.0 Sellout with an EAM at 1540. (Fowler-NY)

6700.0 VO2D calling VV1M at 1105. Moved to frequency 5. Noted some German spoken. (Riddell-NY)

6751.0 Husker Ops working unid aircraft at 0117. Aircraft said they were 20 minutes out and needed the maintenance folks. (Fowler-NY) Unid station calling Husker 25 on HF at 2308. (Jones-CA)

6761.0 Venus 77 working Andrews for a signal check at 1849. Andrews working Executive 1 Foxtrot (also IDed as SAM 683) then shifted to F919 (found them on 11159) at 1851. Gold 91 calling Maniac Ops (101 ARW Bangor, ME). Pac Control (157 ARG Pease, NH) answers Gold 91 at 1900. Marigold working Thule GHFS at 0114. Marigold needs correct time and request a phone patch to DSN 587-7733 (WWV?). Thule says patch drops automatically after one minute because of so many calls for the correct time. Thule rebroadcast WWV time tick feed for five minutes on this frequency. Probably only time you will hear WWV on 6761. (Fowler-NY) *Actually, it is the US Naval Observatory Thule dialed up at the 587-7733 DSN-Larry.* Hawk 87 enroute to Dyess at 0401 working Raymond 37 at 0600 for weather. Raymond 27 said he was usually up on 9025 during the day. Executive 1 Foxtrot (IDed as C-9) working Andrews with check of Nationwide UHF at 0100. (Jones-CA)

6830.0 Executive 1 Foxtrot working Andrews at 0445. Andrews working SAM 28000 and SAM 403 in clear voice and ANDVT for signal checks at 0142 on Air Force 1 primary frequency. (Jones-CA)

6835.0 Repairman 26R working Repairman 26 at 1155. Talking about some problems with the ship. Also heard Ironrod calling Ironrod 1 at 1200. (Riddell-NY)

6870.0 KDK21 calling KUR65 in LSB at 1235. (Riddell-NY) *This is a FAA Emergency and maintenance HF net. KUR65 is in Myrtle Beach, SC-Larry.*

6960.0 English female (British accent) number station at 2217. (Maryanne Kehoe-Atlanta, GA)

6970.0 1J working 6G for KL-43 data transmission. 6B also working the net in clear voice at 0514. (Jones-CA)

6982.0 Halo ground working November 24 Alpha (aircraft) at 1843. Aircraft mentions they have Halo project on board. Who is this? Heard Huntsville, Alabama, mentioned. (Fowler-NY) *This is a NASA frequency and Hunstville is on it; not sure about the Halo Project-Larry.*

6993.0 SAM 300 working Andrews at 1912, talking about satellite and window frequencies. Aircraft wanted them since "Brandywine went down." CWO questioned the real need of secure satcom and the SAM operator decided to forget the whole thing. (Fowler-NY)

7325.0 Andrews checking Paccom 01 for a new frequency from previous 8026.0 at 0355. (Jones-CA)

7690.0 O1E working N5X and 9V at 0041. 9V said would be at Wilson at 1600 local and wanted to setup a CRMO point for ammo. 9V then asked to speak to regimental surgeon. 9T passing Marine Sum Log Report to 1E at 1835. (Jones-CA)

7693.0 Nightwatch 01 working Andrews for signal checks at 0015 on primary F264 in clear voice and ANDVT. Secondary was F646. (Jones-CA)

7700.0 KRF265-DOE Belton, MO, in the clear before returning to digital at 1604. (Metcalfe-KY)

7831.0 Nightwatch 01 working Flyfish on Zulu 170 at 1248. (Fernand Vaillaneourt-St. Pamphile, PQ)

7966.5 Two Navy operators, one trying to teach the other how to run a Harris computer program at 2315. (Fowler-NY)

7985.0 Test counts in English heard at 1300 with no IDs given. (Riddell-NY) *This is a known US Navy frequency-Larry.*

8026.0 SAM 31681 with signal checks through Andrews at 1834. (Jones-CA)

8032.0 SAM 27000 working Andrews with phone patch to SAM command. (Jones-CA)

8040.0 Casey 01 (CINCSTRAT KC-135) working Andrews at 1755. Passed some AFM/AFRTS frequencies: 6086.0, 9595.0, 15225.0, 15280.0, 15315.0, 15330.0, 15410.0, 17765.0, 17820.0, and 21690.0. (Jones-CA) *Looks to me like someone is still living in the past-Larry.*

8285.0 NVLA-*USS Vella Gulf* (CG-72) with radiotelephone traffic through WOM at 0256. (Baker-OH)

8294.0 WBN3014-*Tug Patriarch* at 0059 working another Crowley tug, WBN6511-*Tug Gauntlet*. (Baker-OH)

8300.0 Chinese female 4-digit number station in AM at 1600-1630. (Jay Atherton-Shoreline, WI)

8382.5 ELKV3-*M/V Pacific Runner* with SITOR-A traffic to KPH at 0237. (Baker-OH)

8388.0 NRCB-*USCGC Eagle* (WIX-327) at 1536 in SITOR-A working NMN. (Baker-OH)

8389.5 LAII2-*M/V Adriatic* with SITOR-A traffic at 0223. (Baker-OH)

8495.0 Unid station working each other at 1512. Reported Westover channel A. (Fowler-NY)

8912.0 USCG green analog type comms noted here at 1955. (Jones-CA)

8918.3 Unid station, but probably an Egyptian Embassy at 2208 in SITOR-A sending 5-letter groups. (Baker-OH)

8967.0 Sierra working Sierra Uniform at 1949. (Levine-CA)

8968.0 Reach 80-1495 with phone patch to McChord AMC command center. Reach flight wants refueling frequency, given 123.050 as canal intercom. (Fowler-NY) Townsville Air with a phone patch to AF Sydney to Townsville Ground at 1220. (Riddell-NY) *RAAF traffic-Larry.* Liner 48 flight working Lajes GHFS at 2242. (Mr. TV-UK)

8971.0 3NG working unid station at 1335. Said frequency for exercise changed to ME frequency. (Riddell-NY)

8974.0 AF Sydney working 7229 at 1240. (Riddell-NY) *RAAF frequency-Larry.*

8989.0 Trout 99 working Andrews at 0345. (Jones-CA)

9005.4 N9 working Habitat (NAS Whidbey Island) for message relay from A9. N9 wanted to know the temperature at 650 feet and the primary CZ freq (one or two). F6 and others also on frequency. (Jones-CA) *Pure ASW traffic to the P3 aircraft fir sure-Larry.*

9014.0 Weak aircraft comms at 0159 requesting radio check with Raymond 7. Mike 1/2 with check on hotel fox radio at 1548. (Fowler-NY)

9016.0 Splendid working Nightwatch 01 at 2128. (Fowler-NY) Sofa Bed calling Antiquity on self-IDed Z-175. Moved to frequency Charlie Alpha at 2224. (Mr. TV-UK) PACAF 01 with a phone patch through Hickam Global to Arctic Warrior (Elmendorf Command) at 0110. PACAF 01 with a phone patch through Hickam to PACAF command, callsign Food Store at DSN 488-8500 at 0135. (Jones-CA)

9018.0 Goth 11/12 (spelled phonetically) calling each other with no joy, inbound Ellsworth AFB, SD, at 2335. (Fowler-NY)

9023.0 Sidecar calling 2PL for radio check at 1523. (Fowler-NY)

9031.0 Architect working Ascot 5736 with selcal (AH-GK) check at 1527. (Fowler-NY) *That is a C-130 aircraft (XV177) out of RAF Lyneham-Larry.*

9120.0 Andrews calling SAM 681 with no luck at 2357. Andrews using LSB setting up Air Force 1 comms with SAM 28000 in clear voice and ANDVT at 1835. (Jones-CA)

9145.0 Delta 31 calling BigSky for radio check, no joy. Delta 31 in the blind said going UHF at 0308. (Jones-CA) *Interesting intercept, Jeff. My records show this is a State of Florida drug enforcement and vessel intercept frequency-Larry.*

9240.0 DL calling B6B at 1140. Changed frequency to CF3. (Riddell-NY)

9259.0 Snakeyes and Chesty working Deuce, 4S working 4A at 1150. (Riddell-NY) *This is a known US Marine Corps Reserve tactical and training frequency-Larry.*

10045.0 Unid station "48" announced standing by on frequency at 1845. (Jones-CA)

10204.0 Roamin Lad calling any station this net at 0008 on Zulu 190. (Fowler-NY)

10205.0 SAM 27000 working Andrews with ANDVT comms at 2333. (Jones-CA)

10242.0 Very strong ALE pulses noted at 2100. (Jones-CA) *US Customs Cothen frequency-Larry.*

10493.0 WGY912 with status of FEMA deployment at 1617. Also working an AFF station. (Vaillaneourt-PQ)

10727.9 MFA Paris, France, in FEC-A 192 baud with traffic in French at 1004. (Vaillaneourt-PQ)

11023.0 ANDVT scrambled comms noted here at 2334. (Jones-CA)

11053.0 SAM 202 working Andrews with phone patch to Sherman Base at DSN 552-6041 and 552-2396 at 2200. (Jones-CA)

11086.5 MFA Paris, France, with 5-letter groups using 192 baud FEC-A at 1230. (Vaillaneourt-PQ)

11153.5 Air Force 2 working Andrews at 2316. (Jones-CA)

11159.0 Andrews working SAM 201 on F919 with signal checks at 1835. (Jones-CA)

11175.0 Gunfighter 11 working Ascension GHFS at 2304 requesting a phone patch to DSN 739-5715 (NAS/JRB Fort Worth) with request to land at that field due to bad weather at Kelly AFB. Elements of this flight included: 1 KC-135, 1 B-1B, 2 F-15E, 2 F-15C and 2 F-16 aircraft. (Fowler-NY) *Fascinating log, LF, good job-Larry.* MFA Paris, France, with 5-letter groups using FEC-A 192 baud at 1010. (Vaillaneourt-PQ)

11181.0 Paccom 01 working Hickam Global with phone patch to Delta Oscar at Paccom Command at 0235. (Jones-CA)

11214.0 Darkstar Xray working Raymond 24 and Navy 496 working Andrews all at 2341. Interesting exchanges. (Fowler-NY) Andrews working SAM 201 at 1655. (Jones-CA)

11232.0 Sack 81 working Raymond 24 via Trenton military at 2310 requesting NORAD satcom check. (Fowler-NY)

11244.0 Steel 12 working Thule with an "ops normal" call at 2303. (Fowler-NY) *We have heard quite a few USAF tankers giving these reports lately-Larry.* Camp 92 with a "Skybird" call at 0937, but no answer. Passed "ops normal" call in the blind. Firecan working Andrews at 2000. Requested and received Nightwatch frequencies as X-200/170. (Mr. TV-UK)

11245.0 Scrambled voice comms noted here at 0041. (Fowler-NY)

11460.0 Air Force 2 working Andrews at 2150. (Jones-CA)

11477.0 KCNA Pyongyang, North Korea, with 50 baud/425 shift RTTY English new bulletins at 1245. (Vaillaneourt-PQ)

11494.0 Hammer working unid at 2303. (Jones-CA) *US Customs Cothen frequency-Larry.*

12500.5 J4FE-*M/V Buena Fortune* using SITOR-A at 2126 working SVT. (Baker-OH)

12502.0 ELNV2-*M/V Industrial Champion* at 1410 in SITOR-A. (Baker-OH)

12505.0 KMCB-*M/T Marine Chemist* at 2132 in SITOR-A. (Baker-OH)

12510.0 DZAB-*M/V General Cabal* at 2048 in SITOR-A. (Baker-OH)

12562.0 UHCF-*BMRT Novourainka* using 50 baud RTTY at 1928 with crew telegrams to Kerch. (Baker-OH)

12564.0 UINN-*BMRT Otrog* at 2020 using 50 baud RTTY traffic to UIW. (Baker-OH)

12572.0 UCHV-*TKH Inzhener Yermoshkin* sending 50 baud RTTY telegrams to Murmansk at 2015. (Baker-OH)

12575.0 UYRK-*TKH Viktor Talaliykhin* at 2017 with 50 baud RTTY traffic to Mariupol Radio. (Baker-OH)

13200.0 Elmendorf GHFS working Sierra 54 (self IDed KC-10 tanker) with arrival weather for Travis AFB, CA at 1807. (Fowler-NY) *Aircraft is based out of Travis-Larry.*

13204.0 Paccom 01 working Andrews with phone patch to Command Post at 0235. (Jones-CA)

13205.0 Air Europa 772 at 1930 calling Berne Radio, no answer. (Baker-OH)

13208.5 Reach 0174 working Stewart ops for weather info at 1547. (Fowler-NY)

13211.0 SAM 26000 working Andrews at 1508. (Fowler-NY)

13300.0 Ascot 4318 working Houston Radio at 2307. (Fowler-NY)

13375.0 Single note pipe organ tune then female with 5-digit number groups at 1510. (Fowler-NY)

13445.0 ANDVT scrambled comms heard here at 2030. (Jones-CA)

13446.0 WGY918-FEMA Denver, CO, calling WGY912-FEMA Berryville, VA, at 1844. Isn't 918 a FEMA MERS? (Metcalfe, KY)

13458.0 ALE pulses noted here at 2145. (Jones-CA) *Probably FAA selscan ALE pulses-Larry.*

13485.0 ANDVT comms noted here at 0130. (Jones-CA) *Interesting, as this is a US Navy MARS channel-Larry.*

13585.9 CNM85-MAP Rabat, Morocco, at 1720 with 50 baud RTTY French news bulletins. (Baker-OH)

13954.5 HBD20-Swiss Embassy Berne, Switzerland, at 1540 in SITOR-A with 5-letter messages for Havana/Ottawa. (Baker-OH)

13957.6 Traffic to various RFGW/MilFrance Ambassxs in French and "non protege" (in the clear) using FEC-A 192 baud at 1414. (Vaillaneourt-PQ)

13960.0 Andrews working Air Force 2 at 2346. (Jones-CA)

13971.5 CLP65-Cuban Embassy, Managua, Nicaragua, at 1945 in 300 baud packet. First known logging of a Cuban Embassy in this mode. (Baker-OH) *I think you are right, Rick, I haven't seen it before. Congratulations-Larry.*

14615.0 Reach 50003 (C-5) enroute to Davis Monthan working Ascension GHFS on this discrete with phone patch to Hilda West at 2200. (Jones-CA)

14776.0 WGY918-FEMA Denver, CO, and WGY912-FEMA Berryville, VA, with a H171735 relay message for WGY913 at 1735. (Metcalfe, KY)

15016.0 Albrook GHFS with an "all frequency request" for Shark 21 at 1610. (Riddell-NY)

15084.0 EAM broadcast for four continuous hours by numerous tri-graph callsigns starting at 2130. Highly unusual. (Fowler-NY) *This is an old US Navy only aero OR channel. Both coasts used this freq so it is really hard to say what was happening here. EAM fans take note of this intercept-Larry.*

15094.0 SAM 201 working McClellan GHFS (discrete) with phone patch traffic at 1734. (Jones-CA)

Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702
E-mail: <ghauser@hotmail.com>; fax: (405) 233-2948, ATT: Hauser

World of Radio on the Web

Greetings, everyone! It's been a fun month, with lots of interesting and unexpected developments. I've been spending even more time surfing the web for news to include here, and exchanging DX news electronically with the bulletins you see repeatedly quoted below, but I still love to get original hard copies in the P-mail.

I invite you to visit my website at **http://hudson.idt.net/~khecht19/radio/shortwave/ghauser**, a URL maintained by Kevin Hecht. You'll find the latest weekly update to the frequently changing *WORLD OF RADIO* schedule, as well as my other broadcasts and publications. You can even link into RealAudio playbacks of *W.O.R.* at your convenience!

In addition to the sites mentioned two months ago, I'd like to draw a few more to your attention. Another good one for beginners, from a British standpoint, is from Jeremy, G4NJH: **http://www.innotts.co.uk/~asperges/swl.html**

Chuck Bolland, purveyor of Orchid City Software, has been discussing whether the full moon can influence the ionosphere—after all, a lot of sunlight is being reflected to the dark side of the earth, perhaps including enough UV to make a difference. Check **http://www.flinet.com/~chuck/**

More and more SW stations are getting on the Internet, making us wonder how much longer the original medium of SW can last? See URUGUAY. On *rec.radio.shortwave*, MitchW contrasts TTA (Through The Air) with OTW (Over The Web) broadcasts. CBC is live on the web now 24 hours, both Radio and Stereo networks; you can reach it and about 25 other stations via the World Radio Network site: **http://www.wrn.org/audio.html**.

Tim Hendel, board member of RFPI, again this year is collecting unwanted SW radios to be donated to needy third-world individuals through the Feminist International Radio Endeavor. They need not be in working order. He needs them by Dec. 31; phone for more info at 205-539-5678.

Time is running out to hear Radio Denmark in English. The twice-monthly quarter-hour was authorized for 1996 only. The times to hear it in North America this month, via Norway, are: first and third Sundays at 1238, 1338 and 1438 UT on 11840; 1538 on 9485; 1638 on 11840; 1738 on 13800; 1838 on 9590; 2038 on 7480, 2138 and 2338 on 7465; following UT Mondays at 0038 on 7465; 0138 and 0238 on 7465, 7520; 0338 and 0438 on 7520, as reported in *BC-DX* and *EDXP*. *Adelante*!

AFGHANISTAN Under Taleban control R. Afghanistan returned to 7199v at *0130 within 48 hours, quit using unique flute interval signal, banned women from working at station (Victor Goonetilleke and Sarath Weerakoon, Sri Lanka, *UADX* via *Cumbre DX, DX Window*) At times IDs in Pashto and English as R. Voice of Shari'ah, with some of same announcers. Domestic service heard 0215-0335 (Fri 0800), 1330-1600 on 7200. External follows at 1600-1700, last quarter hour in English but timing varies and may not be on SW (BBC Monitoring)

ARGENTINA RAE on 15338.6 ex-15345 at 2328-0100+ in Spanish, Portuguese (Bryan Clark, NZ, *Cumbre DX*) RAE director was interviewed on RHC's *En Contacto*; 35 of the 60 staff left with change of government, destroying the station; she is trying to reconstruct it (gh) R. Piraña Internacional operates from somewhere in this country (Gabriel I. Barrera, *Play-DX*) A homebrew AM transmitter runs 60 watts carrier power; and a 100 watt SSB was being repaired; listen to *W.O.R.* for dates (Jorge R. García, RPI)

AUSTRIA RAI W96 English to NAm: 1330 on 13730; 0030 & 0230 on 7325; 0530 & 0630 on 6015 via Canada; LAm 0230 on 9870, 9495 (ORF) DX programs in German shuffled to: *KW-Panorama* Sun 0005; *DX Telegramm* Sun 0625, 1325, Mon 0125, 0325, 0525 (Wolf Harranth, *KWP* via *BC-DX*)

BANGLADESH R. Bangladesh made name change even in English to "Bangladesh Betar," starting news in English at 1230 on 7185 which was clear and 9548 badly distorted (Victor Goonetilleke, Sri Lanka, *UADX* via *DXW*)

BELARUS V. of Russia Kalodziscy relay, RV-174, 250 kW for W96: 1500-1700 9905, 1730-2200 7105, tentatively (Nikolai Rudnev, DSWCI *SW News*)

BOLIVIA 4777.1v to 4777.8 station tested in June as La Voz de los Lípez, but now calls itself La Voz del Altiplano Uru, named for area Indians, heard from 1000 (Emilio Pedro Povrzenic, Argentina, *Latinoamérica DX* via *RNM*)

BOTSWANA R. Botswana on new 9640 with ID in English news at 1917, weather, first heard until 2202* with choral anthem, big signal (Jay Novello, NC, *World of Radio*) Also here 2120-2201*, African language, hilife music, no discernable IDs (gh, OK) And *0252-0330+, weak and covered by DW from 0257, best on 4820 (Brian Alexander, PA)

BRAZIL R. Baré reactivated on 4894.97, very good with pop music at 0952-1002, UT-5 timecheck on Oct. 10 (Art Delibert, MD, *Cumbre DX*) Stations planning on SW, per questionnaires: R. América, 750, Belo Horizonte on 62m, 5 kW; R. Ibituruna, 930, Governador Valadares, 31m, 10 kW; R. Tres Rios, 1150; R. Universal, 1530, Teodoro Sampaio, "shortly" (Thord Knutsson, *RNM*)

BULGARIA R. Bulgaria W-96 English: 1130-1230 EAs 9440, 2000-2100 Eu 7335, 9700; 2200-2300 Eu 7390, 9700; 0000-0100 & 0500-0600 NAm 7375, 9485 (R. Bulgaria) DX program: Fri 2045, Sat 0045, Sun 2245, Mon 0545, 1215 (*Panlview* via *BC-DX*)

BURUNDI R. Democracy, pro-Hutu on 7040 at *0430 claiming to broadcast from Burundi, but believed to be from Uvira, Zaire (BBCM)

CANADA RCI W-96 schedule shows no changes in program titles to NAm, Eu; just the times have shifted one UT hour later. Sackville relays of other stations include 17840 BBC formerly via Antigua, 1657:30-1859 at 285°; CRI at 0300-0359 Spanish, 0500-0559 English both on 9560 (via Westenhaver) *The 0500 broadcast doesn't propagate in the middle of the night except in summer. -gh.*

COLOMBIA R. Turbo, 2920 = 2 x 1460 at 0159-0248, trop and pop music; used to be on SW 6085 as Ondas del Darién (Don Moore, IA, *W.O.R.*) This is probably really R. Uno, Barranquilla, at 0008, name change from R. Multicolor (Henrik Klemetz, *Dateline Bogotá*) Ecos del Orinoco reactivated on 4905.42, 0040-0300+, nice salsa, romantic music (Brian Alexander, PA)

COSTA RICA RFPI's *Global Community Forum* with call-ins, now airs live UT Fri 0200-0300 on 7385, 6205-usb. RFPI has added a monthly 15-min supplement to *World of Radio* called *Continent of Media,* immediately following the usual *W.O.R.* times; it may become weekly in January (gh) *Tico Times* supplies CR/CA news for weekly quarter-hour, Fri 2100, Sat 0500, Mon 2330, Tue 0730, except the one week a month *The Neumaier Report* appears (RFPI *Mailbag*)

CUBA After another stint announcing at RHC, Keith Perron is back in Montréal (Bill Westenhaver, PQ)

Some report R. Armonía, Argentina, 3rd harmonic on 4800, but all I hear is R. Rebelde, 8 x 600 at 0210 and 0830-0900+, and stronger on 3600, 4200 as well as //5025 (Brian Alexander, PA, *W.O.R.*)

DENMARK License for community neo-Nazi FM station R. Oasis revoked; Danish neo-Nazis have applied for a SW license to broadcast to Europe (*SCDX/Mediascan*) Also see lead item above

GABON [non] Africa Number One has new

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; Z-96 = Summer season; W-96 = Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

webpage in French: **http://www.sit.ca/africa** (Tom Sundstrom, NJ) *So it's in Canada*-gh.

GERMANY R. Bremen missing from 6190, enormous signal now deceased? (Noël Green, UK, *BC-DX)* R. Bremen confirms that 6190 was shut down Oct. 1. Regionals still active are on 6005, 6030, 6085, 7265, nice targets outside Europe (Kai Ludwig, *BC-DX*)

New AWR sked via Jülich for W96: 0400-0630 5900, 0800-0900 S/S 7230, 1700-1800 7110, 1900-2030 6015, none in English, 100 kW (Andreas Erbe via Kai Ludwig, *EDXP*) Replaces Velke Kostolany, Slovakia

[non] Among DW relay sites for W96 are RN Bonaire in English at 0500 on 9650; RCI Sackville at 0100 on 5960, 6085 (via Andreas Volk, *rec.radio.shortwave*) DW plans lots of holiday specials, both in German and English, Dec. 24-26; *Come to Germany,* Dec. 3-4 is about The Silver Road, Saxony's tourist route, UT Wed 0130, 0530 (DW *tune in* via Jim Moats)

GUAM KTWR added another English service, 1000-1100 on 9870. *Pacific DX Report* will be Sat 0940 on 15200, Mon 1615 11580, Tue 0820 15200 (Bob Padula, *Electronic DX Press*)

INDONESIA Five new 250 kW RRI SW transmitters were inaugurated Sept. 14 in Banta Sunggu, near Ujung Pandang, South Sulawesi; and four more at the RRI complex in Cimanggis near Jakarta, thanks to British government and Marconi aid, RRI reported (BBCM) Sulawesi site uses 9565, 9630, 11750, 11885; Cimanggis 9680, 11785, 15125, 15150 (David Foster, *OzDX* via *Jembatan DX*)

INTERNATIONAL VACUUM *WORLD OF RADIO* winter sked via World Radio Network: NAm on Galaxy 5, 125°W, tr. 6-V, 3.820 GHz, 6.8 MHz, Sat 0630, 2000. Eu on Astra 1B, 19°E, tr. 22-V, 11.538 GHz, 7.38 MHz, Sat 0430, 1700, Sun 1130 (**http://www.wrn.org**)

INTERNATIONAL WATERS [non] Report from Allan Weiner, in charge of outfitting the *Electra* for Scott Becker of Lightwave Mission Broadcasting: ship passed sea trials, max speed 12 knots, repairing hull and painting cost $25K; transmitters should be ready in early Dec; plans SW only, two frequencies at a time, minimum 10 kW, no MW; location still secret; predicts launching in early January depending on weather (Chris Lobdell, MA, *NU* via *EDXP*) Formal complaints have been filed against Weiner with the Kennebunk Chief of Police and the Maine Attorney General, accusing him of fraud in the aborted sale of the *Sarah* to us (MPLX/Baskir-Byford Communications) Under US law, the original seizure of the vessel by the US was illegal, an act of piracy, and thus it had no right to sell it to Frank Ganter who sold it to Weiner. The only legal way for the US to dispose of it was to scrap it. See US Title 19, section 1609 (John England, MPLX)

IRAQ Mother of Battles Radio at 1600-1900 announces 9745, but heard on 9750v. Main Program in Arabic at 0255-2415 on 9715, 7157, 4615. Kurdish 0315-2130 on 6560 (BBCM)

[non] Republic of Iraq Radio, Voice of the Iraqi People, announced freqs as 9560, 11700, 15235, 9570, 9980, 9380, but checks 1500-1700 found it on 9285, 9562, 9568, 9852, 11713 (BBCM)

IRELAND [non] West Coast Radio Ireland began weekly relay via Jülich, Germany on Thursdays from Oct. 31: 0100-0200 NAm 5910, 1500-1600 Eu 6015, 1800-1900 Af 11665, with news, features, music, letters, competitions galore, insights into life in Ireland, specials on Irish abroad. When sponsorship allows, will expand into several languages, per info from website **http://www.mayo-ireland.ie/shortwave.htm** Programs originate from studios of Mid-West Radio, Mayo; address: West Coast Radio Ireland, Murneen P.O., Claremorris, Co Mayo (Bill McClintock, *World of Radio*)

ISRAEL Kol Israel W-96 English: 0500-0515 on 7465, 9435, 17545; 1500-1530 on 11605, 9390; 2000-2025 on 7465, 9365, 9435, 15640 (Doni Rosenzweig, *rec.radio.shortwave*)

KOL ISRAEL QSL קול ישראל

ITALY AWR has been granted a license for a major SW station near Argenta, covering India to Morocco; should be ready in 1999 (AWR via DSWCI *DXW*)

JAPAN Traditionally conservative in frequency usage, R. Japan for W-96 shows 15 new extended-band channels; to NAm/SAm: 0100-0400 13630, 0500-0700 9835, 12000, all from Yamata; also, some from relays, 9825, 9855, 9860, 11665, 11685, 11690, 12005, 12030, 15460, 15475, 15590, 17685 (NHK via Don Rhodes, Bob Padula, *EDXP*) From W96, IDs are coördinated with external TV service, now "Radio Japan, NHK World" (RJ*MR*)

JORDAN BBCM omits the 1500-1730 English from R. Jordan, but I'm still hearing it on 11970 (Michiel Schaay, Holland, *BC-DX*)

KALININGRAD R. ABC/Denmark ceased SW 7570 via here Oct. 20, as Stig Hartvig Neilsen left the station for another job (Nielsen, *rec.radio.shortwave* via *EDXP*)

KAZAKHSTAN [non] Kazakh R. Almaty started more broadcasts to Europe, at least weekdays, via Ukraine, with English 0930-1000 on 7205, 11705 //9505 direct (Wolfgang Büschel, Germany, *BC-DX*)

KURDISTAN V. of the People of Kurdistan, 1400-1600, repeated 0300-0500 on 4020-4050v, times, frequencies and durations highly variable; previously has used 15060v, 7270v, 6295v, 5845-5880v, 4100-4110v, 3930-3960v (BBC Monitoring)

LESUTU R. Lesutu, 4800 also with spur on 4812, perhaps mix with BBC MW 1197 as both go off at 0715 (Piet Conradie, RSA, *W.O.R.*) LNBS is now willing to hire out to other parties two SW transmitters formerly rented to BBC, says Peter Moepi, Studio Engineer (Hans Johnson, *Cumbre-DX* via *EDXP*) No plans for discontinuing R. Lesotho SW service, tho transmitter is rather outdated and in need of major refurbishment. SW reaches Sotho people far beyond this small country (M. J. Rigby, via Mickey Delmage, Alta.)

LIBERIA World's first QSL from R. Liberia International, now on 5100, came by fax from Isaac P. Davis. He promises "enviabiy colorful QSL card" and material prepared especially for DXers by postal mail when restored to those paying $5 return postage fee (Rolf Lövström, Norway, DSWCI *SWN*)

MADAGASCAR New 4960.85v fades in at 1545, beautiful music, Malagasy and French (Victor Goonetilleke, Sri Lanka, UADX via *BC-DX*) Most reliable long-path African here (Hans Johnson, CO, *Cumbre-DX*)

MALAWI MBC sked shows 0257-0810, 1515-2210 3380, 0815-1510 9625, all now 50 kW ex-10; fax 671257 or 671353 (*Panlview*)

MALTA [non] VOM heard with combined DX/mailbag show Sat 2045-2055 (Bob Padula, *EDXP*) VOM via Russia until March 29 is to be one hour later, i.e. 2000-2200 on 7390, 7440; Sun 0200-0500 on 15550, 17570. Also considering expanding broadcast to Japan, starting service to USA (Masao Hosoya via Marie Lamb, *Cumbre DX*) Euro service called VOM, funded by Malta and Libya; other services called R. Melita, funded by Maltese government (BBCM)

MAURITIUS MBC, once on SW, has no plans to return to SW as adequate coverage is provided by AM, per station personnel (Hans Johnson, *Cumbre DX*)

MÉXICO Off DST, XERMX programming on 9705 shifted one hour later, but also some other changes: *Encuentro DX* UT Thu 0200, Sun 2300; *Radio Correo del Aire* Sat 2300 among other times (Julián Santiago, XERMX) Tus Panteras, Mérida, on 6105 at 1300-2140 with lively LA pops in mid-Oct (Bob Wilkner, FL, DSWCI *DXW*) *Had been inactive - gh*

NETHERLANDS ANTILLES RN is building a few lower-powered transmitters at Bonaire relay for DAB experiments, regional broadcasts (RN *Media Network*)

NICARAGUA R. Miskut has been running only 300 watts on 5770 due to lack of a transmitter module; MW transmitter was scheduled to arrive in Oct or Nov. Sked is 1200-2330 M-F, 1200-2400 Sat, 1200-1500 and 1800-2330 Sun, variable (Tetsuya Hirahara, who visited station in Sept, *Nica DXing* via *Radio Nuevo Mundo*) *Arrival of MW could mean the end of SW-gh.* 14th anniversary is Jan. 9, 1997 (Max van Arnhem, *DX Window*)

NIGERIA [non] R. Kudirat, 6205 via RSA at 1955 had a "Kudirat Radio" jingle, *Voice of the Minorities* program in local language, English sign-off at 2009-2010* (Al Quaglieri, NY)

NORWAY R. Norway W96 English to Americas: 1600 11840; 2300 5905, 7465; 0200 7465, 7520; 0400 7520 (via Bill Bergadano, *rec.radio.shortwave*) *Quite a reduction, correcting last month-gh.* Fredrikstad transmitter will go off the air for good at the end of 1996 (Erik Køie, R. Denmark, DSWCI *SWN*) QSL it while you can (Finn Krone, DSWCI ed.)

PAKISTAN PBC S96 and tentative D96 showed English: 0230-0245 7350, 11760, 15120, 15485, 17705; 0800-0850 and 1100-1120 15470, 17900; 1600-1630 7350, 9485, 9900, 11570, 11955, 15555; 1700-1750 9400, 11570 (R. Pakistan via Gigi Lytle)

PERÚ New on 5730 is R. Santiago, Puerto Galilea, Condorcanqui province, Amazonas dept, quite good at 1040, 2240-0100+ saying sked is 1000-1400, 2000-0100 (Henrik Klemetz, *Dateline Bogotá* via *DXW*) La Super Radio San Ignacio active almost nightly on 4190.4 at 2300-0100v, plugs for local stores under same ownership (Klemetz, *DB*)

Heard //6753.2 which is just plain R. San Ignacio. R. Huarmaca, Huancabamba at 0230-0302* on 5385.3 ex-5485.5 (Pedro F. Arrunátegui, Lima) *Due to interference clash we gave last month-gh.* Estación Vernacular, San Miguel de

Cajamarca, on 5453.8 at 0334-0343* (Argentine DXpedition, *DXW*)

PHILIPPINES R. Pilipinas, DZRM uses nominal 9615 with 10 kW to reach outlying provinces at 2200-1400, but something on 9618.9 ran past 1400 (Hans Johnson, CO, *Cumbre DX*) RP at 0230-0330 via VOA on 15270, also announcing 15120, 11885; 0330-0400 still on 13770, 15330, 17730 (Robert Jones, Australia, *EDXP*)

R. Veritas Asia until 1 March shows the only azimuths east of north are Russian 2130-2225 on 9560 at 15°, and Pilipino 1230-1255 on 9505 at 30° toward Japan and NAm (via Bill Westenhaver, PQ)

DX Dial from FEBC is aired first every Tue at 1355 on 11995, repeated Sat 0120 on 15450, 0940 on 11635, 1440 on 11995 (Alok das Gupta, India, *EDXP*)

PORTUGAL R. Renascença has left shortwave, no longer heard on 9680 in Europe (Matthias Gatzke via Kai Ludwig, *EDXP*) Back one week later, football coverage Sun 1500-1700 (Wolfgang Büschel, *BC-DX*)

RUSSIA V. of Russia changed signature tune Oct. 7 to a theme from *Pictures at an Exhibition* by Mussorgsky; now broadcasts in 33 languages, 95 hours a day (BBCM) Mayak via Murmansk 0730-1500 on new 7310-usb, 50 kW,, 195° (*Panlview* via *BC-DX*) According to a reply, V. of Russia, Khabarovsk station will publish its original QSL card soon (Mizuno Mitsuaki, DSWCI *DXW*)

SLOVAKIA RSI W96 for English: 0100-0130 NAm 5930, 7300, SAm 9440; 0830-0900 Au 11990 17550, 21705; 1730-1800 WEu 5915, 6055, 7345; 1930-2000 WEu 5915, 6055, 7345 (Jürgen Kubiak, *EDXP*)

SOMALIA R. Mogadishu, V. of Somalia, 2001-2014 on 6969-usb in English with tribal music, very clear ID, long speech, local and international news (Beppi Gornati, Italy, *EDXP*)

SOUTH AFRICA Tho funding guaranteed until March, more than half of the staff of Channel Africa have departed. No one is in charge of news, and Swahili has only one person (RN*MN*)

SPAIN REE's Sephardic service continues for winter UT Tue 0415-0445 to NAm on 9690, tho it propagates poorly beyond the east coast; here's a sample of what Judeo-Español looks like (gh)

> ***SEFARAD es un programa semanal en lingua sefardi, djudezmo o djudeoespanyol, la linguo aviada por los djudios ke bivian en Espanya, i es en nuestros dias, espanyol medieval kon palovras i ekspreziones en otras linguas, de los paizes ande los sefarodis se aresentaron en el mundo,***

SRI LANKA SLBC External in English has dropped some frequencies to save power, but remains: 1030-1130 on 11835, 17850; 0020- on 15425, 9720 (Victor Goonetilleke, UADX via *Cumbre DX*) 12.5 kW Marconi transmitter with wiring eaten by rats repaired by TWR and used on 6035 with dipole until they were allowed to use MW; then SL government used it daytime for broadcasts to government forces in northern Tamil area (Sarath Weerakoon and Goonetilleke, *BC-DX*) Prime time for 6035 is 1230-1330, now SLBC's Tamil service, no longer a black clandestine (Weerakoon, *UADX* via *Cumbre DX* via *BC-DX*)

SWEDEN R. Sweden W96 English to NAm: 1230 on 15240, 11650 or 13740; 1430 on 15240, 9485 or 11650; 0230 on 6200; 0330 on 7115; LAm 0030 6065, 0130 7265 or 7290 (via Cindy Lindau, MN, Bob Thomas, CT) *The same contradiction as in previous seasons appears in "SCDX/Mediascan" as voiced and E-mailed by George Wood: "7155" at 0330; also try the 2230 to Eu/Af on 7325, 6065-gh*

TAHITI RFO will continue using 15167v until the transmitter dies; it will not be fixed or replaced; seems to be on the air 24 hours, but quite weak even near the site 5 km north of Papeete (Terry Palmersheim, Tahiti, *Cumbre-DX* via *BC-DX*)

THAILAND BBCWS sked shows new relay here completed, and scheduled in English: 5965 2100-2200, 2300-2400; 5990 1300-1615; 6065 0900-0915, 1100-1400; 9580 same plus 2300-0030; 11955 0330-0500; 15280 0000-0030, 0100-0300, 0330-0500, 0900-0915. But some mistake as only 2 x 250 kW transmitters but sked indicates more at once. Two more transmitters to be moved in from Hong Kong (VK3BCY via Martin Elbe, *DXW*) BBC wants reports on whether the Thai frequencies reach California as well as Hong Kong did (*Waveguide*)

TONGA TBC wants to return to SW early in 1997 with a new transmitter from UNESCO. Has been off 5030 since 1993, with less than 1 kW; hope new one will be 10 kW (Hans Johnson, *Cumbre DX*)

TURKEY Türkiye Polis Radyosu, Ankara, operates 1400-0800 on 7370 (*Panlview*)

URUGUAY R. El Espectador is so pleased with about 13K hits per month to its website from abroad that it is not interested in repairing its 11835 outlet; listen via **http://www.zfm.com/espectador** (Horacio A. Nigro, Uruguay, via *Relámpago DX* via *Play-DX*)

U S A WWCR experimented with suppressing LSB on 5065, then switched to 5070 to avoid interference, on air 2200-1200 Dec-Feb. Audio improved by receiving 5065 in USB mode (gh) A survey by mail of people who had written WWCR revealed the top-ten favorite programs: 10 *Ham Radio & More*, 9 Kurt Saxon, 8 Bo Gritz, 7 *World of Radio*, 6 *Protecting Your Wealth*, 5 Pastor Pete Peters, 4 Mark Kornke, 3 Country Music, 2 Norm Resnick, 1 Brother Stair. As a result we feel justified in selling all the time on WWCR-4 to Stair (George McClintock, WWCR)

WORLD OF RADIO on WWCR: Thu 2130 15685, Sat 1230 7435, Sun 1000 3210, 2000 12160, Mon 0030 5070, 2130 15685, Tue 1330 15685, Wed 1230 15685. (gh)

WVHA announced Oct. 19 during the Sabbath 1300-1700 service on 15745 that they must have $200K to finance company by Oct. 31 or foreclosure will begin (*World of Radio*)

WHRI still hadn't fixed the erroneous 9945 entries in its website schedule when we checked it again two months later. Chuck Harder sued UBN over financial deal, claiming they kept him off the air (gh) Then he appeared on TalkAmerica Network at least on satellite (Loren Cox, KY, *W.O.R.*)

WGTG found on 5085 ex-9400 at 0100, and like 9400 on AM with suppressed lower-sideband, same audio quality (Tim Hendel, AL) *i.e., worse than telephone-gh.* Changeover was at 6 pm ET; surprised those expecting KVOH on 5085, which had reserved it for more than a year, but decided it could not get its transmitter, antenna to function on such a low channel (*W.O.R.*)

WRMI, 9955, has started a Portuguese hour, Sun 2130-2230 including *Encontro DX*, originally broadcast on R. Aparecida, Brasil, and *Vida Universal* from Germany (WRMI)

VOA cancelled the UT Sun 0030 broadcast of *Communications World* after Oct. 20. Remains Sat 1030 on 5985, probably best for reception in NAm; 1230, 1730, 2130 (VOA *CW*) Weekend broadcasts to Caribbean and Latin America dropped, still UT Tue-Sat 0000-0200 (Dan Ferguson, VOA, *rec.radio.shortwave*) Also cancelled more languages on SW and reduced Spanish to only one hour at 0100, and closed down all SSB feeders from Greenville to Greece. VOA experimented one week in Oct with digital broadcasts from Delano, 0000-0230 on 5902.5, 1900-2000 on 15235—binary phase shift keying at 8 kbps (VOA *CW*) *Please! Blanketed the entire 19m band and beyond, at least 14800-15600, interfering with even the strongest analog stations; this is progress?-gh*

R. Free Asia full initial schedule in Mandarin: 1500-1600 on 7495, 5860 via Kazakhstan, 7530 via Armenia, 6205, 6240 via Tajikistan, 9430 [sic--was never this but 9455 via KHBI, Saipan]; 2300-2400 7495, 7530, 6205, 6240 from same, and 13825, changed to 13800 via KHBI (RN*MN*, BBCM) VOA's Mandarin broadcasts have been retimed to avoid conflicting with RFA's (VOA *Communications World*) RFA plans to have all seven languages going by January (RN*MN*)

R. Free Asia was lauded in an Oct. 9 editorial by John Hughes in the *Christian Science Monitor*, but he fails to point out that CS benefits financially by selling airtime to RFA on KHBI. There is another connection: Dan Southerland, VP for programming, is a former CSM correspondent in Asia (via Jim Moats) Website up but not fully operational; has mission statement claiming objectivity and non-criticism of any government [*so why bother?*] from a non-US government station; plans to have lots of text in Mandarin and each other language via special software. Check out **http://www.rfa.org** (gh)

Address for reports: 1201 Connecticut Ave. NW, Washington, DC 20036 (BBCM) We hear it will move into building formerly occupied by NPR (gh) At 2025 M St. NW, 20036 (*WRTH* via *DXW*) The 1500-1600 broadcast on 9455 in Chinese via KHBI Saipan was sometimes well heard in deep North America, but WEWN planned to share the frequency for W96. At 2300, 13800 sometimes has dual-path echo here (gh)

Many thanks to WEWN frequency manager Stanley Leinwoll for agreeing to vacate 9580 which had been blocking R. Australia in the mornings, and 7395, which had been splattering RFPI 7385 in the evenings (gh)

Monitor Radio International lost some familiar voices in Oct, as Lisa Dale, *Letterbox* host, left for a job with the Boston Symphony Orchestra; and Rod MacLeish relinquished commentaries and Friday *Roundtables* for print *Monitor* (Jim Moats, OH)

UZBEKISTAN R. Tashkent English at *1200 on 5060 mammoth signal over Xinjiang, announcing also on 9715, 7285, 5975 (Bob Hill, MA, *DXW*)

VIETNAM unID on 4706 very weak at 1200-1400+ definitely //5925 Hanoi, strong at times (Hans van den Boogert, Taiwan, *DXW*)

ZAÏRE Voix du Zaire, Kinshasa, back on 15244.5 around 0500-1850; major news in French at 1130-1155, 1800-1830 (BBCM) 15244.52, *0500-1850*, heard all day, mostly in French, IDs only as R. Nationale (Piet Conradie, Cape Town, RSA, *W.O.R.*)

R. Agatashya—Swallow of Hope in Kinyarwanda, 6125 from transmitter in Bukavu, operated by Reporters without Frontiers, at 0600-1000, 1400(M/W/F 1300)-1800(S/S 1900) includes news in English Wed & Sat 1700-1730 (BBCM)

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

http://hudson.idt.net/~khecht19/radio/shortwave/ghauser

Broadcast Loggings

GLOBAL FORUM

Gayle Van Horn

This column is dedicated to the memory of Loy Lee of the Maywoods DX Team, who passed away Oct. 19, 1996.

0038 UTC on 6479.8
PERU: Radio Los Andes. (Tent) Spanish. Andean flute music program to regional announcements. Tentative ID format, excessive Morse code interference on frequency. (Mark Veldhuis, Borne, Netherlands/via email)

0038 UTC on 3290
NAMIBIA: Namibia BC Corp. Announcer reading obituary notices to station ID at 0102. (Maywoods DX Team/Loy Lee, Ed Shaw, Chuck Everman, Jim McClure, Wayne Gregory, John Haffendorfer)

0040 UTC on 4805
BRAZIL: Radio Amazonas. Announcer in Spanish with "power music" promo and regional items. Brazilian stations noted in Portuguese; **Radio Educacao Rural** 4755 at 0101; **Radio Aparecida** 9630 at 0100; **Radio Brazil Central** 4985 at 0159. **Radio Nacional do Brazil** noted in English on 15445 at 1250. (Maywoods DX Team. KY)

0050 UTC on 4799.8
GUATEMALA: Radio Buenas Nuevas. Spanish. Talk segment into children's chorus music. Guatemalan stations noted; **Radio Maya de Barillas** 3324.8 at 0133; **Radio Chortis** 3380 at 0153. (Maywoods DX Team, KY)

0057 UTC on 4770
ECUADOR: Centinela del Sur. Spanish. Regional music to chat and "Centinela del Sur" ID. Ecuadorian stations noted as; **La Voz del Napo** 3279.5 at 0116; **Radio Quito** 4919 at 0131; **Radio Nacional Espejo** 4879.6 at 0248. (Maywoods DX Team, KY)

0135 UTC on 4939.5
VENEZUELA: Radio Amazonas. Spanish. Traditional Venezuelan harp music to announcements about Pto Ayacucho. ID at 0200 with slogans "mas musical," "mas noticiosa," and "para todo Venezuela y todo el mundo." Poor signal with intermittent utility QRM. (Don Moore, IA/*MARE*)

0220 UTC on 3230.2
PERU: Radio El Sol de los Andes. Spanish. Station from Juliaca, Puno, with Peruvian folklorica music to time check/ID as: "8 minutos para las 10 de la noche en los estudios de radio El Sol de los Andes". Peruvanian stations noted as; **Estacion Wuari** 3280.7 at 1130-1202; **Radio Luz y Sonido** 3234.8 at 2312-2349. (Pedro Arrunategui, Lima, Peru/*The Four Winds*)

0242 UTC on 5700
PERU: Radio Freq San Ignacio. (tent) Spanish. Folk music to local comunicados, including one for listener in Chiclayo. No ID noted. Poor signal. (Moore, *MARE*)

0257 UTC on 9975
USA: KVOH. *Riddles the Clown* program including 1-800 publication/transcript offer. (Sue Wilden, Columbus, IN/via email)

0330 UTC on 4800
LESOTHO: Radio Lesotho. Sesotho. Church service followed by news format, monitored to 0405. (Lee Silvi, Mentor, OH/via email)

0940 UTC on 3280
ECUADOR: La Voz del Napo. Spanish. Pan-flute music to regional announcements, ads, and IDs. (Silvi, OH).

1000 UTC on 6090
CHILE: Radio Esperanza. Spanish. Male with ID and talk about Chile, strong co-channel and adjacent channel QRM. (Racenis/*MARE*) Station noted 1107-1114 (Moore/*MARE*)

1045 UTC on 11715
CANADA: Radio Korea Int'l relay. *Globalizing Korea* program Interviewing the head of Korea's Home Shopping Cable TV channel. (Bob Fraser, Cohasset, MA)

1045 UTC on 6100
NEW ZEALAND: Radio NZ Int'l. Program of excerpts from classical music. (Fraser, MA) BBC *Newsdesk* heard on 6100 at 1100. (Racenis, *MARE*)

1054 UTC on 4975
PERU: Radio del Pacifico. Spanish. Very traditional Andean folk song with evangelical lyrics. ID at 1058 then into a traditional hymn. (Moore, *MARE*)

1100 UTC on 11335
NORTH KOREA: Radio Pyongyang. Sign-on ID to news item on it being the 6th anniversary of Youth Day, poor signal for // 9975. (Fraser, MA)

1110 UTC on 2325
AUSTRALIA: VL8T/(Tennant Creek)Domestic service in English with regional programming. VL8A/(Alice Springs) // on 2310. (Silvi, OH; Racenis, *MARE*)

1118 UTC on 4890
PAPUA NEW GUINEA: NBC. Pop music to regional news on Port Moresby to 1200. PNG's **Radio Madang** 3260, 1110-1201. (Silvi, OH)

1230 UTC on 13625
FRANCE: Radio France Int'l. *RFI Europe* with report on Europe's new professional armies, // 15530. (Fraser, MA)

1234 UTC on 6010
MEXICO: Radio Mil. Spanish. Announcer's chat to station IDs and local interest items. **Radio Mexico Int'l** 9705 noted at 1234. (Maywoods DX Team, KY)

1338 UTC on 9555
PHILIPPINES: Radio Veritas Asia. Musical ID and upcoming program preview for Hindu service. (Zacharias Liangas, Thessalloniki, Greece/*TFW*)

1340 UTC on 15240
SWEDEN: Radio Sweden. Program on the *Jenny Lind Festival*-the Swedish nightingale of the mid-19th century. (Fraser, MA)

1426 UTC on 11865
USA: BBC relay via Okeechobee, FL. Enlightening interview with John Wayne Bobbitt, who offered to expose his "injury" to anyone who asks! (Wilden, IN)

1435 UTC on 13675
UNITED ARAB EMIRATES: UAE Radio-Dubai. Arabic music and prayers. (Wilden, IN) Monitored on 15395 at 2007. (Maywoods DX Team/KY)

1444 UTC on 5005
MALAYSIA: RTM Malaysia. Oldies music to station ID. National anthem to 1459*, unknown station noted on frequency after sign-off, tentatively presumed as Radio Nepal. (Veldhuis, Netherlands)

1445 UTC on 4959.6
VIETNAM: Voice of. Vietnamese announcements to regional music. Station ID and announcer's segment. VOV noted on 10059.8, 1315-1332 with talk to instrumental music program. (Veldhuis, Netherlands)

1515 UTC on 11970
JORDAN: Radio Jordan. Program feature on environmental conference to station promos and news. (Maywoods DX Team/KY)

1547 UTC on 4927
INDONESIA: RRI-Jambi. Indonesian. Easy-listening music to program announcement. Interval signal, station ID to newscast. (Veldhuis, Netherlands)

1557 UTC on 15295
MALAYSIA: Voice of Malaysia. Good signal over HCJB, noted with pop music. Arabic service at 1557 into news and comments to 1625. (Liangas, Greece/*TFW*)

1640 UTC on 15615
ISRAEL: Reshet Bet. Hebrew. Announcer's promo for film starring Alan Alda and George Segal. Station heard on 17545 at 1702. (Edward H. Schwartz, Chicago, IL)

1643 UTC on 9530
SOUTH AFRICA: Channel Africa. *Sportswatch* program to 1645. Frequency quote to telephone interview on humanitarian situation in Sudan. Stock market report to *Businesswatch* report. (Serra, Italy/*TFW*) South Africa's **Trans World Radio** heard on 7215 at 2100 in English. (Maywoods DX Team/KY)

1707 UTC on 17560
GERMANY: Deutsche Welle. German. Political news on Israel to item on popular Berlin parade with a sampling of music from the marching bands. (Schwartz, IL)

1840 UTC on 15265
BRAZIL: Radio Nacional do Brazil. Report on the Brazilian cellular phone system, fair to poor signal quality. (Fraser, MA)

1900 UTC on 11605
ISRAEL: Kol Israel. Report on Palestinian meetings, heard on // 9435, 15640. (Fraser, MA)

1905 UTC on 9534.8
ANGOLA: Radio Nacional. French. Announcer's chat to "Nacional" ID, *We Are the World* pop tune. (Veldhuis, Netherlands) Portuguese service noted on 4950 at 2110. (Tom Banks, Dallas, TX)

1945 UTC on 17840
NETHERLANDS ANTILLES: BBC Antigua relay. *Seeing Stars* show on National Astronomy Week, honoring the 150th anniversary discovery of Neptune. (Fraser, MA; Schwartz, IL)

2020 UTC on 4950
SAO TOME: VOA relay. Listeners letters mixed with jazz tunes. Station ID to program preview and news summary. Noted on // 17755, 17725 (till 2030), 6035 (under Arabic co-channel) 7375,7415, 15580. (Serra, Italy/*TFW*) Station noted on 11975 at 1930. (Maywoods DX Team/KY)

2056 UTC on 5034
CENTRAL AFRICAN REP.: Radio Centrafrique. French. Afro pops to announcer voice overs. Station ID, national anthem to 2100*. (Serra, Italy/TFW)

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

Gayle Van Horn, gayle@grove.net

Special QSLs

Southern Music Radio from New Zealand will broadcast a special program via Radio Miami International on December 14 at 1900-2000 UTC on 9955 kHz. Special QSLs are offered by Southern Music for reception reports, and may be sent to SMR at the address given on the program, or to Radio Miami International at: P.O. Box 526852, Miami, FL 33152.

One other program offered by WRMI is *Rock-it-Radio*, broadcasting on Sundays 2000-2100 on 9955 kHz. Reports may be sent either directly to the program at the address announced on the air or to WRMI.

For the "netheads," Costa Rica's Radio For Peace International gratefully welcomes reception reports via email. On-line QSLs are available at *rfpicr@sol.racsa.co.cr*. For a QSL card and grid schedules, send your report with one U.S. dollar or three IRCs to: P.O. Box 88, Santa Ana, Costa Rica.

AIRCRAFT TRAFFIC

Fine Air 432, DC8-51F/N507DC/Lima-Miami, 6637 kHz USB. Full data prepared QSL card verified in 17 days for an English utility report. QSL address: Fine Airlines Inc., 4600 NW 36th St., Miami, FL 33152. (Steve McDonald-VE7SL, Mayne Island, BC Canada/via email)

DSR 405, B707C-351/5X-JET/Port Harcourt-Lusaka, 8903 kHz USB. Full data prepared QSL card verified in 17 days for an English utility report. QSL address: Das Air Cargo, Aviation Court, Gatwick Rd., Crawley, West Sussex RH10 2RJ, United Kingdom. (McDonald, CAN)

Southern Air 873, DC8-73F/N873SJ/Bogota-Miami, 6337 kHz USB. Full data prepared QSL card verified in 16 days for an English utility report. QSL address: Southern Air Transport, P.O. Box 328988, Columbus, OH 43232-8988. (McDonald, CAN)

Transair 5B-CGP, L-1329/Dublin-Gander/56N-30W, 8879 kHz USB. Full data prepared QSL card verified in 63 days for an English utility report. QSL address: Transair Ltd., 10-12 Kifissias Ave., 151 25 Amaroussion, Athens, Greece. (McDonald, CAN)

Air Malawi 164, B737-300/7Q-YKP/Lilongwe to Nairobi/8879 kHz USB. Full data prepared QSL card verified in 10 days for an English utility report. QSL address: P.O. Box 84, Blantyre, Malawi. (McDonald, CAN)

U.S. Navy Aircraft PR-00, Lockheed UP-3A Orion, Fleet Air Recon Squadron 1 (VQ-1), 11175 kHz USB. Full data prepared QSL card verified, small Batman sticker for aircraft type EP-3E, and an info note on the squadron. Received for an English utility report. QSL address: Operations Officer, VQ-1, NAS Whidbey, WA. (Rick Albright, Merced, CA/*World Utility News*).

ARGENTINA

RAE-Radio Nacional Buenos Aires, 11710 kHz.

Full data station logo card signed by Rodrigo Calderon-English Dept. Personal reply on station letterhead, time/frequency schedule and reception report form enclosed. Received in 28 days for an English report of their Spanish weekend domestic service, plus a souvenir postcard and one U.S. dollar. Station address: CC. 555 Correo Central, 1000 Buenos Aires, Republica Argentina. (Gayle VH, Brasstown, NC)

CROATIA

HRT/Croatian Radio, 5895 kHz. Full data verification on HRT station letterhead signed by Bozidar Tomanek. Received in 88 days after a follow-up English report with cassette tape and one U.S. dollar. Station address: Prisavlje 3, 10000 Zagreb, Croatia. (Randy Stewart, Springfield, MO)

ECUADOR

Radio Oriental, 4780 kHz. Full data *Certificado de Sintonia* QSL card and letter signed by Enrique Espin E. Received in 107 days for a Spanish report and one U.S. dollar. Station address: Casilla 260, Tena, Napo, Ecuador. (Darren White, Hattiesburg, MS)

FM/MEDIUMWAVE

WLSL-FM 96.9 kHz. Full data QSL card signed by Mike Powell KA3SOI. Received for an English FM report, mint stamps and an SASE. Station address: P.O. Box 69, Crisfield, MD 21817. (Hank Holbrook, Dunkirk, MD)

WPTE-FM 94.9 kHz. Full data QSL letter signed by Michael E. Settles-Chief Engineer. Received for an English FM report, mint stamps, and an SASE. Station address: 215 Brooke Ave., Norfolk, VA 23510. (Holbrook, MD)

WZTA-FM 94.9 kHz. Full data QSL letter signed by Christopher G. Sampson-Chief Operator. Received for an English FM report, mint stamps, and an SASE. Station address: 194 N.W. 187th St., Miami, FL 33169. (Holbrook, MD)

FRENCH GUIANA

Radio France Int'l, 13625 kHz. Full data *Alliss* QSL card unsigned. Received in 64 days for an French report. Station address: TDF, Montsinery, French Guiana. (White, MS)

IRELAND

Midwest Radio, 7325 kHz. Full data QSL postcard of County Mayo, Ireland. Two page personal letter about this special broadcast for St. Patrick's Day 1996 broadcast, signed by Michael Commins, the program host. Station bumper sticker, background history sheet and copy of *MWR Newsletter* enclosed. Received in 156 days for an English report (worth the wait!) and two U.S. dollars. Station address: Ballyhaunis, County Mayo, Ireland. (Brandon M. Artman, West Chester, PA)

NICARAGUA

Radio Miskut, 5770 kHz. Full data letter with station stamp, signed by Euaristo Mercado Perez. Received in 133 days for a Spanish report and one U.S. dollar. Station address: Puerto Cabezas, R.A.A.N., Nicaragua. (White, MS)

SHIP TRAFFIC

M/V Pacific Aries ELJQ2, 4197 kHz USB (Car Carrier). Full data prepared QSL card verified in 198 days for an English utility report. QSL address: NYK Line, NYK Bldg., 3-2, Marunochi 2-chome, Chiyoda-ku, Tokyo 100, Japan. (McDonald, CAN)

Zim Santos C6KY5, 156.65 MHz USB (Container Vessel). Full data prepared QSL card verified, and photo of vessel. Received for an English utility report and mint stamps. QSL address: Penn-Maryland Steamship Corp., 2200 Broening Highway, Suite 255, Baltimore, MD 21224-6607. (Holbrook, MD)

Humacao WZJB, 500 kHz USB (Container Vessel). Full data prepared QSL card verified. Received for an English utility report and one U.S. dollar. QSL address: Puerto Rico Marine Management, Inc., P.O. Box 71306, San Juan, Puerto Rico 00936-1306. (Holbrook, MD)

SYRIA

Radio Damascus, 15095 kHz. Full data station logo card, illegible signature. Station sticker, program schedule and *Syria Times* newspaper enclosed. Received via registered mail in 70 days for a follow-up taped report. Station address: Syrian Radio & TV, Ommayad Square, Damascus, Syria. (Stewart, MO)

TOGO

Radiodiffusion Togolaise, 5047 kHz. Full data station logo QSL card unsigned, and handwritten station schedule. Received in 197 days for a French report, cassette tape and one U.S. dollar. Station address: Boite Postal 434, Lome, Togo. (Stewart, MO)

UNITED STATES

Radio Marti, 7365 kHz. Full data QSL card signed by Mike Pallone-Director of Operations. Broadcast schedule enclosed. Received in 57 days for a form letter reception report in Spanish and one U.S. dollar. Station address: c/o Office of Cuban Broadcasting, Bureau of Broadcasting, Washington, DC 20547. (Artman, PA)

How to Use the Shortwave Guide

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Standard Time) 5,6,7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively.

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 (7:30 pm Eastern, 4:30 pm Pacific).

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

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

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am:	The Americas	as:	Asia
na:	North America	au:	Australia
ca:	Central America	pa:	Pacific
sa:	South America	va:	various
eu:	Europe	do:	domestic broadcast
af:	Africa	om:	omnidirectional
me:	Middle East		

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

Hot News

Programming Tips by Jim Frimmel

Germany

Deutsche Welle advises that Christmas time will be music time. Listen for a three-part oratorio by Hector Berlioz (*L'enfance du Christ*) and other special holiday programs between December 24th and 26th. Other holiday news items will be published on Grove's web site as they are received.

More CBC Cuts

In response to new budget cuts at the Canadian Broadcasting Corp. talk of commercial advertising is everywhere despite the public outcry. CBC may increase broadcasting time to make up for the commercialized air time. Meanwhile, RCI has been editorializing against the cuts over its airways.

RCI Live

Radio Canada International's new web page at **www.rcinet.ca/** features a live audio stream of its current broadcast, which may in whatever language is currently in use. When heard using the RealAudio Player version 3.0, the quality of the sound is remarkably high

VOA Jazz

Heard on a special VOA call-in show was a comment that VOA is searching for a host for a new jazz program similar to Willis Conover's famous *Music USA (Jazz)*.

Voice of America Cuts

Budget cuts at VOA forced some reduction in English-language broadcasts effective October 27th. Hardest hit were transmissions to the American Republics and the Caribbean, resulting in the loss of weekend evening broadcasts at 0000-0200 UTC and discontinuance of the 1100 UTC morning broadcast. Listeners in the USA lost a favorite transmission of *Communications World* at 0030 UTC. All is not lost for web users, however, who can catch the RealAudio version of *Communications World* at their own convenience from www.voa.gov/programs/audio/realaudio/.

VOA Feeder Frequencies

All high-frequency VOA feeder frequencies on upper and lower sideband were discontinued on October 27th. Gone are those wonderful frequencies that American listeners could usually depend on to receive VOA when others were difficult to hear. Dropped English-language frequencies which were in current use: 6.873 USB, 7.651 USB, and 10.454 LSB.

New Interval Signal

If you've been listening to the Voice of Russia lately, you may have heard the new signature tune at the beginning of every hour. It's a theme from Mussorgsky's *Pictures at an Exhibition* and was selected because the great Russian composer expresses the spirit and aspirations of the Russian people. When I first heard it I thought I recognized the movement called "The Great Gate at Kiev," but have not yet listened to a recording in order to verify this opinion. Let *MT* know if you think otherwise.

Voice of Russia

Had trouble finding those elusive VoR frequencies? If you don't find what you're looking for in *MT's* centerfold pages, try their web page at **www.vor.ru/worldnew.html**. Separate listings are provided by language and then by target areas. Listings for 32 languages were provided at the time of this writing.

Brother Stair Steps Up

Brother RG Stair, evangelist of *The Overcomer Broadcast* and self-proclaimed last-day prophet of God, purchased the entire output of WWCR's transmitter #4 (2390/7435/9475/12160 kHz). This action caused WWCR to move all other programs from transmitter #4 to #1 and #3. WWCR transmitter #2 was unavailable for the program shifts since its air time is dedicated to the *World University Network* of Dr. Gene Scott. Could there be a fifth transmitter in WWCR's future? (See the selected program section for WWCR's new lineup for transmitters #1 and #3.)

Frequencies

0000-0030	Australia, Radio	13605pa	15510as	17750as	
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0100	Bulgaria, Radio	7375na	9485na		
0000-0015	Cambodia, Natl Voice of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFCX Montreal	6005do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0100	Canada, R Canada Intl	5960am	9755am		
0000-0030	Canada, R Canada Intl	6040am	9535am	11940am	
0000-0100	China, China Radio Intl	9710na	11695na		
0000-0100 vl	Costa Rica, Adv World R	7375am	9725am	13750am	15460am
0000-0100	Costa Rica,RF Peace Intl	6205am	7385am		
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0100	Ecuador, HCJB	9745am	21455am		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	7155as	9705as	9950as	11620as
		11660as			
0000-0100	Lebanon, Voice of Hope	9990va			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na		
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	13760na	15130na		
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Russia,Voice of Russia WS	5940na	7125na	9825na	
0000-0100	Spain, R Exterior Espana	9540na			
0000-0030	Thailand, Radio	9690as			
0000-0100	Thailand, Radio	9655as	11905af		
0000-0100	United Kingdom, BBC WS	5965as	5970sa	5975va	6175na
		6195as	7265as	7325va	9410as
		9590va	9915sa	11750sa	11955as
0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	USA, KTBN Salt Lk City UT	15590am			
0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0100	USA, Monitor Radio Intl	7535na	9430sa	13840as	
0000-0100	USA, Voice of America	5995am	6130am	7405am	9455am
		9775am	11695am	11760am	13740am
		17735va	17820va		
0000-0030	USA, Voice of America	6873va			
0000-0100	USA, WEWN Birmingham AL	5825eu	7395na	7425na	15375sa
0000-0100	USA, WGTG McCaysville GA	5085am			
0000-0100	USA, WHRI Noblesville IN	5745am	7315am	17510am	
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100 mtwhf	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100 mtwhf	USA, WVHA Greenbush ME	9900af			
0000-0100	USA, WWCR Nashville TN	3215am	5070am	5935am	13845am
0000-0045	USA, WYFR Okeechobee FL	6085na	11855ca		
0005-0010	Croatia, Croatian Radio	5895eu	7165eu		
0020-0100	Sri Lanka, Sri Lanka BC	9720as	15425as		
0030-0100	Australia, Radio	9660pa	11640as	12080pa	13605pa
		13755pa	15365pa	17715as	17750as
		17795pa	17860pa		
0030-0055	Austria, R Austria Intl	7325na			
0030-0100	Iran, VOIRI	6050na	9022na	9685na	
0030-0056	Lithuania, Radio Vilnius	6120na			
0030-0100	Netherlands, Radio	5905na	7305na		
0030-0100	Sweden, Radio	6065am			
0030-0100	Thailand, Radio	15370na			
0035-0040	India, All India Radio	4860do	7110do	11830do	11870do
0038-0055 1&3rd m	Denmark, R Denmark Intl	7275na	7465ca	9560sa	
0050-0100	Italy, RAI Intl	6005na	9675na	11800na	

Selected Programs

Sundays

0000 USA, WWCR #1 Nashville TN: Weekly Presidential Radio Address. Bill Clinton's weekly report to the nation.
0000 USA, WWCR #3 Nashville TN: The Hour of Courage. Ron Wilson talks politics and the precious metals market.
0005 Canada, RCI Montreal: Quirks and Quarks. Updating what's new and what's next in science.
0005 USA, WWCR #1 Nashville TN: The Republican Response. A noted Republican rebuts the President's weekly radio message.
0015 USA, WWCR #1 Nashville TN: The Blessed Word of Life. Perry L. Johnson preaches in Spanish and English from Washington, DC.
0025 Netherlands, Radio: Insight. Rob Green looks at what made the news in the past seven days.
0030 USA, WWCR #1 Nashville TN: The People's Gospel Hour. From Nova Scotia, Canada, Perry Rockwood interprets scripture for Christian life.
0038 Netherlands, Radio: Newsline. Correspondent reports, interviews, and commentaries on current events.
0038 Netherlands, Radio: Newsline. See S 0038.
0053 Netherlands, Radio: Weekend. NEW! Maggie Ayre joins colleagues from BBC World Service, Radio France International and Deutsche Welle for a weekly look at issues and themes important throughout Europe.

Mondays

0000 USA, WWCR #1 Nashville TN: The Down Home Gospel Program. Brother Gary and Sister Wanda evangelize.
0000 USA, WWCR #3 Nashville TN: Responde International. Music and words of inspiration by Trevor Prider of Australia.
0005 Canada, RCI Montreal: Tapestry. A look at the broad range of spiritual and human issues facing people of various cultures and religions.
0015 USA, WWCR #3 Nashville TN: Ask WWCR. A mailbag program that answers listener questions about the business of shortwave and radio propagation.
0025 Netherlands, Radio: Dutch Diaries. See S 0225.
0030 USA, WWCR #3 Nashville TN: World of Radio. Glenn Hauser's communications program for shortwave radio listeners.
0035 Netherlands, Radio: Sincerely Yours. See S 1238.
0045 USA, WWCR #1 Nashville TN: Words of Hope. See S 1330.
0053 Netherlands, Radio: Sounds Interesting. See S 1254.

Tuesdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0000 USA, WWCR #1 Nashville TN: Moving to the Front Line. See M 2300.
0000 USA, WWCR #3 Nashville TN: The Kurt Saxon Show (live). Kurt Saxon.
0025 Netherlands, Radio: Press Review. See M 1225.
0038 Netherlands, Radio: Newsline. See S 0038.
0053 Netherlands, Radio: Research File. See M 1253.

Wednesdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0000 USA, WWCR #1 Nashville TN: Point of View. Marlin Maddoux interviewing on current events of interest to Christians.
0000 USA, WWCR #3 Nashville TN: The Kurt Saxon Show (live). See T 0000.
0025 Netherlands, Radio: Press Review. See M 1225.
0040 Netherlands, Radio: Newsline. See S 0038.
0053 Netherlands, Radio: Mirror Images. See T 1253.

Thursdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0000 USA, WWCR #1 Nashville TN: Moving to the Front Line. See M 2300.
0000 USA, WWCR #3 Nashville TN: The Kurt Saxon Show (live). See T 0000.
0025 Netherlands, Radio: Press Review. See M 1225.
0038 Netherlands, Radio: Newsline. See S 0038.

Fridays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0000 USA, WWCR #1 Nashville TN: Point of View. See W 0000.
0000 USA, WWCR #3 Nashville TN: The Jungle Hour (live). Derek Hainey with a program for survivalists.
0025 Netherlands, Radio: Press Review. See M 1225.
0038 Netherlands, Radio: Newsline. See S 0038.
0053 Netherlands, Radio: Media Network. See H 1153.

Saturdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0000 USA, WWCR #1 Nashville TN: Moving to the Front Line. See M 2300.
0000 USA, WWCR #3 Nashville TN: The Kurt Saxon Show (live). See T 0000.
0025 Netherlands, Radio: Press Review. See M 1225.
0038 Netherlands, Radio: Newsline. See S 0038.
0053 Netherlands, Radio: A Good Life. See M 1153.

Hauser's Highlights
AUSTRALIA: Radio Australia, W96

Selected frequencies for North America

0030-0100	17860
0030-0700	15365
0030-0740	17795
0100-0400	13755
0100-0700	15240
0400-0730	11880
0700-0900	6020
0730-1300	9580
0730-1300	9860
1300-1700	5995
1300-1700	11800
1300-2100	9580
1430-1800	6060
1430-2100	12080
1700-2130	9860
1700-2130	11880
2130-2400	13755
2130-2400	17795
2130-2400	17860
2200-2400	15365

(R. Australia via *BC-DX*)

FREQUENCIES

0100-0200	Australia, Radio	9660pa	11640as	13755pa	15240pa
		15365pa	15415as	15510as	17715as
		17750pa	17795pa	17880pa	
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200 vl	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFCX Montreal	6005do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0200	Costa Rica,RF Peace Intl	6205am	7385am		
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB	9745am	21455am		
0100-0150	Germany, Deutsche Welle	5960na	6040na	6145na	9640na
0100-0200	Germany, Deutsche Welle	5460na	6085na		
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0200	Indonesia, Voice of	9525na			
0100-0128	Iran, VOIRI	6050na	9022na		
0100-0110	Italy, RAI Intl	6005na	9675na	11800na	
0100-0200	Japan, NHK/Radio	5960na	11790as	11840as	11860as
		11885as	11890as	11910as	13630na
		17810as	17845as		
0100-0200	Lebanon, Voice of Hope	9990va			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0125	Netherlands, Radio	6020na	6165na		
0100-0200	Netherlands, Radio	5905as			
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	7125na	7240na	7250na	12050na
		13665na	13790na		
0100-0130	Slovakia, R Slovakia Intl	5930na	7300na	9440sa	
0100-0200	Spain, R Exterior Espana	9540na			
0100-0200	Sri Lanka, Sri Lanka BC	15425as			
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200	Ukraine, R Ukraine Intl	7150na	9550na		
0100-0200	United Kingdom, BBC WS	5970sa	5975va	6175va	6195as
		7265as	7325va	9410as	9560va
		9590va	9915va	11750sa	11955as
		15360as			
0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	USA, KVOH Los Angeles CA	9975am			
0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	USA, Voice of America	5995am	6130am	7115as	7205as
		7405am	9455am	9775am	11705as
		11725as	13740am	15170as	15205as
		15250as	17740as	17820as	
0100-0200	USA, WEWN Birmingham AL	5825eu	7395na	7425na	15375sa
0100-0200	USA, WGTG McCaysville GA	5085am			
0100-0200	USA, WHRI Noblesville IN	5745am	7315am	17510am	
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0200 mtwhf	USA, WRMI/R Miami Intl	9955am			
0100-0130 s	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0126	Vietnam, Voice of	5940na			
0100-0130 mtwhfa	Yugoslavia, Radio	6195na	7115na		
0115-0130 f	Greece, Voice of	6125na	7448na	9420na	
0130-0155	Belgium, R Vlaanderen Int	5900na	9925sa		
0130-0150	Greece, Voice of	6125na	7448na	9420na	
0130-0200 s/vl	Malta, VO Mediterranean	15550as	17570au		
0130-0200	Netherlands, Radio	9860as	11655as		
0130-0200	Sweden, Radio	7265am	7290am		
0130-0156	Vietnam, Voice of	5940na			
0138-0155 1&3rd m	Denmark, R Denmark Intl	7465am	9560am		
0140-0200	Vatican State, Vatican R	5980as	7335as		

SELECTED PROGRAMS

Sundays

0100 Germany, Deutsche Welle: World News. Eight minutes of world news from Deutsche Welle.
0100 USA, WWCR #1 Nashville TN: What Does the Bible Say?. M. H. Reynolds exposes other religions.
0100 USA, WWCR #3 Nashville TN: World of Prophecy. Texe Marrs and a guest discuss the evils and pitfalls of today and the outlook for tomorrow.
0108 Germany, Deutsche Welle: Inside Europe. A radio magazine offering a European perspective on events of the week.
0125 Netherlands, Radio: Program Info. Summary of upcoming program schedules.
0130 USA, WWCR #1 Nashville TN: Life's Railway to Heaven. WT English evangelizes from South Carolina.
0138 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.
0138 Netherlands, Radio: Newsline. See S 0038.
0153 Netherlands, Radio: Roughly Speaking. An upbeat magazine program for European youth.

Mondays

0100 Germany, Deutsche Welle: World News. See S 0100.
0100 USA, WWCR #1 Nashville TN: Grace in Action. Paul Kamanu evangelizes from Honolulu, Hawaii.
0100 USA, WWCR #3 Nashville TN: The Coming of the Anti-Christ. Steve T'Seuq even has a web site at http://www.antichrist.com.
0108 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.
0118 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.
0125 Netherlands, Radio: Program Info. See S 0125.
0130 USA, WWCR #1 Nashville TN: International House of Prayer. Jacqueline Brown conducts services from Brooklyn, New York.
0130 USA, WWCR #3 Nashville TN: Old World Order Broadcast. The International House of Yaweh in Ohio.
0133 Germany, Deutsche Welle: German by Radio. See S 1133.
0138 Netherlands, Radio: Wide Angle. See S 1138.
0145 USA, WWCR #1 Nashville TN: Firebrand. Nancy Moses.
0154 Netherlands, Radio: Siren Song. See S 1153.

Tuesdays

0100 Germany, Deutsche Welle: World News. See S 0100.
0100 USA, WWCR #1 Nashville TN: Newswatch Magazine. David Smith compares world news to bible prophecy.
0100 USA, WWCR #3 Nashville TN: The Intelligence Report (live). A patriot radio program.
0109 Germany, Deutsche Welle: European Journal. See M 2324.
0125 Netherlands, Radio: Program Info. See S 0125.
0132 Germany, Deutsche Welle: German Tribune. News and views from the Federal Republic.
0138 Netherlands, Radio: Newsline. See S 0038.
0153 Netherlands, Radio: A Good Life. See M 1153.

Wednesdays

0100 Germany, Deutsche Welle: World News. See S 0100.
0100 USA, WWCR #1 Nashville TN: Newswatch Magazine. See T 0100.
0100 USA, WWCR #3 Nashville TN: The Intelligence Report (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See M 2324.
0125 Netherlands, Radio: Program Info. See S 0125.
0133 Germany, Deutsche Welle: Come to Germany. Focus on a seasonal event, festival, or attraction.
0138 Netherlands, Radio: Newsline. See S 0038.
0153 Netherlands, Radio: Music 52-15. See T 1153.

Thursdays

0100 Germany, Deutsche Welle: World News. See S 0100.
0100 USA, WWCR #1 Nashville TN: Newswatch Magazine. See T 0100.
0100 USA, WWCR #3 Nashville TN: The Intelligence Report (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See M 2324.
0125 Netherlands, Radio: Program Info. See S 0125.
0133 Germany, Deutsche Welle: German Tribune. See T 0132.
0138 Netherlands, Radio: Newsline. See S 0038.
0153 Netherlands, Radio: Sounds Interesting. See S 1254.

Fridays

0100 Germany, Deutsche Welle: World News. See S 0100.
0100 USA, WWCR #1 Nashville TN: Newswatch Magazine. See T 0100.
0100 USA, WWCR #3 Nashville TN: The Intelligence Report (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See M 2324.
0125 Netherlands, Radio: Program Info. See S 0125.
0133 Germany, Deutsche Welle: Arts on the Air. See S 1109.
0138 Netherlands, Radio: Newsline. See S 0038.
0153 Netherlands, Radio: Research File. See M 1253.

Saturdays

0100 Germany, Deutsche Welle: World News. See S 0100.
0100 USA, WWCR #1 Nashville TN: Newswatch Magazine. See T 0100.
0100 USA, WWCR #3 Nashville TN: The Intelligence Report (live). See T 0100.
0108 Germany, Deutsche Welle: European Journal. See M 2324.
0125 Netherlands, Radio: Program Info. See S 0125.
0131 Germany, Deutsche Welle: Through German Eyes. See S 1629.
0138 Netherlands, Radio: Newsline. See S 0038.

HAUSER'S HIGHLIGHTS
JORDAN: RADIO JORDAN IN ARABIC

0000-0259	11935
0359-0559	11810, 9630
0559-0814	15290, 11835, 11810, 9630
0814-1059	15455, 15290, 11835
1030-1159	11810
1059-1259	15355
1259-1559	11810
1559-1859	6105
1859-2059	11740, 6105
2159-2400	15435, 6105

(BBC Monitoring)

0200 UTC SHORTWAVE GUIDE 9:00 PM EST 6:00 PM PST

Frequencies

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, Radio	9660pa	11640as	11695as	12080pa
		13605pa	13755pa	15240pa	15365pa
		15415as	17715as	17750pa	17795pa
		17880pa			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
0200-0300	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFCX Montreal	6005do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0300	Canada, R Canada Intl	6155am	9535am	9755am	11725am
0200-0300	Costa Rica,RF Peace Intl	6205am	7385am		
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB	9745am	21455am		
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	6035as	7265as	7285as	7355as
		9515as	9615as		
0200-0230	Hungary, Radio Budapest	5905na	9840na		
0200-0300	Japan, NHK/Radio	13630na			
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0200-0300	Lebanon, Voice of Hope	9990va			
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0230 s/vl	Malta, VO Mediterranean	15550as	17570au		
0200-0300	Netherlands, Radio	9860as	11655as		
0200-0225	Netherlands, Radio	5905na	7305na		
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0230 m	Norway, Radio Norway Intl	7465na	7520na		
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0300	Philippines, FEBC/R Intl	15450as			
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0200-0300	Russia,Voice of Russia WS	7240na	12010na	12050na	13645na
		13665na	13790na	15580na	
0200-0300	Slovakia, Adv World Radio	11610as			
0200-0300	South Korea, R Korea Intl	7275as	11725am	11810am	15575am
0200-0300	Sri Lanka, Sri Lanka BC	15425as			
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		11825as	15345as		
0200-0300	United Kingdom, BBC WS	5970sa	5975va	6175va	7235va
		9410na	9560na	9590na	9605as
		9915sa	15360as		
0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	USA, KVOH Los Angeles CA	9975am			
0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	USA, Monitor Radio Intl	5850na	7535am		
0200-0300	USA, Voice of America	7115as	7205as	7651as	9635as
		11705as	11725as	15170as	15250as
		17740as	17820as		
0200-0300	USA, WEWN Birmingham AL	5825eu	7395na	7425na	
0200-0300	USA, WGTG McCaysville GA	5085am			
0200-0300	USA, WHRI Noblesville IN	5745am	5760am	7315am	17510am
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300 mtwhf	USA, WRMI/R Miami Intl	9955am			
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300 mtwhf	USA, WVHA Greenbush ME	5850eu			
0200-0300	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0226	Vietnam, Voice of	5940na			
0200-0230	Yugoslavia, Radio	6100na	7230na		
0215-0225	Nepal, Radio	7165do			
0230-0259	Austria, R Austria Intl	7325na	9495sa	9870ca	
0230-0245	Pakistan, Radio	7350as	11760as	15120as	15485as
		17705as			
0230-0300	Sweden, Radio	6200na			
0230-0256	Vietnam, Voice of	5940na			
0238-0255 1&3rd m	Denmark, R Denmark Intl	7465am	9560am		
0245-0300	Albania, R Tirana Intl	6140na	7160na		
0245-0300	India, All India Radio	3945do	6045do	7110do	11830do
		15135do			
0245-0300	USA, WYFR Okeechobee FL	9355eu			
0250-0300	Vatican State, Vatican R	6095na	7305na		

Selected Programs

Sundays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #1 Nashville TN: The Old Record Shop. Ken Berryhill with thirty minutes of selections of music from the days of the 78 rpm record. Recommended.
0200 USA, WWCR #3 Nashville TN: The American Way. Andrew Gause pushes the rare coin market.
0207 Canada, RCI Montreal: Innovation Canada. Canadian entrepreneurs, inventors, and researchers and their ideas and discoveries.
0208 Germany, Deutsche Welle: Commentary. Guest commentary about a current event.
0212 Germany, Deutsche Welle: Sports Report. The latest news from the world of sports.
0216 Germany, Deutsche Welle: Mailbag Asia. Listener mail from Asia is answered.
0225 Netherlands, Radio: Dutch Diaries. Jonathan Groubert gets into the nooks and crannies of everyday Dutch life.
0230 USA, WWCR #1 Nashville TN: The Lights of Spiritual Guidance. Gospel and song with J. Harold Lowman.
0231 Canada, RCI Montreal: Earth Watch. Environment and ecology matters.
0238 Netherlands, Radio: Newsline. See S 0038.
0253 Netherlands, Radio: Weekend. See S 0053.

Mondays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #1 Nashville TN: Wind and Fire. Lady Davis.
0200 USA, WWCR #3 Nashville TN: Free at Last. Mike Seymour with a half-hour of music and scripture.
0207 Canada, RCI Montreal: The Arts in Canada. A look at the Canadian arts scene.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0215 USA, WWCR #1 Nashville TN: Living Water. Howard Howe evangelizes from Florida.
0224 Germany, Deutsche Welle: Inside Europe. See S 0108.
0225 Netherlands, Radio: Program Info. See S 0125.
0230 USA, WWCR #1 Nashville TN: First Hand. Rick Livingood with a world evangelism update.
0231 Canada, RCI Montreal: The Mailbag. See S 1207.
0238 Netherlands, Radio: Sincerely Yours. See S 1238.
0245 USA, WWCR #1 Nashville TN: Wind of the Spirit. Barbara Jennison with a pro-life story.
0253 Netherlands, Radio: Sounds Interesting. See S 1254.

Tuesdays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #3 Nashville TN: Protecting Your Wealth (live). Mike Callahan's financial commentary, investments, and politics dealing with money issues.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1211.
0214 Canada, RCI Montreal: Report to the Peacekeepers. Information about Canada for Canadian Forces overseas.
0224 Germany, Deutsche Welle: European Journal. See M 2324.
0225 Netherlands, Radio: Program Info. See S 0125.
0238 Netherlands, Radio: Newsline. See S 0038.
0253 Netherlands, Radio: Research File. See M 1253.

Wednesdays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #3 Nashville TN: Protecting Your Wealth (live). See T 0200.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1211.
0214 Canada, RCI Montreal: Report to the Peacekeepers. See T 0214.
0224 Germany, Deutsche Welle: European Journal. See M 2324.
0225 Netherlands, Radio: Program Info. See S 0125.
0238 Netherlands, Radio: Newsline. See S 0038.
0253 Netherlands, Radio: Mirror Images. See T 1253.

Thursdays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #3 Nashville TN: Protecting Your Wealth (live). See T 0200.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1211.
0214 Canada, RCI Montreal: Report to the Peacekeepers. See T 0214.
0224 Germany, Deutsche Welle: European Journal. See M 2324.
0225 Netherlands, Radio: Program Info. See S 0125.
0238 Netherlands, Radio: Newsline. See S 0038.

Fridays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #3 Nashville TN: Protecting Your Wealth (live). See T 0200.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1211.
0214 Canada, RCI Montreal: Report to the Peacekeepers. See T 0214.
0224 Germany, Deutsche Welle: European Journal. See M 2324.
0225 Netherlands, Radio: Program Info. See S 0125.
0238 Netherlands, Radio: Newsline. See S 0038.
0253 Netherlands, Radio: Media Network. See H 1153.

Saturdays

0200 Germany, Deutsche Welle: World News. See S 0100.
0200 USA, WWCR #3 Nashville TN: Protecting Your Wealth (live). See T 0200.
0208 Germany, Deutsche Welle: Commentary. See S 0208.
0211 Canada, RCI Montreal: Spectrum. See M 1211.
0213 Germany, Deutsche Welle: Germany this Week. See S 1609.
0214 Canada, RCI Montreal: Report to the Peacekeepers. See T 0214.
0222 Germany, Deutsche Welle: Economic Notebook. See T 0333.
0225 Netherlands, Radio: Insight. See S 0025.
0237 Germany, Deutsche Welle: The Jazz Corner. See F 2333.
0238 Netherlands, Radio: Newsline. See S 0038.
0253 Netherlands, Radio: A Good Life. See M 1153.

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Frequencies

0250-0300	Zambia, ZNBC Radio 2	6165do				
0300-0400	Australia, Radio	9660pa	11640as	12080pa	13605pa	
		13755pa	15240pa	15365pa	15415as	
		15510as	17715as	17750pa	17795pa	
		17880pa				
0300-0400 vl	Australia, VL8K Katherine	5025do				
0300-0400 vl	Australia, VL8T Tent Crk	4910do				
0300-0400 vl	Canada, CBC N Quebec Svc	9625do				
0300-0400	Canada, CFCX Montreal	6005do				
0300-0400	Canada, CFRX Toronto	6070do				
0300-0400	Canada, CFVP Calgary	6030do				
0300-0400	Canada, CHNX Halifax	6130do				
0300-0400	Canada, CKZN St John's	6160do				
0300-0400	Canada, CKZU Vancouver	6160do				
0300-0400	Canada, R Canada Intl	6155am	9755am			
0300-0400	China, China Radio Intl	9690na	9710na	11695na		
0300-0400 vl	Costa Rica,Faro del Carib	5055do				
0300-0400	Costa Rica,RF Peace Intl	6205am	7385am			
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na		
0300-0327	Czech Rep, Radio Prague	5930na	7345na			
0300-0400	Ecuador, HCJB	9745am	21455am			
0300-0330	Egypt, Radio Cairo	9475na				
0300-0350	Germany, Deutsche Welle	6045na	6085na	9535na	9650na	
0300-0400	Guatemala, Radio Cultural	3300do				
0300-0400	Japan, NHK/Radio	11790na	11840as	13630na	15230na	
		17810as				
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		
0300-0400	Lebanon, Voice of Hope	9990va				
0300-0400 s/vl	Malta, VO Mediterranean	15550as	17570au			
0300-0325	Netherlands, Radio	9860as	11655as			
0300-0400	New Zealand, R NZ Intl	15115pa				
0300-0400 vl	Papua New Guinea, NBC	9675do				
0300-0400	Russia,Voice of Russia WS	7240na	12010na	12050na	13645na	
		13665na	13790na	15580na		
0300-0355	S Africa, Channel Africa	3220af	5955af			
0300-0400	Sri Lanka, Sri Lanka BC	15425as				
0300-0330	Thailand, Radio	15370na				
0300-0315 mtwhf	Uganda, Radio	3340do				
0300-0330	United Kingdom, BBC WS	5970sa	6135af	7235va	7325sa	
		15360as				
0300-0400	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af	
		6175va	6190af	6195eu	9410na	
		9600af	9605as	9895va	12095af	
		15310as				
0300-0400	USA, KAIJ Dallas TX	5810am				
0300-0400	USA, KTBN Salt Lk City UT	7510am				
0300-0400	USA, KVOH Los Angeles CA	9975am				
0300-0400	USA, KWHR Naalehu HI	17510au				
0300-0400	USA, Monitor Radio Intl	5850na	7535af			
0300-0400	USA, Voice of America	5980af	6035af	6080af	6115af	
		7105af	7280af	7290af	7340af	
		7415af	9575af	9775af	9885af	
0300-0330 smtwh	USA, Voice of America	4750af				
0300-0400	USA, WEWN Birmingham AL	5825eu	6890na	7425na		
0300-0400	USA, WGTG McCaysville GA	5085am				
0300-0400	USA, WHRI Noblesville IN	5745am	5760am	7315am	17510am	
0300-0400	USA, WJCR Upton KY	7490na	13595na			
0300-0400	USA, WRNO New Orleans LA	7395am				
0300-0400	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am	
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na			
0300-0345	USA, WYFR Okeechobee FL	9355eu				
0300-0310	Vatican State, Vatican R	6095na	7305na			
0300-0400 mtwhfa	Zambia, ZNBC Radio 2	6165do				
0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do				
0315-0330 s	Greece, Voice of	6125na	7448na	9420na		
0320-0350	Vatican State, Vatican R	7360af	9660af			
0330-0400	Albania, R Tirana Intl	6140na	7160na			
0330-0357	Czech Rep, Radio Prague	9480as				
0330-0400	Hungary, Radio Budapest	6195na	9840na			
0330-0355 mtwhf	Moldova, R Moldova Intl	7520na				
0330-0400 vl	Philippines, R Pilipinas	13770as	15330na	17730as		
0330-0400 twhfa	Portugal, R Portugal Intl	6150am	9570am			
0330-0400	Slovakia, Adv World Radio	9465af				
0330-0400	Sweden, Radio	7115na				
0330-0353	UAE, Radio Dubai	13675na	15395eu	21605na		
0330-0400	United Kingdom, BBC WS	9610af	11730af	11955as	15280as	
0335-0355 vl	India, All India Radio	7110do	11830do	15135do		
0338-0355 1&3rd m	Denmark, R Denmark Intl	7165am	7465am	9565am		
0340-0350	Greece, Voice of	6125na	7448na	9420na		
0345-0400 irreg	Burundi, Radio Nationale	6140do				
0345-0400 as	Uganda, Radio	3340do				
0356-0400	Zambia, Christian Voice	3330af				

Selected Programs

Sundays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: Open Bible Dialog. Joseph Chambers preaches bible prophecy from North Carolina.
0300 USA, WWCR #3 Nashville TN: Spectrum (live). SWLs and Hams call 1-800-774-7435 with technical questions and comments.
0305 Canada, RCI Montreal: Double Exposure. The comedy team of Bob Robertson and Linda Cullen present their award-winning brand of political satire and mimicry.
0308 Germany, Deutsche Welle: Inside Europe. See S 0108.
0309 S Africa, Channel Africa: Gospel Music. Authentic regional music on a Sunday morning in Africa.
0331 S Africa, Channel Africa: Religions of the World. An examination of religious beliefs throughout Africa and beyond.
0332 Canada, RCI Montreal: The Royal Canadian Air Farce. The traveling comedy show that was brought back by popular demand.
0337 Germany, Deutsche Welle: Religion and Society. See S 0138.
0339 S Africa, Channel Africa: Choral Music. Church music for a Sunday morning.

Mondays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: World of Prophecy. See S 0100.
0305 Canada, RCI Montreal: The Inside Track. An award-winning program of sports journalism, examining the impact of sports on the lives of Canadians.
0308 Germany, Deutsche Welle: Mailbag. See M 0108.
0308 S Africa, Channel Africa: Dateline Africa. A news magazine lightly sprinkled with African music.
0319 Germany, Deutsche Welle: Living in Germany. See M 0118.
0330 Canada, RCI Montreal: Now the Details. A program about the media.
0334 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
0300 USA, WWCR #3 Nashville TN: The Stan Solomon Show. A talk radio program.
0308 S Africa, Channel Africa: Dateline Africa. See M 0308.
0309 Germany, Deutsche Welle: European Journal. See M 2324.
0333 Germany, Deutsche Welle: Economic Notebook. The economic scene in Germany and around the world.

Wednesdays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
0300 USA, WWCR #3 Nashville TN: The Stan Solomon Show. See T 0300.
0309 Germany, Deutsche Welle: European Journal. See M 2324.
0311 S Africa, Channel Africa: Popular Music. Selections of recordings of contemporary African music.
0333 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the international scene.

Thursdays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
0300 USA, WWCR #3 Nashville TN: The Stan Solomon Show. See T 0300.
0308 S Africa, Channel Africa: Dateline Africa. See M 0308.
0309 Germany, Deutsche Welle: European Journal. See M 2324.
0333 Germany, Deutsche Welle: German by Radio. See S 1133.

Fridays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
0300 USA, WWCR #3 Nashville TN: The Stan Solomon Show. See T 0300.
0308 S Africa, Channel Africa: Dateline Africa. See M 0308.
0309 Germany, Deutsche Welle: European Journal. See M 2324.
0333 Germany, Deutsche Welle: Science and Technology. See M 1633.

Saturdays

0300 Germany, Deutsche Welle: World News. See S 0100.
0300 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
0300 USA, WWCR #3 Nashville TN: The Stan Solomon Show. See T 0300.
0308 Germany, Deutsche Welle: European Journal. See M 2324.
0308 S Africa, Channel Africa: Africa and All That Jazz. News from the jazz music scene and selections of jazz recordings.
0332 Germany, Deutsche Welle: Through German Eyes. See S 1629.
0333 S Africa, Channel Africa: Historical Almanac. What happened on this date in the past.
0340 S Africa, Channel Africa: Channel Africa Sports. The latest in sports from around the continent.

Frequencies

0400-0500	Australia, Radio	9660pa	11880pa	12080pa	13605as
		15240pa	15365pa	15415as	15510as
		17750as	17795pa	17880pa	
0400-0500 as	Australia, Radio	11640as			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500 vl	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFCX Montreal	6005do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, R Canada Intl	6150me	9505me	9645me	
0400-0500	China, China Radio Intl	9560na	9730na		
0400-0500	Costa Rica,RF Peace Intl	6205am	7385am		
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na
0400-0500	Ecuador, HCJB	9745am	21455am		
0400-0450	Germany, Deutsche Welle	6015af	6065af	7225af	7265af
		9565af			
0400-0500 twhfa	Guatemala, Radio Cultural	3300do			
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Voice of Hope	9990va			
0400-0430 s/vl	Malta, VO Mediterranean	15550as	17570au		
0400-0430	Mexico, Radio Mexico Intl	9705na			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430 m	Norway, Radio Norway Intl	7520na			
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0500	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0400-0500	Russia,Voice of Russia WS	5930na	7270na	12050na	13645na
		13790na	15580na		
0400-0455	S Africa, Channel Africa	5955af	9585af		
0400-0427	S Africa, Trans World R	7165af			
0400-0430	Slovakia, Adv World Radio	11600af			
0400-0430	Sri Lanka, Sri Lanka BC	15425as			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na		
0400-0500	Switzerland, Swiss R Intl	9905na			
0400-0430	Tanzania, Radio	5050af			
0400-0500	Turkey, Voice of	7340na	9685eu	17705eu	
0400-0415	Uganda, Radio	5026do			
0400-0500	Ukraine, R Ukraine Intl	7150na	9550na		
0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975af	6005af
		6175va	6180eu	6195eu	7160af
		9410af	9600af	11760va	11955as
		12095af	15280as		
0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, Voice of America	6080af	7170va	7180af	7265af
		7280af	7340af	7405af	9575af
		11965va			
0400-0430	USA, Voice of America	6145af	7340af		
0400-0500	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0400-0500	USA, WGTG McCaysville GA	5085am			
0400-0500	USA, WHRI Noblesville IN	5760am	7315am	17510am	
0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0430 a	USA, WRMI/R Miami INtl	9955am			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0400-0500	USA, WYFR Okeechobee FL	5850af	9985af		
0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0430	Vietnam, Voice of	12020na	15010na		
0400-0500	Zambia, Christian Voice	3330af			
0400-0410	Zambia, ZNBC Radio 2	6165do			
0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0415-0440 vl	Italy, RAI Intl	5975eu	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0430-0500	Australia,DefenseForces R	13525as			
0430-0455 mtwhf	Moldova, R Moldova Intl	7520eu			
0430-0500	Netherlands, Radio	5995na	6165na		
0430-0500	Swaziland, Trans World R	3200af	4775af	6070af	
0430-0500	United Kingdom, BBC WS	7150eu	15420af		
0430-0500	USA, Voice of America	5970af			
0430-0500	Yugoslavia, Radio	6195na	7130eu		
0438-0455 1&3rd s	Denmark, R Denmark Intl	7520na	9565na	13805na	
0440-0500	Russia,Voice of Russia WS	9825na			
0459-0500	New Zealand, R NZ Intl	11905pa			

Selected Programs

Sundays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #1 Nashville TN: Wonderful Words of Life. The international ministry of the Salvation Army.
0400 USA, WWCR #3 Nashville TN: Morning Watch Chapel. Terry Parker of California teaches from the Bible.
0405 Canada, RCI Montreal: Innovation Canada. See S 0207.
0403 Germany, Deutsche Welle: Commentary. See S 0208.
0412 Germany, Deutsche Welle: Sports Report. See S 0212.
0415 USA, WWCR #1 Nashville TN: The Big Backyard. Thirty minutes of rock music from Australia.
0415 Germany, Deutsche Welle: International Talking Point. Journalists discuss major trends and events.
0433 Germany, Deutsche Welle: Feature of the Month (1). A special feature on important developmental issues of our time.
0433 Germany, Deutsche Welle: People and Places. Interviews, stories and music for Africa listeners.
0438 Netherlands, Radio: Newsline. See S 0038.
0445 USA, WWCR #1 Nashville TN: A Study in God's Word. From North Carolina, Hezakiah Smith reads Scripture.
0454 Netherlands, Radio: Weekend. See S 0053.

Mondays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #3 Nashville TN: Beginning of the End. G. Washington.
0405 USA, WWCR #1 Nashville TN: Ham Radio and More. Amateur radio and satellite news and techniques with Len Winkler.
0407 Canada, RCI Montreal: The Mailbag. See S 1207.
0408 Germany, Deutsche Welle: Africa Highlight. A weekly feature on an important topic concerning Africa.
0424 Germany, Deutsche Welle: Inside Europe. See S 0108.
0437 Netherlands, Radio: Sincerely Yours. See S 1238.
0453 Netherlands, Radio: Sounds Interesting. See S 1254.

Tuesdays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #1 Nashville TN: The Radio Bible Hour. J. Harold Smith.
0405 USA, WWCR #3 Nashville TN: The John Bryant Show (live). Talk radio from the American Freedom Network.
0408 Germany, Deutsche Welle: Africa Report. Reports and background to the news from Africa by Deutsche Welle correspondents.
0411 Canada, RCI Montreal: Spectrum. See M 1211.
0424 Germany, Deutsche Welle: European Journal. See M 2324.
0430 USA, WWCR #1 Nashville TN: The Prophecy Club. Stan Johnson discusses bible prophecy from Topeka, Kansas.
0438 Netherlands, Radio: Newsline. See S 0038.
0453 Netherlands, Radio: Research File. See M 1253.

Wednesdays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #1 Nashville TN: The Radio Bible Hour. See T 0400.
0405 USA, WWCR #3 Nashville TN: The John Bryant Show (live). See T 0405.
0408 Germany, Deutsche Welle: Africa Report. See T 0408.
0411 Canada, RCI Montreal: Spectrum. See M 1211.
0424 Germany, Deutsche Welle: European Journal. See M 2324.
0430 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0430.
0438 Netherlands, Radio: Newsline. See S 0038.
0453 Netherlands, Radio: Mirror Images. See T 1253.

Thursdays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #1 Nashville TN: The Radio Bible Hour. See T 0400.
0405 USA, WWCR #3 Nashville TN: The John Bryant Show (live). See T 0405.
0408 Germany, Deutsche Welle: Africa Report. See T 0408.
0411 Canada, RCI Montreal: Spectrum. See M 1211.
0424 Germany, Deutsche Welle: European Journal. See M 2324.
0430 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0430.
0438 Netherlands, Radio: Newsline. See S 0038.

Fridays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #1 Nashville TN: The Radio Bible Hour. See T 0400.
0405 USA, WWCR #3 Nashville TN: The John Bryant Show (live). See T 0405.
0408 Germany, Deutsche Welle: Africa Report. See T 0408.
0411 Canada, RCI Montreal: Spectrum. See M 1211.
0424 Germany, Deutsche Welle: European Journal. See M 2324.
0430 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0430.
0438 Netherlands, Radio: Newsline. See S 0038.
0453 Netherlands, Radio: Media Network. See H 1153.

Saturdays

0400 Germany, Deutsche Welle: World News. See S 0100.
0400 USA, WWCR #1 Nashville TN: The Radio Bible Hour. See T 0400.
0405 USA, WWCR #3 Nashville TN: The John Bryant Show (live). See T 0405.
0408 Germany, Deutsche Welle: Commentary. See S 0208.
0411 Canada, RCI Montreal: Spectrum. See M 1211.
0412 Germany, Deutsche Welle: Africa This Week. A weekly review of trends and events on the African continent.
0430 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0430.
0432 Germany, Deutsche Welle: Man and Environment. See T 1633.
0438 Netherlands, Radio: Newsline. See S 0038.
0453 Netherlands, Radio: A Good Life. See M 1153.

Frequencies

0500-0600	Australia, Radio	9660pa	11880pa	12080pa	13605as
		15240pa	15365pa	17715pa	17795pa
		17880pa			
0500-0600 as	Australia, Radio	11640as			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Australia,DefenseForces R	13525as			
0500-0600	Bulgaria, Radio	7375na	9485na		
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0600	China, China Radio Intl	9560na			
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca	
0500-0600	Costa Rica,RF Peace Intl	6205am	7385am		
0500-0600	Cuba, Radio Havana	9820na	9830na		
0500-0600	Ecuador, HCJB	9445eu	9745am	21455am	
0500-0550	Germany, Deutsche Welle	6120na	6145na	6185na	9650na
0500-0515	Israel, Kol Israel	7465na	9435na	17545af	
0500-0600	Japan, NHK/Radio	6110na	7230eu	9835na	11725as
		11740as	11920na	17810as	
0500-0530	Japan, NHK/Radio	11885na	11895na	15230na	
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0500-0600	Lebanon, Voice of Hope	9990va			
0500-0510 mtwhf	Malawi, MBC	3380do			
0500-0530 m-a/vl	Mexico, Radio Mexico Intl	9705na			
0500-0525	Netherlands, Radio	5995na	6165na		
0500-0600	New Zealand, R NZ Intl	11905pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4990do		
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	5905na	5930na	7270na	7345na
		13790na	15580na		
0500-0555	S Africa, Channel Africa	11900af			
0500-0600	Slovakia, Adv World Radio	7215eu			
0500-0556	Spain, R Exterior Espana	9540na			
0500-0600	Swaziland, Trans World R	6070af			
0500-0515	Uganda, Radio	3340do			
0500-0600	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6195eu	7160af	9410va
		9600af	9640va	9740as	11760va
		11955as	15280as	15360va	15420af
		15575va	17640af	17885af	
0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	17780as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, Voice of America	5970af	6035af	6080af	7170va
		7195af	7295af	9775af	9885af
		11675af	11965va	15205va	
0500-0600	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0500-0600	USA, WGTG McCaysville GA	5085am			
0500-0600	USA, WHRI Noblesville IN	5760am	7315am	9930am	
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0600	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0500-0600	USA, WYFR Okeechobee FL	5850na	9355eu	9985eu	11695af
0500-0530	Vatican State, Vatican R	9660af	11625af	15570af	
0500-0600	Zambia, Christian Voice	3330af			
0500-0510	Zambia, ZNBC Radio 1	7220do			
0500-0510	Zambia, ZNBC Radio 2	6165do			
0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0505-0600	Swaziland, Trans World R	3200af	5055af	9500af	
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0559	Austria, R Austria Intl	6015na	6155eu	13730eu	15410me
		17870me			
0530-0600 mtwhf	Moldova, R Moldova Intl	7520eu			
0530-0600	Romania, R Romania Intl	11940af	15250af	15365af	15370as
		17745af	17790af		
0530-0600	Russia,Voice of Russia WS	9895na			
0530-0600	Slovakia, Adv World Radio	11600eu			
0530-0600	Thailand, Radio	9655eu	11905eu	15115eu	
0530-0600 a	USA, WRMI/R Miami Intl	9955am			
0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			
0538-0555 1&3rd s	Denmark, R Denmark Intl	7465va	13805va		
0555-0600	Malaysia, Voice of	6175as	9750as	15295au	

Selected Programs

Sundays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. A 15-minute report of world and regional news.
0500 USA, WWCR #1 Nashville TN: The Old Land Mark Church. R. L. Mitchell presents the Holy Way Hour from Chicago.
0500 USA, WWCR #3 Nashville TN: Morning Watch Chapel. See S 0400.
0508 Germany, Deutsche Welle: Inside Europe. See S 0108.
0510 S Africa, Channel Africa: Checkpoint. A roundtable discussion about life in South Africa.
0534 S Africa, Channel Africa: Women Today. A program of frank advice for and about today's South African women.
0537 Germany, Deutsche Welle: Religion and Society. See S 0138.
0549 S Africa, Channel Africa: Music. The popular music of South Africa.

Mondays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. See S 0500.
0500 USA, WWCR #1 Nashville TN: Music City Discovery. Listen to the latest singers to hit Nashville.
0500 USA, WWCR #3 Nashville TN: The Extraordinary Science Radio Hour. J.W. McGinnis of the Tesla Society.
0508 Germany, Deutsche Welle: Mailbag. See M 0108.
0518 Germany, Deutsche Welle: Living in Germany. See M 0118.
0530 S Africa, Channel Africa: African Weather. A summary of weather forecasts for African cities.
0531 S Africa, Channel Africa: Sports. The latest in sports from around the continent and surrounding regions.
0533 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. See S 0500.
0500 Monitor Radio Int'l: Monitor Radio News. Five minutes of the latest world news at the beginning of the hour.
0506 Monitor Radio Int'l: Monitor Radio International. News, analysis, commentary, interviews and features in a magazine format.
0509 Germany, Deutsche Welle: European Journal. See M 2324.
0532 Germany, Deutsche Welle: German Tribune. See T 0132.
0535 S Africa, Channel Africa: Sports. See M 0531.
0549 Monitor Radio Int'l: Letterbox. Listeners make their views known by telephone or letter to host Lisa Dale.
0552 Monitor Radio Int'l: Religious Article from the CSM. As published in the christian Science Monitor.

Wednesdays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. See S 0500.
0500 Monitor Radio Int'l: Monitor Radio News. See T 0500.
0506 Monitor Radio Int'l: Monitor Radio International. See T 0506.
0509 Germany, Deutsche Welle: European Journal. See M 2324.
0533 Germany, Deutsche Welle: Backdrop. A program of culture and the arts in Germany.
0539 Germany, Deutsche Welle: Come to Germany. See W 0133.
0549 Monitor Radio Int'l: Letterbox. See T 0549.
0552 Monitor Radio Int'l: Religious Article from the CSM. See T 0552.

Thursdays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. See S 0500.
0500 Monitor Radio Int'l: Monitor Radio News. See T 0500.
0506 Monitor Radio Int'l: Monitor Radio International. See T 0506.
0509 Germany, Deutsche Welle: European Journal. See M 2324.
0533 Germany, Deutsche Welle: German Tribune. See T 0132.
0533 S Africa, Channel Africa: Sports. See M 0531.
0549 Monitor Radio Int'l: Letterbox. See T 0549.
0552 Monitor Radio Int'l: Religious Article from the CSM. See T 0552.

Fridays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. See S 0500.
0500 Monitor Radio Int'l: Monitor Radio News. See T 0500.
0506 Monitor Radio Int'l: Monitor Radio International. See T 0506.
0509 Germany, Deutsche Welle: European Journal. See M 2324.
0533 Germany, Deutsche Welle: Arts on the Air. See S 1109.
0535 S Africa, Channel Africa: Sports. See M 0531.
0549 Monitor Radio Int'l: Letterbox. See T 0549.
0552 Monitor Radio Int'l: Religious Article from the CSM. See T 0552.

Saturdays

0500 Germany, Deutsche Welle: World News. See S 0100.
0500 Israel, Kol Israel: News. See S 0500.
0509 Germany, Deutsche Welle: European Journal. See M 2324.
0510 S Africa, Channel Africa: Mailbag. Listener letters are answered on the air.
0520 S Africa, Channel Africa: Farming for Africa. Advice on agriculture and animal husbandry.
0533 Germany, Deutsche Welle: Through German Eyes. See S 1629.
0533 S Africa, Channel Africa: Channel Africa Sports. See A 0340.

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Frequencies

0600-0700	Australia, Radio	9660pa	9860pa	11880pa	12080pa
		13605as	15240pa	15365pa	15415as
		15530as	17715as	17880pa	
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0633	Australia,DefenseForces R	13525as			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFCX Montreal	6005do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0630 mtwhf	Canada, R Canada Intl	6050eu	6150eu	9740af	9760af
		11905me			
0600-0700	Costa Rica,RF Peace Intl	6205am	7385am		
0600-0700	Cuba, Radio Havana	9820na	9830na		
0600-0700	Ecuador, HCJB	9745am	21455am		
0600-0650	Germany, Deutsche Welle	7225af	9565af	11765af	13790af
		17820as	21705me		
0600-0615	Ghana, Ghana Broadc Corp	3366do	4915do		
0600-0700 vl	Italy, IRRS	3985va			
0600-0700	Japan, NHK/Radio	9835na	11725as	11850au	17810as
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Voice of Hope	9990va			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au	
0600-0700	New Zealand, R NZ Intl	11905pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4990do		
0600-0700	North Korea, R Pyongyang	15180as	15230as		
0600-0630 s	Norway, Radio Norway Intl	5965eu	7180af	9590me	
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0700	Russia,Voice of Russia WS	5905na	5930na	7175na	7270na
		7345na	15470as	15580na	
0600-0700	S Africa, Trans World R	11730af			
0600-0610	Sierra Leone, SLBS	3316do			
0600-0630	Slovakia, Adv World Radio	13715af			
0600-0700	Slovakia, Adv World Radio	5905am			
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	Swaziland, Trans World R	11730af			
0600-0630	Switzerland, Swiss R Intl	9885af	11860af	13635af	
0600-0700	United Kingdom, BBC WS	3955eu	5975va	6175eu	6195eu
		7145pa	7160af	9410eu	9600af
		9640af	9740as	11760eu	11955as
		12095as	15280as	15310as	15360va
		15420af	15575va	17640af	17790as
0600-0700	USA, KAIJ Dallas TX	5810am			
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	17780as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, Voice of America	5970af	6035af	6140af	7195af
		9630af	11805af	11950af	11965af
		12080af	15205af		
0600-0630	USA, Voice of America	6080af	9435af		
0600-0700	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0600-0700	USA, WHRI Noblesville IN	5760am	7315am	9930am	
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WRNO New Orleans LA	7355am			
0600-0700	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0600-0700	USA, WYFR Okeechobee FL	5850af	7355eu	9355eu	9985af
0600-0620	Vatican State, Vatican R	5880eu	7250eu		
0600-0645 vl/m-f	Vatican State, vatican R	15215me			
0600-0630	Vietnam, Voice of	5925as	10060as		
0600-0700	Yemen, Yemeni Rep Radio	9780do			
0600-0700	Zambia, Christian Voice	3330af			
0600-0605 mtwhfa	Zambia, ZNBC Radio 1	7220do			
0600-0630	Zambia, ZNBC Radio 2	6165do			
0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0615-0630	Switzerland, Swiss R Intl	5840eu	6165eu		
0630-0655	Austria, R Austria Intl	6015na			
0630-0657	Georgia, Radio	11805eu			
0630-0700 as	USA, Voice of America	6080af			
0630-0700	Vatican State, Vatican R	11625af	13765af	15570af	
0631-0640	Romania, R Romania Intl	7105eu	9625eu	11775eu	
0638-0655 1&3rd s	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0645-0700	Romania, R Romania Intl	15250pa	15370pa	17720pa	17790as
		17805as			

Selected Programs

Sundays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #1 Nashville TN: These Last Days. Apparitions and prophecies of the Lady of the Roses.
0600 USA, WWCR #3 Nashville TN: Tempered Steel. Dale Early plays heavy metal.
0608 Germany, Deutsche Welle: Commentary. See S 0208.
0612 Germany, Deutsche Welle: Sports Report. See S 0212.
0616 Germany, Deutsche Welle: Feature of the Month (1). See S 0436.
0616 Germany, Deutsche Welle: International Talking Point. See S 0416.
0630 USA, WWCR #1 Nashville TN: The Lutheran Reformation Hour. Richard Shekner preaches from Chicago Heights, Illinois.
0636 Germany, Deutsche Welle: People and Places. See S 0436.

Mondays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #1 Nashville TN: Rock the Universe. See S 1300.
0600 USA, WWCR #3 Nashville TN: Wonderful Words of Life. See S 0400.
0608 Germany, Deutsche Welle: Africa Highlight. See M 0408.
0615 USA, WWCR #3 Nashville TN: The Old Time Religion Hour. Brother Hogan will send you a Bible.
0624 Germany, Deutsche Welle: Inside Europe. See S 0108.
0630 USA, WWCR #3 Nashville TN: The Hour of Courage. See S 0000.

Tuesdays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #3 Nashville TN: The Sower. Musical treat and spiritual tonic with Michael Guido.
0603 USA, WWCR #1 Nashville TN: The Grace Hour (repeat). See M 1502.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0615 USA, WWCR #3 Nashville TN: The Old Time Religion Hour. See M 0615.
0624 Germany, Deutsche Welle: European Journal. See M 2324.
0630 USA, WWCR #3 Nashville TN: The Hour of Courage. See S 0000.

Wednesdays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #3 Nashville TN: The Sower. See T 0600.
0603 USA, WWCR #1 Nashville TN: The Grace Hour (repeat). See M 1502.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0615 USA, WWCR #3 Nashville TN: The Old Time Religion Hour. See M 0615.
0624 Germany, Deutsche Welle: European Journal. See M 2324.
0630 USA, WWCR #3 Nashville TN: The Hour of Courage. See S 0000.

Thursdays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #3 Nashville TN: The Sower. See T 0600.
0603 USA, WWCR #1 Nashville TN: The Grace Hour (repeat). See M 1502.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0615 USA, WWCR #3 Nashville TN: The Old Time Religion Hour. See M 0615.
0624 Germany, Deutsche Welle: European Journal. See M 2324.
0630 USA, WWCR #3 Nashville TN: The Hour of Courage. See S 0000.

Fridays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #3 Nashville TN: Scriptures for America. Peter J. Peters exposes the world's evils.
0603 USA, WWCR #1 Nashville TN: The Grace Hour (repeat). See M 1502.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0615 USA, WWCR #3 Nashville TN: The Old Time Religion Hour. See M 0615.
0624 Germany, Deutsche Welle: European Journal. See M 2324.
0630 USA, WWCR #3 Nashville TN: The Hour of Courage. See S 0000.

Saturdays

0600 Germany, Deutsche Welle: World News. See S 0100.
0600 USA, WWCR #3 Nashville TN: Scriptures for America. See F 0600.
0603 USA, WWCR #1 Nashville TN: The Grace Hour (repeat). See M 1502.
0608 Germany, Deutsche Welle: Commentary. See S 0208.
0612 Germany, Deutsche Welle: Africa This Week. See A 0412.
0615 USA, WWCR #3 Nashville TN: Lyon Gold and Silver Magnet Program. Jackie Lyon hawks a variety of products for healing.
0630 Germany, Deutsche Welle: Man and Environment. See T 1633.
0630 USA, WWCR #3 Nashville TN: America Today Radio. Gary Hahn looks at current issues which are not found in the media mainstream.

Hauser's Highlights
ECUADOR: HCJB, W-96

0000-0359 ENAm	9745
0500-0659 Eu	9445
0500-0700 WNAm	9745
0700-1058 SPac	9445
1100-1600 Car	12005
1100-1600 Ams	12025
1900-2158 Eu	11960

(via Bill Westenhaver)

FREQUENCIES

0700-0800	Australia, Radio	9580pa	9660pa	9710as	9860pa
		12080pa	15240pa	15365pa	15415as
		15530as	17715pa	17880as	
0700-0800 as	Australia, Radio	11640as			
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	6205am	7385am		
0700-0727	Czech Rep, Radio Prague	7345eu	9530eu		
0700-0800	Ecuador, HCJB	5860eu	9445pa	21455au	
0700-0800 as	Eqt Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800 vl	Italy, IRRS	3985va			
0700-0800	Japan, NHK/Radio	7230eu	11725as	11740as	11850pa
		11920as	15165me	17810va	17815af
		21610as			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Voice of Hope	9990va			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	9750as	15295au		
0700-0710	Malaysia, Voice of	6175as			
0700-0715 mtwhf	New Zealand, R NZ Intl	11905pa			
0700-0758 as	New Zealand, R NZ Intl	11905pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0745	Romania, R Romania Intl	15250pa	17720pa		
0700-0800	Russia,Voice of Russia WS	9895as	15470as	15490as	
0700-0710	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	3955eu	6175eu	6190af	6195eu
		7145va	7325eu	9410eu	9600af
		9640va	9740as	11760as	11940af
		11955as	12095va	15280as	15310as
		15360va	15400va	15575me	17640va
	17790as	17830af	17885af		
0700-0730	United Kingdom, BBC WS	6180eu	11780eu		
0700-0715	United Kingdom, BBC WS	6005af	7160af		
0700-0800	USA, KAIJ Dallas TX	5810am			
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KVOH Los Angeles CA	9975am			
0700-0800	USA, KWHR Naalehu HI	17510au			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0700-0800	USA, WHRI Noblesville IN	5760am	7315am	9930am	
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985eu		
0700-0800	USA, WYFR Okeechobee FL	5850af	9355af	9455af	
0700-0800 vl	Vanuatu, Radio	3945do	7260do		
0700-0745 vl/m-f	Vatican State, Vatican R	4005eu	5880eu	7250eu	9645eu
0700-0800	Zambia, Christian Voice	6065af			
0700-0800	Zambia, ZNBC Radio 2	6165do			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0705-0800	Swaziland, Trans World R	5055af	9500af	9650af	
0710-0800 vl	Papua New Guinea, NBC	4890do			
0715-0730	Switzerland, Swiss R Intl	5840eu	6165eu		
0730-0745 s	Greece, Voice of	7450eu	9425eu	11645au	
0730-0735	India, All India Radio	15185do	15260do		
0730-0800	Netherlands, Radio	9830au	11895pa		
0730-0800 as	Palau, KHBN/Voice of Hope	9730as			
0738-0755 1&3rd s	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0740-0800	Guam, TWR/KTWR	15200as			
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7450eu	9425eu	11645au	
0745-0755 as	Monaco, Trans World Radio	7115eu			
0755-0800 mtwhf	Monaco, Trans World Radio	7115eu			
0758-0800 as	New Zealand, R NZ Intl	9700pa			

0800 UTC

0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9510as
		9580pa	9710pa	9860pa	12080pa
		13605pa	15530as	17715pa	21725as
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0830 vl	Australia, VL8T Tent Crk	4910do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica,RF Peace Intl	6205am	7385am	15050am	
0800-0830	Ecuador, HCJB	11615eu			
0800-0900	Ecuador, HCJB	5860eu	9445pa	21455au	
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
0800-0850	Germany, Deutsche Welle	6160as			
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Indonesia, Voice of	9525as			
0800-0830 vl	Italy, IRRS	3985va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Voice of Hope	9990va			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0900	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9830au	11895pa		
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0850	Pakistan, Radio	15470eu	17900eu		
0800-0900 as	Palau, KHBN/Voice of Hope	9730as			
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	15470as	15560as	17570as	17665as
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	9570au	13670eu		
0800-0900	United Kingdom, BBC WS	6190af	6195va	9410eu	9600af
		9740as	9805va	11760as	11940af
		11955as	15280as	15310as	15400va
		15575me	17640va	17790as	17830af
		17885af			
0800-0815	United Kingdom, BBC WS	3955eu	7145va	12095eu	
0800-0900	USA, KAIJ Dallas TX	5810am			
0800-0900	USA, KNLS Anchor Point AK	6150as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	11550pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	7425na		
0800-0900	USA, WHRI Noblesville IN	5760am	7315am	9930am	
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0800-0830 vl	Vanuatu, Radio	3945do	7260do		
0800-0900	Zambia, Christian Voice	6065af			
0800-0805 mtwhfa	Zambia, ZNBC Radio 2	6165do			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0805-0810	Croatia, Croatian Radio	5920eu	7165eu	9830eu	13830eu
0805-0835 mtwhf	Swaziland, Trans World R	4775af	9500af	9650af	
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0816-0900 mtwhf	New Zealand, R NZ Intl	9700pa			
0830-0900 s	Armenia, Voice of	15270eu			
0830-0900 vl	Australia, VL8A Alice Spg	2310do			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0830-0855	Austria, R Austria Intl	6155eu	13730eu	15240as	17870au
0830-0900	Belgium, R Vlaanderen Int	5985eu	9925eu	9940au	
0830-0857	Georgia, Radio	11910me			
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900 vl	Italy, IRRS	7125va			
0830-0900	Netherlands, Radio	5965pa	9830au	13700pa	
0830-0900	Slovakia, R Slovakia Intl	11990au	17550au	21705au	
0838-0855 1&3rd s	Denmark, R Denmark Intl	15220va	17855va		
0850-0853 s	Russia, R Pacific Ocean	7185as			
0855-0900	Guam, TWR/KTWR	11830pa			

Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.

FREQUENCIES

0900-1000	Australia, Radio	5995pa	6020pa	6080pa	9510as
		9580pa	9710pa	9860pa	12080pa
		13605as	21725as		
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755pa	15440pa	17690au	
0900-1000	Costa Rica,RF Peace Intl	6205am	7385am		
0900-0930	Czech Rep, Radio Prague	15640me	17485af		
0900-1000	Ecuador, HCJB	9445pa	21455au		
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160pa	7380as	9565af	11715as
		15145af	15410af	17800af	17820pa
		21600af			
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-0959	Guam, TWR/KTWR	11830pa			
0900-1000 m-f/vl	Italy, IRRS	7125va			
0900-1000	Japan, NHK/Radio	9610as	11850au	15190as	
0900-0930 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	9990va			
0900-1000	Malaysia, Radio	7295do			
0900-0920 mtwhf	Monaco, Trans World Radio	7115eu			
0900-0905 a	Monaco, Trans World Radio	7115eu			
0900-0925	Netherlands, Radio	5965pa	9830au	13700pa	
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-0930 s	Norway, Radio Norway Intl	13800au			
0900-1000 as	Palau, KHBN/Voice of Hope	9730as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia,Voice of Russia WS	9835va	11800pa	12025as	15470as
		15560pa	15580as		
0900-0930	Switzerland, Swiss R Intl	9885pa	12075au	13685pa	
0900-1000	United Kingdom, BBC WS	6190af	6195va	9410eu	9740as
		11750as	11940af	12095eu	15190sa
		15280va	15400va	15575me	17640va
		17705eu	17830va	17885af	
0900-0915	United Kingdom, BBC WS	6065as	7180as	9580as	11760as
		11955as	15310as	15360as	17790as
0900-1000	USA, KAIJ Dallas TX	5810am			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13840au
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na		
0900-1000	USA, WHRI Noblesville IN	5760am	7315am	9930am	
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000 as	USA, WVHA Greenbush ME	13825af			
0900-1000	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Kazakhstan, R Alma Ata	7205eu	9505eu	11705eu	
0930-1000	Lithuania, Radio Vilnius	9710eu			
0930-1000	Mongolia, R Ulan Bator	11850as	12085as		
0930-1000	Netherlands, Radio	5965as	7260as	9810as	9830au
0930-1000	Philippines, FEBC/R Intl	11635as			
0938-0955 1&3rd s	Denmark, R Denmark Intl	13800va	17855va		

1000 UTC

1000-1100	Australia, Radio	5995as	6020pa	6080pa	9510as
		9580pa	9860pa	13605as	21725as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755pa	15440pa	17690au	
1000-1100	Costa Rica,RF Peace Intl	6205am	7385am		
1000-1100	Ecuador, HCJB	9445pa	21455au		
1000-1100 as	Eqt Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1059	Guam, AWR/KSDA	9870as			
1000-1059	Guam, TWR/KTWR	9870as			
1000-1100	India, All India Radio	13700as	15050as	17387au	17890as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1100 vl	Italy, IRRS	7125va			
1000-1100	Lebanon, Voice of Hope	9990va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1025	Netherlands, Radio	5965pa	7260as	9810as	9830au
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1100 as	Palau, KHBN/Voice of Hope	9730as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia,Voice of Russia WS	7150va	9835pa	11800as	12025as
		15580as			
1000-1100	United Kingdom, BBC WS	5965na	6190af	6195va	9410eu
		9740as	11750as	11760as	11940af
		12095eu	13745va	15190sa	15280va
		15310as	15400af	15575me	17640va
		17705va	17790as	17830va	17885af
1000-1100	USA, KAIJ Dallas TX	5810am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095na	7395sa	9430as	13840as
1000-1100	USA, Voice of America	5985va	6165am	7405am	9590am
		11720va	15425va		
1000-1100	USA, WEWN Birmingham AL	7425na	15665eu		
1000-1100	USA, WGTG McCaysville GA	9400am			
1000-1100	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WMLK Bethel PA	9465eu			
1000-1100 as	USA, WVHA Greenbush ME	13825af			
1000-1100	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1100 vl/m-f	Vatican State, Vatican R	11740af	15210af	17550af	
1000-1030	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1000-1100	Zambia, Christian Voice	6065af			
1000-1005 mtwhfa	Zambia, ZNBC Radio 2	6165do			
1005-1010	Croatia, Croatian Radio	5895eu	7165eu		
1030-1055 mtwhfa	Austria, R Austria Intl	6155eu	13730eu	15240as	17870au
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100	Netherlands, Radio	7260as	9810as		
1030-1100	Sri Lanka, Sri Lanka BC	11835as	17850as		
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1038-1055 1&3rd s	Denmark, R Denmark Intl	9480eu	15220na		

MT MONITORING TEAM

Next Reporting Deadline: December 19, 1996

Gayle Van Horn
Frequency Manager
swbcsked@grove.net

Jim Frimmel
Program Manager
DXComp@aol.com

Dave Datko, California

Jacques d'Avignon
Propagation Forecasts
Ontario, Canada
monitor@limestone.kosone.com

Loyd Van Horn, Brasstown, N.C.

THANK YOU ...

ADDITIONAL CONTRIBUTORS TO THIS MONTH'S SHORTWAVE GUIDE:

Bob Fraser, Cohasset, MA; Clyde W. Harmon, Anniston, AL; Jim Moats, Ravenna, OH; Thomas B. Roach, San Jose, CA: Robert E. Thomas, Bridgeport, CT; Alden C. Wires, East Point, GA; Larry Van Horn, Brasstown, NC; BBCMS; BBC *World Media*; BBC *Summary of World Broadcasts*; *Cumbre DX; Fine Tuning; Michigan Area Radio (MARE); NASWA Journal; DX Ontario*; Internet Shortwave Newsgroups; *World of Radio.*

Frequencies

1100-1200	Australia, Radio	9580pa	9615as	9860pa	12080pa
		13605as	21725as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	2325do			
1100-1130 mtwhfa	Belgium, R Vlaanderen Int	6035eu			
1100-1200	Canada, CFCX Montreal	6005do			
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica, Adv World R	7375am	9725am	13750am	
1100-1200	Costa Rica,RF Peace Intl	6205am	7385am		
1100-1130	Ecuador, HCJB	12005am	12025am		
1100-1200	Ecuador, HCJB	15115am	21455au		
1100-1200 as	Eqt Guinea, R East Africa	15186af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17780af	17800af
1100-1200	Iraq, Radio Iraq Intl	13680eu			
1100-1200 vl	Italy, IRRS	7125va			
1100-1200	Japan, NHK/Radio	6120na	9610as	15350as	
1100-1200	Jordan, Radio	11970eu			
1100-1200	Lebanon, Voice of Hope	9990va			
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1125	Netherlands, Radio	7260as	9810as		
1100-1200	New Zealand, R NZ Intl	9700pa			
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na	
1100-1120	Pakistan, Radio	15470eu	17900eu		
1100-1130 as	Palau, KHBN/Voice of Hope	9730as			
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Russia,Voice of Russia WS	4740as	11655as	15460as	15520as
		15560as	17560as	17755as	17775as
		17870as			
1100-1200	Singapore,R Singapore Int	6015as	6155as		
1100-1130	Sri Lanka, Sri Lanka BC	11835as	17850as		
1100-1130	Switzerland, Swiss R Intl	6165eu	9535eu	9885as	11995as
		13635as			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
		9410eu	9580as	9740va	11750as
		11760as	11940af	11955as	12095eu
		15220va	15310as	15575me	17640va
		17705va	17830af	17885af	21660af
1100-1130	United Kingdom, BBC WS	9700au	15190sa	15400eu	17790va
1100-1200	USA, KAIJ Dallas TX	5810am	9815am		
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395sa	9355eu	9430au
1100-1200	USA, Voice of America	5985va	6110va	6165am	7405am
		9590am	9645va	9760va	11720va
		15160va	15425va		
1100-1200	USA, WEWN Birmingham AL	7425na	15665eu		
1100-1200	USA, WGTG McCaysville GA	9400am			
1100-1200	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200 as	USA, WVHA Greenbush ME	13825af			
1100-1200	USA, WWCR Nashville TN	5070am	5935am	9475am	15685am
1100-1200	USA, WYFR Okeechobee FL	5950na	7355na		
1100-1200 vl/m-f	Vatican State, Vatican R	5880eu			
1100-1130	Vietnam, Voice of	7285as	9730as		
1100-1200	Zambia, Christian Voice	6065af			
1115-1127	Zambia, ZNBC Radio 1	7220do			
1115-1200	Zambia, ZNBC Radio 2	6165do			
1130-1200	Bulgaria, Radio	9440as			
1130-1200 vl	China, China Radio Intl	8660as	11445as	11700as	
1130-1200	Finland, YLE/R Finland	15245as	17685au		
1130-1200	Iran, VOIRI	11875me	11930me	15260af	
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	7190eu		
1130-1200	South Korea, R Korea Intl	9650am			
1130-1200 f	Vatican State, Vatican R	15210as	15570as	17550au	
1135-1140	India, All India Radio	9595do	11620do	11710do	15185do
1138-1155 1&3rd s	Denmark, R Denmark Intl	7295eu	17740af		

Selected Programs

Sundays

1100 Germany, Deutsche Welle: World News. See S 0100.
1100 USA, WVHA, Greenbush ME: Prophecy Countdown. Either Al Scott or John Osborne conduct the meeting.
1109 Germany, Deutsche Welle: Arts on the Air. Reports and interviews on major cultural events and developments.
1130 USA, WVHA, Greenbush ME: Live Forever. Dr. Milton Teske speaks.
1130 USA, WWCR #1 Nashville TN: Carl Hammons Ministries. Carl Hammons.
1130 USA, WWCR #3 Nashville TN: Reflections. Lezlie Labadie on the second coming.
1133 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.
1138 Netherlands, Radio: Wide Angle. The weekend edition of Newsline produced by the current affairs team.
1145 USA, WWCR #3 Nashville TN: Bible Gems. Jim Kristoff evangelizes from Indiana.
1153 Netherlands, Radio: Siren Song. Dheera Sujan presents an in-depth current affairs story that will capture and hold your attention.

Mondays

1100 Germany, Deutsche Welle: World News. See S 0100.
1100 USA, WWCR #1 Nashville TN: Truth House. Evangelistic teachings by E.C. Fultcher plus his global shortwave club.
1100 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). Brother R. G. Stair preaches about the last days.
1109 Germany, Deutsche Welle: Newsline Cologne. Worldwide current affairs program with a review of the German or European press.
1133 Germany, Deutsche Welle: Hallo Africa. A program with musical requests and greetings to friends.
1138 Netherlands, Radio: Newsline. See S 0038.
1145 Germany, Deutsche Welle: African News. News about and for African countries.
1153 Netherlands, Radio: A Good Life. Ginger da Silva hosts a program about development in both rich and poor countries.

Tuesdays

1100 Germany, Deutsche Welle: World News. See S 0100.
1100 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
1100 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1138 Netherlands, Radio: Newsline. See S 0038.
1145 Germany, Deutsche Welle: African News. See M 1145.
1153 Netherlands, Radio: Music 52-15. Martha Hawley hosts this program of international music.

Wednesdays

1100 Germany, Deutsche Welle: World News. See S 0100.
1100 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
1100 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1138 Netherlands, Radio: Newsline. See S 0038.
1145 Germany, Deutsche Welle: African News. See M 1145.
1153 Netherlands, Radio: Sounds Interesting. See S 1254.

Thursdays

1100 Germany, Deutsche Welle: World News. See S 0100.
1100 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
1100 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1138 Netherlands, Radio: Newsline. See S 0038.
1145 Germany, Deutsche Welle: African News. See M 1145.
1153 Netherlands, Radio: Media Network. Jonathan Marks and Diana Janssen look at the world of broadcasting. Top-rated.

Fridays

1100 Germany, Deutsche Welle: World News. See S 0100.
1100 USA, WWCR #1 Nashville TN: Truth House. See M 1100.
1100 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1138 Netherlands, Radio: Newsline. See S 0038.
1145 Germany, Deutsche Welle: African News. See M 1145.

Saturdays

1100 Germany, Deutsche Welle: World News. See S 0100.
1109 Germany, Deutsche Welle: Germany this Week. See S 1609.
1120 Germany, Deutsche Welle: Mailbag Africa. Listener mail from Africa is answered.
1137 Netherlands, Radio: Newsline. See S 0038.
1138 Germany, Deutsche Welle: Saturday Special. Information unavailable.
1153 Netherlands, Radio: Roughly Speaking. See S 0153.

Hauser's Highlights

ICELAND: Reykjavik

ISBS, W-96, USB with reduced carrier - 6dB in Icelandic

1215-1315	Sun/Mon	11580, 11710, 13800, 15070, 15100
1410-1445	Sun/Mon	11580, 11680, 13800, 15070, 15100
1855-1930	daily	3920, 3940, 5820, 5840, 7520, 7540, 9380, 9500
1935-2010	daily	same as 1410
2300-2335	daily	9380, 9500, 11580, 11680, 13800

(via *PanIview*)

Frequencies

1200-1300	Australia, Radio	5995pa	9580pa	9615as	9710as
		9770as	9860pa	11660as	11800pa
1200-1300 vl	Australia, VL8A Alice Spg	2310do			
1200-1300 vl	Australia, VL8K Katherine	2485do			
1200-1300 vl	Australia, VL8T Tent Crk	2325do			
1200-1300	Brazil, Radio Bras	15445na			
1200-1230	Bulgaria, Radio	9440as			
1200-1215	Cambodia, Natl Voice of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFCX Montreal	6005do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1230	Canada, R Canada Intl	6150as	11730as		
1200-1300	China, China Radio Intl	7385na	7410as	9565as	9715as
		11660as	11795pa	15440au	
1200-1230 vl	China, China Radio Intl	8660as	11445as	11700as	12110as
1200-1300	Costa Rica, Adv World R	5030am	6150am	9725am	13750am
1200-1300	Costa Rica,RF Peace Intl	6205am	7385am		
1200-1300	Ecuador, HCJB	12005am	12025am	15115am	21455am
1200-1300 as	Eqt Guinea, R East Africa	15186af			
1200-1300	Eqt Guinea, Radio Africa	9530as			
1200-1300	France, Radio France Intl	9805eu	11600as	11670as	13625am
		15155eu	15195eu	15325af	15530ca
1200-1230	Iran, VOIRI	11875me	11930me	15260af	
1200-1300	Iraq, Radio Iraq Intl	13680eu			
1200-1300 vl	Italy, IRRS	7125va			
1200-1300	Lebanon, Voice of Hope	9990va			
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1250	Myanmar, Voice of	5990do			
1200-1300	Netherlands, Radio	6045eu	7190eu		
1200-1206	New Zealand, R NZ Intl	9700pa			
1200-1300	Russia,Voice of Russia WS	7150va	9835oa	11655as	11800pa
		12025as	15520as	17560as	17775as
		17870pa			
1200-1300	Singapore,R Singapore Int	6015as	6155as		
1200-1300	South Korea, R Korea Intl	7285va			
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
		9410eu	9580as	9740va	11750as
		11760as	11940af	11955as	12095eu
		15220va	15310as	15575me	17640va
		17705va	17830af	17885af	21660af
1200-1300	USA, KAIJ Dallas TX	5810am	9815am		
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9430au	9455sa
1200-1300	USA, Voice of America	6110va	9645va	9760va	11715va
		15160va	15425va		
1200-1300	USA, WEWN Birmingham AL	7425na	15665eu		
1200-1300	USA, WGTG McCaysville GA	9400am			
1200-1300	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300 as	USA, WVHA Greenbush ME	13825eu			
1200-1300	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1200-1300	USA, WYFR Okeechobee FL	5950na	11830na	11970na	
1200-1245	USA, WYFR Okeechobee FL	7355na			
1200-1230	Uzbekistan, R Tashkent	5060as	5975as	7285as	9715as
1200-1300	Zambia, Christian Voice	6065af			
1200-1300 mtwhf	Zambia, ZNBC Radio 2	6165do			
1206-1300 occsnal	New Zealand, R NZ Intl	6105pa			
1215-1300	Egypt, Radio Cairo	17595as			
1230-1300 as	Australia, Radio	5995pa			
1230-1300	Bangladesh,Bangla Betar	7185as	9548as		
1230-1300 mtwhf	Finland, YLE/R Finland	11735na	15400na		
1230-1235	India, All India Radio	4860do	6185do	17865do	
1230-1300 w	Indonesia, RRI Sorcng	4875do			
1230-1300 a	Monaco, Trans World Radio	7115eu			
1230-1255 s	Monaco, Trans World Radio	7115eu			
1230-1300	Mongolia, R Ulan Bator	9745as	12085as		
1230-1300	South Korea, R Korea Intl	9570as	9640as	9640as	13670as
1230-1300 mtwhf	Sri Lanka, Sri Lanka BC	15425as			
1230-1300	Sweden, Radio	11650na	13740as	15240na	
1230-1300	Thailand, Radio	9655as	9885as	11905as	
1230-1300	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1238-1255 1&3rd s	Denmark, R Denmark Intl	9590va	13800va	15305va	15480va
1240-1250	Greece, Voice of	9915af	11645af	15650af	

Selected Programs

Sundays

1200 USA, WVHA, Greenbush ME: Missionary Education & Evangelistic Training. Pastor Thomas Jackson teaches.
1200 USA, WWCR #1 Nashville TN: Words of Hope (Paul Bryson). Paul Bryson preaches from Georgia.
1200 USA, WWCR #3 Nashville TN: America's Jukebox Gold. Bryan McKay spotlights the music of the 50's and 60's.
1207 Canada, RCI Montreal (Asia): The Mailbag. Listener letters, musical selections, and happenings in Canada.
1215 USA, WWCR #1 Nashville TN: Rock of Ages. Charles Sanders evangelizes from North Carolina.
1225 Netherlands, Radio: Dutch Diaries. See S 0225.
1230 USA, WWCR #1 Nashville TN: Staff of Life. Irene Armstrong.
1238 Netherlands, Radio: Sincerely Yours. The Sunday replacement for Happy Station that lets the listener comment about the RN's programming.
1245 USA, WWCR #1 Nashville TN: Back to the Bible Baptist Church. Floyd Hendren preaches.
1254 Netherlands, Radio: Sounds Interesting. Robert Chesal takes listener feedback and incorporates their ideas into the show.

Mondays

1200 USA, WWCR #1 Nashville TN: The Hour of Courage. See S 0000.
1207 USA, WWCR #3 Nashville TN: Good Morning from America (live). Gary Kaye hosts a WWCR-produced variety music and call-in program.
1211 Canada, RCI Montreal (Asia): Spectrum. A weekday magazine program of current affairs, features, and a business report.
1225 Netherlands, Radio: Press Review. Rob Green summarizes items in the Dutch media.
1230 USA, WWCR #1 Nashville TN: Grace and Truth. RJ Bruno.
1238 Netherlands, Radio: Newsline. See S 0038.
1253 Netherlands, Radio: Research File. A program of science and technology.

Tuesdays

1200 USA, WWCR #1 Nashville TN: The Hour of Courage. See S 0000.
1207 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1211 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1225 Netherlands, Radio: Press Review. See M 1225.
1230 USA, WWCR #1 Nashville TN: Unshackled. Pacific Garden Mission's radio drama.
1238 Netherlands, Radio: Newsline. See S 0038.
1253 Netherlands, Radio: Mirror Images. Weekly magazine of music, the arts, culture, and European festivals, produced and presented by David Swatling.

Wednesdays

1200 USA, WWCR #1 Nashville TN: The Hour of Courage. See S 0000.
1207 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1211 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1225 Netherlands, Radio: Press Review. See M 1225.
1230 USA, WWCR #1 Nashville TN: World of Radio. See M 0030.
1238 Netherlands, Radio: Newsline. See S 0038.

Thursdays

1200 USA, WWCR #1 Nashville TN: The Hour of Courage. See S 0000.
1207 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1211 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1225 Netherlands, Radio: Press Review. See M 1225.
1230 USA, WWCR #1 Nashville TN: Ken's Country Classics. Key Berryhill with country music from a bygone era.
1238 Netherlands, Radio: Newsline. See S 0038.
1253 Netherlands, Radio: Research File. See M 1253.

Fridays

1200 USA, WWCR #1 Nashville TN: The Hour of Courage. See S 0000.
1207 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1211 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1225 Netherlands, Radio: Press Review. See M 1225.
1230 USA, WWCR #1 Nashville TN: First Hand. See M 0230.
1238 Netherlands, Radio: Newsline. See S 0038.
1253 Netherlands, Radio: A Good Life. See M 1153.

Saturdays

1200 USA, WWCR #3 Nashville TN: Ken's Country Classics. See H 1230.
1205 USA, WWCR #1 Nashville TN: Word of Wisdom. Howard Kirkwood evangelizes from Arkansas.
1206 Canada, RCI Montreal (Asia): Earth Watch. See S 0231.
1210 USA, WWCR #1 Nashville TN: The View from Europe. Harvey Thomas presents the European point of view on current events.
1215 USA, WWCR #1 Nashville TN: Rhema Radio Church. Kenneth Hagin, Jr. preaches from Tulsa, Oklahoma.
1225 Netherlands, Radio: Insight. See S 0025.
1230 USA, WWCR #3 Nashville TN: World of Radio. See M 0030.
1238 Netherlands, Radio: Newsline. See S 0038.
1245 USA, WWCR #1 Nashville TN: Brother Ed. Ed Skultety evangelizes from Oregon.
1253 Netherlands, Radio: Weekend. See S 0053.

Hauser's Highlights

SOUTH AFRICA: Channel Africa

W96 IN ENGLISH

0300-0355	3220, 5955
0400-0455	5955, 9585
0500-0555	5955, 11900
1500-1755	6100, 11825
1600-1655	15240

(*PanIview* via *BC-DX*)

Synthesized FM Stereo Transmitter

Microprocessor controlled for easy freq programming using DIP switches, no drift, your signal is rock solid all the time - just like the commercial stations. Audio quality is excellent, connect to the line output of any CD player, tape deck or mike mixer and you're on-the-air. Foreign buyers will appreciate the high power output capability of the FM-25; many Caribbean folks use a single FM-25 to cover the whole island! New, improved, clean and hum-free runs on either 12 VDC or 120 VAC. Kit comes complete with case set, whip antenna, 120 VAC power adapter - easy one evening assembly.

FM-25, Synthesized FM Stereo Transmitter Kit $129.95

Tunable FM Stereo Transmitter

A lower cost alternative to our high performance transmitters. Offers great value, tunable over the 88-108 MHz FM broadcast band, plenty of power and our manual goes into great detail outlining aspects of antennas, transmitting range and the FCC rules and regulations. Connects to any cassette deck, CD player or mixer and you're on-the-air, you'll be amazed at the exceptional audio quality! Runs on internal 9V battery or external power from 5 to 15 VDC, or optional 120 VAC adapter. Add our matching case and whip antenna set for a nice finished look.

FM-10A, Tunable FM Stereo Transmitter Kit $34.95
CFM, Matching Case and Antenna Set. $14.95

RF Power Booster Amplifier

Add some serious muscle to your signal, boost power up to 1 watt over a frequency range of 100 KHz to over 1000 MHz! Use as a lab amp for signal generators, plus many foreign users employ the LPA-1 to boost the power of their FM Stereo transmitters, providing radio service through an entire town. Power required: 12 to 15 volts DC at 250mA, gain of 38dB at 10 MHz, 10 dB at 1000 MHz. For a neat, professionally finished look, add the optional matching case set.

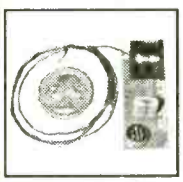
LPA-1, Power Booster Amplifier Kit $39.95
CLPA, Matching Case Set for LPA-1 Kit. $14.95
LPA-1WT, Fully Wired LPA-1 with Case $99.95

Micro FM Wireless Mike

World's smallest FM transmitter. Size of a sugar cube! Uses SMT (Surface Mount Technology) devices and mini electret condenser microphone, even the battery is included. We give you two complete sets of SMT parts to allow for any errors or mishaps-build it carefully and you've got extra SMT parts to build another! Audio quality and pick-up is unbelievable, transmission range up to 300 feet, tunable to anywhere in standard FM band 88 to108 MHz. 7/8"w x 3/8"h x 3/4"h.

FM-5 Micro FM Wireless Mike Kit $19.95

Crystal Controlled Wireless Mike



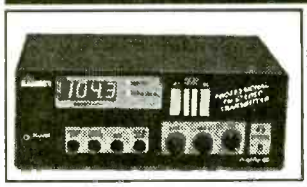
Super stable, drift free, not affected by temperature, metal or your body! Frequency is set by a crystal in the 2 meter Ham band of 146.535 MHz, easily picked up on any scanner radio or 2 meter rig. Changing the crystal to put frequency anywhere in the 140 to 160 MHz range-crystals cost only five or six dollars. Sensitive electret condensor mike picks up whispers anywhere in a room and transmit up to 1/4 mile. Powered by 3 volt Lithium or pair of watch batteries which are included. Uses the latest in SMT surface mount parts and we even include a few extras in case you sneeze and loose a part!

FM-6, Crystal Controlled FM Wireless Mike Kit $39.95
FM-6WT Fully Wired FM-6 ..... $69.95

Call for our Free Catalog !

RAMSEY

Super Pro FM Stereo Radio Transmitter

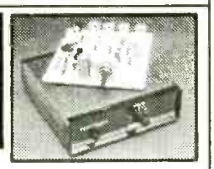


A truly professional frequency synthesized FM Stereo transmitter station in one easy to use, handsome cabinet. Most radio stations require a whole equipment rack to hold all the features we've packed into the FM-100. Set frequency easily with the Up/Down freq buttons and the big LED digital display. Plus there's input low pass filtering that gives great sound no matter what the source (no more squeals or swishing sounds from cheap CD player inputs!) Peak limiters for maximum 'punch' in your audio - without over modulation. LED bargraph meters for easy setting of audio levels and a built-in mixer with mike and line level inputs. Churches, drive-ins, schools and colleges find the FM-100 to be the answer to their transmitting needs, you will too. No one offers all these features at this price! Kit includes sharp looking metal cabinet, whip antenna and 120 volt AC adapter. Also runs on 12 volts DC.

We also offer a high power export version of the FM-100 that's fully assembled with one watt of RF power, for miles of program coverage. The export version can only be shipped outside the USA, or within the US if accompanied by a signed statement that the unit will be exported.

FM-100, Professional FM Stereo Transmitter Kit $299.95
FM-100WT, Fully Wired High Power FM-100. ..... $429.95

Speech Descrambler Scrambler



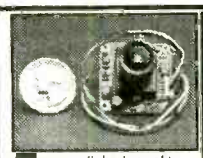
Decode all that gibberish! This is the popular descrambler / scrambler that you've read about in all the Scanner and Electronic magazines. The technology used is known as speech inversion which is compatible with most cordless phones and many police department systems, hook it up to scanner speaker terminals and you're in business. Easily configured for any use: mike, line level and speaker output/inputs are provided. Also communicate in total privacy over telephone or radio, full duplex operation - scramble and unscramble at the same time. Easy to build, all complex circuitry contained in new custom ASIC chip for clear, clean audio. Runs on 9 to 15VDC, RCA phono type jacks. Our matching case set adds a super nice professional look to your kit.

SS-70A, Speech Descrambler/Scrambler Kit $39.95
CSS, Custom Matching Case and Knob Set $14.95
SS-70AWT, Fully Wired SS-70A with Case $79.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

Tone-Grabber Touch Tone Decoder / Reader

Dialed phone numbers, repeater codes, control codes, anywhere touch-tones are used, your TG-1 will decode and store any number it hears. A simple hook-up to any radio speaker or phone line is all that is required, and since the TG-1 uses a central office quality decoder and microprocessor, it will decode digits at virtually any speed! A 256 digit non-volatile memory stores numbers for 100 years - even with the power turned off, and an 8 digit LED display allows you to scroll through anywhere in memory. To make it easy to pick out numbers and codes, a dash is inserted between any group or set of numbers that were decoded more than 2 seconds apart. The TG-1 runs from any 7 to 15 volt DC power source and is both voltage regulated and crystal controlled for the ultimate in stability. For stand-alone use add our matching case set for a clean, professionally finished project. We have a TG-1 connected up here at the Ramsey factory on the FM radio. It's fun to see the phone numbers that are dialed on the morning radio show! Although the TG-1 requires less than an evening to assemble (and is fun to build, too!), we offer the TG-1 fully wired and tested in matching case for a special price.

TG-1, Tone Grabber Kit $99.95
CTG, Matching Case Set for TG-1 Kit. $14.95
TG-1WT, Fully Wired Tone Grabber with Case $149.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95



Mini-Peeper Micro Video Camera

Super small, high quality fully assembled B & W CCD TV camera the size of an ice cube! Provides excellent pictures in low light (2 lux), or use our IR-1 Infra-Red light source to invisibly illuminate an entire room on a pitch black night! Imagine the possibilities... build it into a smoke detector, wall clock, lamp, book, radio. Exact same camera that's in big buck detective catalogues and stores. Kit includes: fully assembled CCD camera module, connectors, interface PC board kit with proper voltage regulation and filtering, hook-up details, even a mini microphone for sensitive sound! Two models available: Wide Angle Lens 3.6mm/f2, adjustable focus lens, 92 degree view; Pinhole Lens 5.5mm/f4.5, 60 degree view. The Pinhole Lens is physically much flatter and provides even greater depth of focus. The camera itself is 1.2" square. The Wide Angle Lens is about 1" long. Pinhole Lens about 1/2", interface PC board is 1" x 2" and uses RCA jacks for easy hook-up to VCRs, TVs or cable runs. Power required is 9 to 14 VDC @ 150 mA. Resolution: 380 x 350 lines. Instruction manual contains ideas on mounting and disguising the Mini-Peeper along with info on adding one of our TV Transmitter kits (such as the MTV-7 unit below) for wireless transmission!

MP-1, Wide Angle Lens CCD TV Camera Outfit $169.95
MP-1PH, Pin-Hole Lens CCD TV Camera Outfit $189.95

MicroStation Synthesized UHF TV Transmitter

Now you can be in the same league as James Bond. This transmitter is so small that it can fit into a pack of cigarettes - even including a CCD TV camera and battery! Model airplane enthusiasts put the MTV-7A into airplanes for a dynamite view from the cockpit, and the MTV-7A is the transmitter of choice for balloon launches. Transmitter features synthesized, crystal controlled operation for drift-free transmission of both audio and video on your choice of frequencies: Standard UHF TV Channel 52 (which should only be used outside of the USA to avoid violating FCC rules), and 439.25 MHz or 911.25 MHz which are in the amateur ham bands. The 439.25 MHz unit has the nifty advantage of being able to be received on a regular 'cable-ready' TV set tuned to Cable channel 68, or use our ATV-74 converter and receive it on regular TV channel 3. The 911.25 MHz unit is suited for applications where reception on a regular TV is not desired, an ATV-79 must be used for operation. The MTV-7A's output power is almost 100 mW, so transmitting range is pretty much 'line-of-sight' which can mean many miles! The MTV-7A accepts standard black and white or color video and has its own, on-board, sensitive electret micorphone. The MTV-7A is available in kit form or fully wired and tested. Since the latest in SMT (Surface Mount Technology) is used to provide for the smallest possible size, the kit version is recommended for experienced builders only. Runs on 12 VDC @ 150 mA and includes a regulated power source for a CCD camera.

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ATV-74, 439.25 MHz Converter Kit $159.95
ATV-74WT, Fully Wired 439.25 MHz Converter $249.95
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FREQUENCIES

1300-1400	Australia, Radio	5995pa	9580pa	9615as	11800pa
1300-1400 vl	Australia, VL8A Alice Spg	2310do			
1300-1400 vl	Australia, VL8K Katherine	2485do			
1300-1400 vl	Australia, VI8T Tent Crk	2325do			
1300-1320	Brazil, Radio Bras	15445na			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFCX Montreal	6005do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400	Canada, R Canada Intl	9640am	11855am		
1300-1400	China, China Radio Intl	7385na	9715as	11660pa	
1300-1330	China, China Radio Intl	7410as			
1300-1400	Costa Rica,RF Peace Intl	7385am			
1300-1330	Czech Rep, Radio Prague	11660eu	17845af		
1300-1400	Ecuador, HCJB	12005am	12025am	15115am	21455am
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	15186af			
1300-1400	Eqt Guinea, Radio Africa	9530as			
1300-1400	Iraq, Radio Iraq Intl	13680as			
1300-1400 vl	Italy, IRRS	7125va			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia, RTM Kuching	7160do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1400 occsnal	New Zealand, R NZ Intl	6105pa			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
		15430as			
1300-1330 s	Norway, Radio Norway Intl	9590eu	9910as	15605va	
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1355	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu
		11815eu			
1300-1400	Romania, R Romania Intl	9690eu	11940eu	17745eu	
1300-1400	Russia,Voice of Russia WS	15460as	15560as	17755as	
1300-1400	Singapore,R Singapore Int	6015as	6155as		
1300-1400 mtwhf	Sri Lanka, Sri Lanka BC	15425as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	12075as	13635as
1300-1400	Switzerland, Swiss R Intl	6165eu	9535eu	13635as	
1300-1400	United Kingdom, BBC WS	5965na	5990as	6190af	6195va
		9410eu	9515va	9590va	9740as
		11750as	11760as	11940af	12095eu
		15220am	15310as	15420af	15575me
		17640va	17705va	17830af	17885af
	21470af	21660af			
1300-1400	USA, KAIJ Dallas TX	5810am	15725am		
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, KWHR Naalehu HI	9930as			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455am	13840as
1300-1400	USA, Voice of America	6110va	9645va	9760va	15160va
		15425va			
1300-1330	USA, Voice of America	11715va			
1300-1400	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1300-1400	USA, WGTG McCaysville GA	9400am			
1300-1400	USA, WHRI Noblesville IN	6040am	9930am	15105am	
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1330 s	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WWCR Nashville TN	5935am	9475am	13845am	15685am
1300-1400	USA, WYFR Okeechobee FL	5950na	11830na	13695na	
1300-1345	USA, WYFR Okeechobee FL	11970am			
1300-1400	Zambia, Christian Voice	6065af			
1300-1330 mtwhf	Zambia, ZNBC Radio 2	6165do			
1330-1355	Austria, R Austria Intl	6155eu	13730na		
1330-1357	Canada, R Canada Intl	6150as	9535as		
1330-1400	Finland, YLE/R Finland	11735na	15400na		
1330-1400	Guam, AWR/KSDA	9650as			
1330-1400	India, All India Radio	11620as	13750as		
1330-1400	Netherlands, Radio	9895as	13700as	15585as	
1330-1400	Sweden, Radio	7155as	13740pa	15240pa	
1330-1400	Turkey, Voice of	9445eu	9630as		
1330-1355	UAE, Radio Dubai	13675eu	15395eu	17630eu	21605me
1330-1400 mtwhf	USA, WRMI/R Miami Intl	9955am			
1330-1400	Uzbekistan, R Tashkent	5975as	7285as	9715as	
1330-1400	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
1330-1400	Yugoslavia, Radio	11835eu			
1338-1355 1&3rd s	Denmark, R Denmark Intl	9590va	13800va	15305va	15340va
1345-1400	Vatican State, Vatican R	9500as	11625as	13765au	

SELECTED PROGRAMS

Sundays

1300 USA, WWCR #1 Nashville TN: Voice of Hope. Oliver Fenison.
1300 USA, WWCR #3 Nashville TN: Rock the Universe. Rich Adcock's selections of rock recordings includes some rare treats.
1306 Canada, RCI Montreal: Quirks and Quarks. See S 0005.
1330 USA, WWCR #1 Nashville TN: Words of Hope. Eugene Brown preaches from Nashville, Tennessee.
1337 Canada, RCI Montreal (Asia): The Mailbag. See S 1207.
1338 Netherlands, Radio: Sincerely Yours. See S 1238.
1345 USA, WWCR #1 Nashville TN: Church of the Lord Jesus Christ. Shelton Rapha preaches from Philadelphia.
1353 Netherlands, Radio: Sounds Interesting. See S 1254.

Mondays

1300 USA, WWCR #1 Nashville TN: New Harvest International. Dennis Deruz.
1306 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1307 Canada, RCI Montreal: Double Exposure. See S 0305.
1315 USA, WWCR #1 Nashville TN: Walk with Christ. Jeff Gauss.
1330 USA, WWCR #1 Nashville TN: Bread of Life Victory Hour (1). Brother Jack Meeks offers a free bible study correspondence course.
1330 USA, WWCR #1 Nashville TN: The Hour of Grace (3/5). Gene Griffin.
1330 USA, WWCR #1 Nashville TN: Victory Baptist Church (2/4). David Robinson preaches from Hildebrand, NC.
1334 Canada, RCI Montreal: The Royal Canadian Air Farce. See S 0332.
1338 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1338 Netherlands, Radio: Newsline. See S 0038.
1345 USA, WWCR #1 Nashville TN: Walking Through the Land of Promises. Bobbie Lively evangelizes from Tennessee.
1353 Netherlands, Radio: Research File. See M 1253.

Tuesdays

1300 USA, WWCR #1 Nashville TN: The King is Coming. Steve Johnson.
1306 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 USA, WWCR #1 Nashville TN: Have in God. Claude Milan.
1330 USA, WWCR #1 Nashville TN: World of Radio. See M 0030.
1338 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1338 Netherlands, Radio: Newsline. See S 0038.
1354 Netherlands, Radio: Mirror Images. See T 1253.

Wednesdays

1300 USA, WWCR #1 Nashville TN: Faith and Truth. Ken Megilligan.
1306 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 USA, WWCR #1 Nashville TN: Day of the Challenge. Gary R. Lightfoot talks about reasons for righteous living.
1330 USA, WWCR #1 Nashville TN: The Chapel Hour. Otis Tillman evangelizes from Buffalo, New York.
1338 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1338 Netherlands, Radio: Newsline. See S 0038.

Thursdays

1300 USA, WWCR #1 Nashville TN: Abounding Grace. Gary Jones of Florida is the bible teacher.
1306 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 USA, WWCR #1 Nashville TN: Faith Minutes. Ryan Hicks.
1330 USA, WWCR #1 Nashville TN: Unshackled. See T 1230.
1338 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1338 Netherlands, Radio: Newsline. See S 0038.
1352 Netherlands, Radio: Media Network. See H 1153.

Fridays

1300 USA, WWCR #1 Nashville TN: Day of the Challenge. See W 1315.
1306 USA, WWCR #3 Nashville TN: Good Morning from America (live). See M 1207.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1338 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1338 Netherlands, Radio: Newsline. See S 0038.
1345 USA, WWCR #1 Nashville TN: Battle Cry Sounding. Deborah Green evangelizes.
1355 Netherlands, Radio: A Good Life. See M 1153.

Saturdays

1300 USA, WWCR #1 Nashville TN: Brother Ed (from 1145). See A 1245.
1300 USA, WWCR #3 Nashville TN: The Extraordinary Science Radio Hour. See M 0500.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 USA, WWCR #1 Nashville TN: Rock of Ages. See S 1215.
1330 USA, WWCR #1 Nashville TN: Battle Cry Sounding. See F 1345.
1335 Canada, RCI Montreal (Asia): Innovation Canada. See S 0207.
1338 Netherlands, Radio: Newsline. See S 0038.
1353 Netherlands, Radio: Weekend. See S 0053.

HAUSER'S HIGHLIGHTS
TURKEY: VOICE OF TURKEY

w96 in English

0400-0500	7340, 9685, 17705
1330-1430	9445, 9630
1930-2030	5970-lsb, 6000
2300-2400	6135-usb, 7280, 9560, 9655

(via Bernhard Klink, *BC-DX*)

Frequencies

1400-1500	Australia, Radio	5995pa	9580pa	9860pa	11660as
		11800pa	12080pa		
1400-1500 vl	Australia, VL8A Alice Spg	2310do			
1400-1500 vl	Australia, VL8K Katherine	2485do			
1400-1500 vl	Australia, VI8T Tent Crk	2325do			
1400-1500 mtwhfa	Belgium, R Vlaanderen Int	13685na	13795as		
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFCX Montreal	6005do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500	Canada, R Canada Intl	9640am	11855am		
1400-1500	China, China Radio Intl	7405na	9530as	9785as	11815as
1400-1500	Costa Rica,RF Peace Intl	7385am	15050am		
1400-1500	Ecuador, HCJB	12005am	12025am	15115am	21455am
1400-1500 as	Eqt Guinea, R East Africa	15186af			
1400-1500	France, Radio France Intl	7110as	15405as	17560me	
1400-1500	India, All India Radio	11620as	13750as		
1400-1430 vl	Italy, IRRS	7125va			
1400-1500	Japan, NHK/Radio	9535na	9610as	11705na	11895as
		11915as			
1400-1500	Jordan, Radio	11970eu			
1400-1500	Malaysia, Radio	7295do			
1400-1500 vl	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1500	Netherlands, Radio	9895as	13700as	15585as	
1400-1500 occsnal	New Zealand, R NZ Intl	6105pa			
1400-1430 s	Norway, Radio Norway Intl	11730as			
1400-1430 as	Palau, KHBN/Voice of Hope	9730as			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	4740as	4975as	15110as	15435as
		15510as			
1400-1500	Sri Lanka, Sri Lanka BC	15425as			
1400-1430	Thailand, Radio	9655as	9830as	11905as	
1400-1430	Turkey, Voice of	9445eu	9630as		
1400-1500	United Kingdom, BBC WS	5990as	6195as	7205as	9410eu
		9515na	9590va	9740as	11750as
		11865am	11940af	12095eu	15220am
		15575me	17640va	17705va	17830af
		17840af	21470af		
1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	USA, Voice of America	6110va	6160as	7125as	7215as
		9645as	9760as	15255va	15395as
		15425va			
1400-1500	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1400-1500	USA, WGTG McCaysville GA	9400am			
1400-1500	USA, WHRI Noblesville IN	6040am	9930am	15105am	
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500 mtwhf	USA, WRMI/R Miami Intl	9955am			
1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500 as	USA, WVHA Greenbush ME	15745na			
1400-1500	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400-1500	USA, WYFR Okeechobee FL	5950na	11830na	17760eu	
1400-1415	Vatican State, Vatican R	9500as	11625as	13765au	
1400-1500	Zambia, Christian Voice	6065af			
1400-1405 mtwhf	Zambia, ZNBC Radio 2	6165do			
1405-1410	Croatia, Croatian Radio	5920eu	7165eu	13830am	
1415-1500 mtwhfa	Bhutan, Bhutan BC Service	5030do			
1415-1425	Nepal, Radio	7165do			
1430-1455 s	Belgium, R Vlaanderen Int	13685na	13795as		
1430-1500	Canada, R Canada Intl	9555me	11935me	15325me	
1430-1500 vl	China, China Radio Intl	8660as	9880as	11445as	15135as
1430-1440	India, All India Radio	3945do	6185do	9565do	9685do
1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
1430-1500 vl	Italy, IRRS	3985va			
1430-1500 mtwhf	Portugal, R Portugal Intl	21515me			
1430-1500	Romania, R Romania Intl	11740as	15335as		
1430-1500	Sweden, Radio	9485as	9885na	11650na	15240na
1430-1500	United Kingdom, BBC WS	15400af			
1435-1445	Greece, Voice of	12105na	15175na		
1438-1455 1&3rd s	Denmark, R Denmark Intl	13800na	15340as		
1440-1500	Myanmar, Voice of	5990do			
1458-1500	Seychelles, FEBA Radio	9810as	11870as		

Selected Programs

Sundays

1400 USA, WWCR #1 Nashville TN: Wings of Healing. Evelyn Wyatt directs this international broadcast from Los Angeles.
1400 USA, WWCR #3 Nashville TN: Answers for Life. Gospel music and a sermon by Pastor Hoover of Wichita, Kansas.
1411 Canada, RCI Montreal: Sunday Morning (1st hour). CBC Radio's powerful and critically acclaimed three-hour current affairs program examines the events and ideas that shape our world.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: Wayne Avenue Church of God. J.C. Wilber preaches from Columbus, Ohio.
1435 Canada, RCI Montreal: The Mailbag. See S 1207.
1438 Netherlands, Radio: Wide Angle. See S 1138.
1454 Netherlands, Radio: Siren Song. See S 1153.

Mondays

1400 USA, WWCR #1 Nashville TN: Powerline. Southern Baptists.
1400 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1405 Canada, RCI Montreal: The Best of Morningside. Repeats of the CBC's morning program.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. Five minutes of evangelizing by Mickey Bonner.
1435 USA, WWCR #1 Nashville TN: The Bright Spot Hour. Music and meditation by Harold Sightler of Greenville, South Carolina.
1438 Netherlands, Radio: Newsline. See S 0038.
1439 Canada, RCI Montreal: Spectrum. See M 1211.
1453 Netherlands, Radio: A Good Life. See M 1153.

Tuesdays

1400 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1405 Canada, RCI Montreal: The Best of Morningside. See M 1405.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1430.
1435 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1435.
1438 Netherlands, Radio: Newsline. See S 0038.
1439 Canada, RCI Montreal: Spectrum. See M 1211.
1453 Netherlands, Radio: Music 52-15. See T 1153.

Wednesdays

1400 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1405 Canada, RCI Montreal: The Best of Morningside. See M 1405.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1430.
1435 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1435.
1438 Netherlands, Radio: Newsline. See S 0038.
1439 Canada, RCI Montreal: Spectrum. See M 1211.
1453 Netherlands, Radio: Sounds Interesting. See S 1254.

Thursdays

1400 USA, WWCR #1 Nashville TN: On Track. See M 1400.
1400 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1405 Canada, RCI Montreal: The Best of Morningside. See M 1405.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1430.
1435 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1435.
1438 Netherlands, Radio: Newsline. See S 0038.
1439 Canada, RCI Montreal: Spectrum. See M 1211.
1453 Netherlands, Radio: Research File. See M 1253.

Fridays

1400 USA, WWCR #1 Nashville TN: The Baptist Hour. A half-hour of sermon and song from Fort Worth, Texas.
1400 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See M 1100.
1405 Canada, RCI Montreal: The Best of Morningside. See M 1405.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1430.
1435 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1435.
1438 Netherlands, Radio: Newsline. See S 0038.
1439 Canada, RCI Montreal: Spectrum. See M 1211.

Saturdays

1400 USA, WVHA, Greenbush ME: Children's Chapel (live). Broadcast from the Rolling Hills Church, Eustis, Florida.
1400 USA, WWCR #1 Nashville TN: The Real World. Evangelizing from Ohio.
1400 USA, WWCR #3 Nashville TN: Hour of Truth. William Bonner preaches.
1425 Netherlands, Radio: Program Info. See S 0125.
1430 USA, WWCR #1 Nashville TN: Hour of Reasoning. P. Mobley preaches to his congregation in Oakland, California.
1435 Canada, RCI Montreal: Innovation Canada. See S 0207.
1438 Netherlands, Radio: Newsline. See S 0038.
1453 Netherlands, Radio: Roughly Speaking. See S 0153.

Hello, Writers...

Do you have a topic you've always "thought about" writing up for Monitoring Times? Now is the time! Given our full-spectrum coverage, plus the interest in new technology on the one hand and nostalgia for the past on the other, there is no limit to appropriate subject matter to write about. Bone up on your research, warm up your pen, and you, too, can earn a little spending money!

Pitch your idea to the editor at mteditor@grove.net or call 704-837-9200 and ask for Rachel. Writer's Guidelines are available on the MT homepage at www.grove.net, or for an SASE.

1500 UTC SHORTWAVE GUIDE 10:00 AM EST 7:00 AM PST

Frequencies

1500-1600	Australia, Radio	5995pa	9580pa	9860pa	11660as
		11800pa	12080pa		
1500-1600 vl	Australia, VL8A Alice Spg	2310do			
1500-1600 vl	Australia, VL8K Katherine	2485do			
1500-1600 vl	Australia, VL8T Tent Crk	2325do			
1500-1555 mtwhfa	Belgium, R Vlaanderen Int	13685na	13795as		
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFCX Montreal	6005do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, R Canada Intl	9640am	11855am		
1500-1600	China, China Radio Intl	7405na	9785as	11815as	
1500-1600	Costa Rica,RF Peace Intl	7385am	15050am		
1500-1600	Ecuador, HCJB	12005am	12025am	15115am	21455am
1500-1600 as	Eqt Guinea, R East Africa	15186af			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1530	Israel, Kol Israel	9390na	11605na		
1500-1600	Italy, Adv World Radio	7230eu			
1500-1600 vl	Italy, IRRS	3985va			
1500-1600	Japan, NHK/Radio	9535na	11915as	11930me	15355af
1500-1600	Jordan, Radio	11970eu			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1530	Mexico, Radio Mexico Intl	9705na			
1500-1530	Mongolia, R Ulan Bator	9745as	12085as		
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9895as	13700as	15585as	
1500-1600 occsnal	New Zealand, R NZ Intl	6105pa			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1530	Romania, R Romania Intl	11740as	15335as		
1500-1600 vl/s	Russia, Voice of Assyria	7325do	9730do	9880do	
1500-1600	Russia,Voice of Russia WS	4740me	4940me	4975me	7225me
		9595me	11775af	11835me	11985me
		12035me	15320me	15350me	15540me
		15560me			
1500-1600	S Africa, Channel Africa	7155af	9685af		
1500-1600	Seychelles, FEBA Radio	9810as	11870as		
1500-1600 mtwhf	Sri Lanka, Sri Lanka BC	9720as	15425as		
1500-1530	Switzerland, Swiss R Intl	9885as	12075as	13635as	
1500-1600	United Kingdom, BBC WS	5990as	6190af	6195va	7205as
		9410eu	9515na	9740va	11750as
		11865am	12095as	15070va	15220am
		15400as	15575as	17705va	17830af
		17840af	21660af		
1500-1530	United Kingdom, BBC WS	11860af	11940af	15420af	17880af
		21490af			
1500-1600	USA, KAIJ Dallas TX	13815am			
1500-1600	USA, KTBN Salt Lk City UT	15590am			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, Voice of America	6160as	7125as	7215as	9645as
		9700va	9760as	15205as	15255va
		15395as			
1500-1600	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1500-1600	USA, WGTG McCaysville GA	9400am			
1500-1600	USA, WHRI Noblesville IN	9930am	13760am	15105am	
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600 mtwhf	USA, WRMI/R Miami Intl	9955am			
1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1600 as	USA, WVHA Greenbush ME	15745na			
1500-1600	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500-1600	USA, WYFR Okeechobee FL	11830na	17760na		
1500-1600	Zambia, Christian Voice	6065af			
1530-1555	Austria, R Austria Intl	9495af	9655me	11780as	13730af
1530-1545	India, All India Radio	3945do	6185do	7140do	7410do
		9530do	9565do	9685do	9700do
		9910do	11740do		
1530-1600	Iran, VOIRI	7290as	9635as		
1530-1600	Netherlands, Radio	9895as	12090as		
1530-1600	United Kingdom, BBC WS	7180as	11720as		
1538-1555 1&3rd s	Denmark, R Denmark Intl	11840va	13805va	15230va	
1545-1600 a	Vatican State, Vatican R	9940as	11640as		

Selected Programs

Sundays

1500 Guam, TWR/KTWR: The Worship Hour.
1500 USA, WVHA, Greenbush ME: Prophecy Countdown. See S 1100.
1500 USA, WWCR #1 Nashville TN: Foursquare Gospel Tidings. J.E. Cartier presents a half-hour of gospel music and meditation.
1500 USA, WWCR #3 Nashville TN: Church of the Harvest. Clarence McClendon preaches from Los Angeles.
1506 Canada, RCI Montreal: Sunday Morning (2nd hour). See S 1411.
1525 Netherlands, Radio: Postmark Europe. New. No information available.
1530 Guam, TWR/KTWR: Family Bible Hour. A bible study program.
1530 USA, WWCR #1 Nashville TN: A Temple of Jesus Christ. Cleveland Waters preaches from Philadelphia.
1538 Netherlands, Radio: Sincerely Yours. See S 1238.
1553 Netherlands, Radio: Sounds Interesting. See S 1254.

Mondays

1500 Guam, TWR/KTWR: Hour of Freedom.
1500 USA, WWCR #1 Nashville TN: Creation Moments. Revealing facts about life's beginnings.
1502 USA, WWCR #1 Nashville TN: The Grace Hour (live). Carl Stevens of Baltimore answers listener questions about religion.
1505 USA, WWCR #3 Nashville TN: Prescription for Health (live). ü program about natural health foods and diet supplements.
1525 Netherlands, Radio: Press Review. See M 1225.
1530 Guam, TWR/KTWR: Thru the Bible. J. Vernon McGee presents a book-by-book study of the Bible.
1538 Netherlands, Radio: Newsline. See S 0038.
1553 Netherlands, Radio: Research File. See M 1253.

Tuesdays

1500 Guam, TWR/KTWR: Leading the Way.
1500 USA, WWCR #1 Nashville TN: Creation Moments. See M 1500.
1502 USA, WWCR #1 Nashville TN: The Grace Hour (live). See M 1502.
1505 USA, WWCR #3 Nashville TN: Prescription for Health (live). See M 1505.
1525 Netherlands, Radio: Press Review. See M 1225.
1530 Guam, TWR/KTWR: Thru the Bible. See M 1530.
1538 Netherlands, Radio: Newsline. See S 0038.
1553 Netherlands, Radio: Mirror Images. See T 1253.

Wednesdays

1500 Guam, TWR/KTWR: Good Tidings Hour.
1500 USA, WWCR #1 Nashville TN: Creation Moments. See M 1500.
1502 USA, WWCR #1 Nashville TN: The Grace Hour (live). See M 1502.
1505 USA, WWCR #3 Nashville TN: Prescription for Health (live). See M 1505.
1525 Netherlands, Radio: Press Review. See M 1225.
1530 Guam, TWR/KTWR: Thru the Bible. See M 1530.
1538 Netherlands, Radio: Newsline. See S 0038.

Thursdays

1500 Guam, TWR/KTWR: Hour of Decision. Evangelist Billy Graham's radio program.
1500 USA, WWCR #1 Nashville TN: Creation Moments. See M 1500.
1502 USA, WWCR #1 Nashville TN: The Grace Hour (live). See M 1502.
1505 USA, WWCR #3 Nashville TN: Prescription for Health (live). See M 1505.
1525 Netherlands, Radio: Press Review. See M 1225.
1530 Guam, TWR/KTWR: Thru the Bible. See M 1530.
1538 Netherlands, Radio: Newsline. See S 0038.
1553 Netherlands, Radio: Media Network. See H 1153.

Fridays

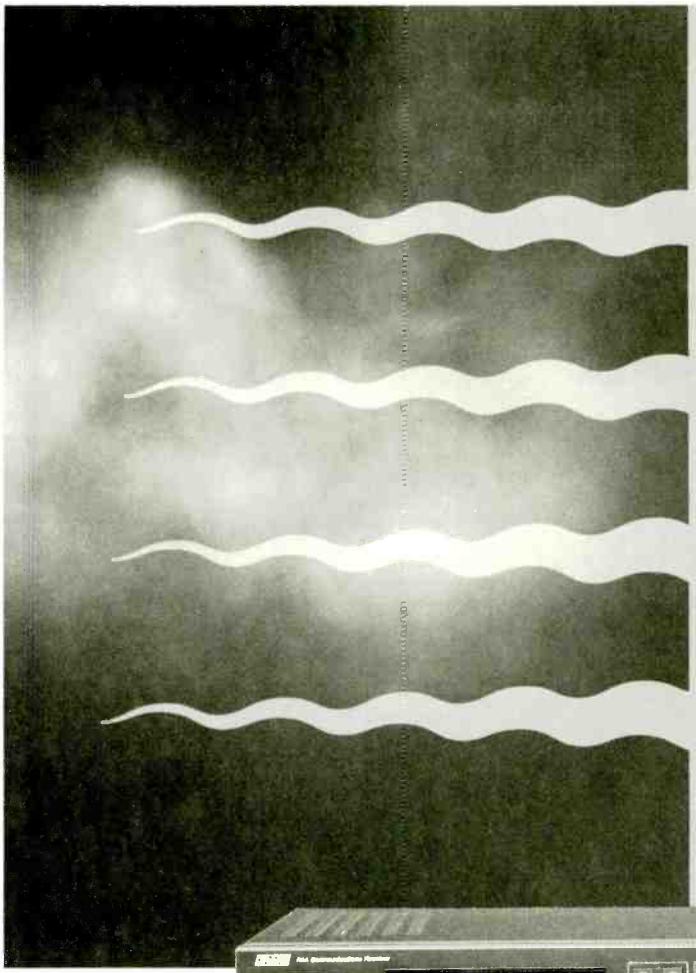
1500 Guam, TWR/KTWR: Words of Hope. David Bass provides the message.
1500 USA, WWCR #1 Nashville TN: Creation Moments. See M 1500.
1502 USA, WWCR #1 Nashville TN: The Grace Hour (live). See M 1502.
1505 USA, WWCR #3 Nashville TN: Prescription for Health (live). See M 1505.
1525 Netherlands, Radio: Press Review. See M 1225.
1530 Guam, TWR/KTWR: Thru the Bible. See M 1530.
1538 Netherlands, Radio: Newsline. See S 0038.
1553 Netherlands, Radio: A Good Life. See M 1153.

Saturdays

1500 Guam, TWR/KTWR: On Track. Good comtemporary music and helpful thoughts.
1500 USA, WVHA, Greenbush ME: Sabbath Services (live). See A 1400.
1500 USA, WWCR #1 Nashville TN: Divine Temple Church. Robert Suell preaches.
1500 USA, WWCR #3 Nashville TN: The Great American Polka Show. An hour of polka favorites both old and new.
1525 Netherlands, Radio: Insight. See S 0025.
1530 Guam, TWR/KTWR: Treasure Islands.
1538 Netherlands, Radio: Newsline. See S 0038.
1545 Guam, TWR/KTWR: Search for Truth. See T 1600.
1553 Netherlands, Radio: Weekend. See S 0053.

I have found your magazine to be excellent .. Far and away the best I've seen on the general subject of radio. I have just begun to learn about this exciting hobby and those two copies of this magazine have been greatly responsible for helping me understand much of what I know at this point. Thank You!

—Dennis Yarbrough, Lakeland, FL



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Frequencies

1600-1700	Australia, Radio	5995pa	6060pa	6080pa	6090pa
		9580pa	9615va	9860pa	11660pa
		11800pa	12080pa		
1600-1700 vl	Australia, VL8A Alice Spg	2310do			
1600-1700 vl	Australia, VL8K Katherine	2485do			
1600-1700 vl	Australia, VL8T Tent Crk	2325do			
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFCX Montreal	6005do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1700 s	Canada, R Canada Intl	9640am	11855am		
1600-1700	China, China Radio Intl	4130af	11575as	15110af	15130af
1600-1700	Costa Rica,RF Peace Intl	7385am	15050am		
1600-1627	Czech Rep, Radio Prague	5930eu	17485af		
1600-1630	Ethiopia, Radio	7165af			
1600-1700	France, Radio France Intl	6175eu	11615me	11700af	12015af
		15210af	15460af	15530af	
1600-1650	Germany, Deutsche Welle	6150as	7225as	7305as	9585as
1600-1700	Germany, Deutsche Welle	7195af	9735af	11810af	13610af
		15145af			
1600-1700	Guam, AWR/KSDA	7395as			
1600-1630	Guam, TWR/KTWR	11580as			
1600-1630	Iran, VOIRI	7290as	9635as		
1600-1700 vl	Italy, IRRS	3985va			
1600-1630	Jordan, Radio	11970eu			
1600-1700	Malaysia, Radio	7295do			
1600-1630	Mexico, Radio Mexico Intl	9705na			
1600-1625	Netherlands, Radio	9895as	12090as		
1600-1650 occsnal	New Zealand, R NZ Intl	6105am			
1600-1630 s	Norway, Radio Norway Intl	9590af	11840na		
1600-1630	Pakistan, Radio	7350af	9485af	9900af	11570af
		11955af	15555af		
1600-1700	Russia,Voice of Russia WS	7240eu	7350eu	7440af	9480eu
		9830va	9880eu	9955eu	9975eu
1600-1700	S Africa, Channel Africa	7155af	9685af	15240af	
1600-1700	S Africa, Trans World R	9500af			
1600-1700	Slovakia, Adv World Radio	13590as			
1600-1700	South Korea, R Korea Intl	5975eu	9515af	9870af	
1600-1630 mtwhf	Sri Lanka, Sri Lanka BC	9720as	15425as		
1600-1700	Swaziland, Trans World R	9500af			
1600-1640	UAE, Radio Dubai	11795me	13675eu	15395me	17825me
1600-1700	United Kingdom, BBC WS	3915as	6190af	6195va	7135as
		9410va	9515na	9590na	9740va
		11750as	12095as	15070va	15400af
		15575as	17830af	17840va	21470af
		21505af			
1600-1615	United Kingdom, BBC WS	5990as	7180as	7205as	17705af
1600-1700	USA, KAIJ Dallas TX	13815am			
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9355eu	9385af	18930af	
1600-1700	USA, Voice of America	7125as	7215as	9645as	9700va
		9760as	11880af	11920af	12040af
		13710af	15205va	15225af	15255va
		15395as	15410af	15445af	17895af
1600-1630 as	USA, Voice of America	6035af			
1600-1700	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1600-1700	USA, WGTG McCaysville GA	9400am			
1600-1700	USA, WHRI Noblesville IN	6120am	13760am	15105am	
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700 mtwhf	USA, WRMI/R Miami Intl	9955am			
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700 as	USA, WVHA Greenbush ME	15745va			
1600-1700	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1600-1700	USA, WYFR Okeechobee FL	11830na	15695eu	17555eu	17760eu
		21525af			
1600-1620 a	Vatican State, Vatican R	5880as	7250as		
1600-1630	Vietnam, Voice of	7400eu	9840eu		
1600-1700	Zambia, Christian Voice	3330af			
1600-1610 mtwhfa	Zambia, ZNBC Radio 2	6165do			
1605-1700	USA, WYFR Okeechobee FL	15215na			
1615-1700	United Kingdom, BBC WS	9510as	11860af		
1620-1630 mtwhf	Estonia, Radio	5925eu			
1630-1655	Austria, R Austria Intl	11780as			
1630-1700	Canada, R Canada Intl	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Slovakia, Adv World Radio	15620af			
1630-1700	USA, Voice of America	11765af			
1638-1655 1&3rd s	Denmark, R Denmark Intl	11860na	13800na	15540na	
1645-1700 irreg	Afghanistan, Radio	7200as			
1650-1700	Eqt Guinea, Radio Africa	15186af			
1650-1700 mtwhf	New Zealand, R NZ Intl	9875pa			

Selected Programs

Sundays

1600 Deutsche Welle: World News. See S 0100.
1600 USA, WVHA, Greenbush ME: The Amazing Facts Broadcast. Joe Crews with unusual happenings which support Christian philosophy.
1600 USA, WWCR #1 Nashville TN: Prophetic Word Program. A message of salvation from Dan Kubish of the House of Yaweh.
1600 USA, WWCR #3 Nashville TN: The Whole Truth. Anthonee Patterson conducts services from Pennsylvania.
1605 Canada, RCI Montreal: Sunday Morning (3rd hour). See S 1411.
1609 Deutsche Welle (af/me): Germany this Week. A summary of the week's events in Germany by Deutsche Welle's Bonn correspondents.
1609 Deutsche Welle (south as): Arts on the Air. See S 1109.
1619 Deutsche Welle (af/me): Religion and Society. See S 0138.
1629 Deutsche Welle (af/me): Through German Eyes. In-depth interviews with prominent German journalists.
1630 USA, WWCR #1 Nashville TN: Cross Roads Baptist Church. Lloyd Ferguson preaches from Lawrenceville, Georgia.
1633 Deutsche Welle (south as): German by Radio. See S 1133.
1634 Deutsche Welle (af/me): Hits in Germany. The German pop scene for listeners in Africa.
1637 Canada, RCI Montreal (Asia): The Mailbag. See S 1207.

Mondays

1600 Deutsche Welle: World News. See S 0100.
1605 USA, WWCR #1 Nashville TN: Our Foundation (M-F). Kim York of Denver compares the old and new testaments.
1606 USA, WWCR #3 Nashville TN: Freedom's Call (live). Bo Gritz hosts this talk radio program.
1609 Deutsche Welle (south as): Newsline Cologne. See M 1109.
1610 USA, WWCR #1 Nashville TN: Spiritual Awakening (M-F). Wisdom from the scriptures.
1615 USA, WWCR #1 Nashville TN: The Living Waters Broadcast (M-F). Father Bob Guste evangelizes from Louisiana.
1630 USA, WWCR #1 Nashville TN: The Time of Deliverance (M-F). Benjamin Smith preaches from the Time of Deliverance Evangelistic Church in Philadelphia.
1633 Deutsche Welle (af/me): African News. See M 1145.
1633 Deutsche Welle (south as): Science and Technology. Magazine program presenting new developments in science and technology.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1643 Deutsche Welle (af/me): Science and Technology. See M 1633.
1645 USA, WWCR #1 Nashville TN: Wisdom from the Word. From the New Covenant Church in Philadelphia.

Tuesdays

1600 Deutsche Welle: World News. See S 0100.
1606 USA, WWCR #3 Nashville TN: Freedom's Call (live). See M 1606.
1609 Deutsche Welle (south as): Newsline Cologne. See M 1109.
1633 Deutsche Welle (south as): Man and Environment. Various topics relating to the environment in industrial and developing countries.
1638 Deutsche Welle (af/me): African News. See M 1145.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1644 Deutsche Welle (af/me): Man and Environment. See T 1633.
1645 USA, WWCR #1 Nashville TN: Wisdom from the Word. See M 1645.

Wednesdays

1600 Deutsche Welle: World News. See S 0100.
1606 USA, WWCR #3 Nashville TN: Freedom's Call (live). See M 1606.
1609 Deutsche Welle (south as): Newsline Cologne. See M 1109.
1633 Deutsche Welle (south as): Insight. See W 0333.
1638 Deutsche Welle (af/me): African News. See M 1145.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1643 Deutsche Welle (af/me): Insight. See W 0333.
1645 USA, WWCR #1 Nashville TN: Wisdom from the Word. See M 1645.

Thursdays

1600 Deutsche Welle: World News. See S 0100.
1606 USA, WWCR #3 Nashville TN: Freedom's Call (live). See M 1606.
1609 Deutsche Welle (south as): Newsline Cologne. See M 1109.
1633 Germany, Deutsche Welle (south as): Living in Germany. See M 0118.
1638 Deutsche Welle (af/me): African News. See M 1145.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1643 Deutsche Welle (af/me): Living in Germany. See M 0118.
1645 USA, WWCR #1 Nashville TN: Wisdom from the Word. See M 1645.

Fridays

1600 Deutsche Welle: World News. See S 0100.
1606 USA, WWCR #3 Nashville TN: Freedom's Call (live). See M 1606.
1609 Deutsche Welle (south as): Newsline Cologne. See M 1109.
1633 Deutsche Welle (south as): Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.
1638 Deutsche Welle (af/me): African News. See M 1145.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1643 Deutsche Welle (af/me): Spotlight on Sport. See F 1633.
1645 USA, WWCR #1 Nashville TN: Wisdom from the Word. See M 1645.

Saturdays

1600 Deutsche Welle: World News. See S 0100.
1600 USA, WVHA, Greenbush ME: Sabbath Services (live). See A 1400.
1600 USA, WWCR #1 Nashville TN: Let the Bible Speak. James Hickey with a program from New Testament Christianity in Oklahoma.
1600 USA, WWCR #3 Nashville TN: Sound of the Trumpet. Jeff Edwards preaches from Kansas City.
1609 Deutsche Welle (af/me): Africa in the German Press. What the German newspapers and weeklies have to say about Africa.
1609 Deutsche Welle (south as): Feature of the Month (1). See S 0436.
1609 Deutsche Welle (south as): International Talking Point. See S 0416.
1615 USA, WWCR #1 Nashville TN: Eternal Good News. Germaine Lockwood teaches from the Old Testament.
1618 Deutsche Welle (af/me): Women on the Move (biweekly). A magazine promoting intercultural understanding and portraying the role of women in society.
1618 Deutsche Welle: Focus on Development (biweekly). Reports and interviews on projects and progress in Africa and Asia.
1623 Deutsche Welle (south as): Development Forum. Reports and interviews on projects and progress in Africa and Asia.
1630 USA, WWCR #1 Nashville TN: The Showers of Blessings Broadcast. Ed McAbee sermonizes before a live congregation.
1633 Deutsche Welle: Economic Notebook. See T 0333.
1636 Canada, RCI Montreal (Asia): Innovation Canada. See S 0207.
1640 Deutsche Welle (south as): Religion and Society. See S 0138.
1645 USA, WWCR #1 Nashville TN: Words of Hope. See S 1330.
1648 Deutsche Welle (af/me): The Jazz Corner. See F 2333.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	9580pa
		9615as	9860pa	11660pa	11880pa
		12080pa			
1700-1800 vl	Australia, VL8A Alice Spg	2310do			
1700-1800 vl	Australia, VL8K Katherine	2485do			
1700-1800 vl	Australia, VL8T Tent Crk	2325do			
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	5220af	7150af	7405af	9535as
		11575af	11910af		
1700-1800 as	Costa Rica, Adv World R	13750am			
1700-1800	Costa Rica,RF Peace Intl	15050am			
1700-1727	Czech Rep, Radio Prague	5835eu	15640af		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	6175eu	11615me	11700af	15210af
		15365af	15460af	15530af	
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, NHK/Radio	6035na	9535na	9580as	11880as
1700-1800 mtwhf	New Zealand, R NZ Intl	9875pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1750 vl	Pakistan, Radio	9400eu	11570eu		
1700-1800	Russia,Voice of Russia WS	4740va	4940va	4975va	7305me
		9595me	9830va	9955af	9975af
		11775va	11835va	12025af	12035va
		15320me	15350va		
1700-1755	S Africa, Channel Africa	7155af	9685af		
1700-1730	Sri Lanka, Sri Lanka BC	15425as			
1700-1800	Swaziland, Trans World R	9500af			
1700-1730	Switzerland, Swiss R Intl	5850af	7410eu	9885af	9905af
1700-1800	United Kingdom, BBC WS	3955eu	6190af	6195eu	7150eu
		9410va	9710as	9740as	11750as
		11760as	11860af	15070va	15400af
		15420af	15575af	17830af	17840af
1700-1745	United Kingdom, BBC WS	3915as	7135as	9630af	12095va
1700-1715	United Kingdom, BBC WS	9515va	9590na		
1700-1800	USA, KAIJ Dallas TX	13815am			
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	13625as			
1700-1800	USA, Monitor Radio Intl	9355eu	9385af	18930af	
1700-1800	USA, Voice of America	6035as	7125as	7215as	9645as
		9700va	9760va	11765af	11890af
		11920af	12040af	13710af	15255va
		15395as	15410af	15445af	17895af
1700-1800 mtwhf	USA, Voice of America	5990va	6045va	7125as	7150va
		7170as	9550as	9770va	11870va
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1700-1800	USA, WGTG McCaysville GA	9400am			
1700-1800	USA, WHRI Noblesville IN	6120am	13760am	15105am	
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 mtwhf	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WRNO New Orleans LA	15420am			
1700-1800	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WYFR Okeechobee FL	15695eu	17555eu		
1700-1800	Zambia, Christian Voice	3330af			
1700-1800 a	Zambia, ZNBC Radio 2	6165do			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1715-1730	Albania, R Tirana Intl	7155eu	9740eu		
1715-1800	United Kingdom, BBC WS	7160va			
1715-1730 a	Vatican State, Vatican R	9645eu	11810eu		
1730-1800	Guam, AWR/KSDA	9370as			
1730-1800	Netherlands, Radio	6020af	9605af	11655af	
1730-1800	Romania, R Romania Intl	11740af	11940af	15340af	
1730-1800	United Kingdom, BBC WS	6180eu			
1730-1800	Vatican State, Vatican R	9660af	11625af	15570af	
1738-1755 1&3rd s	Denmark, R Denmark Intl	7485va	11860va	15220va	
1745-1800 mtwhf	Armenia, Voice of	4810eu	4990eu	7480eu	9965eu
1745-1800	Bangladesh,Bangla Betar	7185as	9548eu	15520do	
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935af	13750as	15075me	
1745-1800 mtwhf	Swaziland, Trans World R	3200af			
1800-1900	Algeria, R Algiers Intl	15160eu	15205eu		
1800-1900	Australia, Radio	9580pa	9860pa	11880pa	12080pa
1800-1830	Australia, Radio	6060pa	6080as		
1800-1900 vl	Australia, VL8A Alice Spg	2310do			
1800-1900 vl	Australia, VL8K Katherine	2485do			
1800-1900 vl	Australia, VL8T Tent Crk	2325do			
1800-1900	Bangladesh,Bangla Betar	7185eu	9548as	15520do	
1800-1900	Brazil, Radio Bras	15265eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica,RF Peace Intl	15050am			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1900	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13750as	15075as	
1800-1900	Kuwait, Radio	11990na			
1800-1900 s	Morocco, RTVM Marocaine	17815af			
1800-1825	Netherlands, Radio	6020af	9605af	11655af	
1800-1900 mtwhf	New Zealand, R NZ Intl	9875pa			
1800-1900 vl	Pakistan, Radio	11570eu			
1800-1855	Poland, Polish R Warsaw	6000eu	6095eu	7270eu	7285eu
1800-1900	Russia,Voice of Russia WS	7350eu	9480eu	9830va	9880va
		9955af	9975af	11675eu	
1800-1900	Sudan, Radio Omdurman	9200af			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1900	United Kingdom, BBC WS	3255af	3955eu	6180eu	6190af
		6195eu	9410va	9740as	12095eu
		15070va	15400af	15575af	17830af
		17840ca			
1800-1830	United Kingdom, BBC WS	7150eu	7160va	9510as	11750as
1800-1900	USA, KAIJ Dallas TX	13815am			
1800-1900	USA, KJES Mesquite NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9355eu	9385af	11550eu	18930af
1800-1900	USA, Voice of America	6035va	9760va	9770va	11920af
		11975af	12040af	13710af	15410af
		15580af			
1800-1830	USA, Voice of America	11765af			
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1800-1900	USA, WGTG McCaysville GA	9400am			
1800-1900	USA, WHRI Noblesville IN	9495am	13625am	13760eu	
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900 s	USA, WRMI/R Miami Intl	9955am			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900 mtwhf	USA, WVHA Greenbush ME	11580af			
1800-1900	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	17555eu			
1800-1845	USA, WYFR Okeechobee FL	15695eu			
1800-1830	Vietnam, Voice of	7400eu	9840eu		
1800-1900	Yemen, Yemeni Rep Radio	9780do			
1800-1900	Zambia, Christian Voice	3330af			
1800-1810	Zambia, ZNBC Radio 1	7220do			
1800-1857	Zambia, ZNBC Radio 2	6165do			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1830-1900	Australia, Radio	7240pa	7330as		
1830-1900	Netherlands, Radio	6020af	9605af	11655af	15315af
		17605af			
1830-1857	S Africa, Trans World R	9525af			
1830-1900	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1830-1900	South Korea, R Korea Intl	3970eu			
1830-1900	United Kingdom, BBC WS	6005af	9630af	9740va	
1830-1900	USA, Voice of America	12080af			
1833-1900	Cote D' Ivoire, RDTV	11920do			
1838-1855 1&3rd s	Denmark, R Denmark Intl	7485eu	9590eu	13805va	15220va
1840-1850	Greece, Voice of	11645af	15150af		
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1850-1900 s	New Zealand, R NZ Intl	9875pa			

FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
1900-2000 vl	Australia, VL8A Alice Spg	2310do			
1900-2000 vl	Australia, VL8K Katherine	2485do			
1900-2000 vl	Australia, VL8T Tent Crk	2325do			
1900-1920	Brazil, Radio Bras	15265eu			
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	6955af	9440af	11515me	
1900-2000	Costa Rica, Adv World R	13750am	15460am		
1900-2000	Costa Rica,RF Peace Intl	15050am			
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB	11960eu	21455am		
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1950	Germany, Deutsche Welle	9640af	9735af	11785af	11810af
		13690af	15135af	15425af	
1900-2000 s	Germany; R Alpha & Omega	6110eu			
1900-1910	Greece, Voice of	9375eu			
1900-2000	Guatemala, Adv World R	5980am			
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13750as	15075as	
1900-2000 vl	Italy, IRRS	3985va			
1900-2000	Japan, NHK/Radio	6035as	7140pa	9535na	9580as
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-2000	Kuwait, Radio	11990eu			
1900-2000 smtwha	Malta, VO Mediterranean	7390va	7440va		
1900-2000	Netherlands, Radio	6020af	9605af	11655af	15315af
		17605af			
1900-1952 mtwhs	New Zealand, R NZ Intl	9875pa			
1900-1958 fa	New Zealand, R NZ Intl	9875pa			
1900-1930 s	Norway, Radio Norway Intl	5960eu	7485af	9590af	
1900-2000	Romania, R Romania Intl	5955eu	7105af	7195eu	9690eu
1900-2000	Russia,Voice of Russia WS	7440af	9480eu	9830va	9880eu
		9955af	9975af		
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-2000	Thailand, Radio	7210eu	9555eu	11905eu	
1900-2000	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195va	9410af
		9630af	9740af	12095eu	15070va
		15400af	15575af	17830af	
1900-1915	United Kingdom, BBC WS	15105af	17880af		
1900-2000	USA, KAIJ Dallas TX	13815af			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9355eu	9385af	11550eu	17510af
1900-2000	USA, Voice of America	4950af	6035af	7415af	9525va
		9760va	9770va	11870va	11920af
		11975af	12040af	12080af	13710af
		15180va	15410af	15445af	15580af
1900-2000	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1900-2000	USA, WGTG McCaysville GA	9400am			
1900-2000	USA, WHRI Noblesville IN	9495am	13625am	13760eu	
1900-2000	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WRNO New Orleans LA	15420am			
1900-2000 smtwhf	USA, WVHA Greenbush ME	9930af			
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-1945	USA, WYFR Okeechobee FL	17555eu			
1900-1930	Vietnam, Voice of	7400eu	9840eu		
1900-2000	Zambia, Christian Voice	3330af			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1905-1910	Croatia, Croatian Radio	5920eu	7165eu	9830eu	
1930-2000	Albania, R Tirana Intl	7270eu	9740eu		
1930-1955	Austria, R Austria Intl	5945eu	6155eu	9495af	13730af
1930-2000	Iran, VOIRI	7260af	9022eu		
1930-2000	Mongolia, R Ulan Bator	9745as	12085as		
1930-2000 vl	Papua New Guinea, NBC	4890do			
1930-2000	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1930-2100 irreg	Somalia, Radio Mogadishu	6710af	6969af		
1930-2000	Sweden, Radio	6065eu	7240eu	9655af	
1930-2000	Turkey, Voice of	5970na	6000na		
1930-2000	Yugoslavia, Radio	6100eu	9720eu		
1935-1955	Italy, RAI Intl	7235eu	9670eu	11905eu	
1938-1955 1&3rd s	Denmark, R Denmark Intl	7520af	11860af	13805eu	15220au
1945-2000 t	Belarus, Radiosta Belarus	7180eu	7210eu	9875eu	11960eu
1953-2000 smtwh	New Zealand, R NZ Intl	11735pa			
1959-2000 a	New Zealand, R NZ Intl	11735pa			

2000-2100	Algeria, R Algiers Intl	11715me	15160eu		
2000-2100	Angola, Radio Nacional	3355do	9535do		
2000-2100	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
2000-2100 vl	Australia, VL8A Alice Spg	2310do			
2000-2100 vl	Australia, VL8K Katherine	2485do			
2000-2100 vl	Australia, VL8T Tent Crk	2325do			
2000-2025	Belgium, R Vlaanderen Int	5910eu	9925af		
2000-2100	Bulgaria, Radio	7335eu	9700eu		
2000-2100	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	China, China Radio Intl	5220eu	6950eu	9440af	9920eu
		11715af	15110af		
2000-2100	Costa Rica,RF Peace Intl	15050am			
2000-2027	Czech Rep, Radio Prague	5930va	11600va		
2000-2100	Ecuador, HCJB	11960eu	21455am		
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2030 mt	Estonia, Radio	5925eu			
2000-2050	Germany, Deutsche Welle	5960eu	7285eu	9615eu	9670pa
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2100	Guatemala, Adv World R	5980am			
2000-2030	Hungary, Radio Budapest	3975eu	5970eu	9840eu	
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI	7260af	9022eu		
2000-2025	Israel, Kol Israel	7465na	9365eu	9435na	15640af
2000-2100 vl	Italy, IRRS	3985va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2030 as	Latvia, Radio	5935eu			
2000-2030	Mexico, Radio Mexico Intl	9705na			
2000-2025	Netherlands, Radio	6020af	9605af	11655af	15315af
		17605af			
2000-2006 fa	New Zealand, R NZ Intl	9875pa			
2000-2100 mtwh	New Zealand, R NZ Intl	11735pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2100 vl	Papua New Guinea, NBC	4890do			
2000-2030 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	15515af
2000-2100	Russia,Voice of Russia WS	5940eu	7350eu	9480eu	
2000-2015	Sierra Leone, SLBS	3316do			
2000-2100 mtwhf	Spain, R Exterior Espana	6125eu	11775af		
2000-2015	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	6165eu	9885af	9905af	11640af
		13635af			
2000-2030	Turkey, Voice of	5970na	6000na		
2000-2015	Uganda, Radio	3340do			
2000-2100	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195eu	7325eu
		9410af	9630af	11750sa	11835va
		11955as	12095eu	15070va	15400af
		15400va	15575eu	17830af	
2000-2100	USA, KAIJ Dallas TX	13815am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100	USA, KWHR Naalehu HI	15405as			
2000-2100	USA, Monitor Radio Intl	5850eu	7510eu	13840pa	
2000-2100	USA, Voice of America	6035af	7415af	9760va	9770va
		11975af	12080af	15410af	15445af
		15580af	17725af	17755af	
2000-2030 as	USA, Voice of America	4950af			
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2000-2100	USA, WGTG McCaysville GA	9400am			
2000-2100	USA, WHRI Noblesville IN	9495am	11815am	13760eu	
2000-2100	USA, WJCR Upton KY	7490na	13595na		
2000-2100	USA, WMLK Bethel PA	9465eu			
2000-2100 mtwhf	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	15420am			
2000-2100 mtwhfa	USA, WVHA Greenbush ME	9930va			
2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2000-2100	USA, WYFR Okeechobee FL	5810eu	7355af		
2000-2045	USA, WYFR Okeechobee FL	21525af			
2000-2100	USA, WYFR Okeechobee FL	15565af			
2000-2030	Zambia, Christian Voice	3330af			
2000-2005	Zambia, ZNBC Radio 2	6165do			
2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do			
2005-2100	Syria, Radio Damascus	12085na	13610eu		
2007-2100 fa	New Zealand, R NZ Intl	11735pa			
2015-2045 as	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Intl	7110af	9710af	11840af	
2030-2100	Armenia, Voice of	9965eu	11615eu	11665eu	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100 mwh	Moldova, R Dniester Intl	11750na			
2030-2100	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2030-2100	Slovakia, Adv World Radio	9455af			
2030-2100	Sweden, Radio	6065eu	7240eu	9655af	
2030-2045	Thailand, Radio	7210eu	9555eu	11905eu	
2030-2100 a	USA, WRMI/R Miami Intl	9955am			
2030-2100	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
2038-2055 1&3rd s	Denmark, R Denmark Intl	7485eu	9590me		
2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
		11715pa	15225pa		
2050-2100	Vatican State, Vatican R	4005eu	5880eu	7250eu	

FREQUENCIES

2100-2200	Australia, Radio	7240pa	9660pa	9850pa	9860as
		11695pa	11855as	11880pa	12080pa
		13605pa			
2100-2130	Australia, Radio	6080pa	11800pa		
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2200 vl	Australia, VL8K Katherine	5025do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2200 vl	Australia, VL8T Tent Crk	4910do			
2100-2200 vl	Cameroon, Radio Garoua	5010do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2200	Canada, R Canada Intl	5925eu	5995eu	7235eu	9805af
		11945af	13650eu	13690af	15150eu
		17820eu			
2100-2200	China, China Radio Intl	5220eu	6950eu	9920eu	
2100-2130	China, China Radio Intl	11715af	15110af		
2100-2200	Costa Rica,RF Peace Intl	15050am			
2100-2200	Cuba, Radio Havana	13715eu			
2100-2200	Ecuador, HCJB	11960eu	21455am		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	9690af	9765as	11785pa	11865af
		15275na			
2100-2200	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 vl	Italy, IRRS	3955va			
2100-2200	Japan, NHK/Radio	6035as	9535as	9560as	11850pa
2100-2110	Japan, NHK/Radio	9570as	11685as		
2100-2105 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	9990va			
2100-2130	Mexico, Radio Mexico Intl	9705na			
2100-2135 smtwh	New Zealand, R NZ Intl	11735pa			
2100-2200 fa	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2125	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2100-2200	Romania, R Romania Intl	5990eu	5995eu	7105eu	7195eu
2100-2200	Russia,Voice of Russia WS	5940eu	7350af	7440af	9480eu
		9880eu	17875af		
2100-2200	Slovakia, Adv World Radio	6055eu			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2110	Uganda, Radio	3340do			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5975va
		6005af	6120as	6180eu	6190af
		6195va	7325eu	9410va	9740au
		11750sa	11835va	11945as	11955as
		12095eu	15400af	15575eu	
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, KWHR Naalehu HI	9930as			
2100-2200	USA, Monitor Radio Intl	5850eu	7510eu	13840au	
2100-2200	USA, Voice of America	6035af	7415af	9760na	11870na
		11965va	11975af	13710af	15185va
		15410af	15445af	15580af	17725af
2100-2130	USA, Voice of America	11855af	12080af		
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRI Noblesville IN	9495am	11815am	13760am	
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200 mtwhf	USA, WRMI/R Miami Intl	9955am			
2100-2200 mtwhf	USA, WVHA Greenbush ME	9930va			
2100-2200 s	USA, WVHA Greenbush ME	9930af			
2100-2200	USA, WWCR Nashville TN	7435am	9475am	12160am	13845am
		15685am			
2100-2200	USA, WYFR Okeechobee FL	7355eu	11580eu	15565eu	
2100-2130	Vatican State, Vatican R	7365eu	9645eu	11625eu	
2100-2105	Zambia, ZNBC Radio 2	6165do			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	15390am	17715am		
2130-2200	Australia, Radio	13755pa	17795pa	17860pa	
2130-2200	Finland, YLE/R Finland	6135eu			
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6175au			
2130-2135 mtwhf	Latvia, Radio	5935eu			
2130-2200 as	Sweden, Radio	6065eu	7230af		
2130-2145	United Kingdom, BBC WS	11680sa			
2136-2200 smtwh	New Zealand, R NZ Intl	15115pa			
2138-2155 1&3rd s	Denmark, R Denmark Intl	7205na	9495na	9590au	
2145-2200 a	Greece, Voice of	9425au			
2145-2200	United Kingdom, BBC WS	5990as	7160as	9580as	

2200-2300	Australia, Radio	11695pa	11855as	12080pa	13755pa
		15365pa	17795pa	17860pa	
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2300	Bulgaria, Radio	7390eu	9700eu		
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, R Canada Intl	5995eu	7235eu	9805af	11705eu
		11945af	13690eu	15150eu	
2200-2300	China, China Radio Intl	7110eu	9880eu		
2200-2230	China, China Radio Intl	3985eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	15050am		
2200-2300	Cuba, Radio Havana	6180na			
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2230	Hungary, Radio Budapest	3975eu	5970eu	7250eu	9835eu
2200-2230	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2200-2230	Iran, VOIRI	6175au			
2200-2300 vl	Italy, IRRS	3955va			
2200-2225	Italy, RAI Intl	5975as	9710as	11815as	
2200-2300	Lebanon, Voice of Hope	9990va			
2200-2300	Malaysia, Radio	7295do			
2200-2225 mtwhf	Moldova, R Moldova Intl	7520eu			
2200-2300 smtwh	New Zealand, R NZ Intl	15115pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4990do		
2200-2208 vl	Papua New Guinea, NBC	4890do			
2200-2300	Russia,Voice of Russia WS	5940eu	7240eu	7350eu	9480eu
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, Adv World Radio	6055af			
2200-2300 as	Spain, R Exterior Espana	6125eu	11775af		
2200-2205	Syria, Radio Damascus	12085na	13610eu		
2200-2300	Taiwan, VO Free China	5810eu	9985eu		
2200-2300	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2200-2300	Ukraine, R Ukraine Intl	5905eu	6010eu	6020eu	6080eu
		9560eu	9735eu	9875eu	
2200-2300	United Kingdom, BBC WS	3955eu	5905as	5975va	6175va
		6195va	9590va	9915va	11750sa
		11835va	11955as	12095eu	15400af
2200-2230	United Kingdom, BBC WS	9410eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	13770sa	13840as	
2200-2300	USA, Voice of America	7215va	9705va	9770va	11760va
		15185va	15290va	15305va	17735va
		17820va			
2200-2230 mtwhf	USA, Voice of America	6035af	7415af	12080af	13710af
2200-2300	USA, WEWN Birmingham AL	7395na	11820eu	13615na	
2200-2300	USA, WGTG McCaysville GA	5085am			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300 smtwhf	USA, WMLK Bethel PA	9465eu			
2200-2300 mtwhf	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	15420am			
2200-2300 smtwhf	USA, WVHA Greenbush ME	5850af			
2200-2300	USA, WWCR Nashville TN	5070am	7435am	9475am	13845am
2200-2245	USA, WYFR Okeechobee FL	11580af	17845af	21525eu	
2200-2230	Yugoslavia, Radio	6100eu	6185eu		
2200-2210	Zambia, ZNBC Radio 2	6165do			
2206-2300 fa	New Zealand, R NZ Intl	15115pa			
2210-2300 vl	Papua New Guinea, NBC	9675do			
2230-2255	Austria, R Austria Intl	5945eu	6155eu	9495af	9880eu
2230-2257	Czech Rep, Radio Prague	7345na	9430na		
2230-2300	Russia,Voice of Russia WS	7125eu	7240eu		
2230-2300	Sweden, Radio	6065eu	7325af		
2230-2300	United Kingdom, BBC WS	7325va			
2238-2255 1&3rd s	Denmark, R Denmark Intl	9495na	11840au		
2240-2250	Greece, Voice of	9425au			
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	7155as	9705as	9950as	11620as
		11660as			
2245-2300	Vatican State, Vatican R	7305as	9600as	11830au	

Frequencies

2300-0000	Australia, Radio	9660pa	11695as	11855as	13755as
		15365pa	17795pa	17860pa	
2300-0000 vl	Australia, VL8K Katherine	5025do			
2300-0000 vl	Australia, VL8T Tent Crk	4910do			
2300-2325	Belgium, R Vlaanderen Int	5910eu			
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFCX Montreal	6005do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-2330	Canada, R Canada Intl	5960am	6040am	9535am	9755am
		11940am			
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am	15460am		
2300-0000	Costa Rica,RF Peace Intl	7385am	15050am		
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	6000as	6160as	7235as	
2300-0000	Guam, AWR/KSDA	11775as			
2300-0000	Guatemala, Adv World R	11775am			
2300-0000	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
2300-0000	Japan, NHK/Radio	5965eu	9535eu	9560as	11850pa
2300-0000	Lebanon, Voice of Hope	9990va			
2300-0000	Malaysia, Radio	7295do			
2300-2325 mtwhf	Moldova, R Moldova Intl	7520na			
2300-0000	New Zealand, R NZ Intl	15115pa			
2300-2315	Nigeria, FRCN/Radio	3326do	4990do		
2300-2350	North Korea, R Pyongyang	11700na	13650na		
2300-2330 s	Norway, Radio Norway Intl	5905sa	7275as	7465na	
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-0000	Romania, R Romania Intl	7175na	9510na	9570na	11940na
2300-0000	Russia,Voice of Russia WS	5940na	7125na	7240na	
2300-0000	Turkey, Voice of	6135na	7280na	9650na	9655na
2300-0000	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2300-0000	United Kingdom, BBC WS	3955eu	5975va	6175va	6195va
		7295as	9580as	9590na	9915va
		11750sa	11945as	11955as	
2300-2330	United Kingdom, BBC WS	3915as			
2300-2315	United Kingdom, BBC WS	11835va			
2300-0000	USA, KAIJ Dallas TX	13815am			
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	7510af	13770sa		
2300-0000	USA, Voice of America	7215va	9705va	9770va	11760va
		15185va	15290va	15305va	17735va
		17820va			
2300-0000	USA, WEWN Birmingham AL	7395na	11820eu	13615na	
2300-0000	USA, WGTG McCaysville GA	5085am			
2300-0000	USA, WHRI Noblesville IN	5745am	9495am	17510am	
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000 mtwhf	USA, WRMI/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000 s	USA, WVHA Greenbush ME	5850eu			
2300-0000	USA, WWCR Nashville TN	3215am	5070am	7435am	9475am
		13845am			
2300-2315	Vatican State, Vatican R	7305as	9600as	11830na	
2310-2315	Kyrgyzstan, Kygyz Radio	4010eu	4050eu		
2330-0000 as	Canada, R Canada Intl	5960am	6010am	9535am	9755am
		11940am			
2330-2359	Netherlands, Radio	6020na	6165na		
2330-0000	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
2335-2345	Greece, Voice of	9935sa	11595sa	11640sa	
2338-2355 1&3rd s	Denmark, R Denmark Intl	7275va	7490va	9485va	
2355-0000	Japan, NHK/Radio	9570as	11685au		

Selected Programs

Sundays

2300 Canada, RCI Montreal: The World This Weekend. Half-hour of up-to-the-minute news and business reports, a feature documentary, arts and entertainment stories with Michael Crabb, sports with Dzintars Cers, and a news quiz.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #1 Nashville TN: A Visit with Mrs. G. Bible stories for children.
2309 Germany, Deutsche Welle: Asia-Pacific Report. Correspondent reports, interviews and background news from the Asia-Pacific region.
2315 USA, WWCR #1 Nashville TN: The Illuminated Word. C.M. Hunt preaches.
2324 Germany, Deutsche Welle: Inside Europe. See S 0108.
2330 USA, WWCR #1 Nashville TN: Church of the Lord Jesus Christ. See S 1345.
2330 USA, WWCR #3 Nashville TN: What a Fellowship Hour. Clay Evans preaches.
2332 Canada, RCI Montreal: Mystery Project. A half-hour series of detective mystery dramas created by Canadian writers.
2340 Netherlands, Radio: Wide Angle. See S 1138.
2354 Netherlands, Radio: Siren Song. See S 1153.

Mondays

2300 Canada, RCI Montreal: The World at Six. CBC radio's major newscast of the day, presenting the important stories in depth and in context.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #1 Nashville TN: Moving to the Front Line. Rick Scham and Jack Smith of Right Way Law offer legal opinions on current matters.
2300 USA, WWCR #3 Nashville TN: Let's Talk Health (live). Kurt Donsbach, a holistic practioner, answers listeners' medical questions.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2324 Germany, Deutsche Welle: European Journal. A review of major events in Europe and Germany through interviews, analyses and background reports.
2330 Canada, RCI Montreal: As It Happens. A daily phone-in show introducing listeners to the newsmakers of the day and people whose stories might otherwise not be told.
2338 Netherlands, Radio: Newsline. See S 0038.
2353 Netherlands, Radio: A Good Life. See M 1153.

Tuesdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #3 Nashville TN: Let's Talk Health (live). See M 2300.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2324 Germany, Deutsche Welle: European Journal. See M 2324.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2338 Netherlands, Radio: Newsline. See S 0038.
2353 Netherlands, Radio: Music 52-15. See T 1153.

Wednesdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #1 Nashville TN: Moving to the Front Line. See M 2300.
2300 USA, WWCR #3 Nashville TN: Let's Talk Health (live). See M 2300.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2324 Germany, Deutsche Welle: European Journal. See M 2324.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2338 Netherlands, Radio: Newsline. See S 0038.
2353 Netherlands, Radio: Sounds Interesting. See S 1254.

Thursdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #3 Nashville TN: Let's Talk Health (live). See M 2300.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2324 Germany, Deutsche Welle: European Journal. See M 2324.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2338 Netherlands, Radio: Newsline. See S 0038.
2353 Netherlands, Radio: Research File. See M 1253.

Fridays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #1 Nashville TN: Moving to the Front Line. See M 2300.
2300 USA, WWCR #3 Nashville TN: Let's Talk Health (live). See M 2300.
2309 Germany, Deutsche Welle: Commentary. See S 0208.
2312 Germany, Deutsche Welle: Germany this Week. See S 1609.
2323 Germany, Deutsche Welle: Economic Notebook. See T 0333.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2333 Germany, Deutsche Welle: The Jazz Corner. A musical change-of-pace from the world of jazz.
2338 Netherlands, Radio: Newsline. See S 0038.

Saturdays

2300 Canada, RCI Montreal: The World This Weekend. See S 2300.
2300 Germany, Deutsche Welle: World News. See S 0100.
2300 USA, WWCR #3 Nashville TN: Health Quest (live). Dan Junker tells how to retain or redeem your health.
2309 Germany, Deutsche Welle: Commentary. See S 0208.
2312 Germany, Deutsche Welle: Sports Report. See S 0212.
2323 Germany, Deutsche Welle: Mailbag Asia. See S 0216.
2330 Canada, RCI Montreal: Now the Details. See M 0330.
2330 USA, WWCR #1 Nashville TN: British Israel World Federation. Douglas Nesbitt of Toronto preaches from the Old Testament.
2339 Netherlands, Radio: Newsline. See S 0038.
2345 USA, WWCR #1 Nashville TN: Calvary Radio Hour. Franklin Zuill of Bermuda evangelizes.
2354 Netherlands, Radio: Roughly Speaking. See S 0153.

I thoroughly enjoy Monitoring Times. I read each issue virtually cover to cover. Your magaine is informative and entertaining; a definite asset to my radio hobby. I congratulate your staff on producing such a consistently excellent publication.

—Monte Carroll, Nashville, TN

The Grayline Advantage

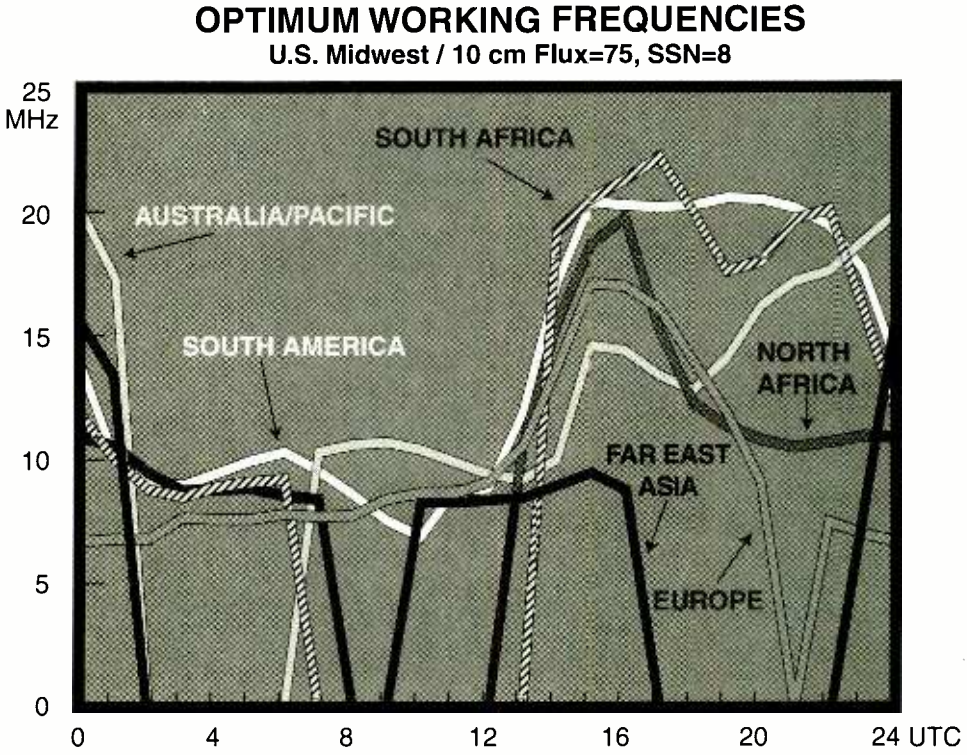
By Jacques d'Avignon, VE3IA

There is a propagation phenomenon that is not very well understood, but which occurs twice daily and is very often used by DXers to log distant and low powered stations. This phenomenon is called *gray-line propagation*. The "gray-line" is the border between day and night—a line that encircles the globe as the earth rotates on its axis. It would be better to call this a "zone," as the conditions associated with the "gray-line" start approximately 10 minutes before actual sunrise/sunset and last for 10 minutes after the event. Thus you have a "window" of about 20 minutes to try to hear that elusive station on the other side of the world.

Twice a day this zone will cross your location: in the morning at sunrise and in the evening at sunset. But, because of the tilt of the earth's axis, every day the DX stations that are covered simultaneously with yours will change. Sunrise and sunset provide excellent opportunities to log some unusual stations, especially if you are listening to tropical stations (generally speaking, those stations between the Tropic of Cancer and the Tropic of Capricorn, which are allocated frequencies in the 2300 to 5060 kHz range). There is a good possibility that these rare stations will "pop out" of the background noise for a short period at sunrise or sunset.

There are tools that can be used to help you predict the time of passage, the azimuth of this zone, and the stations that will be affected. One of these tools is available in two "flavors": the "DX Edge" is a template and "Super DX Edge" is a computer program. Check your Grove catalog for these. Another widely-used computer program is "DX Aid," available from P. Oldfield, 251 Chemin Beaulne, Piedmont, QC, J0R 1K0 Canada.

Another unusual situation arises during the gray-line passage: sometimes it is possible that the best signal will be heard along the "long path" to the target station. What is the "long path"? It is the longest distance between you and the station you wish to hear along the "great circle" route. For example, the shortest route from the US Midwest to the Nordic countries would be the north polar route; the "long path" would be its opposite—south along a route that would carry a signal all the way over the Indian Ocean north to the Nordic countries.



This is difficult to visualize unless you have a globe, so go to the nearest store that still carries terrestrial globes and look at the various short and long paths from your location. The same tools that will help you predict the passage of the gray-line would normally calculate the paths to various locations on earth.

Around December 21, the winter equinox, you will have the longest night, and you should give the "gray-line" phenomenon a try. Look for the station in the "tropical bands" that you know is there but that you have never heard; you may just hear it during the "gray-line" period of the day. Checking those same frequencies during the gray-line for a full year should yield some unusual stations for your collection.

For those of you that live far North—near or inside the Arctic Circle where the nights are very long at this time of the year—listen to signals in the 520 to 1600 kHz broadcast band. You may be able to hear some European signals over the Pole. However, do not forget that the stations in Europe are 9 kHz apart and not 10 kHz like they are in North America.

SKIP AREY, WB2GHA
tjarey@mosquito.com

The Art of Code

As we come to the end of another year, I feel the need to wax pensive about some of the changes in the radio world. Oh, I'm not one of those gloom and doom individuals that is convinced the radio hobby is dying. It's not; but what does make me sigh slightly are some of the changes that are occurring in the hobby. I worry that we have moved too far into "appliance" operating.

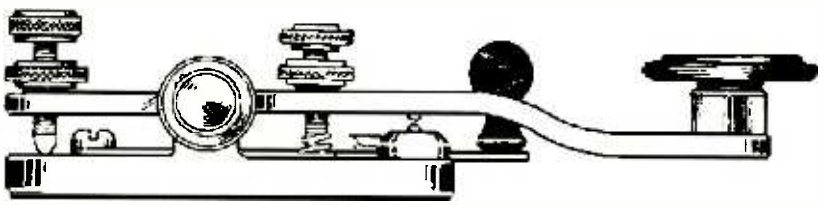
It sometimes seems that folks don't want to melt solder and get into the innards of their equipment with the goal of improving performance, learning a few things, and, along the way, having fun. I worry that radio stations' tight budgets and staff constraints make it harder for them to respond to the confirmation requests of monitors. But most of all lately, I've been worried about "the Code."

It's been over a year since the International Morse Code has fallen out of use by the United States Coast Guard. Just this September the Military Affiliate Radio Service (MARS) announced that it was going to stop its CW net operations. Sure enough, if you tune around the code segments of the bands you don't seem to hear as many signals as you used to. This is great when you're in a pileup for a rare DX station, but it's not so great when you realize it represents a loss of interest in an entire mode.

Don't get me wrong: I've never been a rabid fan of CW. I've even lobbied for its removal as a requirement for amateur radio practice. However, that does not mean I don't enjoy the occasional CW QSO. It doesn't mean I can't appreciate the sound of a good high speed "fist" working a pileup. Also, CW remains the best mode for low power QRP operation.

For most of the years I've been involved in the hobby, mastering the International Morse Code was a necessary evil if you wanted to advance up the amateur radio license structure. The birth of the "No-Code" Technicians class license has done more to revitalize the amateur radio community than anything else. But with this very positive change comes the real possibility that the "art" of CW operation will become a rarity. For example, I sign into a local CW Amateur Radio Emergency Services (ARES) Net each week. At a recent "eyeball" gathering of this group, I came to discover that I was the only member of the net that wasn't collecting a pension. I would certainly hate to see this aspect of the radio hobby die off with this group of old-timers.

What we need to do is recalibrate our thinking a bit. Now that the pressure to learn the code is essentially off, beginners are free to master the code and its practice for the fun of it, and as a valuable skill. And, Compadre, you will discover that CW can be fun if you give it an honest shot. Let's take a look at some of the aspects of the radio hobby that open up to the beginner who decides to discover the code.



CW Saves the World

I was tickled to see that Morse code played an important part in saving the world in the summer blockbuster movie *Independence Day*. However, did you notice how out of adjustment those keys were in that scene? 'Way too much play. Who could work up any real speed like that? Anyway, it still made the point that CW can be heard even when nothing else can get through. So it doesn't matter if you're out to save humanity or just to get a decent signal across the ocean in the midst of this dismal point sunspot cycle—chances are you'll have your best luck with CW.

It must also be noted that many rare and hard-to-hear countries appear almost exclusively in the CW portions of the amateur radio bands. This is often because equipment that can operate CW can be significantly less expensive. Surplus or older equipment may be pressed into service, but still these signals get through just fine.

We on the more affluent end of these QSOs can learn a lesson from this. As I've mentioned frequently, an HF amateur radio station capable of working the world can be assembled for well below $100 by using homebrewing, kits, or used equipment, especially if you're willing to operate in the CW mode. Then, while some guy with a multi-thousand dollar station tries to shout his way through a pile-up on the phone bands, you can be grabbing contacts left and right on the CW segments with a station that cost very little money. Who said radio has to be an expensive hobby? Many people starting out in the radio hobby do so with limited budgets. Keep in mind that CW will almost always give you the most bang for the buck.

Along these lines, the generally simple circuit designs needed to generate CW also make this mode a great place to begin the tinkering aspect of the hobby. There is no greater satisfaction than getting on the air with a piece of equipment you've wired up yourself. You can choose to build a kit or strike out like those pioneers of the radio hobby and construct a circuit from a schematic found in a book or magazine. *MT's* Doug DeMaw, W1FB, has published dozens of simple but great transmitter circuits in *QST* and books available through the ARRL. (In fact, he has a Part 15 transmitter circuit in this issue of *MT*-ed.)

Another grand master of this art is Ed Noll W3FQJ, whose classic book *Solid State QRP Projects* has recently been reprinted by MFJ Enterprises. Ed's book got me interested in low power operation which has given me so much fun over the years.

The Low Power Challenge

Let's talk about QRP for a minute. QRP, or low power operation, is fascinating. On any given day you can work just about any place in the world with a typical 150-watt transmitter and a reasonable wire antenna. But can you imagine doing the same thing with 10 watts? Or 1 watt? How about less than a watt? Serious QRP operators work the world every day using such seemingly impossible low powers. Amongst the tools of their trade is CW operation. Remember, just like in *ID4*, CW gets through, even at very low power levels.

Also, the trained ear can detect even the weakest CW signals, compared to any other mode. *MT* staffer Rich Arland K7YHA has contributed significantly to the literature on

QRP operation over the years in articles, and a series of books published by Tiare Publications. If you have an interest in this area of the CW art you may want to check with the book suppliers in the pages of *MT* for Rich's work. Some people warn beginners off of low power operation because of its frustration factor, but I've known several beginning radio hobbyists that excelled in this area. QRP may have its difficulties, but these do not include high expense or lack of fun.

A Touch of Class

If you do choose to play in the Morse code arena, you will likely get caught up in its aesthetic aspect. One area that continues to fascinate many CW operators, and even some folks who never touched the code, is Morse code keys and keyers. They can be as simple or as complex as you can imagine. Since code operation predates radio, going back to the years of the telegraph, hundreds of keys and keying devices are in existance.

Entire books have been written on antique code key collecting. I recently caught the fever when I was gifted with a classic J-37 straight key. I've even put this old war-horse on the air, and it has a nice feel.

While many modern code operators make use of electronic keyers, you will still hear the occasional mechanical semi-automatic keyer on the air. These devices are known as "bugs," and their sole modern source is the Vibroplex Company, Inc., currently out of Mobile, Alabama. Operating with a "bug" is a true art form. My personal New Year's resolution is to acquire this skill so I can produce that distinctive sound of an accomplished code operator when I hit the CW bands.

While we examine the antique aspects of the code mode, we should probably mention antique receivers and transmitters, too. There is a growing interest in restoring older radio equipment and even getting it on the air. I've found beginners have as much interest and respect for fine old radio gear as any old timer who is chasing their youth.

Since I qualify as "middle-aged," I'm part way to my 1960's dream station. I have a Heathkit DX-100 transmitter that is in great shape, and I've already told you about learning to use a "bug." Now I'm searching for the "right" kind of receiver to complete this classic station. Maybe an old Hammarlund HQ-180 would do the trick. Get the idea? If you want to experience the early days of radio, you have to give some thought to CW operation.

Okay, we've talked about all the exciting things you can do when you approach CW as an art and not a chore. So how do you go about learning the code?

Drumming it in

Morse code is a process of hearing a pattern of dots and dashes and translating them into letters, numbers, and punctuation marks. The patterns are distinctive and become more recognizable with practice. Many of the advertisers in the pages of *MT* market code practice tapes and computer programs that allow you to first learn the individual characters and then practice copying the characters with increasing speed.

Code tapes can be purchased in various increments from as low as 2-1/2 words per minute up through 30 words per minute. Code programs for home computers are infinitely adjustable. Many programs allow you to advance your speed by as little as one tenth of a word per minute. This allows for very smooth transitions to higher and higher speeds. If you own a personal computer, modern code programs offer the best method for mastering Morse code throughout your amateur radio career.

Once you have learned the letters and numbers, you may want to start copying Morse code off the air. One source of accurate Morse code can be found in the form of the American Radio Relay League's regular W1AW code practice, CW bulletins, and code proficiency tests heard on 1.818, 3.5815, 7.0475, 18.0975, 21.0675 and 28.0675 MHz. The Morse code used for these transmissions is machine sent at various speeds to give monitors a source for off-the-air code practice at all skill levels. Check the current issue of *QST* magazine or contact the ARRL at 225 Main Street, Newington, CT 06111 for further information.

If you have a VHF scanner, you may want to check with local hams to find out if any of your area's 2 meter repeater groups offer code practice sessions. While you're at it, check with local hams or at your neighborhood electronics supply stores to find out if any nearby amateur radio clubs are offering license classes. These will usually include excellent code training opportunities.

So, why not join me in making a New Year's resolution to keep the art of the code alive? I'll see you in the CW bands. Have fun, and have a safe and happy holiday season.

Kevin Carey, WB2QMY
kevinc@mdsroc.com

Whistlers, Sferics, & Tweeks, Oh My!

Let's face it, the longwave band is changing. Oh sure, we still have plenty of beacons, longwave broadcasters, and a few maritime stations to try for, but we're seeing the number of these stations dwindle in favor of GPS, satellite, and advanced digital modes.

Rest assured, *Below 500 kHz* will continue to cover the traditional aspects of longwave as long as these signals remain, but we won't *depend* on them for our news. Instead, we'll stay wide open to new LF topics that are of interest to *MT* readers.

This month, for example, the focus is on Natural Radio. We'll be taking the plunge into radio's "sub-basement"—the largely uncharted territory below 10 kHz. We normally associate these frequencies with sound energy, yet natural radio is composed of true *electro-magnetic* signals that can be received on specialized (yet uncomplicated) gear available for purchase or homebrewing. Ironically, even the latest tabletop receiver will do you little or no good down here.

Let's begin by looking at the "big four" sounds of natural radio. There are others we can cover in future columns, but these are the ones most commonly associated with the ELF/VLF spectrum.

Sferics (Radio Atmospherics)

These are the familiar "static crashes," clicks, and pops that we all complain about when trying to snag a weak beacon or other utility station. Each sferic represents a lightning discharge, and the presence of sferics often indicates a greater probability of hearing other natural radio sounds, especially if it's during a solar disturbance.

Use common sense when listening to sferics. If they become *very* strong, it's time to shut down and wait for the storm to pass!

Whistlers

Whistlers are the best known of all natural radio sounds. They produce a falling pitch that lasts from one to several seconds, depending on the distance the signal has traveled. The whistling note can range from a nearly pure tone to a coarse, "breathy" note.

It's well known that lightning gives birth to whistlers, but it is the interaction between lightning, the Earth's surrounding magnetosphere, and the charged particles from the Sun (Solar Wind) that combine to give us the spectacular sound of a whistler.

Briefly, here's how the process works: During a solar disturbance, the Earth's magnetosphere is bombarded with higher than normal amounts of the Sun's charged particles. Besides visual effects such as Aurora Borealis (Northern Lights) and Australis Borealis (Southern Lights), these charged particles can also create ionized trails or "ducts" along the magnetosphere's lines of force, allowing improved electrical conductivity.

Lightning's RF energy can use these enhanced ducts to travel far out into space, ultimately returning to a conjugate point in the opposite hemisphere. Under the right conditions, a listener near this "landing zone" may be treated to the sound of a rather short, "one-hop" whistler.

A "two hop" whistler occurs when the lightning's RF energy is reflected back into the ionized duct and returns to a spot near the originating stroke. This often results in a proportionately longer (but weaker) whistler that is audible to listeners near the origination point. It is possible for this flip-flop process to occur many times, producing progressively longer and weaker whistlers.

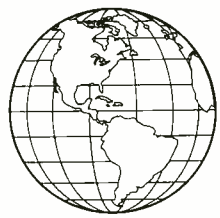
A mechanism called *dispersion* is responsible for a whistler's dropping note. Since the higher frequencies travel slightly faster than the lower ones, they reach the receiving station first, followed by progressively lower frequencies. The farther a whistler has traveled, the more pronounced the dispersion effect will be.

"Even the latest tabletop receiver will do you little or no good down here."

Tweeks

Tweeks are mostly a nighttime phenomenon occurring below about 5 kHz. They result when lightning's RF energy travels within the natural waveguide formed between the Earth and the D and E layers of the ionosphere (approximately 40 to 70 miles above the Earth).

Tweeks produce a very short pinging/chirping note that rarely lasts more than a fraction of a second. The cutoff point of these rapidly descending notes (usually around 1.5 kHz) represents the lowest frequency at which the dimensions of the waveguide can support the RF energy. (The dimensions of a waveguide must be more than a half wavelength of the RF energy to be carried.)



The dropping pitch of tweeks is caused by the dispersion effect described earlier for Whistlers, but it occurs *within* the ionosphere.

Chorus

Chorus is named for its cacophony of overlapping squawks, whoops, and chirps that *rise* in frequency. They sound very similar to flocks of birds singing at sunrise. This phenomenon is believed to be caused by pulsations in the Earth's magnetosphere during very active solar storms. Often, chorus signals will come in distinct waves, rising and falling in intensity over the period of just a few seconds. These are known as "chorus trains."

Chorus events are somewhat rare, but the best time to listen for them is generally during a solar storm and in the early morning hours. It can also occur at night, especially when there is visible Aurora over the Poles. As with most natural radio signals, the closer you are to the North or South Pole, the more frequent and intense the chorus activity will be.

Tuning In

I had intended to present equipment options at this point, but I'm already out of space. Next month we'll continue our natural radio discussion and I'll give you several resources for effective receiving equipment. For a head start, you may want to check out Stephen P. McGreevy's natural radio VLF homepage at: **http://www.netcom.com/~spmcgrvy/index.html**. Here, you'l find a schematic of a simple whistler receiver that can be built entirely from parts available at Radio Shack.

If you missed the Expo in Atlanta, an introductory tape is also available from my seminar titled *Nature's Radio Spectrum*. Look elsewhere in this issue for tape ordering information.

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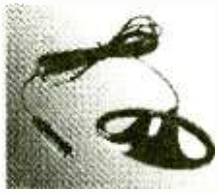

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Without a doubt LOWE's Airmaster 2 ACARS software and interface caused quite a stir in the world of airband listening. Hundreds of aviation enthusiasts are now using LOWE's ACARS software to supplement their monitoring activities. ACARS data comes in particularly fast, especially if you are in a busy location, and the screen soon fills up and scrolls over. Airmaster 3 will resolve these issues and others with many enhanced features:

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Clear(?) Channels

After starting to DX the AM broadcast band, one quickly learns that all AM frequencies are not created equal. A 1,000 watt station on 1080 is pounding in from Louisville, but the 1,000 watt stations on 790 and 1240 are nowhere to be heard. Indeed, the channels simply *sound* different. 1080 has two or three strong signals. 790 sounds like one of those trash TV talk shows, with 8-10 people all trying to talk at once. And 1240 is simply an undistinguishable mess of sounds.

If you sort your log by frequency, you'll notice something else: the DX you hear on 1080 will be better (both in quantity and quality) than on the other frequencies. Why do these nearby frequencies sound so different?

AM stations were, for years, divided into four groups:

Class I: 50,000 watts fulltime, non-directional.
Class II: Up to 50,000 watts. Must protect Class I stations from interference.
Class III: Up to 5,000 watts. Must protect other Class III's.
Class IV: 1,000 watts fulltime, non-directional. Must protect other Class IV's.

And, the AM frequencies were also divided (see the sidebar):

AM Channel Allocations

Here's a list of AM frequencies, by classification. The 1610-1700 kHz expanded-band is a special classification, and doesn't fall into any of these categories.

Clear:	640-680, 700-720, 750-780, 810-850, 870-890, 1000, 1020-1040, 1060-1140, 1160-1210, 1500-1530
(Canada):	540, 690, 740, 860, 940, 990, 1010, 1070, 1130, 1580
(Mexico):	730, 800, 900, 940, 1000, 1050, 1060, 1090, 1140, 1190, 1220, 15501570
(Cuba):	1010, 1560
(Bahamas):	1540
Regional:	550-630, 790, 910-930, 950-980, 1150, 1250-1330, 1350-1390, 1410-1440, 1460-1480, 1590-1600
Local:	1230, 1240, 1340, 1400, 1450, 1490

Clear: Frequencies for Class I and Class II stations.
Regional: Frequencies for Class III stations.
Local: Frequencies for Class IV stations.

Each "clear" channel was home to exactly ***one*** Class I station. Class I stations were protected from interference throughout their service areas—both the "groundwave" area near the transmitter, and the "skywave" DX area. Class II stations could be licensed on the same frequencies, but they had to use directional antennas or sign off at sunset to avoid interfering in the "skywave" zones. Many clear channels had only one station—the Class I—operating at night.

Canada, Mexico, and other nearby countries also wanted clear channels to serve their people. An international agreement assigned specific clear channels for these countries.

Class II State Targets

If you need these states for your log, try these frequencies:

Arizona:	KTNN-660, KCWW-1580
N. Dakota:	KFNW-1200
S. Dakota:	KSOO-1140, KOKK-1210
Wyoming:	KTWO-1030

Regional and local stations weren't quite as lucky. Skywave coverage was not protected from interference. As many stations could be licensed as would fit without groundwave interference. There might be over 20 regional stations on a frequency, and over 150 on a local channel. These stations were only intended for listeners in or near the city of license.

Pressure for more AM stations has continued through the years. And as competition from FM has stiffened, so has pressure for nighttime operation for formerly daytime-only stations. A few years back, the protection and minimum-power rules were relaxed. Today, clear-channel stations are only protected for a distance of 750 miles from their transmitters, a move that allowed hundreds of daytime-only stations to begin night operation. Some use directional antennas to allow night powers of up to 50,000 watts; others use their non-directional antennas at night with powers as low as one watt.

KSL-1160 is one of the original Class I stations. Its 50,000 watt signal covers parts of 12 states at night.

On regional channels, there used to be a minimum power of 500 watts. If a station couldn't use 500 watts without causing interference, it couldn't operate at night. This regulation has also been repealed, allowing many regional stations to begin night operations. Again, many stations use their non-directional daytime antennas with powers as low as one watt. Class IV stations weren't left out either; they were allowed to increase night power from 250 watts to 1,000.

In practice, most of these changes have had little effect on the economics of radio. Those Class II stations with substantial power usually have deep nulls in their directional antenna patterns, and many suburban listeners can't hear the stations. Low-powered Class II and III stations really can't cover their cities, either. The primary improvement has been in small cities—less than about 10,000 population—where the right to broadcast at night with 50 watts makes it possible for the town's residents to hear the high school football game on Friday night.

The effect on DX, however, has been much more profound. When I first got into AM DX (only about 10 years ago!) if you heard a station at night on 1200 kHz, you knew who it was. WOAI San Antonio was the *only*

station allowed to broadcast after sunset on 1200. By the time I left Wisconsin in late 1990, I'd logged Ottawa, Chicago, and Fargo at night on 1200. DXers in other parts of the country have 11 other possibilities on that channel. On the other hand, if you live in Chicago and still need WOAI, you may be out of luck!

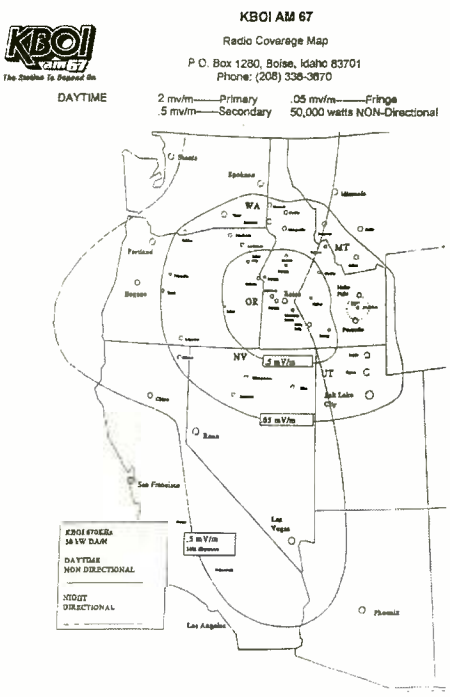
Some of these stations are in rare states. Arizona, Wyoming, and the Dakotas are all difficult to log from Tennessee. Relatively recent Class II authorizations in these states have made them much easier to add to the log.

The primary effect of the changes on the regional-channel DXer has been to make interference worse. But every once in awhile, something exotic will pop above the noise. There are certainly more DX targets on the dial these days.

Expanded-band News

As expected, broadcasters are unhappy with the new expanded-band list released in March. KQXI-1550 Denver lost its expanded-band allocation in the new table. They note they were granted a substantial power increase since the database used to create the table was compiled, a change which should have increased their chances of keeping an expanded-band channel. WNED-970 Buffalo wanted to know why their "improvement factor," the figure on which channels were allocated, was reduced from 0.3985 to 0.0552. And WWBG-1470 Greensboro, NC, and WPWA-1590 Chester, PA, make note of the very small number of stations assigned. All four stations, and four others, have filed petitions for reconsideration of the table.

What's my opinion? The FCC tables are



KBOI-670 is a Class II station. Note that KBOI's night signal (dotted line) only reaches a few miles east of Boise. This null in KBOI's coverage protects the signal of WMAQ Chicago, the Class I station on 670.

right. We're just seeing "sore losers." Granting the additional allocations requested will make the expanded band just as interference-laden as the regular dial.

Bits and Pieces

• Sandra Piotrowski of suburban Detroit uses an ICOM R71A with two wire antennas, and a Select-A-Tenna with the wires and a Panasonic RF-2600 or Radio Shack DX-380. She's delighted to have logged KXBT-1630, her first California logging. I'm sure KXBT is the first California for many other DXers, too! Sandra has also received a QSL for a 1995 logging of Caribbean Christian Radio, 1020 kHz, in the Turks and Caicos Islands. This station has since moved to 1025, though I've heard a rumor of them going back to 1020.

• Some DXers had an unusual opportunity to log a normally daytime-only station this fall. WLIB-1190 is the New York City station that triggered controversy with its plan to buy WOWO-1190 Fort Wayne, reduce WOWO's night power, and begin nighttime broadcasting in New York. The antenna changes necessary both in New York and Indiana are not yet complete, and probably won't be until early 1997. But WLIB obtained special authority from the FCC to broadcast at night during the Republican and Democratic National Conventions. They also expect to receive permission to cover the November 5 election. DXers should keep an ear open on 1190 kHz; there may be other such events in future months until WLIB's new antenna is ready.

• Yet another new AM format has hit the airwaves, this one in Washington, DC. On July 29, WMZQ-1390 became WZHF, "health & fitness radio." Station management hopes to sell "infomercials," similar to the half-hour ads for exercise machines and similar products seen on daytime TV.

FM/TV DXers note: we're approaching the winter E-skip season. Expect several days of long-distance reception on the low TV channels 2-6 and possibly the FM band, around Christmas. If you do log something exotic, please let us know!

DX TEST BULLETIN

These special broadcasts provide a unique opportunity to hear and identify the following stations. If you hear these broadcasts, please report to the address provided.

Sun Dec 1 - WWCN-770 (20125 S. Tamiami Trail, Estero, FL 33928) will test at 3:00-4:00 am EST.

Sun Dec 1 - KGVW-640 (P.O. Box 167, Belgrade, MT 59714; E-mail, macoasis@sunrise.alpinet.net) will test at 2:00-2:30 am EST.

Sun Dec 8 - WWCN-770 (20125 S. Tamiami Trail, Estero, FL 33928) will test at 3:00-4:00 am EST.

Mon Dec 9 - KAAM-620 (Plano, TX) will test at 2:00-2:30 am EST.

Sat Dec 14 - KSTL-690 (814 N. 3rd St, St. Louis, MO 63102; E-mail, richczar@inlink.com) will test at 3:00-3:30 am EST.

Sun Dec 15 - WWCN-770 (20125 S. Tamiami Trail, Estero, FL 33928) will test at 3:00-4:00 am EST.

Mon Dec 16 - WSAF-1180 (P.O. Box 680, Summerville, GA 30747; E-mail, wsaf@wavegate.com) will test at 2:30-3:00 am EST.

Sun Dec 22 - WWCN-770 (20125 S. Tamiami Trail, Estero, FL 33928) will test at 3:00-4:00 am EST.

Sun Dec 29 - WWCN-770 (20125 S. Tamiami Trail, Estero, FL 33928) will test at 3:00-4:00 am EST.

Mon Dec 30 - KJSL-630 (1215 Fern Ridge Parkway #220, St. Louis, MO 63141; E-mail, richczar@inlink.com) will test at 3:00-3:30 am EST.

George Zeller
George.Zeller@acclink.com

Need More Pirate Information Sources?

Given the explosion of North American shortwave pirate activity in 1996, the Outer Limits logging section has been bursting at the seams with stations heard and reported by our readers. DXers are increasingly interested in finding and hearing the stations, many of which provide novel and interesting entertainment value. As Fred Cresce did this month, many shortwave listeners have written to *MT* with questions about finding additional information about North American pirate activity.

Fortunately, several good resources are published on a regular basis. Of course, the Outer Limits remains one of the most comprehensive and accurate lists of active pirates that you can find. An even more detailed collection of pirate station loggings appears monthly in *The ACE,* published by the Association of Clandestine Radio Enthusiasts. Subscriptions to this essential resource are $20 annually from PO Box 11201, Shawnee Mission, KS 66207. You can find ACE info on the web at the **www.access.digex.net/~cps/ACE.html** URL.

Two other newsletters offer more rapid pirate info over the internet. Andrew Yoder's biweekly *Pirate Pages* contain hot tips sometimes not available elsewhere, as well as a fresh list of station loggings. A modest $5 fee brings you the publication for a few months, or it is available even more quickly on the internet. You can write for details via the Blue Ridge Summit maildrop (see below). If you'd prefer e-mail for your inquiry, *ayoder@cvn.net* will reach Andrew.

Even faster material comes from Chris Lobdell's *Free Radio Weekly* newsletter, distributed weekly for free to contributors. You can't beat the price or the speed. Chris' *piradio@usa1.com* e-mail address is good for inquiries and contributions. Or, at **w3.one.net~folk/frw.htm** you can download FRW from the web, courtesy of veteran pirate DXer Mike Folk. Additional information on these services is available at John Cruzan and Kirk Trummel's excellent **www.clandjop.com/~jcruzan/frn.html** web page.

If you'd prefer a Europirate site, **www-pp.hogia.net/jonny/index.html** will take you to the SRSnews web location. After your cruise of the internet, why not turn on your receiver and give the pirate bands a scan next weekend?

Schedule for Colombian Radio Patria Libre posted on a building on the Universidad Nacional campus in Bogotá. After a lengthy silence, the guerilla clandestine reappeared in mid-June at 2200-2230v, on 6300 (Sat) and 6450 (Sun).

■ Nigerian Clandestine Time Change

Radio Kudirat Nigeria, the Voice of Democracy, has once again changed the time of their daily one hour transmission. It's now officially scheduled from 1905-2005 UTC on their regular 6205 kHz frequency. The programming is normally in English, but I have noticed Hausa language shows on some days. Tony Benbenek of East Hampton, NY, says that he heard the announcement of this new time on September 30.

Kudirat has been changing times and frequencies about once a month on the average, so if you want to catch the latest news, the Sentech internet web site at **www.sentech.co.za/meyerton.html** lists their current schedule. It even has two pictures of the South African transmitter site used by this clandestine!

■ Radio Patria Libre Schedule

Since its return to shortwave broadcasting a couple of months ago, I have still seen no North American loggings of the ELN's shortwave clandestine. Since our report in the November Outer Limits, Henrik Klemetz in *Dateline Bogota* has reported their schedule as 30 minute transmissions at 1800 and 2200 UTC on 6250 kHz. The latter time should propagate to North America now that we are into winter conditions. This month we picture some graffiti spotted on a building by Henrik at the Universidad Nacional campus in Colombia, which actually lists the Radio Patria Libre schedule!

In *Dateline Bogota* via *Numero Uno* #1393, Henrik also notes that a FARC clandestine identifying as La Voz de la Resistencia is being heard for between 15 and 30 minutes at 2300 UTC on 6259 kHz. So, if you're checking this area of 49 meters for newly reactivated Colombian clandestines, be careful to catch the actual station ID.

■ Radio Marti

MT reader R. C. Watts of Louisville, KY, received correspondence from Mary Jane Clark at the Office of Cuba Broadcasting in response to a letter that he wrote to Radio Marti about the Marathon, FL transmitter on 1180 kHz medium wave. Clark said that "Radio Marti can only be received in the United States on short wave." Watts notes that the 1180 frequency suffers heavy QRM from the Cuban Radio Tiano tourist service, even from Florida DX locations.

■ What We Are Hearing

Your pirate loggings are always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address at the top of the column. All frequencies are in kHz, with times in UTC.

North American pirate stations listed here use the following addresses: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; PO Box 605, Huntsville, Alabama 35804; PO Box 5617, Ventura, CA 93005; and PO Box 293, Merlin, Ontario N0P 1W0. For return postage, enclose three 32¢ stamps in the envelope to USA addresses. $2 US or two International Reply Coupons go to foreign maildrops.

Alan Masyga Project- 6955 at 2345. Their announcements notwithstanding, this Alan Parsons Project rock station has no relationship with DXer and *MT* contributor Alan Masyga. Addr: Providence. (Harold Frodge; Midland, MI; Barry Williams, Enterprise, AL; Niel Wolfish, Toronto, Ontario; Alan Masyga, Winona, MN; direct from the station)

Back to Back Radio- 6953 at 2300. Although this new one is primarily a rock music station, it uses creative sound effects to make its broadcasts distinctive. Addr: Belfast. (Howard E. Lyon, Oz)

Big Johnson Radio- 6955 at 0100. They primarily are a rocker, but risqué novelty and

comedy bits are always part of their shows. Addr: Providence. (Lee Silvi, Mentor, OH; Bill McClintock; Minneapolis, MN; Jesse Rose, Hampton, VA; Wolfish; Frodge)
COPS- 6955 at 0100. This is not a police station; their slogan is "Canada's Only Pirate Station." Of course, there are other Canadian pirates. Addr: None. (Rich and Talea Jurrens, Katy, TX)
Delta Tango 306- 6956 at 0215. Logs are still trickling in for the reactivation of this in-studio pirate fest, featuring Radio Animal of WKND, Dr. Blue of Radio EXP, Fester the Molester from Radio Fornication, and A. J. Michaels of Action Radio. This was Byron's first pirate catch; congrats! Addr: Belfast. (Byron King, Raleigh, NC; Randy Ruger, North Hollywood, CA)
Hitchhikers Guide to the Galaxy- 13900 at 1400. Arthur Dent travels to other planets in this relatively new operation's drama programs. Note the high band frequency, which has seen some use during daylight hours. Addr: Blue Ridge Summit. (Pat Murphy, Chesapeake, VA)
Infinity Minus One- 6955 at 0045. Their distinguishing characteristic is laughter by The Gatekeeper that is heard atop rock music. Addr: None, said may verify logs in *The ACE*. (Charles Crawford, Henderson, KY; Frodge; Wolfish)
KAMP- 6955 at 0000. They started out as a parody of the Alan Masyga Project, but recent broadcasts by I. M. Nutz have featured other rock bands and various novelty songs. Addr: Blue Ridge Summit. (Frodge; Jurrens; Wolfish; Jurrens)
KAT- 6950 at 0045. Their second program from the Kappa Alpha Tau fraternity house at the University of Wisconsin at Madison featured records that the announcer bought at a local flea market. Addr: Blue Ridge Summit. (Brandon Artman, West Chester, PA; Ruger)
KGDR- 6956 at 1530. This Grateful Dead music station reminds us that pirate activity is sometimes heard during weekend daylight hours, even in the morning. Addr: Providence. (Wolfish)
Mystery Radio- 6955 at 0300. Elaborate new age musical selections dominate this pirate's broadcasts. Addr: Stoneham. (Basil Shelley, Blythe, CA; Wolfish; Silvi; Frodge; McClintock; Jurrens)
North American Pirate Relay Service- 6955 at 2330. Rumors in *The ACE* that Dick Pistek was pulling the plug at NAPRS have so far proved to be premature. He retired once before, but fortunately came back quickly. Addr: Belfast. (Jack McMahon, Depew, NY; Crawford; Silvi; Wolfish)
Radio Azteca- 6955 at 2200. Bram Stoker has now produced 20 different shows that parody the DX hobby. His format includes a Top Ten list, a "real stuff" segment, and fast paced humor about DXing. Addr: Belfast. (Marlin Field, Hillsdale, MI; Mike Prindle, New Suffolk, NY; Silvi; McClintock; Rose; Artman; Williams; Crawford; Jurrens)
Radio BLANDX- 6955 at 0445. The original DX parody station, which borrowed its name from Don Moore's parody of NASWA's *The Journal*, has resurfaced with new and funny material. Addr: Blue Ridge Summit. (Jurrens)
Radio DC- 6960 at 0245. This unusual Morse code pirate still uses a "Don't Vote Republican" slogan. As we saw in the recent election, their results were mixed. Addr: None, sometimes verifies logs in *The ACE*. (Tedd Hemeneck, Arlington, VA)
Radio Experimentation- 6955 at 1900. So far this new one has tested with rock music, saying that reports should go to the alt.radio.pirate internet newsgroup. They should not be confused with veteran Radio EXP. Addr: None. (Wolfish)
Radio Free Euphoria- 6955 at 0145. Captain Ganja said he has given up drugs and that he plans to become a yuppie. We shall see. Addr: Belfast. (McClintock)
Radio Free Speech- 6955 at 1330. The election is over, but Bill O. Rights is still transmitting a fast paced mix of political humor and parodies, often using an AM transmitter. Addr: Belfast. (Ross Comeau, Andover, MA; Tom Venney, Midland, MI; Williams; Murphy; Silvi)
Radio Fusion Radio- 6955 at 2330. From the "College of Knowledge," this is the most active rap music pirate. Addr: Providence. (Tom Mazanec, Maple Heights, OH; McMahon; Silvi; McClintock; Williams; Jurrens; Frodge; Wolfish)
Radio KAOS- 6955 at 0230. Joe Mama sometimes does live shows with formats different from his usual rock, such as recent blues and religious programs. Look for the "Monty Python" theme at sign-off. Addr: Belfast. (Comeau; Shelley; Murphy; Field; Jurrens; Ruger; Silvi; Williams; Frodge; Wolfish; McMahon)
Radio Tellus- 6955 at 0230. Many have heard this new station, which features rock music and discussions of other pirates. But, information about this one has been very hard to find. Addr: None. (George Zeller, Cleveland, OH; Wolfish; Frodge; Silvi; Williams)
Radio Three- 6955 at 1800. Sal Amoniac says that his wife's genealogical research has established that he's related to P. J. Sparx of WREC. Addr: None; says may verify logs in *The ACE*. (William Hassig, Mt. Prospect, IL; Williams; Jurrens; Wolfish; Crawford; Silvi; Frodge)
Rock-It Radio- 6956 at 2315. This one buys commercial time on several shortwave broadcasters, but sometimes it airs via a pirate relay. Addr: Ventura. (Williams)
The Fox- 3945 at 2200; 6055 at 0200. Ranier heard this one via its European relay, but many USA listeners still hear them via North American transmitters. Addr: Blue Ridge Summit. (Ranier Brandt, Germany; Williams; Lyon)
The Radio Goon- 6955 at 0000. The Duceman hosts this new rock station, but not much is known about it. Addr: None yet. (Comeau; Williams)
Up Against the Wall Radio- 6955 at 0030. Owsley has moved into the 1970's with Led Zeppelin music, although Howard said that one show was swished over by WARR. Addr: Providence. (Lyon)
Up Your Radio Shortwave- 6955 at 2315. The political humor on this station's slick productions mocks right wing politicians. Ranier heard them from Europe, QRM'ed by another North American pirate! Addr: Blue Ridge Summit. (Brandt; Frodge; Murphy; Field; Jurrens; Williams)
Voice of Bizzaro World- 6955 at 0015. Station maven Xhem is sending out QSL's for this backwards station, including mint stamps with the QSL's as promised. Addr: None, verifying logs in *The ACE*. (Andrew Everhart, Carmel, IN; Robert Ross, London, Ontario; Williams; direct from the station)
Voice of the Blue and the Gray- 6953 at 1530. Their regular Civil War documentaries are supposed to start soon, but as Harold found, their QSL's are arriving before then. Addr: Providence. (Frodge)
WAMP- 6955 at 1445. This one is a dual parody, both of WWV's time signal and of the Alan Masyga parody stations. Addr: Merlin. (Frodge; Wolfish)
WARR- 6955 at 1815. There is news from this rock music and drug advocacy pirate. Their extremely frequent broadcasts have been cut back to several per month, and they finally have acquired an address! Addr: Belfast. (Wray Lemke, Mt. Pleasant, SC; Jurrens; Crawford; Lyon; McMahon; Jurrens; Silvi; Williams)
WBNY- 6953 at 2245. This hilarious voice of the oppressed rabbits of the world is a clandestine parody that usually appears on Easter. But, this year's October reappearance of the Rodent Freedom Fighters defied the calendar. Addr: Washington drop closed. (Lyon; Zeller)
WLIS- 6955 at 1300. Jack Boggan's veteran station features actual interval signal melodies from licensed shortwave broadcasters. His frequent broadcasts and distinctive programming might make him the best known North American pirate. Addr: Blue Ridge Summit. (Silvi; Wolfish; McMahon; Frodge)
WMPR- 6955 at 2330. Their rock music is sprinkled with sound effects and a "Micropower Radio" slogan, but we still don't know much about them. Addr: None. (Prindle)
Word of the Day- 3901 at 0030. Most pirates respect the amateur radio bands, so they broadcast outside them. A few rare ones, such as a religious sermon by Jeff Smith with this ID, are unfortunate exceptions. Thanks go to our sister publication *Satellite Times* for this log! Addr: None. (Keith Stein, Woodbridge, VA)
WPN, World Parody Network- 6955 at 0030. Captain Squirtlong's novelty music was recently spiced with a contest, where first prize was a free registration to the 1997 Winter SWL Festival in Kulpsville, PA, scheduled for mid-March. Addr: Huntsville. (Rose; Jurrens)
WPRS- 6955 at 0130. Willy B. Quiet has announced that his frantic pace of several transmissions per weekend has been curtailed, but he still produces rock music shows. Addr: Providence. (Ray Carmen, Akron, OH; Williams; Jurrens; Shelley; Wolfish; Field; Silvi; Prindle; Ruger; McClintock; direct from the station)
WREC- 6955 at 0000. P. J. Sparx always plays rock and novelty or comedy music. Cameo ID's from other pirates are regular program fare. Addr: Belfast. (McMahon; Ross; Hassig; Wolfish; Williams)
WRMC- 6955 at 2315. Using a slogan of "Radio Operation Mind Crime," this new one is a semi-clandestine voice of USA workers. Their 5 point program is designed to throw off exploitation of the wealthy. Addr: Providence. (Brandt; Lyon)
WSHB- 6955 at 2300. The call letters have been reported in various ways on this new reggae and calypso station, which claims to broadcast from the Bahamas. Don't confuse it with the licensed station using the same call! Addr: None yet. (Crawford; Murphy; Jurrens)
WSM, Grand Ole Opry Radio- 6955 at 2245. They have stolen the call letters of Nashville's 50 kW medium wave powerhouse. Programs consist of very old country music featured by the Grand Ole Opry many decades ago. Addr: Huntsville (Crawford; Frodge; Prindle; Silvi; Wolfish; McClintock; Rose; direct from the station)
WWWR- 6954 at 0045. World Wide Weasel Radio mainly programs contemporary rock, but "Blue Christmas" by Elvis worked its way into one show. Addr: None. (Comeau; Frodge; Wolfish; Jurrens; Prindle)

Ike Kerschner, N3IK

The Apartment Dweller's Joystick

Back in the early sixties, an antenna called the *Partridge Joystick* was popular with amateurs and SWL's who did not have room for a big antenna farm. The Joystick worked all bands from 160 thru 10 meters, was only six feet long, and did an excellent job.

I purchased a Joystick from the manufacturer (in England) and put it into service on 160 through 10 from my home in Pennsylvania. In very short time I found this to be an excellent antenna for its size. I worked VP9, XE, and all over the West Coast of the USA on 160 meters with the antenna under my bed on the second floor of my home.

Admittedly, the Joystick did require an antenna tuner; but it was very easy to tune to any frequency. Judging from its appearance, it seemed to be two aluminum tubes about 3/4 inch in diameter and a fairly large coil at the center. By its weight, the antenna must have had a ferrite core. A single wire fed the antenna (a.k.a. longwire). This single wire could be any length—according to the manufacturer, the longer the wire the better. It seemed the Joystick was simply a way of loading a wire to improve performance. For the size and price it was one heck of an antenna.

I never did take the antenna apart to examine, and during one of my many moves it was lost. Since the manufacturer became a silent key, the Joystick is no longer available. However, after a bit of research and experimentation, I have learned to build a simpler model of the Joystick that works as well, although it is a bit longer.

The Happy Stick

Many of the hams I know have antenna restrictions and—for one or more of the reaons with which we are all too familiar—cannot put up a decent outside antenna. In an attempt to design an effective antenna for a friend who lived in an apartment, I came up with my version of the Joystick which I call the Happy Stick!

Easy to build, only 4-1/2 feet long, and requiring minimal expense, the Happy Stick works 40 thru 10 meters plus everything in between. I have run 100 watts to this antenna with excellent results; however, if you intend to run much over 150 to 200 watts I suggest installing a top hat consisting of a 6 to 10 inch diameter pie pan or similar metal disk. A Happy Stick for 80 through 10 is only 8 feet long.

Build It

You will need the following for your Happy Stick: a piece of 1/2 inch PVC pipe 4.5 feet long with a 1/8 to 3/16th hole drilled 1/2 inch from each end; 70 feet of stranded insulated wire, 18 or 16 gauge. The preceding is for a 40 thru 10 meter Happy Stick. If you want to work 80 meters, double all dimensions; triple them for 160.

Strip an inch or so of wire and tie it with an overhand knot in one of the holes in the PVC. Close wind the wire on the pipe for the first 30 inches or so and space wind the remaining wire over the last 18 inches. The winding is not critical; if you wish, you can space wind the entire 70 feet of wire over the full 4.5 feet of pipe. Use electrical tape at three or four places to hold everything in place. Photo one is my son Joey with our version of the Happy Stick.

Son Joey with our Happy Stick Antenna

Feed the Happy Stick with a single wire connected to the close wound end of the antenna. Use a transmatch to tune the antenna (any simple transmatch will work fine). The feedline can be any length. If possible put the antenna up as high and in the clear as possible; if you can't get it outside then put it where convenient. Try to get the best ground on the rig as possible.

If you must use the antenna indoors and you run 100 plus watts, RFI can be a problem. If this is the case, keep the antenna as far as possible from the source of RFI, and reduce power if necessary.

It is possible to use coax to feed the Happy Stick, too, but use a counterpoise or good ground at the far end of the feedline. Another idea is to build two Happy Sticks and use them end-to-end like a short dipole. Use 300 or 450 ohm feedline via a transmatch.

The first time I used my Happy Stick resulted in a 40 meter QSO with N8WYO in Troy, Michigan, about 450 miles airline. My report was 449, but his was only 459. On 20 meters, Europe, South America, and all over the USA QSO's are quite easy. I feed my antenna with a single 6 foot wire via an MFJ 948 versa tuner; the rig runs 100 watts. Using my HW-9 with the Happy Stick 15 feet up in a tree and fed with a 25 foot wire I worked XE, W6, W7, and KP4 on 20 meters; on 30 meters SM and G stations were worked with the same setup.

This little antenna will not break the pile-ups, but it sure will allow you to enjoy ham radio where antennas are not allowed. If you build a Happy Stick, please drop me a note and tell me about your experiences with the antenna.

Happy Holidays one and all, 73 de Ike, N3IK

Note on advertisement below: *As of 4/26/95 it became unlawful to market cellular-capable receivers in the US. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.*

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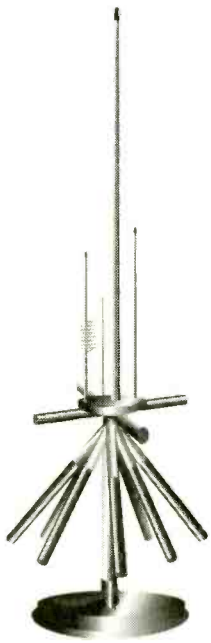

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NAVAIDS: Going the Distance

Welcome aboard, everyone, and season's greetings! It has been a relatively grim year for the airline industry, and the NTSB and FAA have had their work cut out for them. We join in mourning for all those who have lost their lives in the past year's major airline crashes.

To continue with our study of NAVAIDs, let's examine Distance Measuring Equipment (DME) and see how various NAVAIDs work together.

The DME is not a separate NAVAID instrument, but it is used in conjunction with a VHF omni range (VOR), tactical air navigation system (TACAN), VORTAC, or instrument landing system (ILS). The DME operates in the ultra high frequency range from 962 to 1213 MHz, with a maximum range of 300 nm. This range provides 252 frequencies, paired to provide 126 "channels." Each channel consists of two frequencies spaced 63 MHz apart: one for air-to-ground interrogation and the other for ground-to-air response.

For instance, Channel 1 would be air-to-ground, 1025 MHz, and ground-to-air, 962 MHz. The use of different frequencies prevents the airborne interrogator from accepting signals produced by its own transmissions bounced back from the ground.

Until the advent of distance measuring equipment, a pilot could find his bearing from a VOR or L/MF facility, but in order to determine the actual position of the aircraft (direction and distance, or bearing and range), it was necessary to tune to another facility and determine position by cross-reference—a time-consuming procedure.

DME equipment offers many advantages to both pilot and air traffic controller. With it, the pilot has range from a DME-equipped station displayed instantly, accurately, and constantly, along with the directional information from the facility. Radio equipment on the aircraft, known as the *airborne interrogator*, sends out a stream of coded pulses of radio energy.

When a pulse reaches a ground station (known as the ground transponder), it triggers the transmitter which sends out a reply pulse to the receiver of the airborne interrogator. The time interval between transmission of the pulse and reception of the reply pulse is measured electronically, and the range of the beacon is automatically computed and displayed. Reliable signals may be received at distances up to 199 nautical miles at the line-of-sight altitude with an accuracy of better than 1/2 mile or 3 percent of the distance, whichever is greater.

DME aids the controller by making a greater portion of his airspace usable. DME-equipped aircraft can hold at *any* point within reception range of a DME-equipped facility, and are not limited to intersections or radio fixes based on two facilities. They can fly arcs about NAVAIDs, restricted use airspace, or congested traffic areas, aiding in reducing general airway and terminal congestion.

Distance information received from DME equipment is *Slant Range Distance*, not actual horizontal distance. DME measures the slant difference from the aircraft to the beacon, which is slightly longer than the ground distance, but only about 0.5 nm more at 50 nm range. Incidentally, the frequency of the DME is automatically tuned when the frequency of a VORTAC\VOR is dialled, and the distance to go appears when the facility is within range.

Airborne DME Distance-Groundspeed indicator display to read out the amount of flying time in minutes to or from the VORTAC station.

How Do NAVAIDs Work Together?

VORTAC/DME, VOR, ILS/DME, and Localizer/DME facilities are identified by synchronized identifications, which are transmitted on a time share basis. The VORTAC/VOR or localizer portion of the facility is identified by a coded tone modulated at 1020 Hz, or by a combination of code and voice. The TACAN or DME is identified by a coded tone modulated at 1350 Hz.

The DME or TACAN-coded identification is transmitted one time for each three or four times that the VOR/VORTAC or localizer coded is transmitted. Then, if either the VORTAC/VOR or the DME is inoperative, it is important to recognize which identifier is retained for the operative facility. A single, coded ID, with a repetition interval of approximately 30 seconds indicates that the DME is operative.

Readers Corner

Joseph Ling (Hong Kong) contributed the following: "As most of us know, English is the international language of aviation. However, it seems that some Chinese pilots have a problem with the English language. Consequently, the Chinese aviation establishment asked the International Air Transport to conduct a major aviation English language skills course as part of the country's major drive to meet world air safety standards. It seems that a mastery of English is regarded as one of China's most persistent problems....

"2,000 pilots and a good portion of China's air traffic controllers will be involved in a training program to bring their English language skills up to par. It will be modeled after a similar program that the IATA set up a few years ago in Prague for Eastern European airlines. The training will cover language skills only, as IATA is not teaching piloting or ATC skills."

Well, editorially speaking, I say good for them! There are other countries whose pilots have a hard time speaking aviation English and would do well to follow China's example!

An anonymous reader from the Indianapolis ARTCC sends us this list of the Center's high altitude frequencies (FL240-FL330) and the area where the remote transmitters/receivers are located.

Sector Name	Frequencies
DAY High (Dayton)	125.075/307.900
APE High (Appleton)	132.825/343.600
CRW High (Charleston)	119.525/385.600
BKW High (Beckley)	124.575/290.550
FLM High (Falmouth)	128.225/317.750
RBL High (Rebel)	134.675/323.200
IND High (Indianapolis)	128.275/290.300
LOU High (Louisville)	133.050/278.500
KNG High (King)	134.175/270.300
PXV High (Pocket City)	132.525/379.900

Although the VHF aero band frequencies work on the line-of-sight principle, there have been many instances of VHF "skip," (for lack of a better word). Several times this year in Indy, I've heard pilots working centers as far away as Denver. Remember, the higher the aircraft, the further away they can be heard.

Jack Day (Charlotte, NC) contributes this play on words: "Two buzzards, each holding large plastic bags, were standing in line at an (unnamed) airline ticket booth at Charlotte's international airport. When it came their turn to be waited upon, they stepped up to the counter. The helpful ticket agent asked, "Would you like to check those bags?" "No thanks," said one of the buzzards, "These are carrion!"

And with that, I think I'd better say 73 and out. See you next month!

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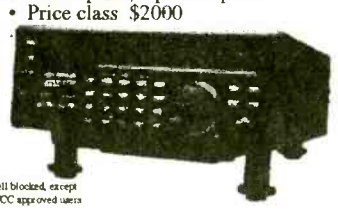

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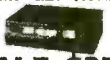

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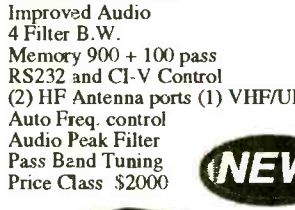

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Monitoring Technology Catches Up

One of the neatest new programs for the computer/scanner user is a program from K&L Technology, of Garland, Texas. It is a very interesting program called **Message Tracker** (see John Catalano's review of it in the June '96 *MT*). The package consists of software plus a special hardware cable that connects between your scanner and your 386 computer. When it is tuned to a paging frequency, it will decode both the cap code, which is the individual identification number of the pager, and the page that is sent to the pager. It works well for both numeric and alphanumeric pagers.

The program runs in the DOS shell, not windows. It will allow you to see all of the languages and speeds that are currently being used for paging networks. To install this device, load the program and then plug the 25 pin cable into a spare serial port on the back of the computer. The other end of the cable terminates in a 1/8 inch plug. Plug this into the earphone jack of your scanner. If the scanner is tuned to a specific paging frequency, you will receive the pages being sent out to the individual pagers.

This is all well and good, you say, but (as you ask every month) what does this have to do with federal system monitoring? (Hey, don't you trust me by now?) One of the major users of paging services is the United States Secret Service.

On a presidential visit the White House Communications Agency (WHCA) comes into town a few days before the President's arrival and sets up their own paging transmitter(s) on their exclusive paging frequency of 167.025 MHz. This is known as the Whiskey channel. Everybody who is anybody within the presidential detail will carry one of the alphanumeric pagers. This includes the WHCA personnel, the individual Secret Service agents, the military personnel that travel with the party, and the support personnel.

Message content begins with the "wheels-up" of Air Force One on its departure from the point of origin to all of the messages needed for the visit, to the final "wheels-up" when Air Force One departs your city. The content of the messages ranges from the humorous to highly sensitive details regarding the specific assignments. Tactical details such as individual telephone numbers for members of the presidential party and locations of support items, such as limousines and other vehicles, may be included in these communications. Personnel who do not qualify for individual two way radios on the Secret Service channels, or who do not need them, will usually be carrying a pager.

There are other data decoders on the market which will decode pager transmissions, but the Message Tracker, or its clones, are stand-alone units. You will not be tying up your large, and probably very expensive, data decoder for a specific project.

Federal Protection Agencies

While we are discussing the Secret Service, let us review the individual channels and their assignments. Although this will duplicate a portion of the information in this month's cover article on monitoring in Washington, D.C., you may find it more convenient than flipping back and forth between articles.

Secret Service

Designator	Frequency	Use
Alpha	32.230	WHCA Technicians
Baker	165.7875	Rptr out and simplex
Charlie	165.375	Rptr out and simplex
Delta	169.925	Protection guards
Echo	407.850	Nationwide ground to air
Foxtrot	415.700	Nationwide air to ground
Golf	166.400	District rptr input
Hotel	167.900	White House Motor Pool
India	407.925	Treasury Security Guard
Juliet	170.000	Paging at Camp David
Mike	165.2125	Nationwide simplex
November	166.700	Executive protection
Oscar	164.8875	Cabinet officers protection
Papa	164.400	Nationwide alternate rptr input
Sierra	166.5125	Nationwide WHCA command post
Tango	164.650	Nationwide rptr out and simplex
Whiskey	167.025	Nationwide paging
Yankee	162.6875	Nationwide car to airplane
Zulu	171.2875	Nationwide airplane to car
Black	415.100/ 418.325	Training Division
Brown	414.850/ 418.800	White House Uniform Div (WHUD) Foreign missions branch
Red	415.975/ 419.725	WHUD Foreign missions br.
Orange	418.775	WHUD Foreign missions br.
Yellow	414.675/ 418.150	WHUD Foreign missions br.
Green	415.750/ 407.875	Foreign missions protection
Blue	414.800	Training Division
Violet	415.800	Training division
Gray	418.350	WHUD Foreign missions br.
White	407.675	WHUD Foreign missions br.
Silver	415.650/ 419.100	WHUD Foreign missions br.
Gold	415.675/ 419.075	Communications Division
Lavender	418.125	Washington, D.C., area
-----	414.950/ 419.075	Communications Division

In Washington, D.C., the Secret Service and the Capital Police work hand in hand. Here are the major frequencies used for their joint operations.

Capital Police

Channel	Frequency	Use
01	164.800/164.050	Primary
02	164.625/162.6125	Secondary
03	164.800	Talkaround
04	164.625	Talkaround
05	164.600/164.325	Secondary tactical
06	164.600	Talkaround
07	162.250/165.5375	
08	162.250	Talkaround
09	163.100/168.350	Coord net
10	168.350	Talkaround

Secret Service Foreign Mission Protection Detail

01	414.850	Rptr out (brown)
	418.800	Rptr input (brown)
02	414.800	Transportation (blue)
03	415.750/407.875	Operations Center (green)
04	415.975/419.725	Emergency (red)

Secret Service Intelligence and Technical Support Division

Pr	164.400	Primary VHF
01	408.500	Tracking units
02	408.975	Tracking units
01	407.800	Electronic surveillance units
02	406.275	Electronic surveillance units

Secret Service Uniform Detail--White House Operations

01	418.775	Protection (orange)
02	414.675	Communications (yellow)
03	415.800	Training (violet)
04	414.975	Tactical ops

Secret Service White House Protection

November	166.700	Executive protection
Sierra	166.5125	Command post
Oscar	164.8875	Cabinet protection
Whiskey	167.025	Paging
Hotel	167.900	Motor pool

Executive Branch Protection at Camp David, Anacostia NAS, and New York City

Delta	169.925	Protection guards
Juliet	170.000	Paging

The Marine Corps offers support to the President in the way of helicopters, known as Nighthawks. These helicopters can usually be found operating on low band. They use the following frequencies:

USMC Nighthawk Helicopters

Channel	Frequency	Use
01	46.750	Primary
02	46.700	Secondary
03	46.800	Alternate

The helicopters can be heard usually talking to the local control tower on the tower frequency. As an example, when the President was visiting South Florida recently, very little traffic was heard on the normal Secret Service channels. The paging channel of 167.025 MHz was transmitting message after message, and the helicopter was talking to the airport control tower on 119.1 MHz. I was able to obtain more information regarding the motorcade and its stops from this aircraft channel than I could by monitoring the Secret Service channels.

I am often asked what Secret Service channels should one monitor to catch all of the activity. Obviously the first one is the 167.025 paging frequency. When you start to hear data paging on this channel, the "boys are back in town." The obvious Secret Service channels of B-C-M-T (see chart above) is the same layout as the individual radios have in them. The next two channels are the Yankee-Zulu pair. You will not hear any unencrypted communications on them, but it is interesting to listen to Air Force One talking to the President in the limousine.

The final channel to monitor is perhaps the most important. It is the Echo-Foxtrot pair. This channel is always, *always*, monitored from my location, whether it is at home or in the car. Some of the most interesting communications have been heard on the 415.7 MHz channel. Unless you live near a major telephone switching center, you will probably not hear the 407.850 MHz link up to the airplane. You *will* hear the 415.7 MHz link from the plane to the AT&T switching center.

We recently had the First Lady visiting us here in South Florida. The White House Comm Agency did not come in and set up any 167.025 MHz paging. There were no additional secure voice repeater channels set up. When the First Lady stopped at Florida Atlantic University in Boca Raton, Florida, to give an evening speech, there was a small amount of simplex activity. This was all being conducted on 165.375 MHz, which seems to be the primary channel or operations.

What was most enjoyable was the 415.700 MHz frequency. From the time the Executive Aircraft, which identified as Executive-One Foxtrot, came into radio range until it landed at Palm Beach International Airport, there were some very interesting conversations from the aircraft back to Crown—the White House Command Post which places the telephone patches for those on the aircraft.

You generally will not hear the First Family, but you will hear the support personnel. They can be most informative and entertaining. If I lived closer to the uplink channel transmitter of 407.850, which is at the AT&T switching site at Pensucco, Florida, I could hear both sides of the conversation. Usually both sides will be repeated on the output channel. . . . Happy listening.

Radio Traffic at OKC

In response to information which I had been seeking regarding the Oklahoma City bombing, a reader sent in some information on what frequencies were active immediately after the blast. They were:

U.S. Army	163.4125
	49.70
Alcohol, Tobacco and Firearms	165.2875
	166.5375
Drug Enforcement Administration	418.900
FBI	167.5625
FEMA	169.875
Government Services Administration Security	415.200
	417.200
IRS	418.225
	165.950
	166.000
Marshal's Service	163.2000
	163.8125
	164.1000
Secret Service	165.375
	166.400
	165.7625
	166.5125
Unknown	166.4625
	(Treasury common)
	165.8875
	168.5500
Red Cross	47.42
	47.46

The U.S. Marshal's Service was the first confirmed transmission on the air after the blast.

No Freqs Off Limits

In my October column on the Atlanta Olympics, I made mention of a FEMA repeater which had been set up outside of the 406-420 MHz government band. This repeater was operating in the 420-421 MHz amateur radio band. This was not a misprint.

After the Value-Jet crash in South Florida earlier this year, FEMA came in and set up an identical repeater in the same frequency range. This was a portable repeater set up in the Everglades near the crash site. Like the Atlanta system, no clear voice was ever heard.

All transmissions were digitally encrypted using a DES (Data Encryption Standard) format.

With all of the news media covering the crash site, and with many of them setting up camp in the Everglades, all of the normally used federal frequencies were being monitored. FEMA needed a place to set up shop and not be discovered. What better place than in the amateur band? The traffic was primarily regarding the bringing back of body parts and identification of the remains, and other traffic they did not want the news media to overhear.

It just goes to show, as I have mentioned many times before, you never know where to look for federal operations to take place. You, the monitor, have to be creative and expand your search imagination to ferret out the unknowns.

It has been rumored for many years that the FBI operates a covert system in the 600 MHz band. Who will be the first monitor to report it? There is activity outside of the normal band plans. The helmet radios used by the quarterbacks in the NFL operate in the 600 MHz band. Who knows what else is up there?

One day I will tell the story of when DEA did a major anti-smuggling operation with two repeaters in the 440 MHz amateur band here in Ft. Lauderdale. But, that's another story for another time.

Until next month..73's...John...WA4VPY

Ken Reitz, KS4ZR

TVRO Publishing Leader: Baylin Publications

The satellite television industry is filled with interesting people who came to this calling from a wide variety of backgrounds. One such person is Frank Baylin, founder and president of Baylin Publications. A multi-faceted man, Baylin received a doctorate in physics in 1975 from the University of Pennsylvania and, two years later, an MBA from the Wharton School of Business. Prior to his founding Baylin Publications he was a Senior Scientist at the Solar Energy Research Institute.

Through the last 15 years Baylin Publications has released a string of successful titles which have become industry standards. With fellow authors Richard Maddox (OnSat's "Dr. Dish"), Steve Berkoff, and John McCormac, Baylin has written no fewer than seven satellite TV related books, all still in print with current editions. Two recent titles: *Home Satellite TV Installation and Troubleshooting Manual* and *Miniature Satellite Dishes* will be reviewed here.

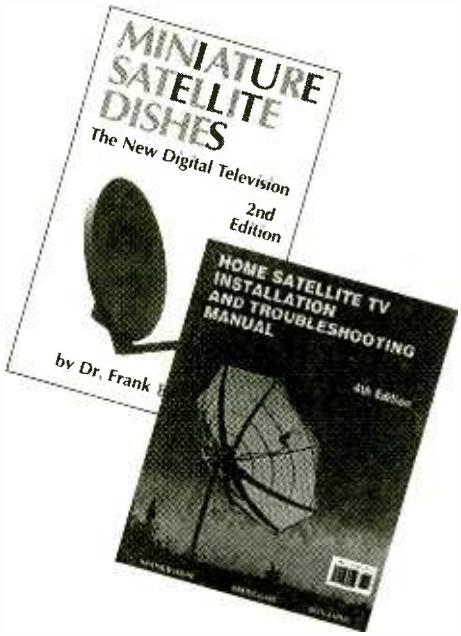
In addition to the book titles, Baylin Publications also offers TVRO related video tapes and installation tools and software. Complete catalogs are found in the back of each of their books or can be ordered from the address at the end of this column.

■ *Miniature Satellite Dishes*

Subtitled "The New Digital Television (2nd edition)," Baylin has come up with this timely title. The 170-page, 5-1/2 x 9 inch paperback is an in-depth look at the world of Digital Broadcast Satellites (DBS). One strength of all the Baylin books is that he assumes readers don't know anything about satellite technology and so, starts at the beginning: Satellite Communications Fundamentals.

Here, he really gets to the basics. You'll learn about radio waves, signal polarity, modulation, bandwidth, and more. You'll discover the basics of satellite design and operation, video and audio formats, and compressed digital video. A virtual parade of interesting topics are explored, including rain fade, solar outages, signal security, and how to hook up your stereo and VCR to your receiver to take advantage of DBS' built-in features.

Readers will find valuable background information on satellite TV history from the perspective of one who was there. Details on



the DBS players (present and future), comparisons with cable, explanation of system components, and much more are covered. In addition, installation and peaking procedures, as well as site selection are presented in full.

This book is not intended for technicians and is written in an easily understood style, greatly enhanced by the numerous line drawings and pertinent photographs. Nor is it lacking in technical information. Baylin explores all facets of this new technology in depth. And, whether explaining DSS data packet structure, Bit Error Rate (BER), or HDTV aspect ratio, Baylin makes this complicated subject comprehensible for virtually all readers. While the original material was published in 1994, the 2nd edition was published in 1995 and neatly anticipated many of the situations and options available at the present. Consumers interested in doing research on satellite television (both C-band and DBS) will find this an excellent place to start.

■ *Home Satellite TV Installation & Troubleshooting Manual*

It's a big title for a big subject, and the result is both big and thorough. This 8-1/2 x 11 inch paperback features just over 300 pages packed with everything anyone needs to know about satellite television. Again, many of the same fundamental topics are covered at the outset, but in more detail. For instance, want to know the difference between prime focus and offset focus feeds? It's covered, and you'll also learn about linear polarization, circular polarization; mechanical, ferrite and pin diode polarity switching. Whew!

And, since this book deals with troubleshooting your TVRO system, other subjects such as "terrestrial interference" (a problem only for C-band systems) are also addressed. You'll find out how to salvage a bungled installation and how to get a dish on a leaning pole to track.

The book is divided into thirteen chapters, each with detailed, step-by-step explanations. It's more of a technician's manual in that emphasis here is on current satellite technology. However, the same easy-to-read style which characterizes *Miniature Satellite Dishes* is evident as well. The result is that most people should not have difficulty understanding the concepts and instructions presented here. Hundreds of line drawings, photographs, and charts illustrate and explain as you read.

The real value of this book lies in the troubleshooting section. Here you'll be introduced to test instruments and learn step-by-step procedures used by professionals to diagnose system problems. Starting with cables and connectors at the dish and progressing to the receiver in the house, you'll learn to recognize the most common system problems. How can you tell if the problem is in the receiver, the LNB, or the cable?

Baylin lists the most common problems caused by each and what to do about them. He identifies three satellite TV subsystems: Mechanical (mount, dish, feed support, and feed), Electromechanical (actuator, polarizer), and RF (LNB, receiver and TV set). From here a "systematic approach to troubleshooting" is outlined and, beginning with a list of questions regarding the problem, answers begin to materialize.

The final pages of the book include six appendices with reference material such as satellite related equations, channel bandwidths (in frequency and wavelength), an extensive glossary of terms, and lists of satellite equipment manufacturers as well as trade and reference publications. As is typical of all Baylin publications, a complete catalog of books,

video tapes and installation aids (along with a convenient order blank) is found at the back. Incidently, this book is available in both Spanish and Portuguese editions, and a companion video tape is available as well.

Also available from Baylin Publications are *World Satellite Yearly* (reviewed in this column last year); *World Satellite TV and Scrambling Methods*; *Wireless Cable and SMATV*; *The 'How-To' of Satellite Communications*; *Ku-Band Satellite TV- Theory, Installation & Repair*; *Satellite Toolbox Software*, and many installation aids including inclinometers, peaking meters, and a spectrum analyzer.

Some of these books are available through the Grove catalog. To receive a Baylin catalog call or write: Baylin Publications, 1905 Mariposa, Boulder, CO 80302 Phone 303-449-4551 FAX 303-939-8720

■ Death of a Good Thing

MT reader Jim Allen, N4DEE, of Columbia, South Carolina, wrote concerning the July column about the data service known as "Ingenius." After calling the company to inquire about subscribing, he was surprised to learn than the service had substantially changed and that it little resembled the description given in the column.

Thanks to a combination of lead time required to write these columns and the fact that Ingenius had substantial changes in the works which they had not yet announced, many readers may have experienced the same disappointment as Jim.

Unfortunately for all of us, the change, which developed over the summer, will go into effect January 1, 1997. According to bulletins released on the X*Change service, Ingenius' X*Change has been changed to Ask A.N.D.I.E. (an acronym which is not explained). As the bulletin states: "...Because Ask A.N.D.I.E. incorporates X*Change, Ingenius has discontinued selling the X*Change service and upgrades..."

The up-shot of all this reorganization is that only existing X*Change subscribers will be given the chance to sign on to Ask A.N.D.I.E. and that the subscription will likely be $200 per year. As far as C-band customers go, there's little change because, as stated in my July column, the original supply of Infocipher data receivers was exhausted last year and there were no plans for further production. Subscriptions to Ask A.N.D.I.E. will be extended to existing C-band and cable customers, but there will not be an effort to recruit new subscribers outside of the education community. Too bad. It was a great idea, and for whatever reason—indifference or incompetence—the service as it has been known will be discontinued at the end of this month.

The decision to market exclusively to schools makes sense as most individuals would not be prepared to pay the $200/year subscription. That fee is per-station at a school which would presumably have 1 to 10 such stations. Assuming one school per county and ten stations per school, a revenue stream of $6 million per year could be turned on. That would equal 100,000 individual subscribers at the old $60/year rate, a universe unreachable given the "hidden" nature of the service and total lack of promotion. X*Change will go down in the annals of technology as the best kept secret in satellite/cable TV.

■ Transponder Notes

• Hughes Communications Galaxy (HCG) strengthens its international position with the acquisition of PanAmSat Corporation. According to a press release: "...the new company will combine HCG's fleet of 10 communications satellites for the U.S. market with PanAmSat's international fleet of four communications satellites." In addition, PanAmSat has four satellites under construction and HCG has three satellites in development, all of which are planned for launch through 1998. Currently PanAmSat operates PAS-1 and PAS-3 over the Atlantic region; PAS-2 over the Pacific and PAS-4 over the Indian ocean. The next scheduled launch will deploy PAS-6 over the Atlantic region this month.

• In other Hughes related news, Galaxy X will ride aboard the inaugural Delta III launch scheduled for 1998. GX will be an HS 601 HP bird featuring both C-band and Ku-band capacity and will take the orbital position of Galaxy IX at 123 degrees west. G9 will then move to 127 degrees (between G5 and C3).

• Fox News Channel is operating on C-band on Galaxy 7, channel 20, currently unencrypted. Fox News joins the three Fox channels on T401, three channels on T402, and fx East and fx West and fxm also on G7. That represents a substantial presence on C-band and a cable force to be reckoned with.

• In the Nail-Biting Dept.: The Radio Amateur Satellite Corporation (AMSAT) has announced that the Phase 3-D satellite will be launched on Ariane 502 which is tentatively set for a mid-April 1997 launch. This will be the second launch of an Ariane 5 vehicle, the first of which was destroyed during the maiden launch in June of this year. Phase 3-D will be the only satellite on board to test the correction of software in the Ariane inertial reference system thought to be the cause of 501's demise. Phase 3-D is the latest in a series of more than two dozen increasingly sophisticated satellites designed, built, and controlled by amateur radio operators from around the world.

Bill Cheek
Internet: bcheek@cts.com

Frequency Record-Keeping Made Easy

Let it be hereby noted that in 1996, Reid Drummond simplified the task of radio-frequency record-keeping by several orders of magnitude. What do I mean by frequency record-keeping? You know.....those index cards, 3-ring notebooks, scraps of paper, dozen frequency directories, floppy disks, and a couple hundred text files and network messages scattered all over your hard drive.

Mr. Drummond just released version 3.0 of his APFTools utility program which gives computer-based radio hobbyists the power to make quick work of extracting and processing frequency information from text files. Figure 1 is a typical representative of the means by which hobbyists exchange frequencies: a plain, unadorned, raw text file, commonly found floating around the Internet as stored text files or in network forum messages. These shared frequency lists are a hodgepodge of verbiage, tables, and notations—just like Figure 1. Until now, the hobbyist pretty much had to manually transcribe the relevant information into his desired format.

Automation at Work

APFTools was created to extract scanner frequencies from ASCII text files and organize them into formatted AutoProgrammer files for the CE-232 Scanner/Computer Interface. (See my 10/92 *MT* column). Other frequency extractor programs required a list to conform to a rigid format, or the extracted data needed so much manual editing that it wasn't worth the trouble. APFTools solves the problem by its ability to extract a structured list of frequencies from almost any raw text style and format.

Figure 1, for example, contains 78 frequencies throughout the text. It's a lot more fun to use those frequencies than to manually compile them into a frequency database! APFTools extracts the frequencies, along with a fair attempt at identification, and puts them into a format suitable for immediate export, not only to the CE-232 Interface, but to most database managers and spreadsheets. The extracted format is even suitable for a word processor or text editor, if your record keeping is still mired in the dark ages. (Read my lips: databases or spreadsheets are much better for frequency management.)

FIG-1: TYPICAL FREQUENCY LIST

```
                    MONITORING AIR SHOWS                Edited for brevity
                    By Larry Van Horn                   10/22/96 /bc
           Copyright © 1993 Grove Enterprises

If you have ever been to an air show, then you know the thrill of excitement
as military and civilian pilots show off their skills. However, you probably
are missing out on the ultimate thrill, that is actually monitoring the pilots
and all of the communications that goes on around an air show. The following
frequencies have been compiled from various sources including Monitoring Times
and most all have been confirmed at one time or another.

Airshow Common Frequency Nationwide:        123 400  123.450

Show Time Control:                          126 400

Stunt Coordination                          120 450

U.S. Navy BLUE ANGELS:
Ground Support                    121.900
Ground Support NBFM Repeater      142.025 in/out 142.625 (Old)
Air to Air                        241.400  250.800  251.600  275.350
                                  360.400  384.400  391.900  395.900

U.S. Air Force THUNDERBIRDS
Ground Support NBFM              66.900  413.100 (Channel 1)  413.025 (Channel 2)
                                 148 550
Operations                       120.450
Air to Air (VHF)                 140.400 (Interplane)  141.850 (Victor 1)
                                 143.850  (Victor 2)
Air to Air (UHF)                 236.600  294.700  322.300  322.600  382.900
                                 383 900  394,000
Solo 5 6                         236.550  241.400  273.500  283.500  322.950
Team Leader                      235 250  250.850
Other Reported Frequencies       140.000  148.175  283.500  319 700  392 900
                                 394.100

U.S. Army GOLDEN KNIGHTS
Operations                       32.300
Primary                          42.350
Air to Ground Support            123.000  123.400  123.450  123.475  123.500

Canadian SNOWBIRDS
ch.1    275 800          ch.11  245.700**
ch.2    295.600          ch.12  316.500
ch.3    310 800          ch.13  344.500
ch.4    227.600          ch.14  356.600
ch.5    243.400**        ch.15  236.600
ch.6    240 500**        ch.16  283.900
ch.7    378 500          ch.17  363.800
ch.8    266.300          ch.18  289.400
ch.9    294.500          ch.19  245.000
ch.10   322 800          ch.20  239.800           ** Primary channels
Brazilian Air Force              130.550  130.655  132.250

Silver Eagles
Air to Ground Comms              30.500
Air to Ground Support            149 800  304.700

Look for support staff (those folks on the ground running the show on common
itinerant channels (i.e.  151.625, 154.570, etc).  Check the back of Police Call
for some additional ideas.

Be sure and don't forget to include some banks in your scanner programmed to the
airport fire, security, local government at civilian airports.  If the show is
at a military base pick up a copy of Monitoring the Military by Daryll Symington.
This is an excellent book for hearing ground and air activity at military bases.
Also don't forget to program some channels for regular air traffic control
activity in the area, these can be fun to listen to as aircraft try to avoid
high performance military aircraft doing aerobatics or parachute jumpers.
```

FIG-2: EXTRACTED FREQUENCY FILE

Good Data	Best Attempt to I.D.	Other Info
,,123.4000,,,,	Airshow Common Frequency Nationwide:	0 123.450
,,123.4500,,,,	Airshow Common Frequency Nationwide:	123.400 123.450
,,126.4000,,,,	Show Time Control:	0
,,120.4500,,,,	Stunt Coordination:	
,,121.9000,,,,	Ground Support	0
,,142.0250,,,,	Ground Support NBFM Repeater	in/out 142.625 (Old
,,142.6250,,,,	Ground Support NBFM Repeater	142.025 in/out (Old
,,241.4000,,,,	Air to Air	0 250.800 251.600
,,250.8000,,,,	Air to Air	241.400 0 251.600
,,251.6000,,,,	Air to Air	241.400 250.800 251.600
,,275.3500,,,,	Air to Air	241.400 250.800 251.600
,,360.4000,,,,		0 384.400 391.900
,,384.4000,,,,		360.400 0 391.900
,,391.9000,,,,		360.400 384.400 391.900
,,395.9000,,,,		360.400 384.400 391.900
,,66.9000,,,,	Ground Support NBFM	0 413.100 (Channel 1)
,,413.1000,,,,	Ground Support NBFM	66.900 0 (Channel 1)
,,413.0250,,,,	Ground Support NBFM	66.900 413.100 (Channel 1)
,,148.5500,,,,		
,,120.4500,,,,	Operations	
,,140.4000,,,,	Air to Air (VHF)	0 (Interplane) 141.85
,,141.8500,,,,	Air to Air (VHF)	140.400 (Interplane) 141.85
,,143.8500,,,,		(Victor 2)
,,236.6000,,,,	Air to Air (UHF)	0 294.700 322.300 3
,,294.7000,,,,	Air to Air (UHF)	236.600 0 322.300 3
,,322.3000,,,,	Air to Air (UHF)	236.600 294.700 322.300 3
,,322.6000,,,,	Air to Air (UHF)	236.600 294.700 322.300 3
,,382.9000,,,,	Air to Air (UHF)	236.600 294.700 322.300 3
,,383.9000,,,,		0
,,394.0000,,,,		
,,236.5500,,,,	Solo 5-6	241.400 273.500 2
,,241.4000,,,,	Solo 5-6	236.550 0 273.500 2
,,273.5000,,,,	Solo 5-6	236.550 241.400 273.500 2
,,283.5000,,,,	Solo 5-6	236.550 241.400 273.500 2
,,322.9500,,,,	Solo 5-6	236.550 241.400 273.500 2
,,235.2500,,,,	Team Leader	250.850
,,250.8500,,,,	Team Leader	235.250
,,140.0000,,,,		
,,148.1750,,,,	Other Reported Frequencies	140.000 283.500 3
,,283.5000,,,,	Other Reported Frequencies	140.000 148.175 283.500 3
,,319.7000,,,,	Other Reported Frequencies	140.000 148.175 283.500 3
,,392.9000,,,,	Other Reported Frequencies	140.000 148.175 283.500 3
,,32.3000,,,,	Operations	0
,,42.3500,,,,	Primary	
,,123.0000,,,,		
,,123.4000,,,,	Air to Ground Support	123.000 0 123.450 1
,,123.4500,,,,	Air to Ground Support	123.000 123.400 123.450 1
,,123.4750,,,,	Air to Ground Support	123.000 123.400 123.450 1
,,123.5000,,,,	Air to Ground Support	123.000 123.400 123.450 1
,,275.8000,,,,	ch.1 0 ch.11 245.700**	
,,245.7000,,,,	ch.1 275.800 ch.11 0**	
,,295.6000,,,,	ch.2 0 ch.12 316.500	
,,316.5000,,,,	ch.2 295.600 ch.12 0	
,,310.8000,,,,	ch.3 0 ch.13 344.500	
,,344.5000,,,,	ch.3 310.800 ch.13 0	
,,227.6000,,,,	ch.4 0 ch.14 356.600	
,,356.6000,,,,	ch.4 227.600 ch.14 0	
,,243.4000,,,,	ch.5 0** ch.15 236.600	
,,236.6000,,,,	ch.5 243.400** ch.15 0	
,,240.5000,,,,	ch.6 0** ch.16 283.900	
,,283.9000,,,,	ch.6 240.500** ch.16 0	
,,378.5000,,,,	ch.7 0 ch.17 363.800	
,,363.8000,,,,	ch.7 378.500 ch.17 0	
,,266.3000,,,,	ch.8 0 ch.18 289.400	
,,289.4000,,,,	ch.8 266.300 ch.18 0	
,,294.5000,,,,	ch.9 0 ch.19 245.000	
,,245.0000,,,,		
,,322.8000,,,,	ch.10 0 ch.20 239.800	** Primary
,,239.8000,,,,	ch.10 322.800 ch.20 0	** Primary
,,130.5500,,,,	Brazilian Air Force	130.655 132.250
,,130.6550,,,,	Brazilian Air Force	130.550 132.250
,,132.2500,,,,	Brazilian Air Force	130.550 130.655
,,30.5000,,,,	Air to Ground Comms	0
,,149.8000,,,,	Air to Ground Support	0 304.700
,,304.7000,,,,	Air to Ground Support	149.800 0
,,151.6250,,,,	itinerant channels (i.e.	154.570, etc). Check t
,,154.5700,,,,	itinerant channels (i.e.	151.625, , etc). Check t

Smart Tools

Figure 2—the data extracted by APFTools—is more confusing than Figure 1, right? Well, it is to you, but not to a computer. Fig-1 is better for humans. Fig-2 is better for computers, but it makes some human concessions. I drew two vertical lines in Fig-2 to make three column divisions easier to see. Looking at the subtitles at the top, note that I labeled the first column, "Good Data." Data determined by APFTools to be frequency numbers was extracted to column 1. As you can see, this data has an extremely high probability of accuracy and freedom from ambiguity.

The middle column begins precisely after the sixth comma, and doesn't really have a clear line of demarcation between it and the third column. In this middle area APFTools does its best to extract an identification for the frequency in the first column. Errors and ambiguous information can be expected to appear in this column, but as you can see, APFTools does a darn nice job.

The right column—similar to a "Notes" field—doesn't have specific significance, but APFTools attempts to include information from the text that might be helpful in editing the file. By and large, the information in the right area can be deleted after you've reviewed it and performed a final edit of the file. The computer is going to manipulate the information based

only on the first column: the other two are for you to do with as you please.

Bells and Whistles

On the APFTools main operating screen, all menu choices are keyed to a highlighted character, and the HELP menu is ample to get the user to first base. No, APFTools is not a snazzy Windows program with racing stripes and drag slicks. In fact, it's just an MS-DOS (3.0 through Windows 95) program that runs on most anything from an ancient 8086/88 XT to a Pentium 200. It's no memory hog. But what do you expect for $5.00?! Yes, APFTools is shareware, and it costs $5 if you try it and keep it. See the end of this article for sources.

Database Basics

Let's get back to Fig-2, Col 1, and those six commas—more aptly called "delimiters." Their purpose is to make it easy to AutoProgram a scanner's memory channels by the CE-232 Interface, the format of which is as follows:

Option , Chan No , Freq , Mode , Delay , LockOut ,

As can be seen, APFTools provides only the frequency information and allows the user to add any desired custom programming later, though APFTools has an option to include channel numbers, and the Delay setting, if desired. APFTools also supports Mark Persson's LinkAll Extended Memory Block Controller. If you don't have either the CE-232 or LinkAll, don't worry about them. APFTools is good for a lot more.

Most importantly, the comma delimiters make it a cinch to import the file to a database manager or spreadsheet. The comma delimiter is recognized as a field separator by almost all databases and spreadsheets. Now do you get the picture? Figure 2 is not an end result; rather, it is an interim step, but it's a huge step!

Gain Without Pain

To give you an example, I fired up APFTools; processed the Figure 1 file, AIRSHOWS.TXT; created the interim file (Fig-2); and then fired up Microsoft WORKS for Windows and imported the interim file to make a full-fledged database—all in 53 seconds, with less than 20-sec to create the interim file.

Lest you think I picked an "easy" file by which to test APFTools, take a look at Figure 3—as much of a garbage scow as it gets. APFTools finds and correctly formats all 66 frequencies, and even makes a little sense of the descriptions! No, the interim file (not shown) is not pretty, but it sure beats manually pulling those frequencies out of the garbage! APFTools handles Fig-3 just as easily as Fig-1.

To summarize: radio hobbyists pay little or no attention to format and style when sharing frequency data in electronic messages and computer text files. APFTools is a frequency data extractor for the type of text files that proliferate on BBS's, network message bases, and other forms of ASCII text. Unless the originator goes out of his way to format the data before sending or filing, it is a tedious, manual task for the recipient to extract the information. APFTools does it automatically with no pain and almost no effort.

FIG-3: A GARBAGE FILE

```
2/5/1995    70.000
..2+.11000,,,,,,,,,COLUMBIA BROADCASTIN,BA,KMH414,LOS ANGELES.
..2+.11000,,,,,,,,,KFAC INC,BA,KMG541,LOS ANGELES,
..2+.15000,,,,,,,,,METROMEDIA INC.,BA,KMD405,LOS ANGELES.
..2+.21000,,,,,,,,,COLUMBIA BROADCASTIN,BA,KMH414,LOS ANGELES.
*******BEARCAT 200-XLT FREQUENCIES*******
FREC            DESCRIPTION     BANK-1    860.937 F-1
 OPERATIONS2      859 937           F-2 OPERATIONS3      858.937        F-3 OPERATI
ONS4      857.937        F-4 RESCUE5       856 937        F-5 INSPECTORS6 86
0.437         F-6 ADMINISTRATIVE7      859.437        F-7 DISPATCH S. OF MULHOLLA
ND8      858.437        F-8 DISPATCH SAN FERNANDO VALLEY9      857.237 F-
9 DISPATCH BRUSH FIRES10      856.237         F-10 RESCUE UNIT TO UNIT11 860.7
62        F-11 COMMAND 112     858.237        F 12 COMMAND 213      857.437
  F-13 FIREGROUND14      856 437          F-14 FIREGROUND & DRILLS15      859.762
    F-15 FIREGROUND16      858.762          F-16 FIREGROUND17      857.762 F
 17 FIREGROUND18      856.762          F-18 FIREGROUND19      119.975 HELICOP
TER: 0CH      FREQ.          DESCRIPTION      BANK-  [illegible] ADELAN
TO , ADELANTO POLICE , F3 POLICE TACTICAL ,155.5200, KNIP802 , POLICE , C
A , SAN BERNARDINO COUNTY
 LOS ANGELES COUNTY , LOS ANGELES COUNTY FIRE , FIRE  - LACOFD ,154.4000, KMB35
 . FIRE , CA , LOS ANGELES COUNTY
 LOS ANGELES COUNTY , LOS ANGELES COUNTY SHERIFF , POLICE - LACOSD CONTRACT F4 ,
4[illegible].9125,  , POLICE , CA , LOS ANGELES COUNTY
 ALAMEDA COUNTY , ALAMEDA COUNTY EMS , AMBULANCES COUNTYWIDE ,155.4000, KNIB308
..3+4.22500,,,,
..3+4.23750,,,,
..3+4.31250,,,,
..3+4.33750,,,,
..3+4 43750,,,,

                     COUNTY WIDE
                   TRUNKED SYSTEMS

West Valley System:
851.5000 861.2000 862.8500 865.8500 866.9125 867.3875 867.8625 868.1875
851.9250 861.8500 863.8500 866.1375 867.1375 867.6125 867.9125 868.3625
860 3250 862.2000 864.8500 866.8625 867.1875 867.6625 868.1375 868.4125
                                                                868.3875
BARSTOW CITY OF
                              POL 158.9100 WPAM482
                              POL 155.5950 KLE738
                              POL 155.7300 WNHQ519
  (YELLOW)                    FIR 154.0700
  (DESERT AMBULANCE)          MED 155.2800 KJI601
  (DESERT RESCUE SQUAD)       SPE 155.1600 KTH396
  (RESCUE 3)                  SPE 155.1600 KQY802
                              SPE 155.1750 KQY802
                              SPE 155.2950 KQY802
```

Availability

By the time you read this, the current version of APFTools will be v3.01 or higher. It's freely available by several means: **ftp://ftp.cts.com/pub/bcheek** or **ftp://ftp.cts.com/users/crash/b/bcheek** or BBS: 619-578-9247 after 5:30pm and before 1:30pm, PST. I can also file-attach it to an e-mail upon request to bcheek@cts.com and by the time you read this, it may also be in the HamNet file library on Compuserve. Remember, APFTools is shareware; not freeware. If you decide to keep it, send the author, Reid Drummond, the nominal $5 registration fee. If you can't obtain APFTools by these means, I will be glad to mail it to you on floppy disk for $8, five of which will be sent to Mr. Drummond as your advance registration, with the balance applied to the cost of disk, mailer, postage, and label. If you choose this option, be sure to include your full name, address, and telephone number, which will be conveyed to the author to validate your registration.

Internet: bcheek@cts.com
Compuserve: 74107,1176
BBS & FAX: (619) 578-9247 5:30pm-1:30pm, PDT
WWW: http://ourworld.compuserve.com/homepages/bcheek
FTP: ftp://ftp.cts.com/pub/bcheek

John Catalano, PhD
j_catalano@conknet.com

Surfing for Monitoring Web Sites

With the memories of last summer quickly receding and the holidays and snows not far off, we in the Northern Hemisphere start turning our attention to indoor activities. Yes, of course, I mean radio monitoring! For those of us who have been a bit distracted during the milder seasons, a lot has changed across the entire spectrum. If you have been following Larry Van Horn's attempt in the *Monitoring Times* Utility World to keep up with the great changes in the frequencies used by U.S. forces, you have some idea of what I am talking about.

Wouldn't it be nice if we could sit in on discussions with other listeners and exchange our bits of facts, frequencies, and other tidbits, to pool our knowledge and speculations? Well, you can: From the warmth of your radio shack, or computer room, you can catch up on most radio related subjects. With just an hour or two of your time you can be up to speed on the latest radio happenings. How? Dare I say it, the Internet!

This month we will look at a large number of monitoring related Internet sites, all of which contain the latest, valuable SWL, utility, scanner, equipment and ham radio information. Best of all, if you have access to the World Wide Web, it's all FREE!

Each Internet site we discuss will be listed in the accompanying table. So let's start our Internet Radio Related Web Site Primer. First we'll check out some shortwave related sites.

Curing the Ham ID Question

Ever monitor ham radio operators on 14 MHz and wonder who and where they were? If you catch the ham's call sign, *Buckmaster's World Wide HamCall Server* (from the people who brought you the CD-ROM of the same name) will tell you who he is, his age, address, telephone area code, longitude and latitude, and give you a detailed map (sometimes). If the ham's E-Mail address is available it is also included. Finally, a weather report for the station's location can be displayed. This is pretty useful stuff.

The *QRZ Call Sign Datebase* site is another one you should have in your Web Browser Bookmark. QRZ also makes a ham callsign CD-ROM. This site does not offer the nice weather or map info that Buckmaster does. However, QRZ does let you search via a ham's callsign or his name.

The *WWW Virtual Library: Amateur Radio* is an excellent way to find other callsign search engines, as well as ham satellites, slow scan TV, radio manufacturers, and lots more. It's worth a look.

Propagation

The Sun is not really cooperating with our desire to monitor shortwave frequencies. Add to this those prophetic (or pathetic) flash predictions of an early sun spot cycle maximum (a year ago and still waiting), and analysis of propagation conditions seems of dubious use.

However, if they, as with most simulations, are taken with the appropriate skepticism, they can sometimes be good indicators. Get on *Ham Radio Online* web site for real-time propagation conditions and forecasts. In addition to maximum usable frequency predictions, this page also contains aurora maps, day/night terminator, solar/geo conditions, sporadic E warning, meteor showers, and lots of other propagation details to satisfy the geophysicist/astrophysicist in all of us.

Usenet Newsgroups

Staying on the Ham Radio Online web site, you can find links to groups "talking" about scanner radios and another concerning shortwave. All sorts of commentary are on these pages. Some people remind us of how little we have progressed from our Neanderthal ancestors. Ugh.

But some links are quite useful, such as the the *Shortwave/Radio Catalog* from North Carolina State University. This one has something for every monitoring enthusiast. This site tops my personal list for radio related links. I could spend, (and I have) days just following links from this site. It has just about everything to do with monitoring. This is a real gold mine of information and links to other radio sites, including shortwave broadcasts you can *hear* on your computer.

Mining the Gold

Using a program called RealAudio, which is also available for downloading from the web (see below), audio can be "streamed" to you and played through your sound card and speakers. Sound card prices have almost kept

SELECTED RADIO-RELATED INTERNET WEB SITES

Description	Internet Address
Buckmaster	http://www.buck.com/cgi-bin/do_hamcall
QRZ	http://qrz.com/cgi-bin/webcall
WWW Virtual Library- Amateur Radio	http://www.meaning.com/pointers/wwwvl-ham.html
Ham Radio Online	http://www.hamradio-online.com/propagation.html
Shortwave /Radio Catalog North Carolina State University	http://itre.ncsu.edu/radio/
RealAudio	http://www.realaudio.com/
Vatican Radio	http://www.wrn.org/vatican-radio/audio.html
University of Melbourne Shortwave	http://ariel.ucs.unimelb.edu.au/~pbd/SW/intradio.html
Federal Communications Commission	http://www.fcc.gov/ib/pnd/neg/hf_web/
Chris Smolinski's Utility Listener's Page	http://www.access.digex.net/~cps/shortwave.html
S. McGreevy's VLF Home Page	http://pw1.netcom/~spmcgrvy/index.html
University of Iowa's VLF Site	http://www-pw.physics.uiowa.edu/mcgreevy/
PerCon	http://www.perconcorp.com/cgi-shl/foxweb.exe/spec_ciout@C:\website\spectrum
Long Island Scanner	http://www.li.net/~j4dice/scanli.html
Gopher - Equipment Mods	gopher://hamster.business.uwo.ca:70/11/.mods
Electronic Workbench	http://www.interactiv.com

Home Page Web Site of Real Audio

up with the big drop in RAM prices. I just bought one of the new "plug and play" high quality sound cards for $55; new from a large computer shop! On page three of the **ncsu.edu web** site you can find the links to around 100 shortwave broadcast stations, many of which allow you to listen to their programing via RealAudio.

One of my favorites is *Vatican Radio* where you can listen to world news in English; it's updated at 2000 UTC daily. Clicking on the "Listen for Heaven Sake" brings you what sounds like their familiar shortwave interval signal. Most stations also give up-to-date broadcast schedules for the radio purists among us.

The *University of Melbourne*, Australia, also has a page which lists, and allows you to link to, all the shortwave stations on the Internet.

The "Friendly Candy Company" Page

The US government agency which is responsible for the radio spectrum is the *Federal Communications Commission* (FCC or Friendly Candy Company). Although limited, their web page is worth a look. It lists all the US shortwave stations by frequency of operation, time of operation, and lots of other station detail. Under the title HFCC Frequency Coordination Schedules, similar lists are provided with the cooperation of major European shortwave stations. Both lists are updated seasonally. It's free, accurate, and up-to-date. What more can an SWLer ask for?

For the SWL Utility station people out there (and right here), *Chris Smolinski's* page should not be missed. His section on numbers stations is very comprehensive with full descriptions of the various types and some operating schedules. *Chris' Radio Links* page has some very diverse and interesting links. Once again the NCSU Shortwave Radio/Catalog site's page 2, Utility/Digital/Internet Radio, is an excellent place to start.

Hey, How About VLF?

If you are into this very interesting part of the radio spectrum (sub 10 kHz) then you *must* check out *University of Iowa's* web site. Here you can download windows audio files to hear what some of the strange, but naturally produced geophysical "signals" sound like. Everything from Whistlers to Dawn Chorus has been captured in a wav. format file that you can download and play. Also check out Stephen McGreevy's Home page, *Natural VLF Radio*, for more info but with a more commercial angle.

Scan the Scanner Frequencies

Since the nature of VHF and UHF signals usually limit their propagation distance only frequencies near the monitor's listening post are of use. *PerCon*, the manufacturer of a CD-ROM scanner database, has a very useful web site. Here you can search for frequencies in your city. Or you can search the database for a commercial/professional/government agency call sign you might have heard. You'll also get lots of info on PerCon' products.

The *Long Island (NY) Scanner Page* is one of the first and best scanner pages I have found on the Internet. Just try it. It is just what the perfect scanner web page should be. It will almost make you want to live on Long Island. I said, almost.

Burning the Midnight Soldering Iron

One of my favorite locations is QRZ's page—the CD-ROM people we spoke about before. Their modification page(s) gives you access to hundreds of equipment modifications, one of my favorite pasttimes. Also check out *Gopher Menu* for more radio equipment modification files. And if you are into electronic hardware you can download a working demo of the Electronic Workbench "electronics lab in a computer" program at **http://www.interactiv.com** address. This is an excellent and powerful program that lets you "build" a circuit and see how it operates using software oscilloscopes, voltmeters, and function generators.

Well, that should give you just an idea of the vast amount of radio related information available at your finger tips via the Internet. It really is like living in a community of radio enthusiasts; you are never alone in your search for information. Try out the included list and let me know your favorite monitoring/electronics web site. I'll pass along any outstanding sites that you send me in future columns. My E-mail address is listed above.

Next time we'll check out operational demos which can be downloaded from some old, familiar names: ScanCat, ScanStar, WiNRADiO and Radio Manager. 'Til next time get ready for snowy winter days and nights by checking your antenna and feedlines. Tune up your receivers. Stock your web browser with radio-related bookmarks. Then this winter will not be as daunting.

WiNRADiO Still a WiNner

Early purchasers of this software-based receiver reported that more than just the prohibited frequencies were missing from the radio's 800 MHz coverage. The manufacturer indicates this was an oversight that has now been corrected. If you purchased an early version, contact your dealer. Incidentally, the updated WiNRADiO is now available from Grove Enterprises as well.

SPECIAL EVENT CALENDAR

Dec 1	Livermore, CA	Livermore ARK / Noel Anklam, KC6QZK, 474 Humboldt Way, Livermore, CA 94550, 510-447-3857
Dec 1	Hazel Park, MI	Hazel Park ARC / Tom Austin, N8TMQ, PO Box 368, Hazel Park, MI 48030
Dec 6-7	Hot Springs, AR	Arkansas DX Conv / Dave Jacques, WA6YOF, 730 South Moore Rd., Hot Springs, AR 71913, 501-760-1181
Dec 7	Dothan, AL	Wiregrass ARC / Joe Higginbotham, KE4HUN, 106 Greenview Circle, Dothan, AL 36301, 334-677-5439
Dec 7	Mesa, AZ	Superstition ARC / Chuck Kruppenbacher, KB7ICP, 1138 South 96th Place, Mesa, AZ 85208, 602-986-3060
Dec 7	Okeechobee, FL	Okeechobee ARC / Al Berryman, AD4RZ, 3037 SE 21st Ct., Okeechobee, FL 34974-6334, 941-467-0516
Dec 7	Minden, LA	Minden ARA / Jimmy White, KB5SUE, 1259 Sand Plant Rd., Dubberly, LA 71024, 318-377-2501
Dec 8	Green Bay, WI	Ashwaubenon HS Tech Club / Scott Cole, KB9AMM, PO Box 12631, Green Bay, WI 54307, 414-496-0989
Dec 8-11	Las Vegas, NV	Western USA; Mexico Chaverim Chapter / Irv Mirovich, N6QAQ, 3718 Green Vista Dr., Encino, CA 91436, 818-986-9438
Dec 14	Lake City, FL	Columbia ARS / Joseph D. Aymond Jr., WD4EOJ, PO Box 1649, Lake City, FL 32056, 904-755-7969
Dec 14	Jacksonville, IL	Jacksonville ARS; Illinois Valley ARC / Kaye Green, KB9KHQ, 27 Ivy Wood Dr., Jacksonville, IL 62650
Dec 14	Union, SC	Union County ARC / Roger Gregory, KD4YFB, 102 Partridge Rd., Union, SC 29379, 864-427-1462
Jan 4-5	Cape Coral, FL	Fort Myers ARC / Jackie Kampfert, KQ4MZ, PO Box 61183, Ft. Myers, FL 33906, 941-542-6675
Jan 5	Livermore, CA	Livermore ARK / Noel Anklam, KC6QZK, 474 Humboldt Way, Livermore, CA 94550, 510-447-3857
Jan 5	South Bend, IN	Michiana Valley Hamfest Assn. / Bob Denniston, KA9WNR, 21970 Kern Rd., South Bend, IN 46614, 219-291-0252
Jan 11	Glendale, AZ	ThunderBird ARC & ARCA / Mark Fellhauer, KC7BXS, 602-931-1204
Jan 11	Marathon, NY	Skyline ARC / Barbara Mudge, KB2TIK, 3364 Rt. 221 W, Marathon, NY 13803, 607-849-6751
Jan 11	San Antonio, TX	San Antonio RC / Eric Smith, KC5BGK, 210-684-2513
Jan 11-12	Sarasota, FL	Sarasota ARA / Fred Auerbach, WA3SSZ, 2786 Heather Place, Sarasota, FL 34235, 941-365-7679
Jan 12	Waukesha, WI	West Allis RAC / Phil Gural, W9NAW, PO Box 1072, Milwaukee, WI 53201, 414-425-3649
Jan 18	Crystal River, FL	Sky High ARC / Chad Johnson, W3IKO, 5050 North Amarillo Dr., Beverly Hills, FL 34465-2829, 352-746-1299
Jan 18	Flint, MI	AR & Youth and Southwestern Acad RC / Keith Allen, N8QNA, 1212 Crawford St., Flint, MI 48507, 810-232-5170
Jan 18	St. Joseph, MO	MO Valley, Green Hills, & Ray-Clay ARCs / John Winkler, WB0VRA, Rte 1, Box 53A, Gower, MO 64454, 816-424-6484
Jan 19	Yonkers, NY	Metro 70cm Network / Otto Supliski, WB2SLQ, 53 Hayward St., Yonkers, NY 10704, 914-969-1053
Jan 19	Broadway, OH	Union County ARC / Gene Moore, N8YRF, 24461 Claibourne Rd., Marysville, OH 43040, 513-246-5943
Jan 19	Richmond, VA	Richmond Amateur Telecom Soc / Craig Spain, KE4CIT, PO Box 932, Chester, VA 23831, 804-526-9838
Jan 26	Odenton, MD	Maryland Mobileers ARC / Jim Botluk, KD3SI, 10 Tiburon Ct., Annapolis, MD 21403, 410-280-9815
Jan 26	Dover, OH	Tusco ARC / Howard Blind, KD8KF, 6288 Echo Lake Rd. NE, New Philadelphia, OH 44663, 330-364-5258

Send anouncements of events or club information to: Editor, Monitoring Times, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net. See MT's homepage on **www.grove.net** for complete listings.

CLUB CIRCUIT

North American Club Listings P-V

Pacific NW/BC DX Club: Bruce Portzer, 6546 19th Ave NE, Seattle, WA 98115. Pacific NW and BC Canada. DXing all bands. $9 US, $10 Canada. *PNBCDXC Newsletter.* Irregular meetings.

Pitt Co SW/Scanner Listeners Club: L. Neal Sumrell, P.O. Box 1818, Winterville, NC 28590-1818. Eastern NC; All bands. *The DX Listener.* Irregular meetings.

Puna DX Club: Jerry Witham, P.O. Box 596, Keaau, HI 96749, (808) 982-9444; Puna, HI; SW and MW. Meet 1st Tuesdays. No dues.

Radio Monitors of Maryland: Ron Bruckman, P.O. Box 394, Hampstead, MD 21074. Maryland, (410) 239-7366; VHF/UHF/HF utilities. *Radio Monitors Newsletter of MD.* Meet irregularly.

RCMA (Radio Communications Monitoring Assn.): Carol Ruth, Gen'l Mgr., P.O. Box 542, Silverado, CA 92676. North America, Europe, Australia; All modes above 30 MHz. *Scanning Journal.*

Regional Communications Network (RCN): Jay Delgado or Public Information Unit, Box 83-M, Carlstadt, NJ 07072-0083. 50 mile radius of NY City; 2-way Radio Public safety notification group.#10 SASE for info.

Rocky Mountain Radio Listeners: Mike Curta, P.O. Box 470776, Aurora, CO 80047-0776. Metro Denver, Colorado. All bands. Meets monthly 2nd or 3rd Sundays 1-4pm, Aurora Central Library.

Sandy River SW Radio DXers Assoc: Duncan or Brenda Steele, R.R. 1, P.O. Box 1560, Norridgewock, ME 04957. Worldwide. *The QSL* - irregular. No dues.

Scanning Wisconsin: Ken Bitter, Dept. MT, S. 67 W. 17912 Pearl Dr., Muskego, WI 53150-9608, (414) 679-9442. Wisconsin. VHF/UHF. *Scanning Wisconsin* ($2 for sample)

Signal Surfer DX Club: Darcy Jabs, RR2, Burns Lake, BC, Canada, V0J 1E0; (604) 694-3760. Canada and worldwide. MW and SW DXing.

Southern California Area DXers (S.C.A.D.S.): Don R. Schmidt, 3809 Rose Ave., Long Beach, CA 90807-4334, (310) 424-4634. California area; AM, FM, TV, scanner and shortwave broadcasting.

Susquehanna Co Scanner Club: Alan D. Grick, P.O. Box 23, Prospect St., Montrose, PA 18801-0023. PA area; Scanning. Meets irregularly.

Toledo Area Radio Enthusiasts: Ernie Dellinger, N8PFA, 6629 Sue Lane, Maumee, OH 43537. NW Ohio and SE Michigan; Shortwave, scanning, amateur. Meets 3rd Thursdays 7pm Holland Big Boy.

Triangle Area Scanner/SW Listening Group: Curt Phillips, KD4YU, P.O. Box 28587, Raleigh, NC 27611. Central NC.

Vancouver Shortwave Association (previously British Columbia Shortwave Listening Club)**:** Box 500, 2245 Eton St., Vancouver, BC Canada V5L 1C9, (604) 255-8987 fax. Shortwave. *LOGJAM.* Meets 3rd Thurs. 7pm at 920 Davie St.

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST TO THE RADIO HOBBYIST

by Larry Miller

Guest Reviewer: Bob Grove

Grove Expo on Tape

Another jam-packed Grove Expo has come and gone. There's little doubt that this year's event outdid all previous years. There's no need for wailing and gnashing of teeth, however, if you're one of those who could not make the trek to Atlanta. Grove has carefully captured all of the great moments from the convention on a series of high-quality audio tapes.

You can hear an articulate and representative group of international shortwave broadcasters talk about the state of broadcasting and answer a variety of questions from the floor; hear Bob Grove give his scanning seminar, "Making the Beginner a Pro"; or listen in as Larry Van Horn tells conventioneers how to "Monitor Big Brother." Dynamic banquet speaker, Astronaut Ron Parise, entertained his listeners (and you, too, if you buy the tape) with down-to-earth descriptions of life in space. All these seminar tapes are $9.95 each, except for the two-hour $19.95 broadcaster forum. Join together with a group of hobbyists and buy the full set of 35 tapes for $269.95—less than the cost of four full registrations!

While you're making plans for next year's radio adventure, hone your skills by listening to some of the great seminars (plus hand-outs) from this year's show. Check out the ad on page 31 of this edition of *Monitoring Times* for a detailed list of tapes.

New Tone Encoder Upgrade

Communications Specialists, Inc. has produced a new upgraded version of their TE-64D tone encoder. The multi-purpose CTCSS/Burst tone unit now displays the actual tone frequency on a four digit LED display. The self-contained, fully enclosed unit provides EIA CTCSS tones from 67.0 Hz to 203.5 Hz plus all common burst tones from 1600 to 2250 Hz in 50 Hz increments. A front dial rotary switch provides tone selection, making it ideal for mobile applications, nighttime operations, or whenever high visibility readout is desired.

The TE-64D operates on 6-16 VDC and measures a compact 5.25 x 3.3 x 1.7 inches. Frequency accuracy is .1 Hz for sub-audible and 1 Hz for audible tones. The price is $129.90 and comes with a one year "no hassle" warranty.

Incidentally, if you already own the TE-64 and want to add the digital display portion of the TE-64D to it, the mod kit is just $49.95. If you'd like to order or want further information, call Communications Specialists at 800-854-0547. Their mailing address is 426 West Taft Ave., Orange, CA 92865-4296.

ICOM Improves R8500

After our preliminary report on the new ICOM R8500 super receiver (November *MT*), in which we found the receiver to be vulnerable to intermod interference from strong local signals, ICOM engineers took another look at front-end filtering. A second evaluation receiver was forwarded to us and we found it to be substantially improved. ICOM has modified all receivers prior to shipment.

— *BG*

Offshore Radio in Glorious Mono!

The year is 1968. Everyone in Europe is tuned to the offshore pirate station, Radio Caroline. DJ Johnnie Walker is spinning the tunes: Fontella Bass sang "Rescue Me," the Classics IV had a hit with "Spooky," and Eric Clapton played with The Yardbirds. Don't Touch that Dial!

Whether you remember those great days of AM radio or want to experience the history of "boss" music radio for yourself, check out East Anglian Production's "Don't Touch That Dial 1" a Jumbo CD that captures the music, commercials, and jingles of Radio Caroline from actual off-air recordings in 1968. It's all there, in nostalgic AM mono, for just £12.99.

But wait! There's more! Order today and you can also get "Don't Touch That Dial 2" for only £12.99, featuring a unique and exclusive lost 1966 Beatle interview lasting nearly 20 minutes. Hear John, Paul, Ringo, and George talking to Tom Lodge in London and broadcast on Radio Caroline on the Bob Stewart Show.

East Anglian Productions has other CDs like "Pirate Radio Jingles from the '60s, '70s and '80s" (each £12.99). You'll hear Radio London ("The Big L"), Britain Radio, Radio City, Radio Northsea International, Radio Atlantis, Radio Mi Amigo, and the late, great, Laser 558.

Other CDs of interest are "10 Years of Offshore Radio" and "Another 10 Years of Offshore Radio." Both are double CDs that include all the bigger offshore pirates like Radio Caroline as well as smaller ones like Radio Sutch, Radio Essex, Radio Invicta, and more, for £21.99 each.

Finally, you may want to check out "The Laser 558 Story," "The Radio Caroline Story," "The Radio London Story," and "The Veronica Story." All are £21.99.

There's still more, but I've run out of space! Get a copy of the catalog, or, to order, use your credit card and write East Anglian Productions, Studio House, 21/23 Walton Rd., Frinton-On-Sea, Essex CO13 OAA, UK, or call 01255 676252. You can visit their catalog on-line at **http://eastangprod.com**. Mention *MT* when you contact them, please.

Happy Hamming

For the northerner, it's the falling of the last leaf that signals winter. For the shortwave listener, it's the arrival of the new *Passport to World Band Radio*. But, for the ham radio operator, it's the new *ARRL Handbook* that makes things happen. The new 1997, 74th edition of the *Handbook* contains over 1200 pages covering advanced theory of radio and communications technology with everything from DC to microwave.

A variety of construction projects illustrate the theory and put it into practice, providing functional pieces of equipment that hams can use. A 3-1/2 inch diskette is bundled with the book and contains informational software, such as a list of over 1,000 equipment and parts suppliers.

The book can be purchased from Grove Enterprises or direct from the League itself. The price is $38.00 plus $6.00 UPS shipping. Call 860-594-0200 or write ARRL, 225 Main Street, Newington, CT 06111.

Sunglasses For Your Brain

And now for something completely different.

"From bad TV shows to terrorist talk radio, from cell phone business banter to leaky computer monitors, the sensitive circuits of the human body are literally bathing in electro-smog." So says Bruce

Oliver, president of ShieldWorks, Inc., producer of a line of radio frequency (RF) shielding wear. Like sunglasses for your brain, Shieldworks wear provides line-of-sight attenuation of trespassing signals for various parts of the human body.

Choose from the baseball-style CyberCap, which features a newly developed RF reflecting material ("until recently available only to the military") with its "Radio Free Head" logo, or a classic triangular shielding scarf, available in soft black or deep blue. There are even PowerSheets, to ensure RF-free slumber.

According to Bruce, the material in the CyberCap provides shielding effectiveness of 55-90 dB between 100-10,000 MHz, and far-field shielding effectiveness of 65-85 dB at 1 GHz.

The CyberCaps are $39.95, the PowerScarf is $39.95, and the PowerSheets are $199.95. Add $4.95 for shipping. You can order from 1-800-403-0255 or write ShieldWorks, 5821 Mt. Sinai Rd., Durham, NC 27705.

Collector's Guide

Many astute collectors will recognize author Raymond S. Moore from his previous, very popular work, *Communications Receivers, the Vacuum Tube Era*, available from Grove Enterprises and other *MT* advertisers. In his newest work, *Transmitters, Exciters and Power Amplifiers, 1930-1980*, Moore adopts the same illustrated format, utilizing hundreds of photos on glossy page stock covering over 100 manufacturers for half a century.

Familiar names like Collins, Hallicrafters, Johnson, Heathkit, Globe, Hammarlund, Harvey Wells, Gonset, and many more abound in this nostalgic and informative directory. Each listing provides date of manufacture, price, and a brief description.

Transmitters, Exciters, etc. is $21.95 plus $3 handling from RSM Communications, PO Box 1046, Key Largo, FL 33037; ph. 305-853-0379.

— *BG*

Feds Wishbook

Dynatech Tactical Communications has released a new 16-page catalog detailing its family of two-way radio accessories. It includes photos and data on security kits, wireless earphones, transducers and microphones, headsets, and more. The accessories interface with most popular radios including Motorola, Ericsson, Kenwood, King, Maxon, Standard, ICOM, and Racal. Used by every major United States federal law enforcement agency, Dynatech's catalog would an interesting reference for your shack. Write to 77 Northeastern Blvd, Nashua, NH 03062 or call 800-233-8639.

IC Master, 1996

The electronics industry deluges manufacturers with tens of thousands of new integrated circuits (ICs) every year, from analog to digital, low to high power, simple to complex, and from DC to light. Keeping track of these devices can be a chore. While literature is available from every one of these manufacturers, and their ads are in every trade journal, the sheer volume is overwhelming.

IC Master comes to the rescue.

This annual, three-volume set is the single source for more than 120,000 IC devices now on the market up 20,000 since 1995! Included along with proprietary information is the complete list of 8,500 NTE replacement devices for the repair industry. Besides complete tech specs, *IC Master* offers a comprehensive manufacturers and distributors directory for sourcing the parts listed.

IC Master is available as 4000 pages bound into three volumes ($190 including Internet pinout and package data, and fax-back service), or as an instant access, Windows- version CD-ROM ($235, pinout/package data included). Price includes free spring and fall updates.

For more information on the *IC Master*, contact Marie Botta at from Hearst Business Publishing/UTP Division, 645 Stewart Ave., Garden City, NY 11530; ph. 516-227-1314 or fax 516-227-1453. Credit card orders 800-833-7138.

— *BG*

Business and Equipment News

The Grove Expo is always a great place to learn about new products, and this year's extravaganza was no exception. It was announced that Uniden will soon release two new "Trunk Tracker" scanners which should turn the listening industry topsy-turvy. Both the BC235XLT hand-held and BC895XLT desktop will be capable of tracking the most widely-used form of trunking communications, and will have one or two other special features as well, including an RS232C port on the 895 for computer control.

Additionally, an aftermarket software designer is expected shortly to release a computer interface package for tracking trunking transmissions on other scanning receivers.

RELM, formerly Regency Land Mobile Communications Company, has begun production of the HS100 and HS200 handheld scanners, possibly private-labeled by Yupiteru, which include CB reception. The HS100 tunes 26-54, 118-174, and 406-520 MHz, while the 200 adds 806-960 MHz (less cellular). CTCSS and digital squelch capabilities are also offered.

EDCO demonstrated AOR's advanced AR7000 wide coverage receiver with built-in spectrum display. No technical, operational, availability, or cost information was available from the representative

On a different note, it has just been learned that Tucker Electronics, a well-respected electronics retailer and *MT* advertiser, has gone out of the radio business. A veteran test equipment dealer for nearly three decades, Tucker tried expanding into hobby radio in 1993, but poor profit margins with no expected improvement in the long term resulted in a re-evaluation of the market, and they liquidated their entire radio inventory. Founder Jim Tucker feels that this was the proper choice, "improving their financial liquidity." Tucker continues to sell test equipment.

— *BG*

Correction

For Telecommunications and Multimedia Encyclopedia on CD (see Nov. MT p. 89), call 1-800-750-JONES. Correct zip code is 80112.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.

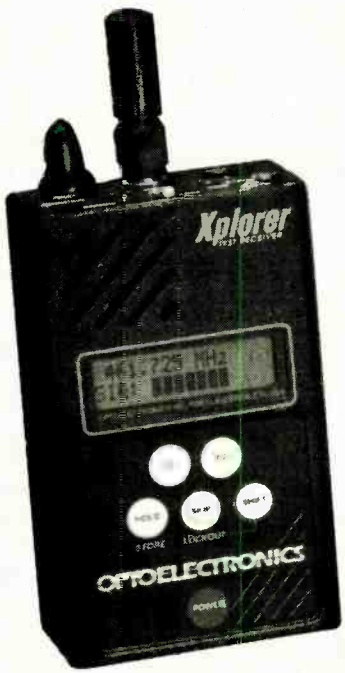
MT REVIEW

The OptoElectronics Xplorer

By Bob Grove

For years, scanner listeners have wished for a wide-frequency-coverage, hand-held radio that would immediately respond to a nearby transmission, displaying its frequency while monitoring its content. Several years ago, Optoelectronics introduced the Interceptor, a signal-capturing receiver without a display; this was followed by the Scout, a frequency counter with memory. Wouldn't it be nice to have both of these features in one compact box?

The new Xplorer is this—and more. The husky, handheld, test receiver weighs 1 pound and measures 3 inches wide by 5 inches high by 1-1/2 inches in diameter. The Xplorer features a backlit LCD window, rechargeable battery pack with heavy-duty charger, telescoping BNC whip, tuning knob (which doubles as a squelch and volume adjustment), a five-multifunction-key membrane panel, separate jacks for recorder audio and earphone, and a data port.



Useful for transmitter testing, FM transmitter monitoring, debugging, interference locating, and signal surveillance, the Xplorer is not a scanner. It is an auto-sweeping, FM-only receiver which utilizes a multiple-frequency "comb" oscillator to search several frequency ranges simultaneously in order to capture any signal in its 30-2000 MHz (less cellular, restorable) bandpass within one second.

Its intentionally low sensitivity enables it to discriminate nearby signals from the background din; typical reception range is on the order of a few hundred feet for strong base stations, or a few tens of feet for hand-held radios. Judicious selection of optional antennas and bandpass filters (in the $40-$130 range) will increase reception distances dramatically.

The speaker will produce sound only from FM transmitters, which include all land mobile services, VHF/UHF amateur, and VHF/UHF broadcasting. The wider the deviation (like broadcasters), the louder the audio. It won't pick up aircraft, CB, SSB, narrowband modulation, digital transmissions, or rapid on-off keying such as keyless entry and garage door transmitters. And the 30 MHz lowest frequency specification is absolute; no signals are receivable below that limit.

The speaker, while small and somewhat harsh sounding, produces enough intelligible audio to be heard in most environments. An earphone jack is provided for an optional source of concentrated, private monitoring.

Selectable displays include date, time, frequency (to four decimal places), signal strength, volume and squelch level settings, CTCSS tone, DCS code, DTMF numeric sequence, FM deviation, manual tuning increments, and baud rate.

An 8-pin DIN / 9-pin DB cable is supplied to enable the Xplorer to be used with a GPS receiver, computer, frequency database, and other digital accessories. Utility management software is provided.

The internal battery pack (not user-replaceable) will hold a full charge for 5-6 hours of use, depending upon audio levels, before recharging is necessary. Either a trickle charge or 1.5 hour fast charge mode may be selected, with the display reading remaining battery voltage on partially expended charges. Any external source of 9-12 volts DC at 1 amp, including the AC/DC adaptor provided, may be used for recharging. The Xplorer may be used while charging.

Our Test

As you might expect, our first inclination was to attach the antenna and see what we could hear; that will probably be your choice, too. We weren't disappointed. Within a second, the Xplorer latched onto near-field signals, primarily incidental radiation from microcontroller chips in household appliances. But up to 1000 of these unwanted signals can be sequentially locked out by a simple button press, and the Xplorer resumes its persistent search for signals.

The temptation to attach a rooftop antenna was irresistible. Nearby FM and TV broadcasters were immediately accessed and monitored. Since the only other local transmissions would be from 27 MHz AM CBers, it seemed expedient to take a drive.

Using a Grove *Stealth* magnetic cartop antenna, the trip was productive. As we drove by McDonald's, the kiosk order takers could be heard on the familiar 35.02/154.570 MHz pair. Two-way police dispatching was heard as their frequencies were logged by the Xplorer. Clearly, the Xplorer did the job it was designed to do.

Once a signal is captured, the listener may press a "hold" button to maintain that frequency indefinitely for continued monitoring of communications. The user may restore the autosearch sequence by pressing "skip," or he may alternatively select the VFO mode and tune the radio's frequencies up and down in a manual mode.

Frequently we were puzzled by odd frequencies being displayed when commonly-recognizable signals were being monitored. According to Opto, this is caused by detecting harmonics of a strong signal. Sure enough, we could reduce the false hits either by setting the squelch to a less sensitive position, or by increasing the distance to the transmitter.

Optoelectronics claims a typical 100 microvolt (uV) sensitivity for their unit at 500 MHz; to check that out, we hooked the receiver to an HP8640B laboratory signal generator. In the sweep mode, the sensitivity was best at 30 MHz, its lowest working frequency, growing progressively less sensitive with increasing frequency.

At 30 MHz, squelch break sensitivity was about 50 uV, worsening to 250 uV at 500 MHz and diminishing to 1500 uV at 1000 MHz (1 GHz). It seems likely that Opto's better sensitivity claim was in the VFO (unswept) mode, squelch open, listening for modulation on minimum detectable signals (MDS).

The Xplorer costs $899 plus $10 shipping and is available only from Optoelectronics, 5821 NE 14th Ave., Ft. Lauderdale, FL 33334; phone 954-771-2050.

The Best Receivers in the World...

Grove sells both of the best consumer receivers on the market—the ICOM R-8500 and the AOR AR-5000. No matter which one of these extended coverage receivers you choose, you will be on top of the radio world! Need help deciding? See Bob Grove's review in the November Monitoring Times or on our web site (see below).

ICOM R-8500

"For intuitive ease of use, display readability, and professional appearance, the ICOM wins hands down."

—Bob Grove
Nov. 1996 Monitoring Times

ORDER SCN 1
$1999.95 *Plus $17 UPS Shipping*

NOTE: An intermod problem with the first R-8500 units manufactured (as reported on in MT by Bob Grove) has been corrected. ALL UNITS SOLD BY GROVE WILL BE THE NEW, UPGRADED MODEL.

Imagine: an affordable, compact, tabletop receiver with continuous 100 kHz-1999.99 MHz frequency coverage (less cellular) in precise 10 Hz steps—longwave, shortwave, VHF/UHF, all services and modes (wide and narrow FM and AM, USB, LSB, CW). Add high sensitivity, IF shift, selectable AGC timing, audio peak filter to automatically enhance modes, built-in RS232C and CI-V for direct computer control, 1000 memory channels in 20 banks, multiple scanning selections with priority function and selectable delay, S-meter settable squelch, noise blanker, and 12 VDC / 120 VAC operation.

This all-new receiver offers features previously found only on the premium R-9000—which sells to the government for $7,508—but the R-8500 retails for under $2,000. High stability crystal oscillators combine with automatic frequency control circuitry for outstanding stability. Multiple tuning speeds optimize signal hunting. Alphanumeric display aids in identifying memorized frequencies. Automatic memorizing of search-discovered active frequencies, skipping of unwanted channels, three antenna connectors for optimal choices for frequency ranges, even voice scan to ignore noisy channels, and even optional voice synthesizer and remote control--an incredible array of advanced features! See Grove's printed and on-line catalogs for complete specifications.

AOR AR-5000

AOR has scooped the market with their new AR5000 extended-frequency coverage receiver, tunable from 10 kHz through 2600 MHz (less cellular) and offering 650 memory channels. For the first time, you can hear VLF time signals and naval communications, international shortwave broadcasting, worldwide single-sideband communications, civilian and military aeronautical transmissions, VHF/UHF public safety radio, ham repeaters, microwave earth satellites, and much, much more all on one receiver!

This triple-conversion luxury receiver offers outstanding sensitivity (0.15 microvolt SSB, 0.3 microvolt VHF/UHF FM, 0.6 microvoltAM), rapid 50-channel-per-second scan/search speed, 1 Hz to 1 MHz programmable tuning steps, all mode reception (AM/FM/LSB/USB/CW), selectable IF bandwidths (3/6/15/40/110/220 kHz), superb frequency stability (+/-1 ppm,0-50 deg. C.), mobile or fixed power (12 VDC / 120 VAC), and much, much more. See Grove's printed and on-line catalogs for complete specifications.

ORDER RCV12 *Plus $17 UPS Shipping*
$1999.95

"For compact installation requirements, widest frequency coverage, and the greatest variety of options, select the AOR."

—Bob Grove
Nov. 1996 Monitoring Times

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Please visit our site on the World Wide Web:
www.grove.net
(See Bob Grove's ICOM-AOR comparison at www.grove.net/grovereview.html)

Lawrence Magne
Editor-in-Chief, Passport to World Band Radio

Sangean ATS 303 Portable

For years, Taiwan's Sangean has been known for producing world band radios that are well-made and perform better than you might expect for the price charged. Their new ATS 909 we reported on in the September *MT* is a good example of this.

Competition from Chinese-made radios, including from Grundig, has altered that value curve in recent years. Yet, Sangean's Taiwan-made models continue to hold their own with construction quality that's superior to that of most competitors.

Sangean is especially known for its mid-priced compact and larger digital portables, and also makes a superior mini-portable, the digital ATS-606. Where it has fared less well is with lower-priced digital portables. Here, Grundig, Sony and even Radio Shack have eaten Sangean's lunch with models around $100 that work surprisingly well.

Where's It From?

To meet this challenge, Sangean has introduced the ATS 303 compact portable with a street price of $70-90. On our unit, which we purchased new from Universal Radio, there was no indication whatsoever of the country of manufacture either on the radio or its packing. To ensure this wasn't a sample shortcoming, we asked Universal to check over their stock. They found the same thing.

As Sangean now manufactures in the People's Republic of China, as well as Taiwan, the actual country of origin is anybody's guess. That's regrettable, as consumers and dealers should be clearly informed of these matters. This is especially so with Sangean, as there is a body of politically conservative listeners who prefer Sangean products because they are made in "Free China," as opposed to the People's Republic. Sangean has been made aware of our findings, so hopefully they will begin indicating the country of manufacture with future shipments of the '303.

Painfully Slow Tuning

The '303 is powered by four "AA" batteries, but comes with no outboard AC adaptor. It is digitally tuned, and being a compact is small enough to be handy to carry on airplane trips. It has ten presets for shortwave (five for below 7.3 MHz, five for above 9.5 MHz; the other ten are for AM/FM), plus signal-seek scanning and a pair of up/down slew buttons that tune in 5 kHz increments. The signal-seek scanning, using a two-position switch underneath the cabinet, works by tuning within any pre-designated meter band or by tuning throughout the chosen portion of the radio spectrum (SW1, FM, etc.).

So far, so good. But missing altogether are a keypad and tuning knob. Exacerbating this is that the up/down slewing buttons are slow as a Mississippi tortoise. As a result, "getting there from here" is no mean feat. In all fairness, cutting out the keypad is something that's done on several models of inexpensive digital portables, so the '303 has plenty of company—although some competing models have much faster slew tuning than the '303. But that's poor consolation for '303 owners whose patience is tested while the radio crawls along from station-to-station.

The radio's ten shortwave presets help overcome the slowness of tuning to some extent, because you can assign each preset to a given shortwave band. But during sunspot minimum, which we'll continue to be facing for another couple of years, just about the only presets that do much good at night are the five that work below 9.5 MHz. Add that to no keypad, no tuning knob, and slow slewing, and it requires *beaucoup* patience, indeed, to tune this radio.

Another tuning nuisance is that the '303 has two shortwave ranges, "SW1" and "SW2," like radios from decades back. This means that if you're listening to a station on 7295 kHz and want to tune to, say, 9505 kHz, in addition to all the other tuning steps you also have to switch the radio from "SW1" to "SW2."

The bottom line is that if you don't tune to a lot of different stations, the '303's operating arrangement is passable. But if you change station settings often, or like to dial up and down the bands to see what's on, this radio is definitely not for you.

Incorporates Some Useful Features

The '303 also has an easy-to-set 24-hour World Time clock. Although its display is shared with the frequency display, you can see the time when listening by pressing a button. And since it's designed for traveling, it has a power-lock switch to keep itself from being turned on accidentally. For getting you to sleep, there's a delay-off "sleep" button with adjustable times, as well as an alarm timer.

The LCD has excellent contrast, no matter which angle you view it from. Equally helpful for middle-aged eyes is that the LCD characters are large. However, there is no light for the display, making the radio singularly inappropriate for use in unlit rooms or dark outdoors environments.

Performance Mostly Typical for Price...

Of course, ease of operation isn't everything, or even the main thing. With some radios, like the former Drake R8 and Sony ICF-SW30, standout performance offsets clumsy operation. In this regard, the '303 is a mixed bag.

Take sensitivity to weak signals, for example. This is important, particularly if you listen during the day. It's also of importance if you live in such places as California, British Columbia, or New Zealand—where shortwave signals tend to be weaker than they are in most other parts of the world.

Here, the '303 does a nice job. It plucks stations from the airwaves at least as well as do most competing models of compact portables. Audio quality on shortwave, although lacking much in the way of fidelity, is passable. Ear-

phones help, especially if you want to use the '303 to hear FM in stereo, but most people don't use earphones to listen to shortwave.

The '303 uses low-cost single-conversion circuitry, which results in "image" signals which cause interference 900 kHz below their true frequencies. At this price point, that's to be expected, although for very little more you can get double conversion from a couple of competing models. Another form of spurious signal interference is that the '303 sometimes reproduces, badly distorted, some local FM broadcasters within the shortwave range. Again, at this price that's to be expected.

But its ability to keep out squeaks and squawks from adjacent channels is mediocre. This means its ability to select the one station you want to hear out of a group of stations clustered together is only fair. Given the worthy performance of today's low-cost ceramic bandwidth filters, there's really no excuse for this level of performance. Yet, the sad truth is that most radios selling for under $100 suffer from this pointless, but significant, shortcoming.

...but Many Stations Can't Be Tuned

So far, what we've found is a passable, if somewhat disappointing, radio. But here's the rub, and it's a doozy: the '303 can't tune the important 7305-9495 kHz portion of the shortwave spectrum used for world band broadcasts!

For a radio introduced in 1976, that might be okay. But *1996*? One glance at the Blue Pages of the 1997 *Passport to World Band Radio* shows over 13 pages of juicy listening schedules for these frequencies that are omitted entirely on the '303!

There's no excuse for Sangean to screw up like this. After all, it is the world's largest shortwave manufacturer. They should know something as basic as this in their sleep.

The bottom line is that the Sangean ATS 303 doesn't hack it. For precious little more, you can get properly functioning digital models from Radio Shack, Grundig, and Sony that leave the '303 in the dust, where it belongs.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

Bob Parnass, AJ9S

AOR's AR5000 All-in-One Receiver

The AOR AR5000 is a truly wide coverage receiver, spanning 10 kHz to 2600 MHz (cellular phone bands excluded). Bob Grove provided an overview and comparison with the new ICOM R8500 in November's *MT*.

The AR5000 is a triple conversion design, with IFs at 620, 10.7, and 0.455 MHz, and has more features than we have space to describe. One can select AM, FM, CW, USB, and LSB modes. Six IF bandwidth settings are provided from 3 to 220 kHz. A 0.5 kHz bandwidth, of primary use in CW, is optional.

The mode and IF bandwidth settings are independent. While the 15 kHz bandwidth is the norm for most FM scanning, we use the 6 kHz bandwidth for reducing adjacent channel interference from 155.46 MHz while monitoring 155.475 MHz, for example. You can configure the AR5000 for proper reception of wider deviation VHF tactical military and weather satellite transmissions using the 30 kHz bandwidth, which means the U.S. Army's 30.45 MHz "Range Control" will no longer slam the squelch shut on voice peaks!

Memories and VFOs

The AR5000's low contrast display shows frequencies with a resolution of 1 Hz, quite unusual in a receiver marketed to hobbyists. An ordinary scanner might display 162.550 or 162.5500 MHz, but the AR5000 display shows 162.550000 MHz. The rightmost two or three digits can be used for relative measurements, but probably won't be "dead on" without connecting the AR5000 to an accurately calibrated, lab grade frequency standard through the BNC connector thoughtfully provided.

Memories are divided into 10 large banks of 100 channels each, too big for organizing frequencies rationally into groups of interest. Along with the frequency, each channel can be programmed with a text label, mode, IF bandwidth, step size, attenuator setting, audio low and high pass filter cutoff frequencies, AGC decay constant, and other parameters.

A text label can be associated with each of five VFOs. There are 20 search banks, too. Not only can they be linked together, but search parameters like pause time and rescan delay can be associated with each bank. Like

the ICOM R7100, the AR5000 features an Auto Store mode in which up to 100 unique frequencies found active during a search can be stored in the first memory bank. Unwanted frequencies can be locked out of a search using the PASS key.

Scanning and Searching

The clicking of electromechanical relays is heard when crossing frequency boundaries at 40, 400, 1000, and 1600 MHz. Scanning groups of channels in different bands is accompanied by the clickety-clack noise. The ICOM R8500, R7100A, and R7000A are afflicted by the same distraction.

Cyber Scan is the term AOR uses to describe a faster scan and search rate, akin to Radio Shack's use of the Hyper Scan label. Euphemisms aside, our AR5000 (serial #050025) isn't as fast as a Uniden/Bearcat BC9000XLT.

A priority scan feature permits one priority frequency to be checked for activity every 5 seconds. The sampling doesn't work well on our test radio, which sometimes lingers on the priority channel when there is nothing there to monitor.

Unusual Features

The AR5000 comes with a built-in DTMF decoder which displays up to 10 digits and works well.

Our AR5000 is not equipped with the optional CTCSS decoder, so we cannot test the tone search feature. The manual refers to an optional speech descrambler with 128 possible settings, but that option isn't installed either.

A DB-9 RS-232 jack is mounted on the back for computer control. Two 8 pin miniature jacks, one mounted on the front and another on the back, tap into critical points in the AR5000 circuitry and provide connections to all manner of external equipment. Two antenna jacks, an SO-239 and an N type, can be associated with each memory channel, and an external switchbox option permits a total of four selectable antennas.

A 10.7 MHz IF output jack feeds a 10 MHz wide part of the spectrum to one of our Hewlett Packard spectrum analyzers, providing a panoramic view of the band.

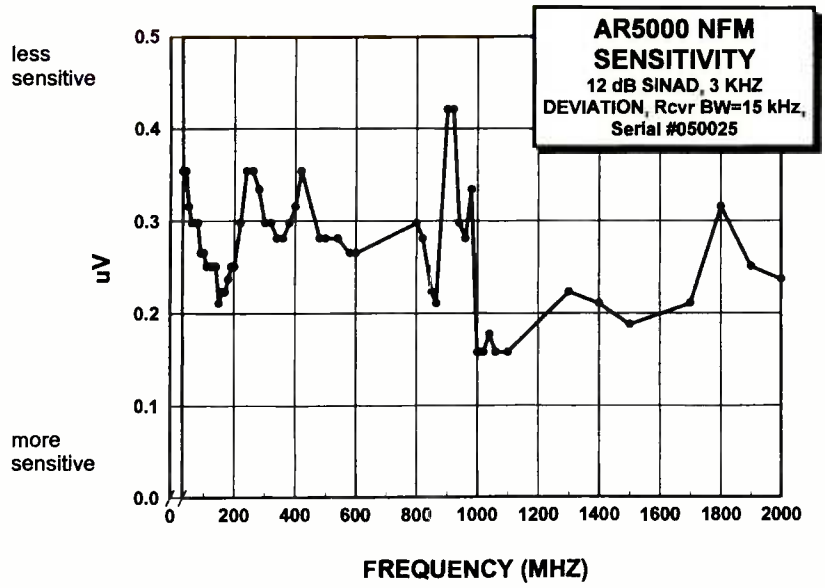
Test Results

Our AR5000 has excellent NFM sensitivity up to 2000 MHz, the limit of our signal generator. Using the 15 kHz default IF bandwidth for NFM, the squelch opens on signals 5 dB weaker than the 12 dB SINAD level. At 400 MHz, for example, we measured a sensitivity of -117 dBm (0.32 uV) and the squelch opens at -122 dBm (0.18 uV). The FM squelch is sensitive enough, but takes too long to close, producing a 200 millisecond noise burst after each transmission.

Our receiver measured an MDS (Mini-

Photo by Pam Parnass N9HRZ

The AR5000 is considerably smaller than the ICOM R8500, as this photo illustrates.



mum Discernible Signal) of 0.08 uV. MDS measures a shortwave receiver's ability to make weak CW and SSB signals heard above noise generated inside the receiver itself.

An internal preamp, designed to boost signals below 230 MHz, is supposed to be selectable, but we cannot get the AMP indicator to turn off without activating 10 or 20 dB attenuators, despite following the instructions in the draft operating manual.

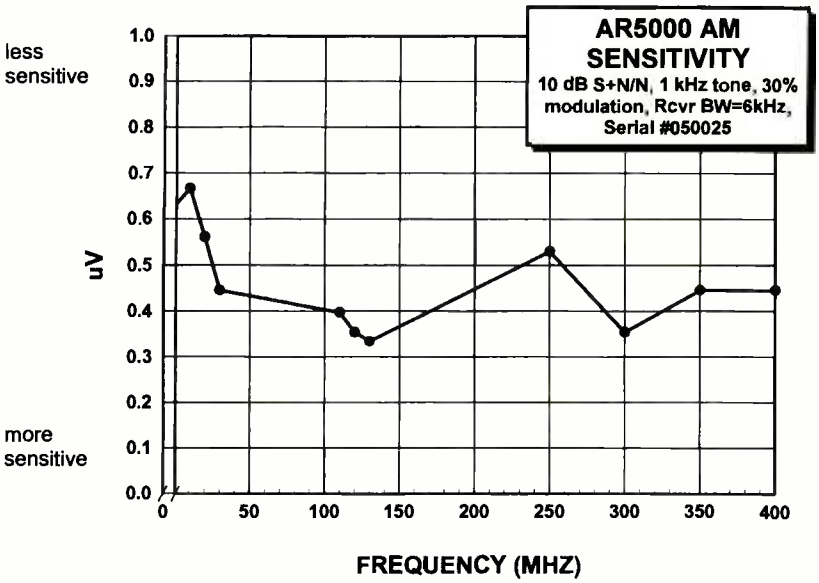
We can hear several birdies (internally generated signals), on our AR5000, especially in the 400 - 500 MHz range. This shouldn't be too surprising in a wide coverage receiver, and most of the birdies register less than 2 on the S-meter. We traced some of the lower frequency birdies to harmonics of the internal 12.8 MHz TCXO reference oscillator.

Finale

The AR5000's wide frequency coverage makes it an outstanding "all in one" radio, though we prefer the larger Japan Radio NRD-535D and ICOM R8500 for shortwave listening, due to their additional selectivity controls and ease of use. Just changing the AR5000's mode, for instance, requires pressing two different keys and twisting a small knob.

Our AR5000's noisy squelch, cumbersome programming, and lack of a noise blanker are its main blemishes. Aside from those warts, the AR5000 is extremely flexible, and has many great features and adjustments which work just fine.

We will review ICOM's new R8500 wide coverage competitor next month.



Measurements, AR5000 S/N 050025

MDS (Minimum Discernible Signal),
CW mode, 3 kHz bandwidth:
-129 dBm (.08 uV)
measured at 1, 10, 20, and 30 MHz

Sensitivity, CW mode,
10 dB S+N/N, 3 kHz bandwidth:
0.25 uV @ 1 MHz
0.30 uV @ 10 MHz
0.27 uV @ 20 MHz
0.22 uV @ 30 MHz

Sensitivity, AM mode,
6 kHz bandwidth, 10 dB S+N/N,
1 kHz tone modulated 30%:
better than 0.7 uV,
sampled 1 - 400 MHz (see graph).

Sensitivity, FM mode,
12 dB SINAD, 15 kHz bandwidth:
better than 0.45 uV,
sampled 30 - 2000 MHz (see graph).

NFM Modulation Acceptance:
10 kHz @ 15 kHz bandwidth
5 kHz @ 6 kHz bandwidth

Audio output:
1.6 watts @ 9% distortion into 8 ohms

S-Meter reading of S9, CW mode,
3 kHz bandwidth:
27 uV @ 1 MHz
32 uV @ 10 MHz
32 uV @ 20 MHz
16 uV @ 100 MHz
18 uV @ 400 MHz
25 uV @ 900 MHz

Search rate (approx.):
35 steps/sec, 12.5 kHz step
35 steps/sec, Cyber Scan, 12.5 kHz step
35 steps/sec, 5 kHz step
42 steps/sec, Cyber Scan, 5 kHz step

Scan rate (approx.):
(one bank of 100 channels programmed with 460 - 500 MHz frequencies)
37 channels/sec, normal mode
43 channels/sec, Cyber Scan mode

Doug Demaw, W1FB

Be a Mini MF or LF Broadcaster

Broadcasting can be as much fun as monitoring. There are many things you can do with a legal low power, mini-transmitter under Part 15 of the FCC rules. You can operate without a license with up to 1 watt of dc input power to the last stage of your transmitter from 160 to 190 kHz (low frequency, or LF). In a like manner, operation in the standard AM broadcast band requires no license, provided you use no more than 100 mW of dc input power to the last transmitter stage, from 550 to 1600 kHz (medium frequency, or MF).

Part 15 of the rules define clearly how many microvolts per meter of antenna radiation are legal in lieu of the maximum dc-input power rule. Few experimenters have the instrumentation required for accurately measuring antenna radiation levels, so the dc-input power limitation is best for the tinkerer.

The remaining restriction is the size of the antenna. For operation between 160 and 190 kHz the antenna can be no longer than 50 feet. A maximum of 3 meters (9.9 feet) is specified for the antenna used in the BC band. Conversations I have had with FCC engineers in Washington indicate clearly that the antenna length pertains to a single conductor. The wire contained in loading coils is considered part of the maximum antenna length, so don't cheat if you want to be legal! In other words, the antenna conductor beyond the feed line can not exceed the foregoing dimensions. Apparently, ground radials and matching networks at the antenna feed point are acceptable.

What About Useful Range?

Some experimenters (known as LOWfers)[1] claim "heard" distances as great as 600 miles in the 160-190 kHz LF band. Most of the experimenters operate beacon transmitters that continuously transmit self-assigned call letters. Many use their initials for this purpose. The government does not want ama-

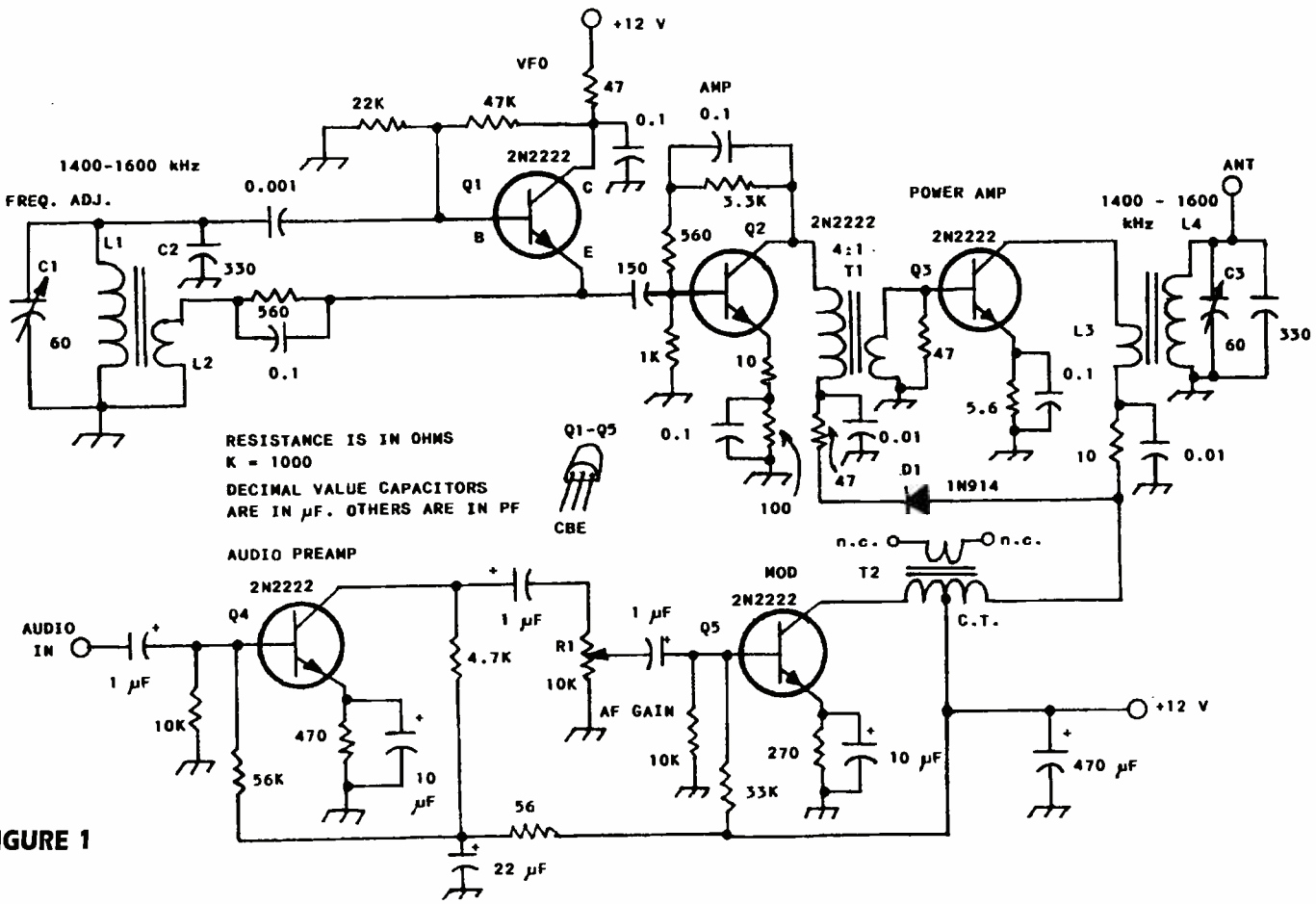


FIGURE 1

Schematic diagram of a 100-mW AM transmitter for unlicensed use under Part 15 of the FCC rules. C1 and C3 are ceramic, mica, or plastic trimmers. Polarized capacitors are electrolytic or tantalum. All others are 50- or 100-V disc ceramic. D1 is a 1N914 diode. L1 consists of 52 turns of no. 28 enam. wire on an Amidon T68-1 (blue) toroid core. L2 is 14 turns of no. 28 enam. wire wound over the grounded end of the L1 winding. L3 has 15 turns of no. 28 enam. wire wound over the grounded end of the L4 winding. L4 uses 52 turns of no. 28 enam. wire on an Amidon T68-1 toroid. Resistors are 1/4-W carbon types. R1 is a 10K-ohm, audio- or linear-taper carbon control. T1 has 14 turns of no. 28 enam. wire on an Amidon FT-50-43 ferrite toroid. The smaller winding consists of 7 turns of no. 18 enam. wire wound over all of the larger winding. T2 is a transistor audio output transformer, 1000 ohms center-tapped to an 8-ohm speaker (Mouser no. 42TC013).

teurs to use their FCC-assigned call signs.

With regard to the 550-1600 kHz MF band, the greatest distance I have achieved for a reliable signal was 1/4 to 1/2 mile while monitoring the signal via my car radio. The tests were conducted with a 10-foot vertical transmitting antenna, in combination with four 60-foot radials and an impedance-matching network at the antenna feed point.

Signal Quality

The short antennas permitted for use under Part 15 of the rules are extremely narrow in 2:1 SWR bandwidth. My antenna had a bandwidth of only 3 kHz. This means that AM transmissions are limited in fidelity by the narrow-band response of the antenna. So, don't expect high signal quality if you transmit music. Single-tone audio and voice modulation is not impaired significantly.

A Practical Transmitter

Figure 1 shows a simple AM transmitter you can build for a modest outlay of money. Five low-cost transistors are used to create an RF section and a modulator. This transmitter is designed for use from 1400 to 1600 kHz or lower. It is well within the lawful power limit specified for the MF range.

Q1 operates as a self-excited oscillator. Crystal control could be used, but crystals are expensive. C1 is adjusted for the desired operating frequency. Select a frequency that falls between existing BC band signals.

Q2 amplifies the oscillator output signal, which is then routed to the final RF amplifier, Q3. T1 is a tuned circuit that matches the Q3 collector to a 10-foot antenna. C2 is used to resonate the tuned circuit.

Q4 operates as a mic or audio amplifier. Modulation is accomplished by means of Q5. A transistor radio audio output transformer is used as the modulation transformer. A 1000-ohm center-tapped transformer that is designed for use with an 8-ohm speaker is suitable. The output winding is not used. Audio gain control R1 sets the modulation percentage.

D1 allows Q2 to receive modulated dc voltage, but permits only the positive audio peaks to reach the collector of Q3. This ensures that upward modulation occurs (signal increase with modulation). Negative-going audio peaks would reverse-bias Q3 and cause downward modulation (reduced output power during negative-going audio peaks).

Construction

The Figure 1 circuit can be assembled on perf board, or you may use point-to-point wiring between insulating terminal strips. Keep all RF leads as short and direct as practicable. Q1, Q2 and Q3 should be arranged in a straight line in order to keep them sufficiently isolated from one another. This will help to prevent unwanted self-oscillation of Q2 or Q3. Most of the parts for this project are available from Mouser Electronics.[2] Amidon toroids are used for L1, L2, L3, L4 and T1.[3]

Operation and Use

The 10-foot antenna wire is connected directly to the junction of C3 and L4 (Figure 1). Look for a clear frequency between 1400 and 1600 kHz and adjust C1 until you hear the transmitter signal on an BC-band radio. Now, adjust C3 for maximum signal strength. A radio with an S meter is best for this purpose.

Connect a microphone or tape player to Q4. Adjust R1 for a setting that produces a transmitted signal which is loud, but not distorted or fuzzy. Operation below 1400 kHz is possible if you add capacitance in parallel with C2. Using a trimmer at with greater maximum capacitance at C1 will also lower the operating frequency.

If you aren't interested in operating this transmitter as a beacon for others to monitor, consider employing it for on-the-air code practice with a friend in your neighborhood. A keyed audio oscillator (500 to 1000 Hz tone) may be connected to J1 for this purpose. Two of these transmitters may be used as part of an intercom system between the house and the workshop if two BC-band radios are included. For intercom use tune one transmitter to, say, 555 kHz and the other to 1600 kHz. This will allow you to communicate without muting the receivers.

You can transmit music from your hi-fi system to a remote site, such as your workshop, deck, or a Walkman AM/FM radio. The possibilities are many.

Building, testing and operating this transmitter can be educational as well as entertaining. Who knows? You may become an MF band DX titan if you operate the Figure 1 circuit as a beacon transmitter!

Notes

1 — *The Low-Frequency Scrapbook* was written for experimenters who build equipment and operate in the LF and MF bands under Part 15 of the FCC rules. Contact author Ken Cornell, W2IMB, 225 Baltimore Ave., Pt. Pleasant, NJ 08742.

2 — Amidon Assoc., Inc., 3122 Alpine Ave., Santa Ana, CA 92704. Phone: (714) 850-4660 for parts or a catalog.

3 — Mouser Electronics, 958 N. Main St., Mansfield, TX 76063-4422. Phone: (800) 346-6873 for parts or a catalog.

Clem Small, KR6A, CET

Need a MicroScope to see a MicroWave?

We talk of microwave communications routinely these days, but do you actually know what a microwave is? Is it a radio wave so small you need a microscope to see it?

Microwaves are often classified as waves with a frequency of 1000 MHz (1 GHz) or higher. That means that the longer of them are just slightly less than a foot (about three-tenths of a meter) in length, so they are large enough for us to see if they were visible. It is true that radio waves, including microwaves, are electromagnetic radiation just as are visible light waves. But the wavelength of visible light is on the order of a few hundred thousandths of a meter; our eyes just aren't designed to respond to wavelengths as long as microwaves.

To give you an idea of the contrast in the length of radio waves of different frequencies across the radio-frequency spectrum consider the following facts. Radio waves in the ultra-low frequency range are actually over 100,000,000 meters long. Frequencies in this band are below 3 Hz, and, yes, antennas designed for these ultra-low frequencies do radiate radio waves. The short waves (3 to 30 MHz) that many of us are so fond of monitoring range in length from 10 to 100 meters. Microwaves are the waves at the upper end of the radio frequency spectrum from 1 GHz to perhaps 300 GHz, depending on the definition you use. This means that their length varies from about .3 meter to about 1 millimeter.

Because radio waves are in the same spectrum as visible light waves, some of what we know about light waves is also true of radio waves. (Actually, *all* of what we know about light waves is true of radio waves if we adjust for the difference in wavelength!) Of all the waves in the radio frequency spectrum, microwaves come the closest to behaving in exactly the same way that light waves do.

We know that light waves travel in straight lines, and radio waves tend to do that, too. But radio waves will bend in their travels more than do light waves: the longer the wave the more it will bend. For instance, although microwaves are pretty much limited to line-of-sight paths, short waves can bend as they pass through the ionosphere, and sometimes even bend so much that they "reflect" (actually they refract) back to earth. This makes their signals "skip" around the world between the ionosphere and the earth (fig. 1). This is why we can receive foreign signals so easily on the shortwave (HF) band.

Satellites:

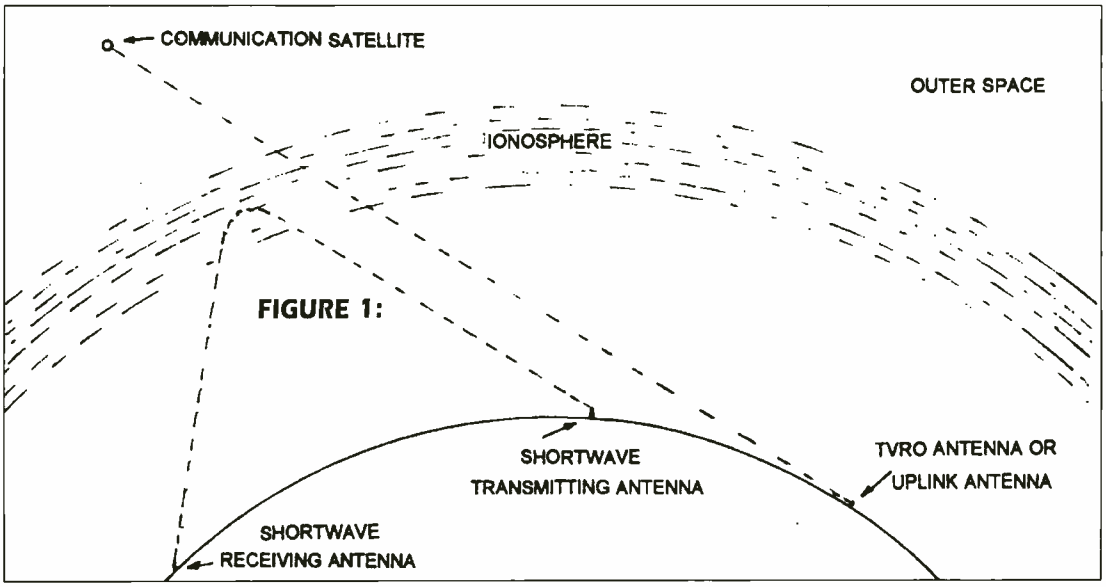
Any communications system which requires a line-of-sight propagation path is a likely candidate to populate the microwave spectrum. Satellite communication is one such system. If signals from satellites could skip around the earth after they entered the atmosphere, then we couldn't utilize a specific down-link frequency for more than one satellite. We would have signals skipping out of their footprint (the earth-area in which they arrive), and interfering with one another.

Also, the fact that microwaves don't bend much due to variations in the atmosphere allows us to aim our TVRO antenna at a satellite (fig. 1), and expect that the beam from the satellite's transmitting antenna won't wander off our receiving antenna due to ionospheric changes.

Microwaves are also especially well fitted for satellite work from the point of view of the high-gain antennas needed in that work. The short length of waves on the microwave band allow the construction of very high-gain antennas which are remarkably small when compared to sizes needed for similar gain levels on lower-frequency bands. The dish and horn antennas used for much microwave work yield gains far above any practical antenna available for the shortwave or even the VHF bands.

Radar:

The same benefits of small size come into play in choosing microwaves for use in radar systems. At microwave frequencies the very high directivity needed for visual definition on the radar scope can be had from antennas of practical size. On the lower bands antennas of such gain and directivity would be quite impractical to consider.



Microwave signals are relatively little affected by the ionosphere whereas HF signals are often completely re-routed when they encounter the ionosphere.

Antenna Modeling:

From the point of view of the antenna designer, microwaves offer a tremendous advantage over the longer wavelengths. An antenna designed for microwave work is much smaller than an antenna of the exact same type made for VHF, shortwave, or for one of the longer wavelength bands. An antenna designed for 1 GHz is 1000 times smaller than that same type of antenna designed for 1 MHz. This tremendous difference in antenna size across the bands is frequently exploited by antenna design engineers and technicians in what is called " antenna modeling."

In antenna modeling, an antenna design destined to work at a lower frequency is first constructed and tested at a frequency in or near the microwave region of the RF spectrum. The design is worked out by testing and changing the model as necessary at the higher frequency. Once the design has been refined, the antenna is constructed in the proper dimensions to perform at the desired lower frequency range.

Just imagine the time and money saved in changing and adjusting elements and supporting structures on an antenna with elements less than a foot in length as compared to one with elements 50, 100, or more feet in length! Although this technique isn't foolproof, it generally saves much time and money.

RADIO RIDDLES

Last month:

We had a simple crossword puzzle using antenna related terms. Check fig. 2 for the solution. If you have constructed a puzzle you like, send it along. Maybe it will appear in a future column.

FIGURE 2.

						R
A	N	T	E	N	N	A
E		R		U		D
R		A		L		I
I		P		L		O
A				S		
L	O	O	P			

Here's the solution to last month's puzzle. How did you do?

This Month:

Let's say that we could stain some radio waves—frozen at one moment in time—with some kind of visible dye so that we could actually see them. Of course we can't do this, except in our imagination. But if we did, how would the waves appear to us? Helpful hint: they would not look like a wavy line, or even the graph of a sine wave.

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

Rich Arland, K7YHA
P.O. Box 1782, Shavertown, PA 18708; email address: k7yha@juno.net

Packet for the Penny-Pincher

Packet radio can be simultaneously one of the most useful modes you've tackled in your amateur career, and the most frustrating. I have been involved with amateur packet radio for about eight years. Without a doubt, packet radio has revolutionized the amateur radio world. Like it or not, if you are not into this digital mode, you are really missing out on a major facet of the hobby. Amateur e-mail aside, packet radio opens the digital world for today's radio amateur.

Just why is packet radio so important to amateur radio? Packet is a very cost-effective form of digital communications. In addition to amateur e-mail via local radio bulletin boards (BBS), packet can provide emergency communicators with an error free method of transmitting disaster relief information using both long-haul HF and tactical V/UHF networks. Packet also provides a way to communicate through amateur satellites, the U.S. space shuttle, the Russian *Mir* space station, and much, much more.

A packet station consists of an HF and/or VHF transceiver or V/UHF scanner receiver, a computer, and a terminal node controller (TNC). The TNC is the equivalent of a radio modem which interfaces with your computer and allows digital communications via HF or V/UHF radio. The problem faced by many newcomers to digital ham radio is which TNC to buy: Prices range from under $100 to over $500!

While I like to find used equipment and accessories and recycle them whenever possible, used TNCs are extremely rare. Hence, we are faced with the problem of spending money to enter the digital radio game. Prices of used, synthesized, 2 meter transceivers and scanners start around $125. Older crystal-controlled rigs range around $25 to $100.

Remember our **K.I.S. Radio** philosophy: When we must spend money we do our research and try to get the best value for what we spend. When it comes to cost-effective radio accessories nobody does it better than MFJ Enterprises[1]. For years the folks at MFJ have provided the amateur and shortwave community with a host of useful, inexpensive accessories to make life around the shack a little easier. In this column I'd like to focus on MFJ's packet radio offerings for the frugal operator. Whether you are already involved with packet radio or new to the game, the MFJ 1270C packet controller (TNC) and companion MFJ 8621 two meter packet transceiver deserve serious consideration.

My one *big* pet peeve about amateur packet radio is that I must tie up one perfectly good 2 meter FM transceiver in order to play on VHF packet. The tiny MFJ 8621 packet transceiver alleviates this problem. This rig is a single channel radio (about the only serious drawback I can find with it) that provides approximately 5 watts output on 2 meters. Receive sensitivity is .25 microvolts for 12 dB SINAD. The radio supports all packet data rates through 9600 baud. Power requirements are 13.8 VDC at 1 amp. A 5 pin DIN plug on the back of the radio allows connection to virtually any TNC. Since I also have the MFJ 1270C TNC, it was a simple "plug and play" operation to get the system up on the local packet node.

FIGURE 1:
The MFJ 8621 Data Radio (top) and the 1270C Terminal Node Controller perched atop a vintage ICOM IC-21 2 meter base station.

MFJ's packet gear is very easy to put on the air. Their quick start instructions have you up and running in a flash. Documentation on both the 1270C TNC and the 8621 packet radio are very detailed, including a section on troubleshooting. The packet transceiver is very compact and takes up little operating space. The 1270C TNC is slightly larger, but can easily be tucked away. The entire package takes up less room than my old ICOM IC-21 2 meter rig (see Fig#1). This is nice, especially for those who are relegated to cramped operating positions.

The beauty of this system is in the integration of the two units and the ease of operation. It's traumatic enough for a newcomer to the digital radio hobby to try hooking up a packet station. If it doesn't play right away, frustration quickly builds and the newcomer becomes disenchanted. The MFJ 8621/1270C combo makes getting on HF and VHF packet radio a snap.

The 1270C TNC employs genuine TAPR TNC 2 AX.25 protocol packet firmware and features HF/VHF modes of operation. It is a "no frills" TNC that is a real workhorse. The unit also includes improved DCD circuitry that is optimized for HF packet operation. This means that it is less susceptible to background noise while still being able to respond to a valid data carrier. It features 32 K of RAM, expandable to 512 K with memory expansion options. The 1270C will connect to any IBM PC or compatible, Macintosh, Amiga, or Commodore C68/128 computer using the proper interface cable. MFJ also offers starter kits for all their TNCs which include the proper computer-to-TNC cable and terminal software.

Initial set-up is fast. Connect your computer to the 1270-C TNC via the proper RS-232 cable and connect the 1270-C TNC to the 8621 transceiver with a 5 pin DIN cable. Hook the antenna to the transceiver and fire up the computer terminal program. That's it! You are on the air via digital packet radio.

In short, the MFJ 8621/1270C combo fits nicely into our **K.I.S. Radio** philosophy. Remember, if we spend money, we spend it wisely. This little packet station provides a very cost-effective way to enter digital radio. The retail cost of the pair is only $230 and most radio retailers discount MFJ products, so it is not unreasonable to expect to get this dynamic duo for around $200.

Global Applications

Now that we have the packet station on the air, what can we expect to do on this new mode? For starters, the local packet BBS would be a good place to begin. Once you obtain the callsign of your local packet BBS, try connecting. Once on line with the BBS, register as a user and start looking over the message files that change daily. Some of the things you can find via the packet BBS are the latest ARRL bulletins, propagation forecasts, DX bulletins, for sale listings, Radio Amateur Satellite Corporation (AMSAT) information, including Keplerian data for running satellite

tracking programs, news of local and regional ham radio, scanning and SWL events and much more. As you can see, your local packet BBS is one place to regularly go to find out what is happening locally and around the world.

The U.S. space shuttle and the Russian *Mir* space station both carry packet stations on board. The shuttle program is named SAREX, short for Shuttle Amateur Radio Experiment, and regularly flies with shuttle missions. *Mir* maintains a full-time packet station, running 24 hours per day. Connecting with either of these two orbital platforms requires some skill and a lot of luck due to the tremendous popularity of both systems and irregular operating schedules. Here is one place that the 5 watt output from the MFJ 8621 transceiver might need a little help from a linear amplifier in the 75 to 100 watt range. Check with AMSAT-NA[2] for details on the SAREX and *Mir* operations.

Orbiting Satellites Carrying Amateur Radio (OSCAR) satellites built by AMSAT and launched by the USAF, NASA, and the European Space Agency (ESA) are prime targets for packet operation. Currently, the Brazilian AMSAT (BRAMSAT) Oscar-17, nicknamed Dove, offers receive-only downlink packet information. You can even hear this on a scanner with the receiver output connected to the TNC. Here you will see the onboard telemetry signals along with selected messages that are uploaded from a ground control station on a regular basis. Using a scanner and a TNC will also enable you to monitor the *Mir* and Space Shuttle missions without actually connecting to the orbital system.

After you gain some experience in connecting with the local BBS and other hams for keyboard-to-keyboard communications, you are ready to try connecting to a local node. Nodes are a lot like gateways: they tie a bunch of users together. Nodes can be visualized by thinking of them as the center of a wheel with the various radio circuits going to other nodes radiating out from the center. Node-hopping can be fun and it can get you all over the world.

If your local node does not support a DX packet cluster, then you can node-hop until you find a DX cluster and log on. Here you will find many other DXers all reporting the DX stations that are currently on the air on various frequencies. Since I am a low power communicator (QRPer) I find the DX packet cluster spots of little value. After all, I am giving up between 13 and 20 dB of RF power by operating at the 5 watt level, and to try and compete with the wolfpack on frequency with a rare DX station makes little sense. While I have had limited success busting pileups with a 5 watt signal, it is not a regular occurrence. I can definitely be more productive by hunting DX on the bands while the wolfpack chases one or two rare stations.

What I do like about the DX cluster is the ability to post the DX I have worked to the rest of the DXers on the cluster. And don't think that I don't make use of every opportunity to included a short comment like: "DX de K7YHA 18.075 3B8DW wkd him w/2 watts & dipole," just to reinforce the idea that it takes skill, not power, to play the ham radio game.

Disaster Relief

Packet radio has found a place in the emergency communicator's arsenal. Logistics support during and after a natural or man-made disaster is such a natural application it seems to be what packet was designed for. Error-free communications is what packet radio provides, and no one appreciates this ability more than disaster communications managers. Packet radio is perfect for providing logistics support to shelters by relaying names and addresses of shelter occupants, forwarding damage assessment reports, and more.

With the widespread use of laptop computers; ultra-small, energy-efficient TNCs; and hand-held V/UHF transceivers, today's Amateur Radio Emergency Services[4] communicator is much better equipped to aid the local community in times of disaster. Many ARES volunteers have assembled portable packet stations that fit inside a briefcase. Add a small solar panel to recharge some gelled electrolyte batteries, and this station can function indefinitely in a disaster scenario.

Well, I hope you have enjoyed our little journey into packet radio. Here's wishing you and yours a splendid holiday season. I hope Santa brings you all sorts of radio gear and lots of good DX.

FOOTNOTES

[1] Rich Arland, K7YHA P.O. Box 1782 Shavertown, PA 18708

[2] MFJ Enterprises, P.O. Box 494 Mississippi State, MS 39762 TEL: (800) 647-1800 FAX: (601) 323-6551

[3] AMSAT-NA, P.O. Box 27, Washington, DC 20044 TEL: (301) 589-6062
AMSAT has books and literature available for the newcomer to satellite communications. In addition, they offer outstanding satellite tracking software at reasonable prices.

[4] Amateur Radio Emergency Service (ARES) is a group of ham radio volunteer communicators registered with their local, county, and state governments to provide disaster relief communications. Contact the Public Services Manager, Rick Palm, K1CE, at ARRL HQ, 225 Main Street, Newington, CT 06111 TEL: (203) 666-1541 for further details and the name of your local Emergency Coordinator.

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bob@grove.net

More on the Weather Buoys

A follow-up on a question in our October column concerning the National Weather Service data buoys was forwarded by *MT* reader Paul Horak. The information comes from the web site **http://thunder.met.fsu.edu:80/~nws/buoy/** .

The buoys work in conjunction with the Coastal Marine Automated Network (CMAN) which is maintained by the National Data Buoy Center (NDBC). Visit their site for more information as well as the latest coastal observations.

Thanks, Paul, for your assist.

Q. Why don't single sideband shortwave signals penetrate my steel-columned building as easily as FM scanner signals? Is it AM versus FM? (Herb Kynor, Phillipsburg, NJ)

A. It's the wavelength of the signal. The lower the frequency, the longer the wavelength, and the wider the aperture necessary to allow the wave to pass. This is one of the reasons why C-band satellite dishes (4 GHz) are larger than Ku band dishes (12 GHz); the shorter wavelengths are more easily reflected by smaller surfaces.

Q. One of my scanners seems to linger on a frequency between transmissions, emitting background hiss from the speaker, unless I attach the scanner to an external antenna. What causes this? (JK, Salem, OR)

A. Scanners radiate weak signals generated by their own oscillators. The attachable whip is so close it picks these signals up, while attaching the scanner to a more remote antenna removes it from the nearby weak signals.

Q. My portable radio has an internal loop antenna for AM broadcast reception. Can I disconnect it so that I can benefit from of a larger, external loop? (Jim Weber, Colton, CA)

A. Nope. Frequency-determining coils are wound on that ferrite rod. Even when you plug in an external AM loop, there will always be some residual effects from the internal loop, often preventing you from getting a good, sharp null on an interfering signal, or peaking a desired signal. In most cases, you must rotate the radio as well as the antenna. This is why serious AM DXers use communications receivers which have no internal antennas.

Q. Why is Universal Coordinated Time abbreviated UTC and not UCT? (Several readers)

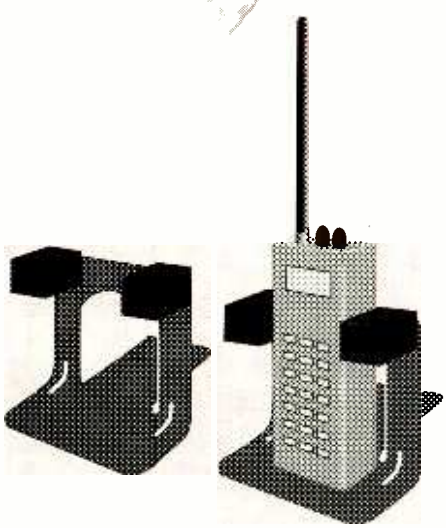
A. This is one of those questions I wish I hadn't been asked! At first I thought it might be because the standard is maintained in France, and UTC might be the French language abbreviation; however, the French give the noun first, followed by the modifiers, so the direct French/English translation would be Time Universal Coordinated (TUC)!

Thinking back, I seem to remember Universal Time (UT) replacing GMT, then being subsequently updated to UTC (Universal Time, Coordinated). Perhaps one of our radio historians can come up with the appropriate answer to this one!

Q. Antenna books show butterfly-shaped lobes to illustrate the radiation patterns they produce. Do such lines really exist? (John T. Wagner, Pickerington, OH)

Bob's Tip of the Month

Build This Hand-Held-Radio Stand



Edward Baxter of Cherry Valley, Massachusetts, shares a great idea with fellow hobbyists this month. This stand for a hand-held scanner or two-way radio is built around a standard metal bookend available from office suppliers, discount stores—and flea markets!

Edward drilled a small hole on each side of the bookend to mount the wood-block stabilizers, carefully measuring their spacing beforehand, to cuddle the scanner. He glued felt to the inside surfaces of the blocks to snugly fit the radio, and painted the blocks black to match the bookends. Smaller blocks than shown in the illustration may be used, so long as they provide stability.

For shorter radios, a wood shim can be added atop the base to support the radio so that it doesn't dangle by its belt clip. The radio is slipped down from the top so that the belt clip slides over the bookend. Check the location of the battery charge jack to see if it is necessary to drill another hole in the back of the bookend or offset the base shim. Elegant!

A. No, nor do magnetic "lines of force" actually exist. These lines are merely graphic ways of showing, in space, zones of identical intensity of the field being measured. They are similar to isotherms and isobars on weather maps, lines drawn to show the positions of common temperatures and atmospheric pressures.

I really think many science teachers, and perhaps even a few physics professors, actually believe these abrupt lines are real, probably because they see the formation of rows of iron filings sprinkled on paper suspended over a magnet. The phenomenon is provided by the mutual attraction and repulsion of the particles behaving as tiny magnets, not the presence of finite lines.

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 **bob@grove.net**. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: **www.grove.net**

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RC-740X, band expansion for KENWOOD 741/742 series, ScannerWEAR WINDOWS software for ICOM, AOR, Opto receivers. See all at http://www.radioscan.com. Radio Control Systems Inc. 1-800-560-7234.

TEST EQUIPMENT BONANZA! Free shipping! Bird 4411W wattmeter, like new; elements for 2-30, 144-520, 400-1000 MHz, leather case. Orig. cost $1383 (order TIN75 $699.95). Tenney Jr. Environmental Test Chamber (order UTST-1 $2000.00). Hewlett Packard Draft-Pro Excel Plotter MDL#7576A (order UPTR2 $2000.00). Grove Enterprises, P.O. Box 98, Brasstown, NC 28902. 1-800-438-8155.

FOR SALE: UNIDEN BC9000XLT SCANNER. CTCSS board installed. Excellent condition. $325. I ship. Call Tom (906) 632-3964.

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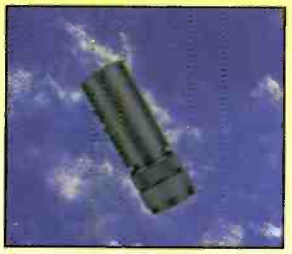
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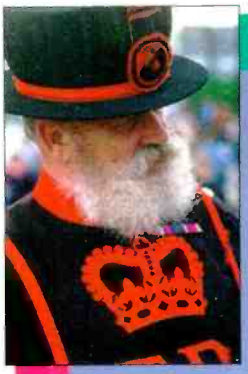

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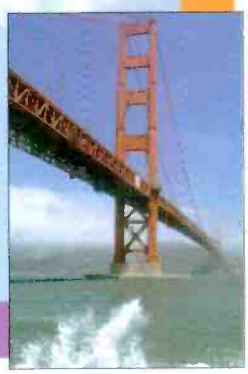

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