Vol. 15, No. 6 • June 1996

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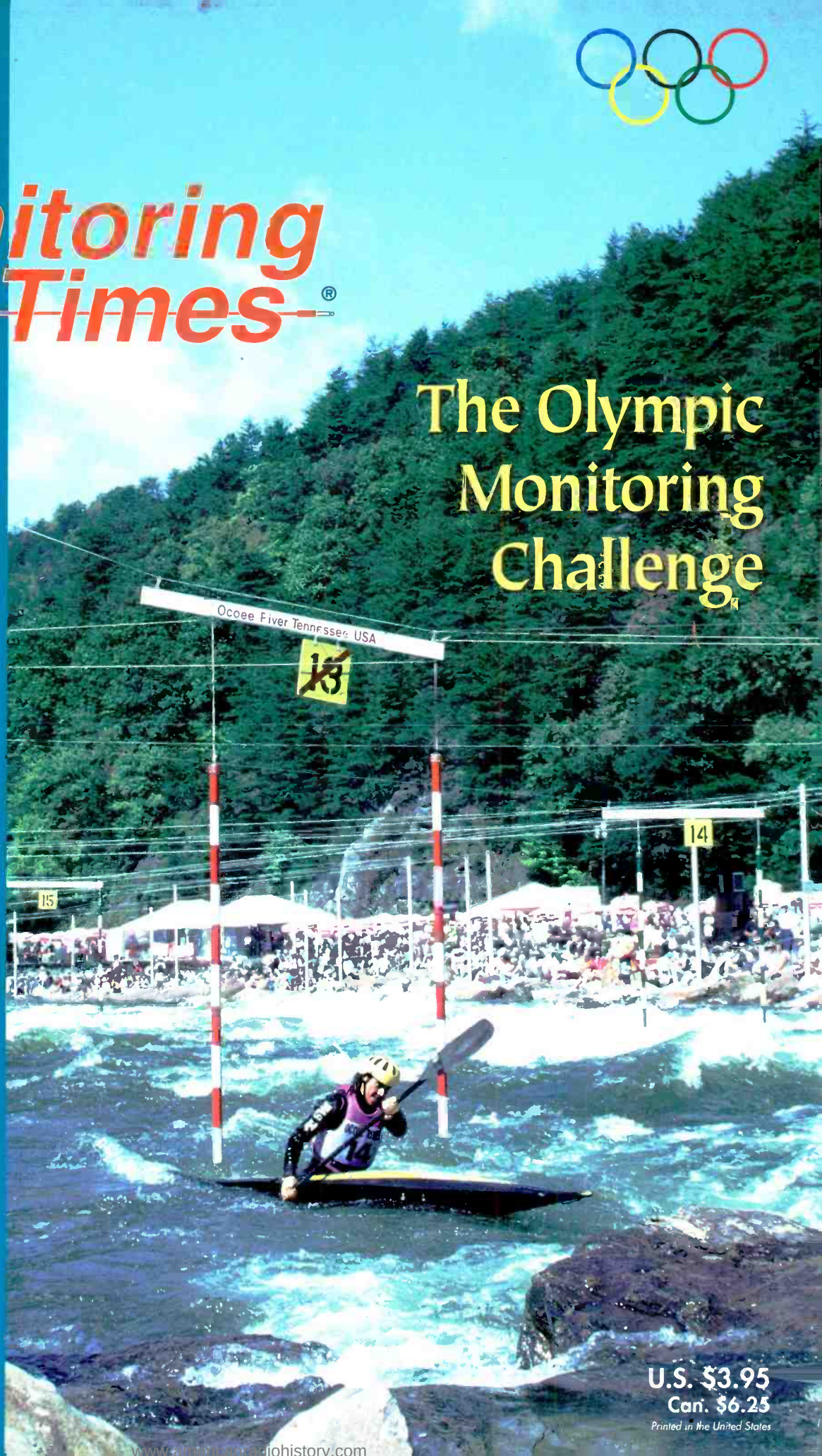

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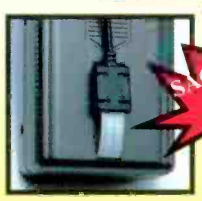

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Monitoring Times™

Vol. 15, No.6 June 1996

CONTENTS

Cover Story

"Hot Listening in "Hot-lanta"

By Michael Martin and Roger Cravens

July 19th to August 4th, all eyes and ears will be on Atlanta for the running of the Centennial Olympic Games. If you are one of the thousands of visitors expected to visit Atlanta and the other venues in the Southeast, welcome to the best scanning you have ever experienced!

Although sensitive communications such as security for athletes and dignitaries will be using scrambled circuits, probably *no* daily activity around the region will be "routine" during the Olympics. So that you won't miss a minute of monitoring, we've prepared some extensive frequency lists so you can program your scanner for your favorite agencies — beginning with your arrival at the airport.

Our cover shows Andraz Vehovar of Slovakia on the challenging new kayak venue — Tennessee's Ocoee River. Photo by Harry Baughn.

Reviews:

Readers have expressed a great deal of curiosity about the Radio Shack DX-394 shortwave receiver. How does this tabletop, priced under $400, stack up against the classics? See Magne's review on page 98 for the bottom line.

Parnass revisits the Uniden BC9000XLT (p.100) to pass along to readers some additional mods and tips acquired over a year of operation.

Addressing a number of common reception requirements, the Grove TUN-4A is not only an antenna preselector/amplifer, but provides "a complete antenna system control unit." See page 96 for the review.

DEPARTMENTS

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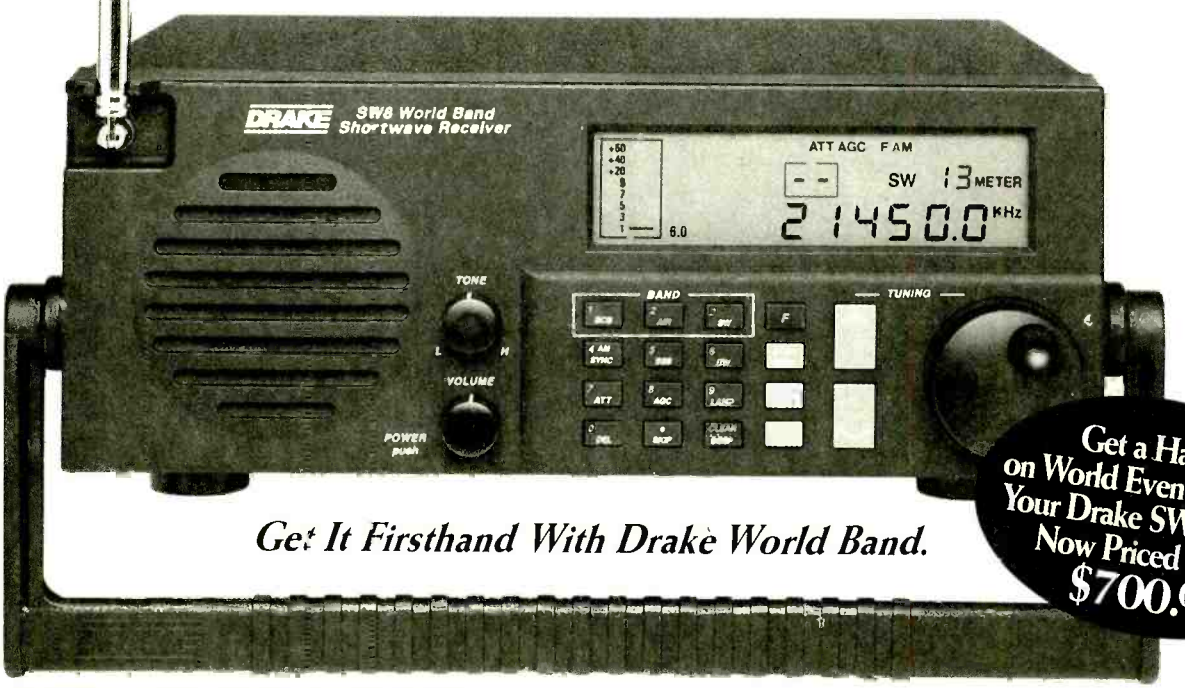

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Ed Schwartz spied this photo in the Chicago Tribune, and says, "Check what stands behind the man in the photo (taken in Okinawa). I'll be only we radio junkies would know what it is!"

The Wullenweber Unveiled

As expected, April's tantalizing but admittedly incomplete story on the Wullenweber antenna did elicit some additional information and further reference sources from our readers. The following message from Dave Rogers of Plano, Texas, filled in a lot of gaps.

• "The Wullenweber antenna was stationed at various NAVSECGRU (Naval Security Group) Bullseye (Wullenweber) sites around the world. The antenna is for HF (shortwave) use only. There are two separate arrays which are concentric. The Lo-band array covers 2-10 MHz and has 40 elements, while the Hi-band array covers 8-30 MHz and has 120 elements. The arrays are backed up by a ground screen which improves directivity.

"The key element in the design of the antenna system was the goniometer, which is a mechanical rotating switch used to switch the input from one antenna to the next. Knowing which antenna is currently selected allows one to 'point' the array in a particular direction for DF (direction finding). Gonios have since been replaced by electronic switches.

"There were far more than 14 antennas built by the Navy. The USN had 25 sites worldwide at one time. Also, the Air Force Security Service has a similar antenna system which is a three-band design at other locations.

"Herr Wullenweber was kidnapped by the Russians at the end of WWII and, consequently, they also have Wullenweber sites.

"WWII was certainly not the heyday of NAVSECGRU. It wasn't even put in place until the 1950's. We had about 10,000 personnel in SECGRU in the 1970's. In the late 1980's, one site (Rota, Spain) had almost 2000 people at it. The current NAVSECGRU is a shadow of its former self."

• Bill Neill of Westminster, Colorado, adds this information: "Considerable information is available about the Wullenweber antenna and ancillary equipment, much of it from the US Navy. About ten years ago, I was able to obtain the following publications from the Naval Security Group Training Facility at Corry Station, Florida (all numbers prefaced by NAVELEX0101):

108 - Naval Security Group Elements;
102 - Naval Communication Station Design;
103 - HF Radio Propagation and Facility Site Selection;
104 - HF Antenna Systems (contains considerable engineering information on Wullenweber arrays).

"Further, information about the equipment used at Wullenweber sites is found in the following Naval Rate Training Manuals:

0500-LP-068-0110 - Electronics Technician 1 & 2
0500-LP-070-2000 - Electronics Technician 3 & 2
0500-LP-075-0110 - Radioman 1 &C (Chief)
0502-LP-051-1410 - Radioman 3 & 2
0502-LP-051-1610 - Cryptologic Technician M, 3 & 2
0502-LP-051-1760 - Communications Technician O, 3 & 2
0502-LP-051-2500 - Principles of Radio Wave Transmission
0502-LP-051-2550 - Cryptologic Collection Equipments

"As for 'very interesting reading,' probably the more salient would be *The Puzzle Palace* by James Bamford, published in the early 1980's."

Credit Where Credit is Due

The following is exerpted from comments by Sheldon Harvey of Greenfield Park, Quebec, on the March cover story about Radio Canada International.

"I would like to thank *Monitoring Times* for once again giving front page prominence to the plight of Radio Canada International. I am pleased to see that you obviously believe that it is an issue worthy of such coverage.

"First, it is important to give credit where credit is due. The figures relating to costs of operating other international broadcasters, as well as the number of international broadcasting organizations worldwide, were quoted from a 1995 study conducted by Radio Australia.

"Second, if not for the formation and subsequent lobbying of the Coalition to Restore Full RCI Funding, the issue of RCI would have been a dead one five years ago. The overwhelming media coverage throughout Canada and worldwide, combined with the outpouring of support in the way of letters, faxes, e-mail, etc. to the Canadian government from supporters and believers in RCI, surprised everyone, including the Coalition members. The efforts of the Coalition had succeeded in drawing domestic and international attention to a matter which five years ago, hardly anyone wanted to talk about.

"Past history leads us to believe that, come December 1996, we'll be back to the drawing board. The government has indicated that they hope to be able to meet with various groups throughout the balance of this year to find alternate sources of funding for the service, but the time is short and money is difficult to come by.

"It is most disturbing to hear current RCI Executive Director, Mr. Terry Hargreaves, telling listeners to a Montreal talk show that 'it isn't my job to lobby to save Radio Canada International.' The government continually hands the operations of the service back to CBC, resulting in the placing of CBC executives at the helm of a service which they don't believe in.

"The Coalition would like to see a separate, protected budget, somewhat like Canada's contribution to the United Nations.

"On behalf of the Coalition, we wish to publicly thank everyone for their continued support."

In recognition of those who have worked so hard over the past five years, we acknowledge the hard-working members of this committee, who are: Wojtek Gwiazda, Maggy Akerblom, Daniel Black, William Westenhaver, and Sheldon Harvey. You can contact the Coalition at 1250 de la Visitation, Montreal, Quebec, Canada H2L 3B4 (514) 521-3082 fax; or send your support for RCI to the Rt. Honorable Jean Chretien, Prime Minister, House of Commons, Ottawa, Ontario, Canada K1A 0A6, (613) 957-5556 fax.

(Continued on Page 104)

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Leave It At Home

CENTENNIAL OLYMPIC GAMES

It's hard to believe, but ham radio operators are being told not to bring their radios to the Olympics in Atlanta this summer. Leave your handheld radio at home — you won't be allowed inside the gate, says Andrew Funk, KB7UV and a member of the Olympic Broadcast Frequency Coordination Committee.

According to Funk, all RF radiating devices will be strictly controlled at the event. In fact, according to *Worldradio*, all RF gear, including broadcast equipment, will be required to pass a separate Olympic certification inspection in addition to the normal FCC certification.

On The Road Again

No sooner had the United Kingdom's Radiocommunications Agency — the equivalent to the U.S. Federal Communications Commission — settled into their new offices in London's dockside region, than the facility was damaged by a bomb blast. No one was injured, but the RA was forced to pack up and once again go on the road in search of a new home. At press time, it was not known when or where it will be relocated.

800 MHz System Works

Not all is doom and gloom when a new 800 MHz radio system comes to town, says reader George Beard — at least not to the people who use it as part of their job.

"Interesting notice in the paper about the 800 MHz system of the Kansas City, Kansas, Fire Department, " says Beard. According to the report, the new system has given the department state-of-the-art communications. "The new radio service has given us capabilities we have needed for some time," says Fire Chief John Bergman. Not one whimper about blackouts, dead spots, or other complaints that sometimes accompany the installation of these high-tech systems.

The Kansas City, Kansas, story is in contrast to the adjoining Kansas City, Missouri, Fire Department 800 MHz system which reportedly does not work well. Kansas City, MO, is about three times larger in population than Kansas City, KS.

In Portland, Oregon, trouble continued to nag the system when a misaligned microwave dish and rain combined to take that 800 MHz trunked system off the air. One month earlier, a windstorm froze the system, forcing police and firefighters to use cellular and wired telephones to contact their dispatchers.

Keeping Track

According to FCC officials, the total number of (licensed) radio stations in the United States is 12,034. That's up from 11,987 last September. AM stations added only one new station since the last figures came out in late 1995. That brings their total to 4,909. Whereas, thirty-two new FM stations swelled the ranks of facilities using frequency modulation to a total of 5,306.

Porno Jammer

According to newspaper reports, police in Vancouver, Canada, have been harassed by a "radio amateur" who jammed their radio traffic with the sound of a couple having sex. It's extremely dangerous, Vancouver police Inspector Al Forbes said — referring to the jamming, not the sex. The fleshy blasts, believed to be from the soundtrack of pornographic movie, followed the police from channel to channel as they attempted to avoid the jammer.

"They obviously know all the frequencies," said Forbes. In emergencies, police could be heard over the interference, although the grunting was a distraction. Inspector Forbes said it's unlikely the radio pervert will ever be caught.

Er, you might ought to repeat that last transmission, captain. I copied you up to the part where you said, "oooooh, aaaaaaahh, more, more!"

Beware the Motor-Mouth

Anyone who has ever watched the person in the car in front of you [*weave*] as he or she talks on a cellular phone [*Oops! Off on the shoulder again!*] already knows this story.

Researchers say that people with a cell phone in the car have a 34 percent higher risk of having an accident than people who do not have cell phones. What's more, people who use their cell phones a lot (50 minutes or more a month) are five times more likely to crash than motorists who talked less.

The Cellular Telephone Industry dismissed the study, saying, "It has glaring research shortcomings." We wondered, what about those other people who use radios in their cars? Researchers ignored the question of 2-meter and CB users.

Satellite Saves Driver

Truck driver James Foster was not particularly happy when they installed a satellite tracking device in his rig. An invasion of privacy, sniffed the driver. Some time later, Foster, who has diabetes and high blood pressure, collapsed in his truck after leaving Orlando, Florida.

Transcontinental Refrigerated Lines, Foster's employers, used the global positioning system to locate Foster's truck and then called local paramedics. When the EMTs arrived, they reportedly found Foster only hours away from death. There is no mention of whether the event has changed the driver's opinion about the device.

On the Move

CB is, admittedly, a low priority with the FCC these days. There's too much money to be made auctioning off frequencies for the so-called emerging technologies. CBer Danny Lee Coffield managed, however, to get the FCC's attention.

What makes Coffield's run-in the with feds interesting is that he was nailed, not for high-powered operation but for out-of-band operation. Agents of the FCC's Los Angeles office discovered Danny Lee operating a modified Cobra on 27.7744 MHz in September of 1993.

How he was nailed is also interesting: The FCC said that modification of a CB to transmit out-of-band voids the radio's type acceptance (that silver sticker on the radio's back) and thus invalidates anyone's authority to use the radio.

Coffield was fined $2,000 but has managed to avoid paying based on several legal maneuvers. Many, including industry-watcher Fred Maia, sees no indication that the FCC is eager to collect CB fines. Says Maia, "despite the claim of Commissioner Susan Ness that `...the Commission is no paper tiger; FCC rules must be obeyed, and noncompliance will draw meaningful sanctions,' we are skeptical that most CB... violators will be forced to pay anything in the end."

Tube Resurrection

Amazing. Tubes are making a comeback. Driven by hoards of audiophiles who say that solid state equipment simply can't hold a candle to tube-type rigs, AT&T's Kansas City Works is gearing up to once again begin production of the glowing orange wonders!

Atlanta entrepreneur Charles Whitener, Jr., is using the facility to bring the tubes back to life. In fact, Whitener will even employ some of AT&T's old tube vets to work at the plant.

AT&T closed the operation in 1988. Since then the tube market has fallen into the hands of the Russians and Chinese. Full scale production at Kansas City is scheduled to begin next month. The initial output of the factory, some 30,000 Westrex 300B tubes, is already spoken for!

Currently, an original AT&T Westrex 300B goes for $700 and up. Whitener plans to offer his for $350.

Radio Ruckus in LA

Radio stations in Los Angeles were stunned when the latest Arbitron ratings came out. The number one station turned out to be KLVE-FM.

What's the problem with that? KLVE is a Spanish language station. How the station suddenly gained a 40 percent increase on ratings to land in the #1 slot is being hotly debated, but the finger is being pointed at the Arbitron ratings company.

According to a coalition of 13 LA stations contesting the ratings, Arbitron not only sends bilingual material to Hispanic diary-keepers, but pays two dollars instead of one for his or her time and makes three follow-up calls rather than the standard one to ensure the diary comes back.

According to Arbitron, these steps were taken "because Hispanics do not participate in surveys to the same extent as the population at large." In Los Angeles, 36.7 percent of the population 12+ years of age is Hispanic.

"Communications" is written by Larry Miller with help from Rachel Baughn and the following members of the *MT Communications Media Monitoring Team*: Michael Agner, Glen Burnie, MD; David Alpert, New York, NY; George Beard, Kansas City, KS; Art Blair, Orangevale, CA; Robert Coburn, Londonderry, New Hampshire; Robert Hamilton, Baldwin, NY; Maryanne Kehoe, Atlanta, GA; Kevin John Klein, Appleton, WI; James McDonald, Soldier, KS; Mark Murphy, Lockport, NY; Richard Sklar, Seattle, WA ,and Eric Walton, Vancouver, BC. We also consulted the following publications and list their names in appreciation: *Dispatch Monthly, National Scanning, Overdive, Radio World, Worldradio* and *W5YI Report*. Thanks to everyone for your help.

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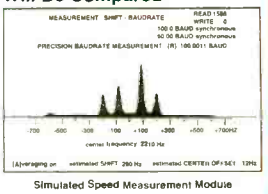
"The Standard Against Which All Future Decoders Will Be Compared"

Many radio amateurs and SWLs are puzzled! Just what are all those strange signals you can hear but not identify on the Short Wave Bands? A few of them such as CW, RTTY, Packet and Amtor you'll know - but what about the many other signals?



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There are some well known CW/RTTY Decoders but then there is CODE-3. It's up to you to make the choice, but it will be easy once you see CODE-3. CODE-3 has an exclusive auto-classification module that tells YOU what you're listening to AND automatically sets you up to start decoding. No other decoder can do this on ALL the modes listed below - and most more expensive decoders have no means of identifying ANY received signals! Why spend more money for other decoders with FEWER features? CODE-3 works on any IBM-compatible computer with MS-DOS with at least 640kb of RAM, and a CGA monitor. CODE-3 includes software, a complete audio to digital FSK converter with built-in 115V ac power supply, and a RS-232 cable, ready to use.

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- ARQ-N-ARQ1000 Duplex Variant
- ARQ-E3-CCIR519 Variant
- POL-ARQ 100 Baud Duplex ARQ
- TDM242/ARQ-M2/4-242
- TDM342/ARQ-M2/4
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- FEC-S • FEC1000 Simplex
- Sports info 300 baud ASCII
- Hellscreiber-Synch/Asynch
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Atlanta 1996

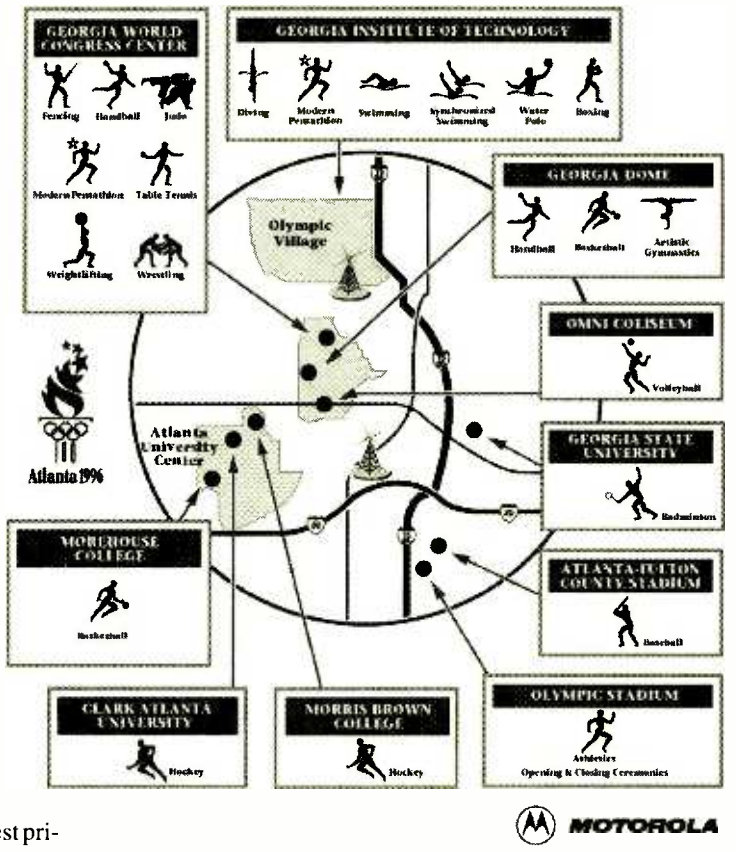
Hot Listening in "Hot-lanta"

By Michael Martin
Frequencies by Roger Cravens

Celebrating the 100th anniversary of the modern Olympic Games, the XXVIth Olympiad will bring 16 days of the hottest monitoring we ever expect to hear, beginning with the gala opening ceremony July 19 in the newly-constructed Olympic Stadium and culminating in the closing ceremony August 4th. The communications networks will not be dismantled until after the Paralympics (Aug. 16-25). Three areas will host the majority of events: the Olympic Ring, Metro Atlanta, and the Southeast United States.

The Olympic Ring is an imaginary circle with a 1.5 mile radius extending outward from the center of Atlanta. Within the ring are venues for 20 sports competitions, the Main Press Center, and the International Broadcast Center. The Olympic Ring and Stone Mountain Park, 16 miles east of Atlanta, are the sites for most of the sessions of the 1996 Games. But soccer, kayaking, rowing, yachting, etc. will be held in locations around Georgia and the southern states, presenting a monitoring and reporting challenge.

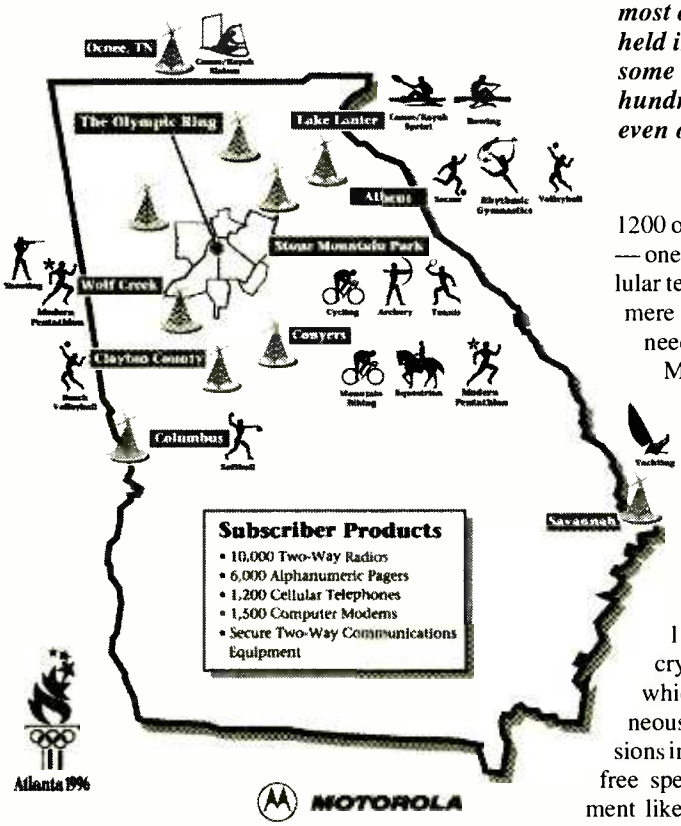
THE OLYMPIC RING



For these few days Atlanta will be hosting the world's finest athletes. Runners, swimmers, basketball players, archers—you name it, and they'll be there. Also here will be Motorola (the official provider of communications equipment) together some of their finest products! They will be renting out well over 10,000 two-way radios, including the following: ASTRO™ SABER™ portables which feature high quality, digital voice capability, pre-stored phone list dialing, programmable function keys, full keypad, and alphanumeric display; ASTRO™ Spectra® mobile units that feature high-quality, digital voice capability in a remote-mounted radio, pre-stored phone list dialing, programmable function keys, full keypad, and alphanumeric display; MTS2000™ portables that are lightweight, ergonomically designed handhelds that feature a top mounted, six character alphanumeric display; and the MCS2000™ mobile—compact and lightweight, Motorola's smallest private systems mobile radio.

Do you want more? How about cellular telephones! Motorola is providing at least

COMMUNICATIONS NETWORK



The far-flung venues of the 1996 Olympic Games will present a formidable challenge to listeners. While most of the games will be held in the Atlanta area, some will take place hundreds of miles away—even outside of Georgia.

1200 of their Micro TAC Elite™ —one of the world's lightest cellular telephones, weighing in at a mere 3.9 ounces. Anticipating a need for over 6000 pagers, Motorola will be providing their new Advisor Gold FLX™ "message receiver." For computer data, there's the 3500 Series Data Service Unit (DSU). For secure two-way communications over telephone lines, at least 1500 SECTEL® 2500 encryption devices will be used which will provide simultaneous voice and data transmissions in a secure mode and a hands free speaker phone. With equipment like this, visiting media may not want to go home!

According to an official press release, "A 900-MHz trunked radio system will offer excellent portable and mobile coverage in downtown Atlanta. In the more remote areas outside of metro Atlanta, 800 MHz trunked radio coverage will be available. Additionally, Motorola will offer its Integrated Enhanced Dispatch Network (iDEN™), which incorporates four communications services (voice dispatch, full-duplex telephone interconnect, text messaging, and future data capabilities) into one network — operating on one device. For the Games, its wide-area capability is an ideal solution for meeting the transportation needs of organizations."

Metro Atlanta is not a small area. It covers five counties and several cities (depending on who you are talking to), with well over 2.5 million people who call it home! But, Metro Atlanta isn't the only place where the Olympics are going to be held. Lake Lanier (Gainesville), Athens, Columbus, and Savannah are additional Georgia locations, plus even the Ocoee River in Tennessee! This means multiple jurisdictions will be involved. Law enforcement, fire, emergency medical services, and many others will be providing important support roles.

It would be cost prohibitive to provide every one of these county/city/state agencies with radios set to the Olympic frequencies, so it is expected that each jurisdiction will be setting up their own network for support services. Outlying regions will probably use the frequencies already allocated for use in their areas by the FCC. One thing that should work in the favor of support teams in the Metro Atlanta area is that most of the agencies there are operating on Motorola's Type Two and Two I 800 MHz Trunking networks (Table 3), using Maxtracs and Spectras as mobile units and STX's and MTX's for portable use. This only requires a simple programming change to enable each agency to talk to each other.

At this time, some of the fire departments have "mutual aid" channels so they can back up each other. Agencies outside the Metro Atlanta area also have their own way of coordinating with others (see Table 5).

Scanners/CB/Weather Stations

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Weather Stations

The Weather Monitor II (7440) comes complete with an-emometer with 40 feet (12.2 m) of cable, external tempera-ture sensor with 25 feet (7.6 m) of cable, junction box with 8 feet (2.4 m) of cable, AC-power adapter, detailed instruc-tion booklet and one year limited factory warranty.

Now you can be your own weather reporter with the Davis Weather Monitor II. Our top-of-the-line weather station combines the most advanced weather monitoring technologies available into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Push a button, and read indoor and outdoor temperature, wind chill, humidity and barometric pressure. Using the Weatherlink with Weather Talker option and your computer, you can issue your own spoken weather reports. Call 313-994-9000 for a demonstration. Our system can even call you. Our package deal includes the new ultra high resolution 1/100 inch or 0.2 mm rain collector part #7852, and the external temperature/humidity sensor, part #7859. The package deal is order #DAV1-Z for $479.95 plus $16.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for $134.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part #7862-Z. Apple Mac Plus or higher including PowerBook, order part number 7866-Z.

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Thermometer with transparent calender & clock display by OSI TC188-Z ... $19.95
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Mfg. suggested list price $769.95/**Special $357.95**
500 Channels · 20 banks · Alpha numeric display
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Frequency Coverage:
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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 one year limited Uniden warranty.

VHF Transceiver

RELM® WHS150-Z Transceiver/SPECIAL

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Cobra IIH40-Z CB 40 channel handheld transceiver .. $79.95
Maxon GMRS210+3-Z GMRS transceiver/SPECIAL $166.95
Ranger RCI2950-Z 25 watt 10 meter transceiver $219.95
Uniden GRANTXL-Z SSB CB Mobile $139.95
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Now, anyone can record and archive their telephone calls and scanner radio traffic with our affordable Eventide brand digital communications loggers. Model VR204DAT4 give you powerful performance with a single DDS-2 DAT drive that records more than 500 channel hours of storage on four channels. For monitoring trunking systems, the Eventide VR240 Mark III digital 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 fast breaking radio action. FCC approved telephone interface is built-in and beeps are selectable on a channel-by-channel basis. Other options include GPS time sync. Order your tape logger from CEI today.

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Photo by Bennett Liles

Among the more familiar venues is Atlanta-Fulton County Stadium, home of the Atlanta Braves, 1995 World Series Champions.

The Who's Who of Law Enforcement

What agencies are involved in the Olympic games that will be using two-way radio communications? More than you can imagine: police, sheriff, Georgia State Patrol, GBI (Georgia Bureau of Investigation), fire, EMS (both private and county services), military (it has been reported that soldiers will be driving the shuttle buses for the athletes, as well as providing special security; even approximately 350 United Nations soldiers will be here), Secret Service (for all those "out of town" dignitaries), BATF, DEA, FBI, Central Intelligence Agency, National Security Agency, Department of Defense, park rangers, airport police (Hartsfield International Airport is the second busiest airport in the world), Department of Transportation, the media, Georgia State Department of Transportation and private traffic services, and many more ABC through XYZ government and private services.

An opportunity for pre-Olympic listening was provided April 16-18, as our government flexed its muscles during a U.S. Security Exercise. The exercise was planned to cover a possible hi-jacking scenario at Hartsfield Airport and a terrorist attack at the Olympic Village located in the central part of Atlanta.

Prior to the event, a report in the New York *Post* quoted unidentified sources familiar with the preparations as saying this army of FBI, CIA, Defense Department, and Bureau of Alcohol, Tobacco, and Firearms forces was to hold mock attacks on the Olympic Village and stage hostage negotiations including bomb disposal drills. Although the Games will be patrolled by as many as 20,000 guards, 10,000 soldiers, and thousands of agents from the FBI, CIA, Secret Service, and Georgia State Patrol staff, the story reported that some experts believe authorities are still inadequately prepared for a biological warfare incident.

Hospitals are another group that will be pressed into service. ACOG (Atlanta Committee for the Olympic Games) has announced that six hospitals will be providing medical care for Olympic athletes. The communications between the EMS and the hospital could be interesting. Also the security guards will be quite active on their radios when the media shows up at the ambulance.

Speaking of the media, journalists and news crews from around the world will be covering their "home town" athletes. Although the media has been warned not to bring in their own two-way equipment without prior approval, we suspect all one will have to do is set his scanner at 30 MHz on the low end and set the top end to the limit and let it scan! One can throw out prior notions of frequency allocations: If you normally hear your local police on 460.150 MHz, it could be used by a wrecker service in Australia, a fast food restaurant in Switzerland, and even a Taxi service in Ghana! Of course, the FCC (with help from Motorola) will have its hands full with the interference from all of these sources. (See last month's feature on "Coordinating RF at the Olympic Games.")

Amateur radio frequencies should also be very active during the Games. Amateurs from other countries will be visiting and bringing their equipment with them. Call signs that you only see in magazines or on another amateur's wall will be heard. In some instances, amateurs will be assisting in communications for some events.

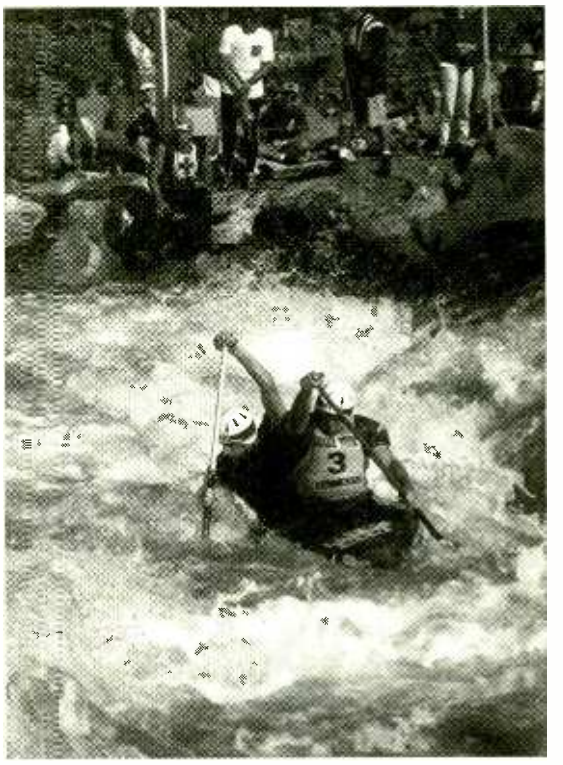
Coordinating Traffic of Different Kind

Atlanta's preoccupation with traffic may soon graduate to an obsession. But high-tech efforts to cope continue, even as the tide of vehicles threatens to flood the city. Among those on which weary motorist can pin their hopes is the Advanced Transportation Management System from the state's Department of Transportation. Plans call for continual radio broadcast of traffic conditions, 41 changeable message signs, touch-screen kiosks at the airport and hotels, and a way for drivers to get up-to-date information by telephone.

This system has employed numerous video cameras mounted atop tall poles around the Metro Atlanta area expressways which are all hooked together by a fiber optic network back to DOT headquarters in Atlanta. From their headquarters, DOT can monitor hundreds of miles of highways coming into and out of Atlanta.

Also assisting in this role are the traffic reporters both in the air and on the ground. Four helicopters (one Jet Ranger and three R22's) as well as a Cessna 172 and multiple ground units will be patrolling the interstates (Table 4).

Atlanta is served by three airports. The major entry to Atlanta is Hartsfield International Airport. A plane either takes off or land about every 30 seconds here. All international traffic is handled through Hartsfield. Everything from Lear Jets to the newest Boeing 777 can be handled and fully serviced. The DeKalb-Peachtree Airport (northeast Atlanta along I-85) and the Fulton County/Charlie Brown Field (west Atlanta along I-20) will take care



The Olympic kayak event will be held on the Ocoee River of eastern Tennessee. Support agencies will use a mixture of local and federal frequencies.

of smaller traffic. The Brown Field also handles traffic for the U.S. Army Forces Command (FORSCOM) travelers. North of Atlanta in Marietta is the very busy Dobbins Air Reserve Base. All branches of the service (USAF, Army, USN & USMC) use this field, and DARB would be a good target to monitor for military transports from other countries (Table 1).

There are a multitude of other agencies that will be involved in the Atlanta Olympic Games, but there is not enough space to cover every one of them. We hope that with the above information and the following frequency tables, anyone with a scanner should be able to wear out more than one set of batteries and cause some serious wear and tear on earphones.

Photo by Bennett Liles

The International Horse Park in Conyers, Ga., is the site of the equestrian and bicycle venues.

The Frequencies to Monitor

Roger Cravens has compiled an outstanding start to listening in and around Atlanta, Georgia. The frequency listings are not all-encompassing, but should give visitors to Georgia and the southern states the best idea of where to start, and to have as many frequencies as possible "in hand" on arrival. (A less abridged list is available at **www.grove.net/mthmpg.html**). Here are some comments from Roger on the following tables.

The frequencies listed are for local and state agencies providing logistic and public service support during the Olympics. As of November 1995, Atlanta switched to 800 MHz trunking (though because of the exceptional need for communications, it's likely the 460 MHz frequencies will be pressed back into use as well). If you are entering 800 MHz trunked frequencies, be sure to enter them in *reverse* sorted order, since the Motorola systems roll from high to low. You cause yourself unnecessary difficulty and stress in trying to listen to trunked frequencies if you don't.

It would be impossible to provide every known federal agency located in Atlanta, even those planned for use during the Olympics. Hopefully, you've been following John Fulford's "Federal File" column, and you should already have an excellent idea of what agency is located where. But just as a reminder, if you'll conduct a serious search between 162.000-174.000, 400.000-406.000, and 406.000-420.000 MHz, you will almost certainly find more than you ever thought possible in one city.

The U.S. Army will be playing a major role in the Olympics. The only two Army posts within the Atlanta area are Fort McPherson and Fort Gillem. Fort McPherson is located just south of Atlanta and is the Headquarters for U.S. Army Forces Command. Fort Gillem is located further south of Atlanta, and is primarily a reserve post, but even so it sees a lot of activity.

Dobbins Air Force Base is located just northeast of Atlanta in Marietta. With the number of high-level of U.S. Government VIPs visiting the Olympics, an excellent bet is that they will be landing at Dobbins. Past Presidents have always landed here, including other important dignitaries.

Because so many people will be traveling to Atlanta from literally all parts of the planet, I have provided the most interesting and active frequencies for Hartsfield International Airport. To a lesser extent, the two smaller airports, Charlie Brown Field and Peachtree-DeKalb airports, will also be exceptionally busy with helicopters and smaller fixed wing aircraft. Peachtree-DeKalb already handles several federal agencies (like the DEA), while Brown Field handles mostly smaller U.S. Army and other military (generally non-U.S. Air Force) aircraft. Coke Cola's main hanger is also located there.

Frequencies are included for MARTA, Atlanta's public transportation system which uses both bus and rail, and also supports handicapped riders. Due to the extreme traffic conditions and downtown streets being blocked off, MARTA will be the only reasonable method of transportation in or around Atlanta. Even if you're not interested in listening to trains, you should make sure you poke these frequencies in and listen for a short time.

The largest listing is for the State of Georgia. If it's happening in Atlanta or other Georgia Olympic sites, the State of Georgia will have people there to monitor the action. Please note especially the Georgia Bureau of Investigation frequencies and the statewide "Metro Fugitive Squad." These frequencies, in combination with the State Highway Patrol, should provide enough fascinating listening to keep you up 'til all hours.

There are others listed as well, not all identified. Besides the Motorola digital system, every available frequency is expected to be used for Olympic support, but you may encounter some unexpected uses, especially with so many international visitors. I strongly recommend you bring a good frequency counter, since the action could pop up anywhere.

We hope to see you here in the Peach State, because "Hot-lanta" is where the action is! So, sit back, turn on the scanner, and let the games begin!

TABLE 1: Military Monitoring

Atlanta 1996

Generally, you will find military in the following ranges -

30.000 - 30.560	US Government
32.000 - 33.000	US Government
34.000 - 35.000	US Government
36.000 - 37.000	US Government
38.000 - 39.000	US Government
40.000 - 42.000	US Government
138.000 - 144.000	US Government
148.000 - 150.800	US Government
162.025 - 174.000	US Government - Some Military
225.000 - 400.000	US Government - Military Aero (AM)

Fort Gillem

030.0900	Explosives and Ordnance Disposal Teams
030.4500	Nuclear Accident Crews
036.3000	Nuclear Accident Crews
038.3000	Nuclear Accident Crews
038.5000	Nuclear Accident Crews
041.5000	Army airfields
049.7000	Explosives and Ordnance Disposal Teams
049.8000	Explosives and Ordnance Disposal Teams
119.5000	Airport control tower
119.6500	Aircraft Terminal Information Service (ATIS)
122.5500	Aircraft Terminal Information Service (ATIS)
122.9500	Helicopter Operations
139.0000	Explosives and Ordnance Disposal Teams
139.1750	Explosives and Ordnance Disposal Teams
141.0750	902d Military Intelligence Group
142.9500	902d Military Intelligence Group
143.0550	902d Military Intelligence Group
148.9250	902d Military Intelligence Group
149.8000	902d Military Intelligence Group
163.0375	902d Military Intelligence Group
163.5600	Research and Development Operations
163.5625	902d Military Intelligence Group
163.5625	Research and development operations
165.0375	Rail Operations
165.0825	Fire dispatch
165.0850	Military Police
165.0850	Military Police (supports Fort McPherson)
165.0875	Military Police (supports fort McPherson)
165.1875	Military Police alternate

Fort McPherson

139.3500	Post Operations
141.0750	902d Military Intelligence Group
141.3250	3d Military Police Group (CID)
142.3250	3d Military Police Group (CID)
142.9500	902d Military Intelligence Group
143.0550	902d Military Intelligence Group
143.3750	3d Military Police Group (CID)
148.5750	Paging
148.5750	Post pagers
148.7000	3d Military Police Group (CID)
148.7000	Base Operations
148.7000	Miltiary Police
148.9250	902d Military Intelligence Group
149.7500	Fire dispatch
149.8000	902d Military Intelligence Group
150.5500	3d Military Police Group (CID)
150.5750	Other/Unknown
150.5750	Post Operations - probably medical units
150.6750	3d Military Police Group (CID)
163.0375	902d Military Intelligence Group
163.5875	Military Police
165.0350	Post Building Maintanance
165.0375	Post Civil Engineering/building maintenance
165.0625	Military Police/Security ("Blue Knight")
165.0625	Police Dispatch
165.0825	Fire dispatch
165.0850	Military Police
165.0875	Fire and Military Police
165.1875	Military Police alternate
165.1875	Military Police/Security ("Blue Knight")
166.9000	Frequency in use-purpose not determined
172.3000	3d Military Police Group (CID)
406.9375	3d Military Police Group (CID)
406.9750	3d Military Police Group (CID)
407.4750	3d Military Police Group (CID)
407.5750	3d Military Police Group (CID)
408.4250	3d Military Police Group (CID)
412.8250	3d Military Police Group (CID)
412.9000	3d Military Police Group (CID)
412.9500	3d Military Police Group (CID)
413.0250	3d Military Police Group (CID)
413.2250	3d Military Police Group (CID)
413.2375	3d Military Police Group (CID)
413.4250	3d Military Police Group (CID)
413.5250	3d Military Police Group (CID)
413.5250	Base Operations
423.5250	3d Military Police Group (CID)

Dobbins Air Force Base/Naval Air Station

030.5000	AFB/Lockheed tac sec test
030.5100	"Blue Night" AF/N Ground Air
030.8400	AFB/Lockheed operations air
031.2000	AFB/Lockheed operations air
036.8500	"Blue Night" Navy Air Force
047.0000	National guard
049.9500	"Blue Night" AF/N Ground Air
119.3000 381.650	Approach/departure
120.7500 397.200	AFB Tower
120.7500 397.200	Tower primary
121.0000 385.500	approach/departure
121.8000	Res Trn fac-grnd con air
123.3500	AFB/Lockheed experimental flight test
123.5500	AFB/Lockheed primary flight test
125.3000 275.800	ground control
125.3000 275.800	ground primary
126.0500 302.000	AFB Rapcon
126.0500 312.400	GCA
134.2000 302.000	GCA
138.0250	"Blue Night" AF/N Ground Air
138.1000 309.200	GCA
138.3600	"Blue Night" AF/N Ground Air
138.9500	AFB/Naval air maint/fire/security
138.9600	"Blue Night" Navy Air Force
139.5450	"Blue Night" Navy
140.8950	"Blue Night" Navy
142.2000	"Blue Night" AF/N Ground Air
148.1000	"Blue Night" AF/N Ground Air
148.5250	"Blue Night" AF/N Ground Air
148.5500	"Blue Night" AF/N Ground Air
149.1500	"Blue Night" AF/N Ground Air
149.4750	Security Police & Naval Crash
150.0900	"Blue Night" Navy Air Force
150.6600	"Blue Night" AF/N Ground Air
151.9550	AFB/Lockheed operations air
153.3200	AFB/Lockheed in-plant page/tone/voice
158.3100	AFB/Lockheed transportation disp
163.4875	Security Police
163.5000	Security Police
164.9625	disaster preparedness
165.0125	maintenance (Dock 1)
165.0600	AFB/Lockheed security
165.0600 330.125	AFB/Lockheed security
165.1000	maintenance
165.1125	grnd ctrl, ramp vehicles, tower
165.1375	ANG maint cntrl
165.1625	"Dapper Dan" National Guard
172.3000	disaster preparedness
173.1500	disaster preparedness
173.4125	"Blue Night" AF/N Ground Air
173.4375	"Blue Night" AF/N Ground Air
173.5875	Fire & Crash
229.300	Military air
233.700	VR-46 ops Navy C-9 transports
234.500	700 TAS air-to-air/c-130
239.000	Military air
239.900	Peach operations/116 TFW operations
242.400	Air to Air (mohawks)
253.500	Marine Air, Channel 7 (Georgia wide)
255.400	Marine Air, Channel 17, flt svc sta
257.800	Marine Air, Channel 6 (listed as "Civ")
261.200	Military air
264.200	VMO-4 sqdn operations
266.300	Military air
271.600	ATIS
276.400	Marine approach
277.500	Marine Air, Channel 12, "Skywatch"
279.200	Military air
285.100	VA-205 sqdn maintenance
295.100	Military air
300.900	Marine Air, Channel 14, "NEST 2"
301.200	Marine Air, Channel 19, "TAC 1"
302.000	GCA
303.100	Marine Air, Channel 14, "NEST 1"
309.200	approach
309.200	Military air
311.300	Military air
312.400	GCA
320.000	Military air
326.100	Military air maintenance
333.300	Military air
333.550	
340.200	Naval Air Station opns pilot to disp
342.500	Marine Air, Channel 16, "Metro Weather"
343.600	Marine Air/Atlanta Center
346.800	GCA
356.450	Marine Air, Channel 10
359.100	Military air
360.200	Naval Air Station gnd, Marine Channel 15
372.200	Operations pilot to dispatch
375.800	ground control
381.300	command post/700 tac air sqdn
381.600	Marine Air, Channel 5/Atlanta Center
382.600	AFB/Lockheed primary flight test
384.800	Military air
385.500	Air Traffic Control
396.100	Military air
462.275	AFB/Lockheed security, fire, crash, med
462.625	AFB/Lockheed facilities eng & maint

** NEST: Nuclear Emergency Search Teams*

TABLE 2: Atlanta Area Airports

Atlanta 1996

Hartsfield International Airport

118.350	Arrival South
119.100	Tower rwys 9/27 (L & R)
119.500	Tower rwys 8/26 (L & R)
119.650	ATIS - arrival-automatic terminal info
120.500	Gate Hold
121.650	Depart Clearance
121.750	Ground rwys 9/27 (L & R)
121.900	Ground rwys 8/26 (L & R)
123.850	Tower rwy 9l/27r
125.550	ATIS - departure-automatic terminal info
127.250	Arrival north
127.900	Arrival south of V-18
129.270	Ramp #3
129.370	Ramp #4
131.250	Ramp #5
131.450	Ramp #1 Delta ground ops

131.850	Ramp #2 Delta company freq.
154.190	Primary (TAC-1)
257.600	Tower see 119.1 & 119.5
348.600	Ground see 121.75 & 121.9
463.025	Med-2, hosp/ambulance
464.100	Security WNPR718
464.525	Maintenance WSD698 lic. to Delta, KNJL861

Atlanta Police at Hartsfield

853.9875	Airport Police
853.4625	Airport Police
852.9625	Airport Police
852.4625	Airport Police
851.9625	Airport Police

Dekalb-Peachtree Airport

119.3000	Atlanta approach/departure
120.0000	Tower (tower-nights)
120.9000	CTAF (tower-days)
120.9000	Tower
121.6000	Ground control
122.9500	UNICOM
125.2000	Clearance
128.4000	ATIS
381.6500	Atlanta approach/departure
464.6375	Dekalb-Peachtree Air

Charlie Brown Field

118.5000	CTAF/tower
119.0000	ATIS
119.5000	Airport/facility control tower
119.8000	Atlanta approach/departure control
120.7000	Tower
121.0000	Approach/departure control
121.7000	Ground control
122.5500	Aircraft terminal information service (ATIS)
122.9500	UNICOM/helicopter operations
122.9750	Army aviation
123.0500	CTAF/UNICOM
123.7000	Clearance
141.3500	U.S. Army FORSCOM VIP Operations
149.7500	Army aviation
254.2500	Aircraft approach/departure comms
255.4000	Flight service station
257.8000	Control tower
348.6000	Control tower/ground control
464.9250	Lockheed representative

TABLE 3: Atlanta Area Public Safety/Law Enforcement

Atlanta 1996

City of Atlanta

154.9050	Sheriff's intra-county statewide net
154.9350	Sheriff's inter-city statewide net
155.3400	Atlanta/Fulton County EMS
155.3700	Police/Sheriff statewide intersystem
155.7000	Detectives (Primary) duped w/460.4250
155.8500	Detectives (Alternate)
156.0450	Detectives (Alternate) output from
151.1300	(i-85 common)
156.0500	
156.0650	
156.0800	
156.0900	
156.1100	
156.1250	
156.1400	
156.1550	
156.1700	
156.1850	
156.4500	Detectives (Alternate)
158.9025	
158.9100	
158.9175	
158.9625	
158.9700	
158.9900	
159.0000	
159.0050	
159.0350	
159.0500	
159.0650	
159.1100	
453.2500	Channel 10 (com-net) Special Opns (Red Dog Sqd)
453.3625	Public Works (input to 458.3625)
453.4375	
453.6625	
456.4875	Usage unknown
457.1000	Atlanta Housing Authority
458.2500	Channel 10 (com-net) Special Opns (Red Dog Sqd)
458.4375	
458.6625	
460.0250	Zone 2 dispatch NE (now 800-trunked)
460.0750	Zone 3 dispatch SE (now 800-trunked)
460.1500	Zone 5 dispatch Downtown (Ambassador Security) (now 800-trunked)
460.2000	Inquiries/SWAT (Atlanta wide)(TAC-1)
460.3000	Zone 1 dispatch NW (now 800-trunked)
460.3500	Zone 4 dispatch SW (now 800-trunked)
460.4250	Detectives/Administration (F-8) (echos 155.7000)
460.4750	Zone 6 dispatch E Central (now 800-trunked)
460.5250	Police tactical (TAC-2) Red Dog/Special Ops
460.5500	Police mobile data/phone patch (TAC-3) CH 12, split 465.5500, handi-talky dup
461.0250	Atlanta Housing Authority
462.9500	Atlanta/Fulton County EMS
462.9500	Atlanta/Fulton County EMS
462.9750	Atlanta/Fulton County EMS
464.8000	Atlanta/Fulton County EMS
466.0250	Atlanta Housing Authority
860.9375	Police & Fire
860.7625	Police & Fire
860.4875	City Government
860.4625	City Government
860.4375	Police & Fire
860.2375	Police & Fire
859.9375	Police & Fire
859.7625	Police & Fire
859.4875	City Government
859.4625	City Government
859.4375	Police & Fire
859.2375	Police & Fire
858.9375	Police & Fire
858.7625	Police & Fire
858.4875	City Government
858.4625	City Government
858.4375	Police & Fire
858.2375	Police & Fire
857.4875	City Government
857.4625	City Government
856.4875	City Government
856.4625	City Government
853.1125	City Government
851.7375	New freq-prob City Government

MARTA

452.3750	F-1 north-south train
452.4250	Avondale & College Park yards
452.4750	F-1 Police
452.6375	MARTA
452.6625	MARTA
452.6750	F-3 Police
452.6875	MARTA
452.7125	MARTA
452.7375	MARTA
452.7750	F-2 police/East-West train
452.8250	College Park yard
452.8750	F-5 train maintenance
453.2875	Miscellaneous/Mobile Operations
453.6375	Miscellaneous/Mobile Operations
453.6625	Miscellaneous/Mobile Operations
453.6875	Miscellaneous/Mobile Operations
453.7000	F-2 A-Div. buses; Eastside
453.7125	Miscellaneous/Mobile Operations
453.7250	Georgia, State of City-Wide Voice & Emergency
453.7375	Miscellaneous/Mobile Operations
453.7750	F-3 B-Div. buses; North & West
453.8750	F-4 C-Div. buses; Central & West
453.9250	F-6 Supervision/Maintenance vehicles
453.9500	F-5 buses; Citywide and digital signaling
457.3750	
457.4750	
457.6375	
457.6625	
457.6750	
457.6875	
457.7125	
457.7375	
457.7750	
457.8250	
457.8750	
458.7000	
458.7250	
458.7750	
458.8750	
458.9250	
458.9500	
462.6250	Miscellaneous Operations
462.7000	Miscellaneous Operations
467.6250	
467.7000	

Fulton County Frequencies

153.7850	
153.9950	
156.0900	
173.3900	
451.8250	
456.8250	
458.5500	
458.5750	
859.3875	
858.4125	
858.3875	
857.4125	
857.3875	
856.3875	
855.7375	
855.4625	
855.2375	
821.0000	
453.5750	Emergency Management
462.6750	Emergency Management
854.5625	Fire (simulcast)
854.5375	Fire (simulcast)
154.3250	Fire dispatch
154.2800	Fire mutual aid (statewide)
855.6625	Fire/EMS
154.2350	Fireground
155.3400	Fulton County EMS
155.3250	Fulton County EMS (F-1)
155.2350	Fulton County EMS (F-2)
901.0000	Fulton County Housing Authority
154.9350	Intercounty Law Net (Statewide)
155.3700	Intersystem Law Net (Statewide)
856.4125	Phone patch
854.5125	Phone patch
155.4150	Police Dispatch (North Fulton)
158.7750	Police Dispatch (South Fulton)/County Services
468.0000	(MED-1 Ambulance)
463.0000	(MED-1 Hospital)
462.9750	(MED-10/Coordinating Chan Hospital)
467.9750	(MED-10/Coordinating Chan Ambulance)
468.0250	(MED-2 Ambulance)
463.0250	(MED-2 Hospital)
468.0500	(MED-3 Ambulance)
463.0500	(MED-3 Hospital)
468.0750	(MED-4 Ambulance)
463.0750	(MED-4 Hospital)
468.1000	(MED-5 Ambulance)
463.1000	(MED-5 Hospital)
468.1250	(MED-6 Ambulance)
463.1250	(MED-6 Hospital)
468.1500	(MED-7 Ambulance)
463.1500	(MED-7 Hospital)
468.1750	(MED-8 Ambulance)
463.1750	(MED-8 Hospital)
462.9500	(MED-9/Coordinating channel hospital)
467.9500	(MED-9/Coordinating channel ambulance)
855.1875	Sheriff's Office

TABLE 4: State of Georgia Frequencies

Atlanta 1996

045.2400	045.5600	047.3200	047.6200
151.0250	151.0850	151.1150	151.1720
151.2200	151.3550	151.4600	153.7400
153.7850	153.8150	153.8450	153.9050
153.9200	153.9350	154.0250	154.0550
154.0850	154.1000	154.4150	154.6800
154.6950	154.7250	154.7850	154.8000
154.8900	154.9650	155.0250	155.1000
155.1300	155.2050	155.2350	155.4300
155.4450	155.6100	155.7450	155.7600
155.8950	155.9250	155.9400	156.0000
156.0150	156.6500	156.8000	158.7450
158.7600	158.8050	158.8350	158.8650
158.8800	158.9250	158.9400	158.9550
159.0000	159.0450	159.4200	159.6000
159.8250	159.9300	160.1250	452.1875
453.0625	453.0875	453.1500	453.3375
453.4750	453.5125	453.6250	453.6750
453.7500	453.7625	453.8375	453.8500
453.9250	453.9750	458.0375	458.0500
458.0625	458.0875	458.1875	458.3375
458.4250	458.4750	458.5125	458.5500
458.6750	458.7250	458.7500	458.7625
458.8375	458.8500	458.9000	458.9250
458.9750	460.0125	460.0625	460.2250
460.4625	460.5000	460.6250	464.9750
465.0125	465.0625	465.2250	465.3625
465.4625	465.5000	469.1000	469.9750
867.6250	867.2625	853.4625	852.4375
823.6000	823.0750	822.6250	822.6000
822.2625	821.6500	821.5125	821.0125
808.4625	807.4375		

151.4450	(new in 1995-use unknown-prob GBI)
153.9650	(new in 1995-department of health ?)
153.9950	(new in 1995-use unknown)
155.1450	(new in 1995-use unknown)
155.7300	(new in 1995-use unknown)
159.7500	(new in 1995-use unknown)
453.5750	(new in 1995-Georgia/Fulton County EMA)
458.5750	(new in 1995-use unknown)
614.0000	(new in 1995-use unknown)
867.6000	(new in 1995-use unknown)
821.0000	(new in 1995-paired with 806.0000-use unknown)
806.0000	(new in 1995-paired with 614.0000-use unknown)
158.8950	Clayton Co (F-2) Sheriff/State of Georgia
154.8600	Cobb Co/State of GA Joint Task Force
153.8600	Department of Education
453.2250	Dept of Natural Resources (Statewide Ops)
160.2000	Dept of Transportation (Trucking & Multi-Use)
122.9500	Dept of Natural Resources/Air Coordination
151.1450	Forestry Commission (District Administration)
151.2800	Forestry (District Administration)
151.3700	Forestry (District Administration)
151.4000	Forestry (District Administration)
151.2050	Forestry (State Administration)
151.4750	Forestry (State Administration)
121.7000	Fulton Co Airport (Ground Control)
154.8150	Georgia Bureau of Investigation/State Patrol (F-2)(mobiles)
155.5050	Georgia Bureau of Investigation (F-1)
155.5500	Georgia Bureau of Investigation
155.7900	Georgia Bureau of Investigation
159.0750	Georgia Bureau of Investigation
159.7950	Georgia Bureau of Investigation
159.9750	Georgia Bureau of Investigation
159.1200	Georgia Dept of corrections/Metro Correctional Inst
039.5800	Georgia Emergency management agency
045.1200	Georgia Emergency management agency (f-2)
155.1600	Georgia, Supported Georgia K-9 statewide rescue
453.4875	Georgia State Patrol (mobile extender-h/t to vehicle)
458.4875	Georgia State Patrol (mobile extender-h/t to vehicle)
155.1900	Georgia State Patrol/GBI relay (base @ 155.9100 output)
453.0500	Georgia State University Police (including public call boxes)
453.6000	Georgia State University Police (campus-wide maintenance)
458.2250	Georgia World Congress Center (exact use unknown)
458.6250	Congress Center (exact use unknown)
155.4600	Governor's Mansion (general ops/security-trunked?)
151.0700	Highway Department (engineering)
047.2400	Highway Department (metro atlanta)
047.3000	Highway Department (statewide)
047.3400	Highway Department (statewide)
047.4000	Highway Department (statewide)
151.1000	Highway Department (survey & construction)
453.7250	Marta City-Wide Voice & Emergency
156.2250	Metro Fugative Squad (Wants & Warrents) (M-Channel)
158.9850	Metro Fugative Squad (Wants & Warrents)
047.4600	National Red Cross/Georgia Coordination
155.0550	State Cap Sec & Bldg Authority (security dispatch)(old channel)
156.1800	State Cap Sec & Bldg Auth (capitol security-simplex)(old channel)
896.0000	State Capitol Security & Building Authority (trunked)
868.8500	SCS&BA (trunked)
868.6000	SCS&BA (trunked)
868.0750	SCS&BA (trunked)
867.0375	SCS&BA (trunked)
866.6500	SCS&BA (trunked)
866.5125	SCS&BA (trunked)
866.0125	SCS&BA (trunked)
155.4750	State Patrol (Nationwiide Law Enforcement Net)/GBI
042.0200	State Patrol Intersystem (statewide)/GBI
154.9050	State Patrol, intrastate coordinating (F-3)/I
154.9350	State Patrol, Intrastate Coordinating (Metro Fugative: TAC-2)/I
155.9100	State Patrol, Main Dispatch (Metro Atlanta)/ GBI (mobile input 155.1900)
155.3700	State Patrol, Statewide Intersystem (all police agencies)/GBI
453.0375	State Vehicle Repeaters
453.1375	State Vehicle Repeaters
453.1875	State Vehicle Repeaters
042.1800	Statewide Alcohol & Beverage Control
154.2800	Statewide fire coordination network
122.9000	UNICOM (also listed as 122.9500)

TABLE 5: Venues Outside Atlanta

Atlanta 1996

SAVANNAH: Chatham County

155.3400	Chatham County Emergency Medical Serv.		
153.8000	153.9650	154.2800	154.3850
154.4300	154.6500	154.7400	154.9050
154.9350	154.9650	155.0100	155.1300
155.1600			
155.3700	155.4750	155.9100	156.0000
156.0300	156.1500	158.9100	458.0250
458.0750	458.1250	458.1750	458.2750
460.5000	463.0000	463.0250	463.0500
463.0750	463.1000	463.1250	463.1500
463.1750	468.0000	468.0250	468.0500
468.0750	468.1000	468.1250	468.1500
468.1750	859.4625	858.4625	857.4625
856.4625	853.6375		

Port Wentworth

154.4000	155.0550

City of Savannah

045.0800	045.2400	045.3600	045.4000
153.8300	153.8900	154.1750	154.3100
154.9950	158.9550	453.2500	453.3250
453.4000	453.8750	453.9250	453.9625
458.2500	458.3250	458.4000	458.8750
458.9250	458.9625	460.0250	460.2000
460.3250	460.4000	460.4750	465.0250
465.2000	465.3250	465.4000	465.4750
465.5000	860.9875	859.9875	858.9875
857.9875	857.7625	856.9875	856.7625
928.3935	952.3935		

City of Tybee Island

154.1000	154.4450	154.7100

TENNESSEE

Depending on which dignitary wants to visit this site, the Air Guard should be on alert for this exercise. Here's a short listing that was mailed to me.

Tennessee Air National Guard

138.1000	Command Post
163.4875	Security)
163.5875	Fire & Crash
165.1125	Security
165.1625	Job Control

The actual fun will be held in Polk County, so try thes for public service support activities. Other support agencies such as the Chattanooga, TN, Sheriff's Dept may be using their own frequencies. Also check Forest Service frequencies.

Polk County

154.7550	
154.8600	
156.0150	
156.0900	
155.2050	Ambulance to Base
155.3400	Ambulance to Hospital
155.2800	Hosp to Hosp Net
037.2600	Sheriff Ofc State Net
462.9500	Special Emergency
462.9750	Special Emergency

State of Tennessee

042.5600	
045.6200	
072.7800	
155.4300	
460.5250	
460.5500	
155.6550	Dept of Correctons
156.2100	Dept of Correctons
158.7750	Dept of Correctons
042.2600	Dispatch F-1
042.4200	Dispatch F-1
042.5600	Dispatch F-3
154.7700	Drug Task Force
158.8350	Emerg Mgmt-Opns
155.4450	Environmental
159.3000	Environmental
042.2800	Executive Channel
042.7400	Input to C-8
155.3700	Intercity
072.0200	Mtn Radio Links
072.3000	Mtn Radio Links
072.3800	Mtn Radio Links
072.5800	Mtn Radio Links
072.7800	Mtn Radio Links
072.8000	Mtn Radio Links
072.8600	Mtn Radio Links
451.5500	Mtn Radio Links
451.6000	Mtn Radio Links
452.2500	Mtn Radio Links
452.2750	Mtn Radio Links
452.4500	Mtn Radio Links
460.4000	Mutual Aid
155.4750	Nat'l Law Net
154.9050	Portable Extender
037.9000	State Rescue
154.6650	Surveillance
154.6800	Surveillance
155.4600	Surveillance
045.5800	Tactical F-5
045.6200	Tactical F-6
045.6600	Tactical F-7
045.7000	Tactical F-8
155.4300	TN Bureau of Inv
460.5250	TN Bureau of Inv
460.5500	TN Bureau of Inv
045.3600	TN Emerg Mgmt F-1
045.4400	TN Emerg Mgmt F-2

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American Named Official Airlines of Expo 96

By Larry Van Horn
Expo '96 Publicity Chairman

American Airlines has been named the official airlines of the 1996 Grove Communications Expo. Expo attendees will be able to get special round trip rates from American by using a special registration number and toll free telephone number.

The airline is offering a five percent discount off American's lowest discount rate to Expo goers. This rate is subject to availability and all fare rules and restrictions apply. This discount may not be used in conjunction with other discounted type fares (i.e.-Senior, Child, Military/Government, Companion, etc.)

Attendees desiring to travel coach will get a 10 percent savings on their round trip ticket purchase and those traveling first class can get a five percent discount.

Some restrictions do apply to get the special rate. Travel is to and from Atlanta (round trip only). Travel must originate and end in the continental United States, Hawaii, San Juan, St. Thomas, St. Croix, Bermuda, or the Bahamas. Coach tickets must be purchased seven days in advance. A $50.00 administrative charge applies for reissue or refund.

To make reservations and receive the special rates mentioned above, attendees must use the American meetings services desk toll free number — **1-800-433-1790.** Make sure you use the special American Star Number **S2406MC** when confirming your reservations for the Expo.

The Grove Expo has also selected Avis as the official Rent A Car for the 1996 Expo. Special rental rates are available to attendees one week before and after the Expo.

Should a lower qualifying rate become available, Avis will honor a five percent discount on that rate. You must return the vehicle to the same renting location or additional charges will apply. Weekend daily rates are available from noon Thursday through Monday at 11:59 p.m. Rates do not include tax, optional coverages, or gas refueling charges. Renter must meet Avis minimum age, driver, and credit requirements. State imposed surcharges are additional.

If you want the special Expo 96 rate from Avis, you must use the assigned Meeting Discount Number — **J627344** — by calling the special toll-free 800 number: **1-800-331-1600**.

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Specialty Topics

New to this year's Expo is a series of talks loosely defined as the computer/technology track. At 9:00 a.m. Saturday morning, John Fulford will kick it off with a *Beginners Guide to Bug Hunts*. Regular attenders know that the two bug hunts conducted during the Expo have become a very popular part of the program each year. John's forum (which will also address direction-finding techniques in general) will help anyone who might be hesitant to join in on the fun.

When do you say "good buy" or "goodbye" to used equipment? Old timers hold old equipment in high esteem. But are there really bargains in the flea market? Find out at 10:15 a.m. Saturday morning during Bob Grove's *Used Equipment — Bargain, Bust, or Investment* forum.

People in the radio hobby have an overriding interest in communicating. The Internet has gotten rid of the static and distance problems of radio, and has enormously increased the number of people communicating and sharing information. During Bill Grove's *Internet and the Radio Hobbyist* forum on Saturday at 1:00 p.m., learn how the two hobbies cross over and how you can benefit from adding this new capability to your skills.

What is available for the radio enthusiast on the software market? *MT*'s John Catalano will review and demonstrate the latest logging database, radio control, and data decoding programs at 2:15 p.m. on Saturday afternoon.

Anything we do in space with satellites requires knowing how to track them, and most applications today require fast, accurate predictions. Dr. TS Kelso of the *Satellite Times* staff will cover the basics of satellite tracking and review various software programs available to make this task easy and fun during his forum Saturday afternoon.

Sunday morning will feature three more specialty/computer/technology forums. Bill Grove will return to the podium at 9:00 a.m. to explore the world of space and cyberspace.

FM/TV DXing is a specialty area a lot of hobbyists are interested in exploring. What equipment and what antenna do you need? What are E-skip, tropo, and the more exotic modes of propagation like aurora and meteor scatter? Find out as *MT* columnist Doug Smith challenges you with *FM/TV: 1000 Mile TV Reception - You Can Do It.*

You know they are up there, but just what do you need to know to be able to watch the U.S. Space Shuttle or Russian Mir space station track across the sky? Dr. TS Kelso's *Visually Observing Earth Satellites* forum will close out the specialty forums at 11:30 a.m. Sunday. This seminar will go beyond knowing where the satellites are, to knowing when they will be visible and discussing some simple projects to test your skills.

Complete details on the Expo 96 are available at the Grove Internet home page on the Internet. Point your web browser to URL address: ***http://www.grove.net/hmpgexpo.html*** for the latest information and Expo updates. You can also register for the Expo and get additional information by sending e-mail to the following address: **expo96@grove.net**. An automatic Expo information service is available by sending e-mail to: **expo96-info@grove.net.**

To register by phone, call the Grove order line at 1-800-438-8155 or by fax at 1-704-837-2216.

The Grove booth is always a popular browsing location for Expo participants, and this year should be no different. You can expect great bargains from all of our exhibitors!

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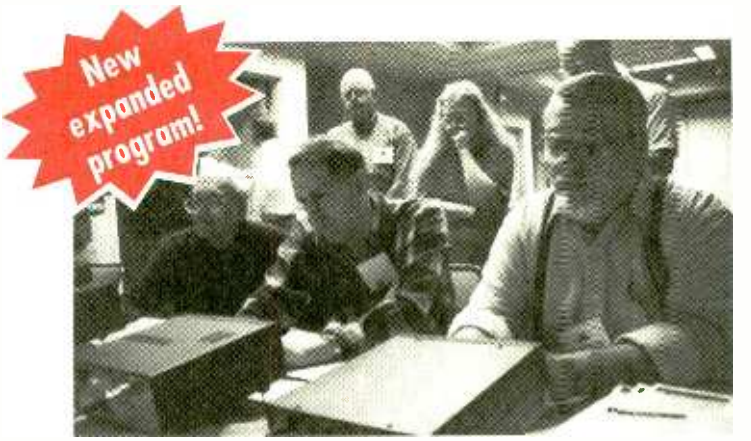


Come to Grove Communications EXPO '96!

If you are interested in **electronic communications**, the **Grove Communications Expo** is your event of the year! Expo '96 in Atlanta, to be held **Oct. 18-20**, unites you with hundreds of like-minded communications enthusiasts who assemble to **exchange information, introduce new products, and offer technical help**. This is an outstanding opportunity for you to move into the information age! This year's expanded program includes over **50 seminars, forums, demonstrations and events** in the following areas:

- **Computers and the Internet**
- **Shortwave and scanner monitoring**
- **Satellite communications**
- **Radio astronomy**

As in recent years, the Expo will feature exhibits by top-name vendors, a hands-on listening post, club booths and prizes. Tours will be conducted to the **Delta Communications Center, Atlanta Fire Communi-cations, Atlanta/Fulton County Communications Center** and more.

Keynote speaker at this year's banquet will be **Ron Parise, NASA astronaut** and astronomer. Parise, WA4SIR, has made two trips into space aboard the shuttle and operated the shuttle's amateur radio experiments (**SAREX**). Several special workshops, forums and exhibits will be sponsored this year by the Society of Radio Astronomers (**SARA**), which will be conducting their fall conference in conjunction with the Expo!

This year's scheduled exhibitors include **AMSAT, Bearcat Radio Club, Cellular Security Group, Computer Aided Technology, Dallas Remote Imaging Group, Electronic Distributors (EDCO), Grove Enterprises, OptoElectronics, Radio Astronomy Supplies, Radio Progressive, Satscan Electronics, Scan Master, Signal Intelligence, Sony, Swagur Enterprises, Transel Technologies**

Atlanta Airport Hilton
October 18-20, 1996

Registration is $55 per person (take $10 off if you bring a first-time registrant with you). Rooms at the Airport Hilton available at the conven-tion rate of $76 per night, single or double occupancy. Call 1-800-Hiltons.

For more information and schedules, set your web browser to **http://www.grove.net/hmpgexpo.html**, e-mail us at **expo96-info@grove.net**, phone us at **1-800-438-8155**, or fax us at **1-704-837-2216**.

Broadcasting War in ETHIOPIA

Oromo station powers up for another round

Mr. Taye Teferra, European coordinator of Voice of Oromo Liberation, proudly presents some of the letters he receives each day.

By Harald Kuhl

The region called the Horn of Africa has been a playground for clandestine broadcasters for many years now. Starting in the mid 80's, stations like Voice of the Broad Masses of Eritrea, Voice of Tigre Revolution, or Voice of Ethiopian Unity were broadcasting from Sudan towards Ethiopia. In return, the Ethiopian state broadcaster—then called Voice of Revolutionary Ethiopia—was home for several past clandestine radio operations such as Radio SPLA broadcasting towards the Sudan, Radio Halgan with programs for Somalia, Radio Freedom broadcasting to South Africa, and Voice of Namibia for listeners in that country.

Every time the political environment changed, the clandestine radio scene did as well. When the Ethiopian government of Mengistu was overthrown by a coalition of opposition forces in July of 1991, a lot of clandestine broadcasters in the region shortly thereafter ceased to exist. At least for a while.

Today the Voice of Sudan—or Voice of the Sudan's Radio of the Sudanese National Democratic Alliance, as they called themselves in a recent English program section—broadcasts via facilities in Eritrea towards Sudan. Eritrea itself is targeted by a station calling itself Voice of Eritrea, broadcasting via an Iraqi state broadcaster frequency.

Some of the material SBO is producing at their Berlin offices, including a tape containing one of their programs. These tapes are sent to a broadcaster in Southeast Europe for transmissions in the 49 meter band.

The former Voice of Revolutionary Ethiopia changed its name to Voice of Ethiopia and, more recently, to Radio Ethiopia. Their facilities today are used several times a week for broadcasting programs of humanitarian organizations via a service called Radio Voice of Peace towards Rwanda—namely, the Radio Amahoro service—and towards Somalia.

Radio Fana—or Radio Torch as it is called in English—is another station that is based in Addis Ababa. They transmit on 6210 kHz and just recently converted from a station of the ruling party, the Ethiopian People's Revolutionary Democratic Front, to a private station, supported by non-governmental organizations (NGOs) and the US Information Agency (USIA). Radio Fana was apparently formed from the remains of two other former clandestine radio stations: Voice of the Ethiopian People for Peace, Democracy, and Freedom and Voice of the Broad Oromo Masses.

Though there is a lot of broadcasting activity going on, life is not easy for journalists living in the region. Based in Paris, France,

Reporters Sans Frontieres (reporters without borders) was founded in 1985 and has seven branches (located in Belgium, France, Germany, Italy, Spain, Sweden, and Switzerland) as well as members in 83 countries around the globe. It is an independent organization that defends imprisoned journalists and press freedom all over the world. Once a year, in cooperation with UNESCO (United Nations Educational, Scientific, and Cultural Organization), they publish a report telling about the state of press freedom in different countries on all continents.

The flag of the Oromo Liberation Front, which stands behind the Voice of Oromo Liberation.

In their latest 1995 Report the figures for Ethiopia are not looking very encouraging: Dozens of journalists were arrested, setting a record in Africa. On the other hand, a certain degree of free speech exists: over 200 press titles are officially registered. But the working conditions for journalists are very tough, and there is a high degree of censorship of non-governmental media.

"The permanent pressure on the private press reflects the high tension between the ruling coalition—the EPRDF, dominated by the presidents's Tigre People's Liberation Front—and the increasingly radical opposition, made of groups such as the Oromo Liberation Front (OLF), the Amhara People's Organization, and the Ogaden National Liberation Front," the report concludes. This is not only true for the press, but also for the broadcasting media in this country: Radio Ethiopia strictly represents the views of the present government.

■ The Voice of Oromo Sounds Again

At the end of last year, a station reappeared on the air that has been active from Sudan in the past, but which left the air at the end of June 1992 following the change of government in Ethiopia and the improvement of relations between that government and that of Sudan. Voice of Oromo Liberation was first noted back in 1988 as transmitting from a location inside Sudan as the mouthpiece of the Oromo Liberation Front, which started its activities in the mid-70's.

After leaving the air, it came back for a short while last year, when its programs were transmitted via the facilities of WHRI, a private shortwave broadcaster based in Indiana, USA. Since late 1995, they have been on the air three times a week via what seems to be a transmitter in one of the republics of the former Soviet Union. It is said to be located in the Ukraine.

Besides Radio Ethiopia, Radio Fana also uses a shortwave outlet.

■ The Interview

We talked to the European coordinator of Voice of Oromo Liberation—or *Sagalee Bilisummaa Oromoo* (SBO), as it is called in the Oromo language—Mr. Taye Teferra, in Berlin, Germany, about how it all began and what their broadcasting activities are all about. (Though the following is largely verbatim, his comments have been edited for clarity.)

SBO: We started around 1988. After the creation of a coalition of all opposition groups in Ethiopia in 1991 we stopped for a while. But as soon as we understood that it was impossible to go with the present government, we pulled out from the coalition and we went back to the old position. And we started broadcasting again, this time from the state of Indiana, USA. However, the transmission was not that successful for different reasons, so later on we started again from Southeast Europe during July 1995.

MT: *Where are the studio facilities?*
SBO: We have a very nice professional studio in Addis Ababa itself (or Finfinne, as we call it in our Oromo language). We also have some studios in Germany, about which I don't want to go into detail. And we have some studios in neighboring countries in Africa.

MT: *Why do you think that there is a need for such an operation?*
SBO: As you know, Ethiopia has 52 million people, including Eritrea. The Oromos are well over half of these 52 million—about 30 million. This governing regime is very devastating to our people. That is why this time we are motivated to do our own thing by ourself, including this station.

MT: *Starting in 1988, Voice of Oromo Liberation was broadcasting via facilities in the Sudan. Why did that end in 1992?*
SBO: Well, I'm sure you know African politics: It changes with the weather. The Sudanese people are very kind and the Sudanese government was also very kind. But after the foundation of the coalition, they told us this coalition was going to be fine, and that the broadcasting agreement should be stopped for a while. That's why we pulled back.

MT: *Before the end of the government of Mengistu there were also other opposition broadcasters like Voice of the Tigre Revolution or Voice of the Broad Masses of Eritrea. Was there any kind of cooperation between these stations and Voice of Oromo Liberation?*
SBO: We had very good cooperation with the Tigrayans and used their broadcast stations in Tigre itself. At the same time the Eritreans were also very cooperative, making it possible for us to do our radio transmission from the Sudan. Today this cooperation no longer exists, but we hope that through our current broadcasts the Eritrean people and the Tigrayans will understand us again.

MT: *Last year for a short while you used the facilities of WHRI in the United States to broadcast towards Ethiopia. Why did you stop that?*
SBO: In the United States it is legal to broadcast such programs, so politically there was no problem. However, the transmission quality was not good enough and at the same time it was expensive. For us, the cost of a one-hour transmission was quite a lot, and we transmit three hours per week. So, high cost was a big problem.

MT: *Are there any broadcasts of Voice of Oromo Liberation from inside the country itself?*
SBO: The OLF has a shortwave station there also, which is quite weak and limited to the boundary of the Oromo region. It does not reach the people very well. Because this small shortwave transmitter inside the area cannot fill our need by itself, we prefer to have one good transmission, using transmitters in Europe.

MT: *In a folder you're sending out you write that there is no Oromo radio*

Voice of Revolutionary Ethiopia took over the facilities of former religious broadcaster Voice of the Gospel. Later they changed their name to Voice of Ethiopia...and more recently to Radio Ethiopia.

station in Ethiopia. But if you take the latest schedules of Radio Ethiopia or Radio Fana, both based in Addis Ababa, they have programs in the Oromo language and some other national languages. Don't you think it would be a good step to try to get access to these programs in the Oromo language rather than broadcasting into the country from abroad?
SBO: To be frank, whose interest is going to be reflected in this Radio Fana? This government opposes everything that the majority says. They oppose everything some others want to say, even the minorities, let alone the Oromo majority. Please try to ask the Oromos, if you get the opportunity in Addis Ababa, what they think. That is why nobody listens to their radio.

Our radio, after all, is not the radio of immigrants from abroad. That's the reason I'm so interested in the thousands of letters we are getting from Addis Ababa. They tell us that our radio should reflect exactly the needs of our people. That's why Fana or other media in the country cannot fulfill our needs.

***MT**: In May of 1995 you had elections in Ethiopia. How was the media situation during the election campaigns? Did all parties have access to the media for presenting their views to the public?*
SBO: Not at all, it was very one-sided. Not only did we not have access to the media, we were not even allowed to print our own pamphlets. On the one hand they say, there are opposition papers printed in Addis Ababa. That's true. But their number is limited to Addis Ababa and they are not allowed to print the quantity they need. And even during that time journalists were harassed and some also imprisoned. So, we didn't have any access to the media at all.

***MT**: How's the situation of journalists and media in Ethiopia in general?*
SBO: If you are someone who is against the party of the government you are incredibly harassed. You have no chance. To the outside world, they say Ethiopia is democratic. Please go and see yourself! And talk to these journalists. Ask how many times they were imprisoned; how many times they paid money to get out.

***MT**: And there are no opposition media allowed at this time?*
SBO: No, we are not allowed. That is why we are now forced to campaign in this form from abroad. We are very much interested to operate within our own country, we want to operate it from Addis Ababa. But as I said, we are not allowed. The freedom of press, the freedom of speech, freedom of organizing yourself is not there.

***MT**: Do you have contacts to other opposition groups in Ethiopia and do you know about any other plans of setting up a radio station like yours by one of these groups?*
SBO: We have contact, but whether they have a facility like ours, I don't know. We do reflect not only the interests of the Oromos, but also the interests of other ethnic groups like the Amharas, the Sidamas etc.

***MT**: What kind of programs are you broadcasting?*
SBO: News in our language about world events and happenings in this geographic area. We are especially interested in the work of the opposition, like the Oromo Liberation Front, Sidama Liberation Front, Somalis, etc. But people are very uninformed if they think that we are only broadcasting politics. Politics barely takes up five minutes of our programming.

We really emphasize health. AIDS has been spreading so quickly all over Oromoland, over Ethiopia. This government is not responsible for that. But they don't do anything about it. Gender issues, women's questions, family questions, family planning... Ecological work is among the major issues in this radio.

And then alphabetization. The majority of our people are not educated. They can neither read nor write. The big catastrophe of the Third World is that people cannot read—people cannot understand, people cannot grasp what is going on in our world. They cannot understand the message you are passing to them.

The human rights question is another very important issue in that area. Another program issue is culture, of course, and the history of the Oromo people. At the moment we are broadcasting only in the Oromo language, but in the near future we want to include Amharic in our program as well. A 30 minute program, two times in a week in Amharic is planned.

***MT**: What's your main target area? Is it just Ethiopia or do you also want to reach Oromo people living in other regions of Africa and maybe in Europe, too?*
SBO: Really our main target is our homeland. As I said, this program is intended to serve the Oromo people. So, our target will be the Horn of Africa.

***MT**: What are your sources for the program? Do you have correspondents inside Ethiopia?*
SBO: We have daily correspondence with some of our people in Addis Ababa. In fact, we produce our program mainly at home. And here in Berlin we coordinate the entire thing, using modern technology. In Canada there are many Oromo intellectuals who produce materials for us—concerning health, for example.

***MT**: How do you know that the message is really getting through? Do you get any response to your programs?*
SBO: I'm fortunate to be able to show you a lot of letters we have received from Ethiopia, Saudi Arabia, Yemen, Kenya, Somalia, Djibouti. We are getting hundreds of letters in a month, daily over 20-30 letters from Addis Ababa alone.

***MT**: And you're also getting letters from shortwave listeners around the world. What do you think about that?*
SBO: That is very interesting to me and I'm an amateur when it comes to this hobby. I learned that there are people who do not understand my language, but they wrote to the radio Voice of Oromo Liberation. Since we broadcast only in our language, I wonder who translated the name for them? I'm very much surprised and this in itself is wonderful support, with a hope for more in the future. We received letters from Japan, Sweden, Denmark, Germany, Fiji Island, and from America.

***MT**: The Ethiopian president, in a recent interview carried on the English service of Deutsche Welle, stated that the programs of international broadcasters are followed very closely in Ethiopia by the public. Can you confirm this? Do the people in the region listen to international radio on shortwave?*
SBO: Absolutely. I have been one of them myself. Although these programs are one-sided, one feels that broadcasts from stations like Deutsche Welle, like BBC, like Voice of America do contain information.

***MT**: Do you think international broadcasters pay sufficient attention to your people?*
SBO: We begged the British Broadcasting Corporation to broadcast in the Oromo language. This language is not only the language of the Oromos, it's a language of over 30 million people. Also in other countries of that area there are people that understand and read the Oromo language. But, the BBC is not willing to include Oromo in their program. We are still struggling to convince Deutsche Welle, Voice of America, or BBC to include Oromo in their program.

Radio today is very important, just like bread and water, for the region. That is how we can defeat illiteracy, we can defeat disease, we can defeat refugees who are unnecessarily leaving their homeland. That is how we can settle our people in that area.

***MT**: What about the problem of receivers in the target area? Do the people have access to shortwave radios and to batteries to keep them working?*
SBO: That is really a big problem. If I speak for the majority of this poor area, most of the people there have no access. If one person has access to a radio, hundreds of people will use it. That is a kind of communal life in our country. But for those in the city, those who are living in Addis Ababa, there is no problem. In the areas like in the eastern part of Oromia, for example, our broadcast is well heard. But I wonder whether the facilities available are good enough to reach the entire people.

***MT**: What kind of radios are available there?*
SBO: Philips, Siemens, Sony, etc. Most of them originate from Japan.

***MT**: Can one say that Voice of Oromo Liberation is the mouthpiece of the Oromo Liberation Front?*
SBO: Not necessarily. You know that before, of course, the owner of SBO was the Oromo Liberation Front. The Oromo Liberation Front leadership gave us the chance to maintain our own autonomous position without damaging the interest or the principles of OLF itself. But SBO is not directed, as some people think, by any group.

***MT**: Do you have any information on what the Ethiopian government thinks about the activities of Voice of Oromo Liberation?*
SBO: I can say they are negative, though they shouldn't be. We are looking for a good political environment—a situation where people can live together, a situation where people can decide their own field.

***MT**: Where do you transmit from? As I understand you don't operate your own transmitter.*
SBO: Well, as to the exact name, let me reserve the right not to tell you exactly where it is. Anyway, as I said, we broadcast before from the United States and now from Southeast Europe. Only, for some security reasons, we don't want to tell the exact location.

***MT**: What kind of broadcaster would you consider the station that airs your programs?*
SBO: I cannot say it is a clandestine. It operates openly like the one in America. I would say they are a national broadcaster. These are independent agencies who are interested in business, no more.

For the future, we are trying to gain access to international broadcasting. Politically I don't see any reason why it shouldn't be international. We are not broadcasting one-sided political issues, concerning only the Oromo people or the Oromo Liberation Front. Our broadcasting is very international and it covers the entire people of that area.

***MT**: Who is supporting your broadcasting activities? Hiring a transmitter costs a lot of money.*
SBO: Indeed, it is very expensive. That is really a problem for us. We're thankful to the over 80,000 Oromos living abroad. They are the primary carrier of this burden. In the future we are planning to ask NGOs to help our program. We depend at the moment on ourselves.

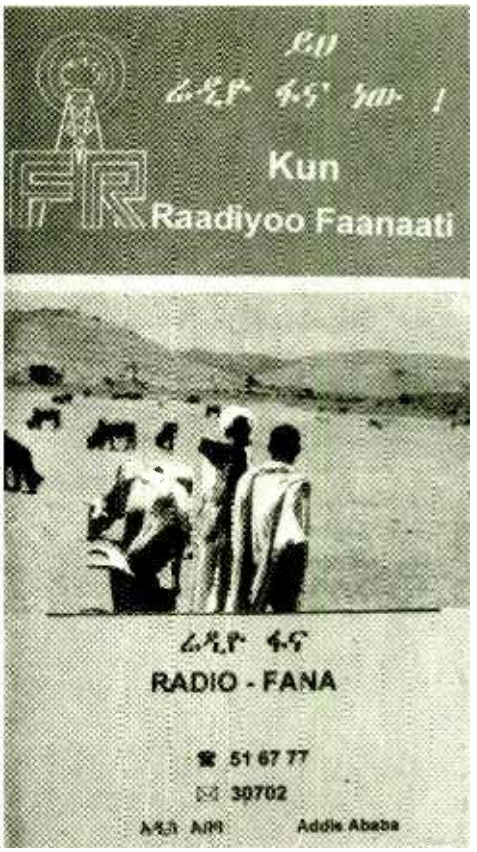
***MT**: What are the experiences so far with your broadcasts? Are you satisfied with its impact both from a technical and a political point of view?*
SBO: Well, it is too early to comment on that. Technically I'm very much satisfied: reception quality in the target area is good. But it's not enough. We are using only one frequency: 5960 kHz. People are asking why there are no additional channels available, to have more alternatives. In this direction we have not been very successful yet, but we have to speak with money.

***MT**: What can you tell us about your future plans? Do you want to expand your broadcasts to, say, an hour each day?*
SBO: If money permits us, we want to expand it. If money permits us, we want also to involve German friends or any others in Europe who are friendly to our program and want to work with us. Since we are interested in the good development, in a good healthy political situation in our country, there is no reason why we should limit involvement only to the Oromos. I don't think the Oromo Liberation Front would be against this, or against any other group who supports the Oromo Liberation Front.

We are trying to use the present situation to keep our autonomy and to ensure that our position is fairly represented in radio broadcasts.

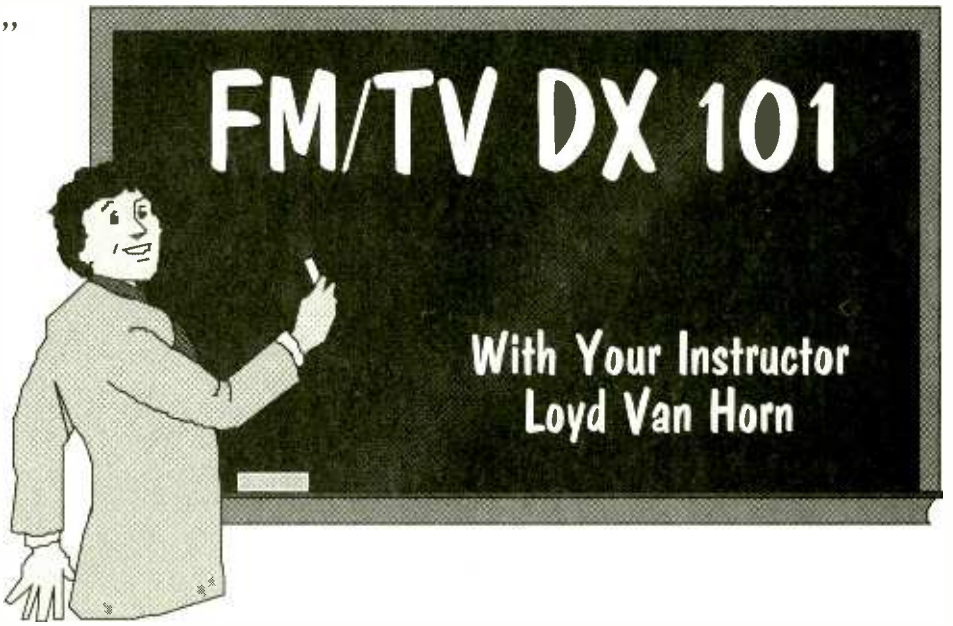
We wish to thank Mr. Teferra for answering our questions. It is a troubling reminder that broadcasts like Voice of Oromo exist because, in so many parts of the world, freedom of expression does not.

Voice of Oromo Liberation currently broadcasts at 1600-1700 UTC on Mondays, Wednesdays, and Saturdays on a frequency of 5960 kHz. Reception reports sent to the following address will be verified by a letter: SBO, P.O. Box 510610, 13366 Berlin, Germany.



Radio Fana appears to have been formed from the remains of two former clandestine radio stations: Voice of the Ethiopian People for Peace, Democracy, and Freedom and Voice of the Broad Oromo Masses.

Although experience is the best teacher, next best may be someone who has himself just passed the course. The material is still fresh and exciting and the teacher still remembers when the subject was a complete mystery. In the philosophy of "each one teach one," welcome to...



"*It's not the shoe you wear, but the runner inside the shoe that counts.* I've lost track of how often my track coach has enlightened me with these words before testing the limits of my legs and body.

This phrase not only applies to running but to DX as well: *It's not the radio you use, but the DXer behind the radio that counts.* My dad first spoke these words to me last year on my first endeavor into the world of FM/TV DX. I wanted to use the flashy radio with the big, rotating antenna and the big, powerful preamp, so I could pull in those signals.

Son, when the DX is there, it is there no matter what you use. But I didn't listen. Still, perhaps this explained why he was hearing things on a little portable radio that I couldn't hear on the big radio with all the bells and whistles. So finally, frustrated, I asked him. *Dad, why am I not hearing, with all this expensive equipment, the great DX that you are?*

The answer was obvious: *Experience, persistence, and a working knowledge of the art of DX.* Say what? So we sat down and he taught me some tricks of the trade. (Which I am now sharing with you!)

The Basics

I learned in physics class that FM stands for *Frequency Modulation.* This is just a fancy way of saying that the frequency, or number of radio waves that pass through your receiver in a given time, is modulated, or altered, so that it varies with the audio signal that is being transmitted.

The first workable FM setup was invented by Edwin H. Armstrong in 1936. At first, people disregarded FM as a way of DX. They figured it was too line-of-sight, and that you could only hear stations within 50 miles or so. Then a few curious people began tuning around their FM dials, and noticed stations well beyond the 50-mile range. Some just blew this off, but others tried to figure out why it was they could hear these far-away stations. Thus began "FM DX."

How do you know when you are hearing FM DX? Here is an example. You are driving to work one summer morning. The New York traffic is a mess. You flip on the FM radio and begin to listen to your favorite station, WHYJ 90.1 "All Jazz hits, all the time." Everything is normal; then all of a sudden, something happens. WHYJ begins to fade. Another station comes in. You realize that WHYJ has been replaced by WEMT. Then you hear them giving a weather forecast, and you notice they don't sound like New Yorkers.

The DJ says, "And it's going to be 70 degrees today in the greater Omaha area..." Omaha?! Congratulations. You have just FM DXed!

What do you need to get started?

For equipment, as in the example above, even your car radio will do. I have also had great results using a GE Superadio III connected to a Grove Scantenna with a Radio Shack preamp. In actuality, you can use any kind of FM radio available to you. I have done Es skip off of the stereo in my room. I have heard of people using their Walkmans!

To get better and stronger skip, it is usually a good idea to connect an outside antenna that is rotatable and is pointed in the general direction of the Es opening. But again, it doesn't take much to pull them in. It is mostly a matter of being at the right place at the right time.

The most important thing to do before undertaking *any* kind of DX is to get a work-

ing knowledge of your local FM band. You have to know—under the deadest of conditions, day in and day out—who is going to be there. Do a complete bandscan, from 88 all the way up to 108 MHz. Be able to call out on demand who that rock and roll station is on 92.9.

Another bit of information that's useful to know is the normal signal level at which the station comes in. From here in Brasstown, I know that if WUSY-100.7 in Chattanooga, Tennessee, is coming in at only an S9, something is up.

There are two main types of FM DX. Tropospheric, or "tropo" for short, and E-Skip, or Es. There are others, ranging from bouncing signals off other layers of the ionosphere such as the F-layer to bouncing them from airplanes and even meteors! But for now, let's concentrate on the main types.

Tropospheric DX

Most veteran DXers refer to tropo as their favorite kind of FM DX. Tropo occurs best during the two to three hours after local sunrise. What happens is that a "duct" begins to form toward a certain direction. This is a special type of tropo known as "tropo enhancement." For example, while living in New Orleans, a tropo duct would form just about every morning toward Biloxi, Mississippi.

Tropo occurs most frequently near coastal areas, where temperature inversions are great. Really good tropo DX can last anywhere from a few hours to several days, depending on the strength of the duct opening. While not as common, or as strong, there is also a "sunset tropo" opening to watch for.

Knowing what causes tropo to happen will help you become a better DXer. Let's take sunrise tropo for instance. When the sun comes up, as it has for millions of years, it heats up the surface of our big blue planet. This heated air rises, and moves out the colder air that settled in during the nighttime. During this process, an "inversion layer" forms between the newly heated air on the ground and the colder night air atop it.

It is in this inversion layer that VHF/UHF

signals become "trapped" and carried out past the horizon around 300 miles or so. This condition initially starts out low to the ground, where the first thin layer forms. It then moves up at a rate of around 1,000 to 2,000 feet per hour! Once it reaches above 2,000 feet (usually just after local noon, when the peak occurs), the signals can no longer be trapped by the layer, and our tropo opening ends.

There is a variation of sunrise tropo called "double inversion" in which a thin cloud layer forms between 250 and 2,000 feet above the earth's surface, preventing the surface from being warmed: instead, the top of the cloud layer is warmed. This creates a tropo layer below and above the cloud, creating a "double inversion" layer. This kind of tropo can produce DX on one layer ranging from 100-300 miles. The other layer (the bottom) will produce DX from 250-600 miles and more! You can expect these conditions when the skies are clear at night, but in the morning there is a low overcast that is supposed to "burn off" before noon.

There are other forms of tropo, including the aforementioned sunset. Some others include fog tropo (generally a rare condition, because not all fog conditions produce DX), moisture (basically a cross between fog tropo and early morning sunrise tropo), high pressure (once or twice a year, really far-reaching DX, generally lasting all day, for several days), and weather front tropo.

Of all of these, my favorite is the latter.

Weather front tropo

This follows the principle of inversion layers forming between regions of hot and cold air. Let's say that a cold front is coming down from Canada, moving south or southeast. When it reaches an area where there is a warm air mass in place, it creates an inversion layer up along the front line itself. If it extends from Minneapolis down to El Paso, stations all the way between and including those cities will be heard.

The front should move slowly. It also needs to be strong and straight. Any time you see one that appears crooked on the weather map, don't get excited. VHF-UHF signals follow line-of-sight and need a straight path between point A and point B. The more drastic the temperature difference on the two sides of the

front, the stronger the inversion layer. Strong storms are not best because they generally break down the layer before they can form. Scattered showers are okay, but flash floods definitely are not.

Not all fronts can produce this type of tropo. In fact, under 10% of them actually do. How long does it last? Only as long as it takes for the front to pass through your area. It could take hours. The tropo will last just before, during, and after the front has passed.

Now that you are beginning (hopefully) to understand tropo DX, let us now browse through FM DX nirvana—Es skip!

Sporadic E (Es)...a phenomenon of nature

Simply put, Es skip provides the easiest way to pull in very long distance signals. (I use the term "easiest" very lightly). What produces this form of DX is already implied in its name, Es. The "E" represents the atmospheric layer height from which the signals are being shot at your radio. The "S" stands for its nature: "sporadic."

Since the 1930's, when amateurs began probing our ionosphere to see what made it tick, they have noticed Es. All they knew was that whenever this condition would occur, abnormal reception would occur. There are still things about Es we just don't know. But here are some of the things we do. (I will simplify this complicated subject as much as possible.)

What happens is that a "cloud" forms in the E-layer of our atmosphere. This cloud moves along a certain path, and reflects all those VHF signals back down to your radio. It is possible to actually track these Es clouds to help identify stations that you are hearing. The clouds move anywhere from 150-200 miles per hour, and are anywhere from 10-50 ft. in size.

The great thing about Es is that it can happen in any part of the country, and you get great, distant catches from it. The problem is you never know when it will happen (hence the sporadic in its name). Now is the time when Es really begins to rev up its tasty DX brew. You should continue to experience this all through the summer. Another opening should occur sometime around Christmas.

Es will typically last an hour or two at a time. However, during Es's annual peak—towards the end of this month, June 21st to be exact—these openings are intense and can last all day. Es skip is a two-way occurrence. So, if you are hearing Florida from New York, then people are hearing New York from Florida. Look for Es to occur most often in the daytime.

The lower the frequency or channel you are DXing, the better the Es will be. It will start on channel 2 and 3 on your TV. You will notice bars and a high-pitched noise on your TV. Last year from here in Brasstown, I was able to DX stations from Colorado and Nebraska on channel 2 during one opening, and I caught the end of the opening at around 2:00pm ELT (eastern local time). It ended around 2:30 to 3:00pm ELT.

Once it situates itself on channel 2, it will begin to move up. Channel 3....4....5...6. Once it gets to channel 6, fire up the FM radios. Once again, start with the lower frequencies. It works its way up through the educational part of the band, the 88-92 MHz region. It continues its way up till it can go no further. This is known as the maximum usable frequency (MUF). Sometimes, openings will reach beyond the 107.9 MHz range, and spread into channels 7, 8, and beyond! Each opening varies. However, last year during one Es opening, I was able to log all the way up to 101.7 MHz.

When Es happens, your DX will generally be confined to one general geographical area. For instance, the two stations I logged on channel 2 were both to the west of my location. So, I looked for other stations in that general area. Another example is the opening I had that went to 101.7. All of the stations were from the west Texas, eastern New Mexico area. During this opening, I also logged audio from a TV station in Dallas on channel 4 (see Table 2).

What about TV DX?

TV DX is basically the same thing as FM DX. The frequencies are affected by the same forms of propagation, such as tropo and Es. In fact, you don't really even have to use your TV to DX TV! If you have a scanner capable of tuning the TV/FM bands, tune in the audio frequencies for channels 2-6 (see Table 1). I have logged several stations this way.

Remember that with Es, TV is where it all begins. It starts at channel 2 and works its way up. Es rarely gets above channel 6 or 7, but tropo can work its way up into the UHF band! This makes for some excellent DX.

The equipment needed for TV DX is basically the same as with FM. A black & white TV with a rotatable outdoor antenna, facing in the general direction of the DX itself will do fine. Whether the set is b&w or color is not

TABLE 1

Check these Channel Frequencies for DX Openings

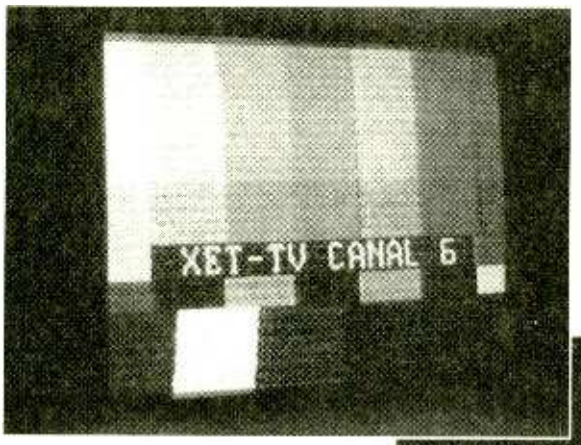
Channel 2	59.75 MHz
Channel 3	65.75 MHz
Channel 4	71.75 MHz
Channel 5	81.75 MHz
Channel 6	87.75 MHz

TABLE 2

The Es Opening of July 1, 1995, as DXed from Brasstown, NC (All times in Eastern Local Time)

Start	Freq/Chan	Station	End	Comments
2:59	88.7	**KTCU**-Ft. Worth, TX	3:10	Alternative music, full ID.
3:12	99.9	**KGEE**-Monahams, TX	3:13	"KG-100" ID, to Country and Western music
3:14	99.7	**KBCY**-Tye, TX	3:16	"Y-99" ID, to Country and Western music
3:17	99.1	**KKKK**-Odessa, TX	3:20	"Quad K" ID, religious music, and local ads
3:22	101.1	**KONO**-San Antonio, TX	3:24	Local ads, ID, oldies music
3:25	100.3	**KIOL**-Lamesa, TX	3:26	"K-Lite 100.3 FM", ID
3:27	100.5	**KSFX**-Roswell, NM	3:27	"KSFX" ID, many mentions of the UFO crash site
3:28	100.7	**KORQ**-Abilene, TX	3:32	"Q-100" ID, to Urban music
3:33	101.7	**KSNY**-Snyder, TX	3:35	Local ads, to ID
3:36	101.5	**KOXE**-Brownwood, TX	3:37	Country and Western music, local ads and ID in weather forecast
4:00	Channel 4	**KDFW**-Dallas, TX	4:10	CBS TV audio, (71.75 MHz), Nice ID

critical. Weak signals on a color set will show up without the color anyway, whereas a strong signal in color will provide an excellent snapshot opportunity!



What to do with the stuff we hear or see

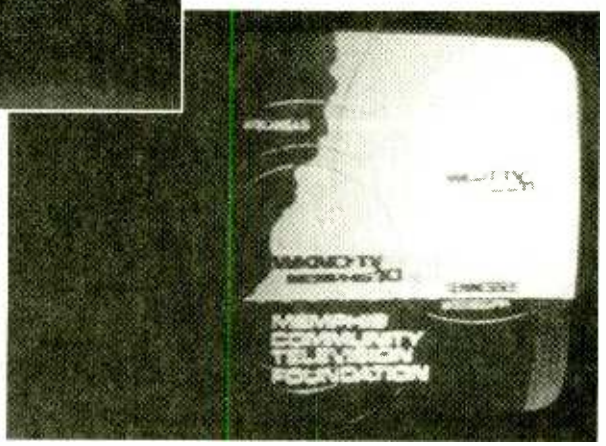
As with any form of DX, once you have heard or seen a station, you must decide what to do about it. Most DXers keep a running logbook of everything they have heard. Some keep tapes of the audio. I have had success using a VCR for my TV DX. You can also take pictures of ID's from the TV using a high ASA film, as mentioned above. We used 400 ASA to snap pictures of IDs from Mexico viewed on channel 6 a few years back.

Some DXers still like to prove beyond a shadow of a doubt that they did indeed log that station. So they write to the station, enclosing details of what they heard or saw, in order to receive a written confirmation of reception known as a QSL. To some DXers, QSL's are prized material and a way of remembering the stations they heard.

Closing comments

It is up to you what you do once you have received a station. But another thing my coach always tells us is to make sure that when we run we have fun—otherwise we shouldn't be running at all. It's the same thing in DX: if you don't have fun at it, then you shouldn't be doing it.

What I find is that the more you learn about your hobby, the more fun you can have by logging more stations. As in track, an educated runner is a good one. So, crack open those books on Es theory, study those weather charts for tropo opening possibilities, and crank up the radios and TVs. Class dismissed. It's DX time!



Skip Arey, WB2GHA
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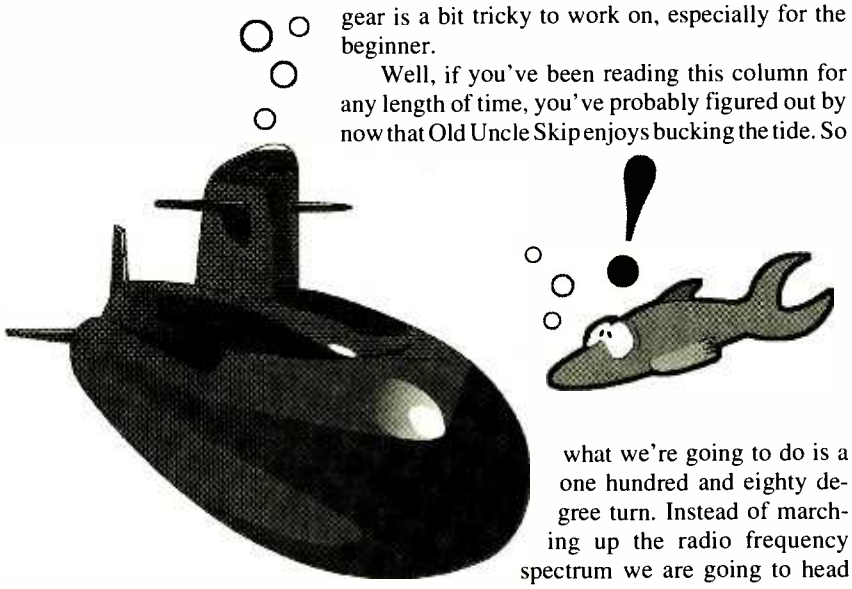
Going Down?

Radio evolves in interesting ways. If you observe the trends of the last fifteen years or so, you can't help but notice that everyone seems to moving up to ever higher realms in the frequency spectrum. Ten years ago most scanners topped out at around 500 MHz. Today 1.2 GHz is the upper end of scanner frequency coverage.

Another trend seems to be "appliance operating." This term is given to the purchasing of radio equipment, as opposed to building or modifying it to suit the user's purpose. Actually, these two trends go hand in hand, because most of that upper edge frequency gear is a bit tricky to work on, especially for the beginner.

Well, if you've been reading this column for any length of time, you've probably figured out by now that Old Uncle Skip enjoys bucking the tide. So what we're going to do is a one hundred and eighty degree turn. Instead of marching up the radio frequency spectrum we are going to head *down* the band.



In fact, we're going to go *below* the VHF/UHF world, *below* the shortwave world, *below* even the medium wave broadcast band. We're going to check into radio's basement. We are going to places in the frequency bands that still allow experimenting, building your own equipment, and (hold on to your seats) transmitting without the need of any license. Let's get LOW!

■ Very Low Frequency (VLF): 10-30 kHz

The very low frequency area is truly the basement of radio. Very low frequency is synonymous with *very long* wavelengths. What you can hear 'way down here are submarine navigation systems and a few other military and science applications. Both the United States and the Soviet Union use this neck of the radio frequency spectrum to play the kinds of dangerous games that have been popularized in books such as Tom Clancy's *The Hunt for Red October*. The U.S. system goes by the name OMEGA, and it operates on frequencies between 10 and 14 kHz.

The reason these frequencies are used is because they are very effective in penetrating through sea water, allowing for continuous submerged submarine operations. This portion of the radio spectrum is more or less off limits to the typical radio monitor for two reasons. First, receiving equipment that covers this portion of the spectrum is harder to come by. Most entry level hobby communications receivers do not tune down this far into radio's basement. Second, just about anything going on down here is seriously coded. Perhaps the easiest way to log signals down in the VLF region would be to head for your nearby Navy recruiting office and sign on for a hitch in the submarine service!

By the way, the land-based transmitting stations that send signals out to the submarines have antenna installations that can cover several *miles*. I said we were dealing with long wavelengths!

At the upper end of the VLF band you can find Standard Time and Frequency Stations. These exist for the purpose of performing various calibration procedures for their users, usually the military. There are some beacon stations that can be found this low in the radio spectrum along with some interesting modes of operation such as Pulse Modulation. If you become hooked on studying the low end of the radio dial you may want to study more about these fascinating signals.

■ Low Frequency (LF): 30-300 kHz

At least a portion of the low frequency band is easily reached by the hobbyist. This is because many modern hobby level communications receivers begin their frequency coverage at 150 kHz. The lower end of the LF bands is populated by more Standard Time and Frequency Stations as well as by a host of military operations.

At 100 kHz you will find the signal for the LORAN-C Navigation System. If you own a boat (that hole in the water that you keep throwing money into) or if you have a neighbor who is a boat owner (recognizable by the threadbare clothing), you have probably heard of and possibly have depended on the LORAN (LOng Range Aid to Navigation) system.

Above 100 kHz you will find more military stations, including systems that send weather charts by way of

fax—very similar to the fax machines you might have in your office, only utilizing radio signals instead of signals that come over the telephone.

As we round the corner into the 150 kHz range where hobby receivers begin to earn their keep, we run into a lady named GWEN. From 150 through 175 kHz the Ground Wave Emergency Network (GWEN) is a nationwide system established by the United States Air Force to provide for a "survivable" communications system. GWEN is there to keep things running if "The Big One" ever drops. Again, as with so many military operations, you can listen but you won't hear very much. The signals are encrypted.

From 160 through 190 kHz is a very interesting place. This is referred to as the 1750 meter band, or the "Land of the Lowfers." Lowfers are radio hobbyists who set up low frequency stations to transmit signals for the fun and enjoyment of other Lowfer listeners. For some hobbyists this is a great way to get involved in putting out their own signals without needing to obtain a license to operate, as is required on the amateur radio frequencies further up the bands.

At around 200 kHz, things pick up a bit for the radio hobbyist. From 200 kHz through and beyond the 300 kHz that marks the top of the LF band, you will find a world populated with hundreds of beacon stations. Non-directional beacons are used throughout much of the world as homing signals for aircraft. They are very easy to find and can be great fun to log.

The beacon station signals consist of between one and three letters sent repeatedly in International Morse Code. The code speed is very slow, so it is easy enough to write down the dots and dashes and look the letters up on a code chart. (This would be considered heresy for any serious code operator, but go ahead, I promise not to tell.) When conditions are right (the best time being at night in the winter) these signals can travel over great distances, making beacon logging a very challenging radio monitor activity.

Chasing beacons is one aspect of the area of the radio monitoring hobby known as "utility" listening. This is where the monitor seeks to listen to signals that do not fall in the realm of broadcasting for public consumption.

If you live on the eastern coast of the United States, on a cold winter night it is possible to hear some European based broadcast stations from 155 through 281 kHz. These stations are similar to those we hear every day in the standard AM broadcast band, except that you are likely to hear a language other than English. Low Band broadcast stations are rare finds and great additions to your log. Most of these stations will even QSL just like international shortwave broadcasters.

■ Low Down Equipment

The Low Frequency and Very Low Frequency portions of the radio spectrum are neat places to play radio. Monitoring the world below about 530 kHz often gets lost among all the opportunities that higher frequencies provide. This is largely because many receivers do not tune below the medium wave band. The first and easiest path to this end of the radio band is to find a receiver that tunes down that far. As mentioned earlier this can be as simple as shopping for a modern receiver that tunes down to 150 kHz. Some more serious hobbyists go hunting for military surplus LF/VLF receivers. These are not particularly expensive and have the advantage of being designed to work specifically in this frequency range.

Another possibility is to build or buy a converter to allow your existing receiver to reach down into radio's basement. One outfit that markets such equipment is the LF Engineering Company, 17 Jeffry Road, East Haven, CT, 06473 (203) 248-6816. Another company that has made LF equipment such as antennas and converters for many years is Palomar Engineers, Box 462222, Escondido, CA 92046 (619) 747-3343.

One area of experimentation and fun in the VLF/LF regions is antennas. Folks who monitor and operate in this region can be very resourceful in their antenna designs. As I said earlier, commercial and military installations can use antennas that cover areas measured in *square miles*! Most hobbyists don't have the luxury of this much real estate, much less enough money to buy all that wire. But this is one of radio's frontiers.

People playing in radio's basement are as resourceful and tenacious as those you'll find at the other end of the radio frequency spectrum. So, as you become more familiar with VLF/LF operations, you will discover a plethora of long wires, loaded vertical whips, and loop antennas, all designed to wring every last milliwatt out of the airwaves. Most antennas designed to be used down here must also find a way to minimize the wall of background noise produced by mother nature and man-made machinery.

■ Joining In

If you have equipment that will let you listen down in the low frequencies, take some time to tune around. You will find many signals worth logging, especially beacons and "Lowfers." It's also fairly easy to build a simple transmitter to operate in this range yourself, and join in with the other adherents to basement band radio practice. It's fun, it's challenging, and it's completely legal.

In addition to this unique area of legally unlicensed operation, there is a growing movement within the amateur radio community to petition for a new ham band in the LF region to allow for further experimentation and activity. This development could go a long way in popularizing low frequency operation and monitoring by further increasing the number of signals worth tuning.

This area of monitoring has enough adherents to have spawned its own club. The Longwave Club of America (LCWA) can be contacted by sending an SASE to 45 Wildflower Road, Levittown, PA 19057. They publish a monthly journal called *The Lowdown*. In this bulletin you will discover the many signals that occupy radio's basement and just how VLF/LF monitors go about hearing and confirming reception. Logging listings can actually number in the hundreds of beacon stations plus many other signals. The club journal covers everything from tips for beginners up through graduate level analysis of radio phenomenon down at this end of the spectrum.

Don't forget to keep your eye on *MT*'s own monthly LF column, "Below 500 kHz." Once you check out what other folks are hearing, you will be truly amazed at how much radio activity can be found down here where many receivers cannot go.

Because folks that play radio in the basement band tend to be tinkers and thinkers, it's little surprise that they have even set up their own "Home Page" on Internet's World Wide Web. This can be checked out by sending your web browser crawling over to **http://users.aol.com/lwcanews.html** to check out what all those Lowfers are up to.

Many radio hobby enthusiasts claim to be DC to Daylight monitors. But to truly live up to this claim, you need to spend some time in radio's basement. Tune on down to this less fashionable end of the radio frequency spectrum for a while and I'm sure you'll get hooked by what you can hear. Don't forget to have fun while your at it! How low can *you* go?

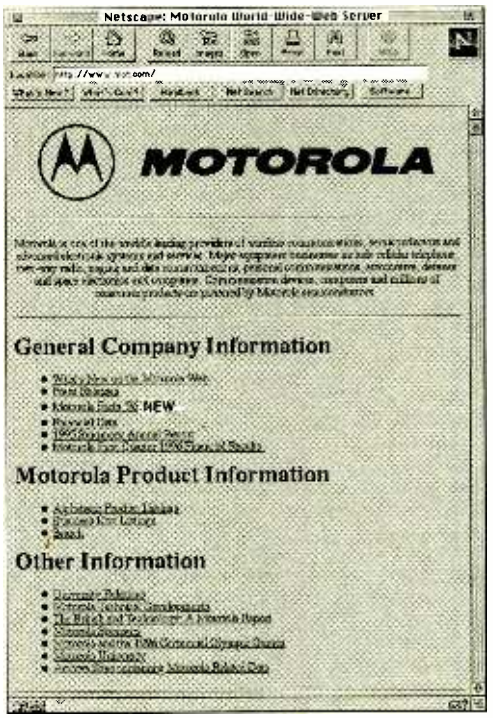
Richard Barnett
ScanMaster@aol.com, Compuserve at 102354,3643

Scanning for Information On-line

Lately, public safety agencies and businesses alike are changing frequencies and radio systems as never before. Technologies, such as trunking and digital, offer communications flexibility that once was only dreamed of. And, as frequencies and radio systems change, hobbyists are increasingly thirsty for information on which police or fire department is about to make the big switch.

That thirst for information can now be quenched by a variety of sources, including frequency books, clubs, and magazines. But nothing is as immediate today as on-line resources. Hobbyists can trade extremely valuable information on the very robust scanner sections in America Online, CompuServe, Internet newsgroups, and lists. We hope to profile these resources in future articles.

(Note to forum or list managers: please contact me via **ScanMaster@aol.com** if you are interested in working on a profile of your electronic assets for scanner buffs.)



What is remarkable, though, is that there is a tremendous amount of information available to hobbyists on the burgeoning World Wide Web. Interestingly, much of this data was not really designed for hobbyist consumption, but it's out there for anyone to look at.

This month we'll focus on Motorola, which is undoubtedly one of the largest, if not *the* largest, purveyor of communications equipment in the United States and the world. Motorola, of course, is actively involved in developing and installing some of the most advanced public safety, utility, and business communications systems around the country. And, naturally, this Illinois-based behemoth is proud to tout its accomplishments on the World Wide Web.

A search for Motorola on the Web turned up a URL of **http://www.mot.com/**. This is a very interesting site — still under construction — providing data on Motorola products and services. The site also offers press releases about new products, as well as new system installations. With this feature, scannists can check the site to see if their city or county will soon be cutting-over to a new radio system.

Below are three press releases that I culled from the numerous releases available on the Web. They not only illustrate what you can find on this site, but they also provide information regarding the agencies which have allocated funds for new systems. All of the press releases give a glimpse into which departments in a city will use the new radios, why the new system was needed, and a view of what the future inter-operability of the system will be.

■ Baltimore to Modernize Communications

This first release is a little alarming. Baltimore has been a great city to monitor on their 460 MHz police radio system. The question once again arises: Will the APCO digital standard be available for scanner manufacturers to include in their radios? Baltimore's new system won't be active for some time. Hopefully, in the interim, this and other important questions will be answered.

February 7, 1996, Press Release: The City of Baltimore Board of Estimates has awarded Motorola a $38 million contract to manufacture and install a new 800 MHz radio communications system for the city's public safety and public service agencies.

The new Motorola ASTRO™ digital system initially will serve City of Baltimore Fire department. Eventually, all City of Baltimore public safety and public service departments will use the system. The new system replaces a number of individual radio systems whose capabilities could no longer meet growing department communications needs. The 800 MHz system consolidates departments into the city's first city-wide communications network.

"Finally personnel from every department on the system will be able to talk with each other using just one radio," says Assistant Fire Chief Raymond Lehr. "The days are gone when personnel had to carry multiple radios so they could talk to other departments responding to the same emergency. That minimizes the equipment everyone has to carry, and the many capabilities of the new radios really will enhance our ability to coordinate response and rescue efforts."

The new ASTRO digital system provides departments enhanced voice quality and sophisticated secure communications features. The new system will also include a computer aided dispatch upgrade, mobile data terminals, as well as automatic vehicle location.

"Clearly, the ASTRO system provides us some immediate capabilities, that will help us in every aspect of our jobs." says Assistant Chief Lehr. "The system also has the design flexibility to incorporate new technology and features for years to come. We needed a system with this level of flexibility, and now we have it."

The heart of Baltimore's ten-site digital trunked simulcast system is Motorola's ASTRO family of digital mobile and portable radios. Plans call for the system eventually to include as many as 5,000 portable and mobile radios, along with consoles, primary and back-up communications centers and enhanced computer-aided dispatch capabilities. The system will be compatible with Motorola 800 MHz systems used by Baltimore and Anne Arundel counties, and Baltimore Gas and Electric Co. The compatibility provides smooth inter-department communication if necessary.

The Baltimore system also will be upgradable to the APCO Project 25 standard for digital radio systems. The standard means Baltimore can buy additional compatible radios in the future manu-

factured by any vendor, confident that both new and older radios will be able to communicate with one another This type of competition and vendor choice for system add-ons is new in the land mobile products industry, and should provide the city a number of system technological, performance and cost benefits in the future.

Used by public safety and public service agencies across the country to write specifications for digital systems, the standard was created through a joint effort of many international communications organizations and governmental agencies. They include the South Daytona, Florida-based Association of Public-Safety Communications Officials-International (APCO), the National Association of State Telecommunications Directors, United States federal agencies including the Department of Defense, National Communications System, and National Telecommunications and Information Administration, and communications experts from a number of countries. APCO is the world's oldest and largest organization of public safety communications professionals. The organization has more than 10,000 members worldwide.

Implementation of the first phase of the City of Baltimore's system will begin once specific contract details are finalized. Installation of the first phase is projected to take about 22 months.

■ Florida Trunking Creeps Northward

This next press release deals with a new conventional trunking system under construction in the city of Ocala, Florida. Trunking in Florida is exploding in popularity. Ocala, which lies north of the Orlando area, represents a northward creep of this explosion as the southern half of the state is already saturated with trunked, and a few trunked digital systems. This release is particularly interesting for its discussion of future plans relating to the system's inter-operability with the new state of Florida trunked digital radio network.

August 11, 1995, Press Release: The City of Ocala, winner of the National Civic League's 1995 All-America City Award, has selected Motorola to design and install a new 800 MHz radio communications system for the city's public safety and public service departments. The City Council unanimously approved the contract award.

The city's police and fire departments plus the Ocala Electric Utility will be the first to use the system. It's scheduled to "go live" in December 1995. Plans call for all other city public safety and service departments to join the system shortly afterward. The new system will provide all departments a wide range of radio capabilities, a welcomed replacement for a 40-year-old radio system that simply could no longer meet growing communications needs, according to city officials.

"The 800 MHz system will give us more consistent radio coverage throughout our 175-mile service area," says Dean Shaw, Ocala Electric Utility director. "We will be able to communicate directly with other city departments if we need their help. This is particularly important in major regional emergencies or natural disasters like Hurricane Andrew that devastated south Florida a few years ago. We were considerably north of the path that hurricane took, but we always must be prepared. This radio system will give us an invaluable tool to coordinate multi-agency emergency response when we need to."

The Motorola SMARTNET II trunked analog system uses 12 channels with a single repeater site. Plans call for more than 500 Motorola MTS 2000 portable and Spectra mobile radios eventually to be included in the $2 million system.

"The system provides us significant spectrum relief and tremendous channel efficiency, enabling us to expand our radio capacity and communications capabilities," says Fire Chief William Woods. "We'll have faster system access, individual unit identification when a transmission is made, telephone interconnect and private conversation capabilities, the flexibility to organize radios into talk groups, the technology to disable radios that are lost or stolen, and the ability to retrieve information on system activity. We've never had a radio system with so many positive features."

The system even will give city agencies the future capability to send data for the first time. "All we'll have to do is connect data terminals to our mobile units," says Police Chief Morrey Deen.

The Motorola system is designed to be easily upgraded to digital technology in the future, and be compliant with the standard for digital radio systems defined by APCO Project 25. Public safety and public service agencies across the country are using the standard to specify and buy digital radio systems. The States of Delaware, Florida, and Michigan, cities such as Memphis, Tennessee, and counties like Sarasota County, Florida, all have purchased Motorola 800 MHz digital systems upgradable to the APCO Project 25 standard.

When the Ocala system is upgraded to digital technology, city personnel will be able to communicate with agencies using the State of Florida's Motorola 800 MHz digital radio system through their own portable and mobile radios.

■ Arguments for Trunking in Everett, WA

This last release is reprinted in order to answer the hows and whys about a local public utility's switch to a trunked radio system.

February 6, 1996: Motorola's Land Mobile Products Sector has signed a contract to install a SMARTNET™ 5-channel, trunked simulcast radio communications system for Snohomish County Public Utility District (PUD) of Everett, Washington. It will be the first Motorola utility trunked radio system in the Northwest.

According to Walt Pierce, telecommunications engineer and project manager for Snohomish PUD, the enhanced communications ability afforded by the SMARTNET system is designed to maximize the company's operational efficiency, provide greater assurance of employee safety and improve customer-service coordination.

"The telephone interconnect capability and the inherent efficiency of the SMARTNET system will allow us to reduce congestion and expedite communications," explained Pierce. "The improved connectivity means we can provide our services with greater speed and greater safety — advantages that maximize our productivity and profitability."

Pierce also detailed Snohomish PUD's plans to add mobile data capability to the system in the near future. "This will provide real-time, wireless transmission of information," he added. "Coupled with our existing voice capability, we'll have an advanced means of voice and data communication."

Scheduled for completion in March of 1996, the system will use 45 Quantar™ repeaters operating on 10 sites throughout Snohomish County and Camano Island, Washington. Eventually, Snohomish PUD plans to expand its system to include 85 repeaters, doubling their channel capacity from five to 10 per site.

The system also will employ Motorola Spectra™ mobile and MTS 2000™ portable radios, as well as MOSCAD™ Remote Terminal Units (RTUs) that will be used in monitoring pump control and tanks for the water department. Snohomish PUD will use the system to help provide electric and water service for its more than 250,000 customers.

SMARTNET is one of the many two-way radio platforms designed to operate on EnerConnect™ — Motorola's complete utility wireless communications and information network. EnerConnect integrates transmission and distribution automation, mobile data and voice communications onto a single network allowing utilities to streamline the flow of information and significantly reduce response times while controlling costs.

Commercial Web sites of more obvious relevance to hobbyists are available today as well. We'll check out the Radio Shack and the Uniden Web sites in a later article. (Note: the articles above were reprinted with permission.)

Scanners in Movies - The Sequel

Here's a challenge for those of you looking for scanners which play a role in motion pictures: A friend told me recently that a Bearcat 700 appears in the Sigourney Weaver vehicle "Copycat." A free copy of *Monitor America* goes to the first person who can tell me what was wrong with the 700's appearance in the film. There are people who thrive on catching mistakes in movies, and this mistake, for scanner folk, is a doozie!

Frequency Exchange

We're going to take a break from readers' frequency lists just this month to respond to an interesting inquiry.

A recent article dealt with taking an Optoelectronics Scout into a Las Vegas casino to snag frequencies. A reader, Jan Roth, wrote and admonished me for undertaking such a dastardly deed. Jan wrote, "...please correct me if I am wrong. You fail to tell your readers that in the state of Nevada it is illegal to have a scanner or frequency counter turned on and operating in any gambling casino - it's a felony."

A review of the latest edition of Grove's *Listener's Lawbook* does not show any reference to monitoring laws in the state of Nevada. It seems likely to us that this is simply a casino rule, which is within their rights to make. The point, however, is well taken, that before anyone takes a scanner or frequency counter into a casino, he or she may want to check out the legality of this act before proceeding. If anyone knows the existence and wording of such a law, regional or statewide, please write us and let us know.

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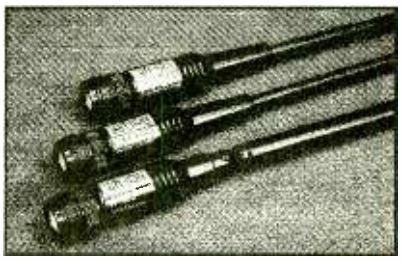

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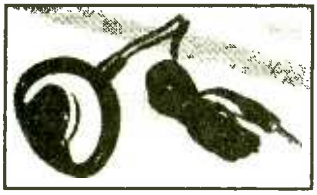

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- VSWR ratios
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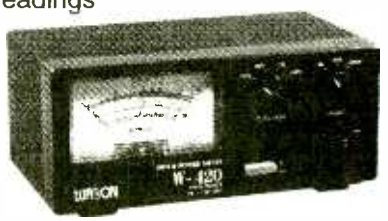
W - 420

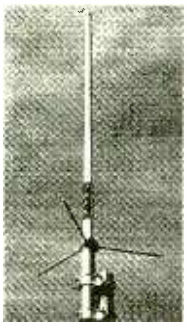


- **W-220** - 1.7 - 200MHz, 5/20/200W, SO239 connectors, Light
- **W-420** - 118 - 530MHz, 5/20/200W, SO239 connectors, Light
- **W-620** - 1.7 - 520MHz, 5/20/200W, SO239 connectors, Light

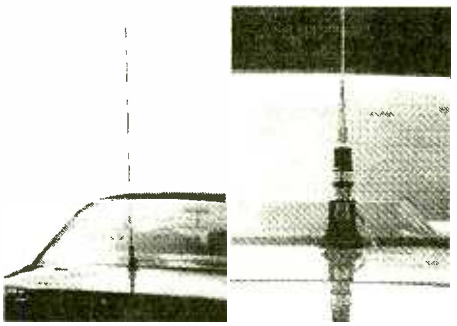
Δ ANTENNAS

- **W-30** - 2M/70 cm Base antenna, fibre glass, 3/6dB, 150W
- **W-50** - 2M/70 cm Base antenna, fibre glass, 4.5/7.3dB, 200W
- **W-50** - 2M/70 cm Base antenna, fibre glass, 6.5/9dB, 200W

W - 30



W3HM



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Monitoring the FBI on HF

The Federal Bureau of Investigation (FBI) has been busy the past couple of months with the Freeman situation and the capture of a possible Unabomber suspect both in Montana. I always like to catch some of the action, but Montana is a little bit too far to hear a VHF repeater. However, the FBI does have an HF network, so I went back into my records for this month's profile of the FBI's Inter Field Office HF network.

The FBI is an investigative agency under the Department of Justice that was formed in 1908. After various changes in name, it became known as the FBI in 1935.

Headed by a Director, FBI headquarters is comprised of nine divisions and three offices. The FBI maintains 56 field offices, approximately 400 resident agencies, four specialized field installations, and 23 foreign liaison posts. There are 10,158 special agents and 13,711 support personnel as of November 1, 1995. The FBI Academy is located in Quantico, Virginia. It occupies 385 acres situated approximately 40 miles south of Washington, D.C.

The mission of the FBI is to uphold the law through the investigation of violations of federal criminal law; to protect the United States from foreign intelligence activities; to provide leadership and law enforcement assistance to federal, state, local, and international agencies.

For years, it has been widely known among ute hobbyists that the FBI has an HF backup network for their VHF repeater system. Some of the stations that participate in this backup system are the 56 field offices of the FBI. Each field office has a Harris transmitter with voice encryption and ALE (Automatic Link Establishment) capability. Occasional voice (USB) and digital activity is reported on FBI HF frequencies.

Some monitors have reported that stations in this network test their equipment every Monday morning at 0900 Eastern Time. By far the

TABLE 1 — FBI HF Frequencies

(Modes of operation include RTTY/USB)

2332.0	2810.0	4992.5	5058.5	5390.0
5913.5	6954.0	7780.0	7793.5	9185.0
9240.0	9313.0	10500.0	10915.0	11075.0
11492.5	12140.0	14460.0	14493.5	14498.0
14533.5	15955.0	16175.0	16342.5	18172.5
18582.5	18667.5	19132.5	19346.0	20350.0
20604.0	23404.0	23805.0	24205.0	24775.0
26569.0	27575.0	27585.0	27785.0	

TABLE 2 — FBI HF Call Signs

KAG69	Denver, Colorado
KAG78	Kansas City, Missouri
KAG81	Minneapolis, Minnesota
KAG98	Omaha, Nebraska
KAH63	St. Louis, Missouri
KCC61	Boston, Massachusetts
KCC76	New Haven, Connecticut
KEC67	Albany, New York
KEC71	Buffalo, New York
KEC86	Newark, New Jersey
KEC96	New York, New York
KGD83	Baltimore, Maryland
KGE22	Quantico, Virginia (Academy)
KGG64	Philadelphia, Pennsylvania
KGG76	Pittsburgh, Pennsylvania
KGG85	Washington, D.C.
KIG67	Atlanta, Georgia
KIG73	Birmingham, Alabama
KIG81	Charlotte, North Carolina
KIG91	Knoxville, Tennessee
KIH67	Louisville, Kentucky
KIH73	Memphis, Tennessee
KIH98	Mobile, Alabama
KII50	Columbia, South Carolina
KII66	Norfolk, Virginia
KII74	Richmond, Virginia
KKI83	Savannah, Georgia
KII95	Jacksonville, Florida
KIJ22	Miami, Florida
KIJ44	Tampa, Florida
KKI68	Dallas, Texas
KKI73	El Paso, Texas
KKI88	Houston, Texas
KKI99	San Antonio, Texas
KKJ23	San Francisco, California
KKJ45	Jackson, Mississippi
KKJ67	Albuquerque, New Mexico
KKJ78	Little Rock, Arkansas
KKJ88	New Orleans. Louisiana
KKJ98	Oklahoma City, Oklahoma
KMG22	San Diego, California
KMI66	Los Angeles, California
KOG55	Las Vegas, Nevada
KOG69	Butte, Montana
KOG71	Phoenix, Arizona
KOG83	Portland, Oregon
KOG93	Salt Lake City, Utah
KOH22	Seattle, Washington
KQC67	Cincinnati, Ohio
KQC77	Cleveland, Ohio
KQC87	Detroit, Michigan
KSC63	Indianapolis, Indiana
KSC71	Milwaukee, Wisconsin
KSC81	Springfield, Illinois
KSD61	Chicago, Illinois
KSD73	Sacramento, California
KUR20	Honolulu, Hawaii
KUR50	Agana, Guam
KWX20	Anchorage, Alaska
WWR20	San Juan, Puerto Rico

most commonly reported frequencies in use by this agency are their SHARES frequencies. FBI stations have been heard during quarterly SHARES exercises on various government frequencies including the FBI SHARES pool frequencies of 5058.5, 7903.5, and 14493.5 kHz (USB).

Due to restructuring of the HF spectrum over the last few years, there have been some changes to FBI frequencies that published hobby lists simply do not show. Table 1 is the latest list of FBI HF frequencies available. Also most of these frequency lists do not have a complete or accurate list of FBI HF call signs. Table 2 is the most complete list (60 stations) of FBI calls and locations with HF capability ever published.

■ New Station in Globe Wireless Marine System

The Globe Wireless network continues to expand. Officials from the company recently announced that Bahrain Radio (call sign A9M) was expected to join the system on May 1. The station is expected to enhance the coverage of the Globe Radio network in the Indian Ocean and Arabian Gulf. Bahrain Radio is operated by Batelco.

A data link from Manama, Bahrain, to the Globe Wireless Traffic Delivery Center in Half Moon Bay, California, will allow the exchange of messages and supporting communications.

The Global Radio network started four years ago when remote control equipment and data lines were installed between WNU-Slidell Radio, Louisiana, and the centralized traffic facility at Half Moon Bay. Expansion of the network to global coverage has proceeded quickly since then.

Stations currently part of the Global Radio Network include: KEJ-Hoolehua Radio, Hawaii; KFS-San Francisco Radio, California; SAB-Goeteborg Radio, Sweden; VCT-Tors Cove Radio, Newfoundland; WNU-Slidell Radio, Louisiana; and ZLA in New Zealand.

"The Globe Wireless network will grow to over a dozen stations by the end of the year," said Dino Martins, General Manager of Globe Wireless. No word at deadline what other stations will be part of this growing marine network.

■ Interesting Ute Sites on the Web

If you are interested in ships and vessels that work the Great Lakes region there is a very interesting site on the world wide web. You will find pictures, addresses, facts and figures, current vessel information and much, much more on this interesting web site. Great Lakes marine buffs check out: **http://www.acs.oakland.edu/~ncschult/boatnerd.html**. Thanks to Steve Fisher and the WUN for bringing this site to our attention.

Aero buffs will find many interesting pages on the web. One of my favorites is put up by Hans Wildschut in the Netherlands. Hans has files on MWARA (Major World Air Route Areas), LDOCs (Long Distance Operational Control) stations, Military info (GHFS/Mystic Star), ACARS (Aircraft Communications Addressings and Reporting System), and much, much more. He also has some real neat wallpaper behind the text. Check out URL: **http://web.inter.NL.net/hcc/Hans.Wildschut.**

ACARS aircraft buffs will also want to visit Tigger's Web home page at: **http://www.u-net.com/~morfis/acars.htm** for additional information and links on the HF/VHF ACARS systems and frequencies.

Finally, this month's *Best of the Web* site for ute enthusiasts belongs to Andrew Toppan. His site on the web is called the *Railroads, Ships and Aircraft Homepage*. At this web site you will find a complete, accurate, up-to-date list of all vessels in active service with the U.S. Navy, Coast Guard, and NOAA. The lists are broken down into the following categories:

- U.S. Navy surface combatants including all aircraft carriers, cruisers, destroyers, frigates.
- U.S. Navy submarines including manned submersibles of all types.
- U.S. Navy amphibious assault ships, landing ships of various types, mine countermeasures ships of all types, and major coastal combatants.
- U.S. Navy Auxiliary Ships including all replenishment ships, tenders, tugs, salvage ships, surveillance, research and surveying ships, command/flag ships, and miscellaneous auxiliaries such as range instrumentation ships, cable ships, hospital ships, coastal tankers, and sundry other vessels.
- U.S. military sealift ships in active service or laid up in ROS-4, APF, MPS or RRF status (172 vessels).
- U.S. Navy carriers, carrier wings, and associated squadrons.
- All U.S. Coast Guard vessels from the biggest cutters to the smallest tenders.
- All National Oceanic and Atmospheric Administration vessels.

Similar but less comprehensive information is available for the Royal Navy and Canada. The listings for these countries include all warships and major auxiliaries, but omit most non-military vessels, such as research ships.

Each entry includes "vital information" such as the displacement, dimensions, propulsion, and weapons of a vessel, in addition to its name, number, year of entry into service, fleet assignment, and notes about its future. Ships planned or under construction are also listed. A single image representative of the class of ship is provided in many, but not all, cases. The total database on this site includes over 1000 vessels.

Additional links are provided to official and unofficial sites providing similar information on navies around the world. Additional on-site documents within the "current" section include lists of all aircraft carriers in the world today (short and long formats), list of surviving "true" destroyers, list of surviving big-gun warships, and list of preserved naval vessels in the United States. Many additional comprehensive warship lists are available from other parts of the site plus several megs worth of text files, and over a dozen megs of images (well over 200 images in all). And this is just for the ship portion of this web site!

You can visit the *Railroads, Ships and Aircraft Homepage* at: **http://www.wpi.edu/~elmer/**.

That is about it this month. How about plugging in some of those FBI frequencies we have listed in this column and letting us know what you hear? Remember, an HF frequency could be silent for days on end and come alive when you least expect it. Have patience and keep tuning that HF receiver around in the *Utility World.*

Utility Loggings

Larry Van Horn

UTILITY WORLD

Abbreviations used in this column

AM	Amplitude Modulation	GHFS	Global HF System
AMVER	Automated mutual assistance vessel rescue system	HF	High Frequency
		KCNA	Korean Central News Agency
ARQ	Synchronous transmissions and automatic repetition teleprinter system	LSB	Lower Sideband
		MARS	Military Affiliate Radio System
ARQ-E3	Single channel ARQ teleprinter system	MFA	Ministry of Foreign Affairs
ARQ-M2	Multiplex ARQ teleprinter system with 2 data channels	MOD	Ministry of Defense
		m/t	Motor Tanker
		m/v	Motor Vessel
ASECNA	Agence pour la Securite de la Navigation Aerienne en Afrique et a Madagascar	NAS	Naval Air Station
		NCS	Net Control Station
		PIAB	Pressure- und Informanipulationsanstalt dieser eurer Bananenrepublik
CAP	Civil Air Patrol		
CW	Continuous Wave (Morse code)	RTTY	Radioteletype
		SI-FEC	Siemens simplex FEC teleprinter system
DSN	Defense Switching Network (old Autovon network)	SITOR	Simplex teleprinting over radio system
DUP-ARQ	Hungarian diplomatic simplex ARQ teleprinter system	SITOR-A	Simplex teleprinting over radio system. mode A
		SITOR-B	Simplex teleprinting over radio system, mode B
EAM	Emergency Action Message	Unid	Unidentified
FEC	Forward Error Correction	USAF	U.S. Air Force
FEC-A	One-way traffic FEC teleprinter system	USCG	U.S. Coast Guard
		USMC	U.S. Marine Corps
FF	French Forces	USN	U.S. Navy
		VNA	Vietnam News Agency

All times are in UTC, all frequencies in kHz, and all transmissions are in USB unless otherwise indicated

530.0 Unid station with a male voice in AM saying, "400, 400 this is site number 400." Then female voice gives time, day and date. The signals are NW of my location. Any ideas? (Maryanne Kehoe-Atlanta, GA) *No idea on this end, Maryanne, readers-Larry?*

2009.0 UMFA-t/h *Volga 4001* (sea/river cargo vessel) working GNI-Nitton Radio with phone patch at 1908. (Robin Hood-UK)

3032.0 WAR46 working Nightwatch 01 at 0051. (Jeff Haverlah-Houston, TX)

3041.0 DoD Cape at 0813 working Clearance 1 at 0819. (Rick Baker-Austintown-OH)

3113.0 Hot Cake working Nightwatch 01 at 0416. (Haverlah-TX)

3130.0 USN Alligator playground net with talk of using INMARSAT at 0059. (Haverlah-TX)

3245.0 U.S. Army MARS stations AAR2F and AAR2DQ in LSB at 0230. (Jacques d'Avignon-Kingston, ON) UCE-Archangel Radio with traffic to UAAP-*Akademik Glushko* in SITOR-A at 1835. (Hood-UK)

3295.0 Overreach working Chop Down then Nightwatch 01 at 1435. (Haverlah-TX)

3369.0 Overreach working Nightwatch at 0807. (Haverlah-TX)

3438.5 2RC8 repeating "V 8L6S DE 2RC8" at 1140 in CW. (Takashi Yamaguchi-Nagasaki, Japan)

3440.0 6PXJ repeating "V A6YZ DE 6PKJ" at 1135 in CW. (Yamaguchi-Japan)

3450.0 BAA-Beijing Meteo, China, with 50 baud RTTY testiong RYs at 1201. (Yamaguchi-Japan)

3455.0 Japan Aeroradio working various aircraft at 1145. (John Newby-Jamestown, CA)

4028.0 Spanish female 5-digit number station in AM at 0512. (George Knight-Garfield, NJ)

4032.5 U.S. Army 10th district MARS net at 1520. (Newby-CA)

4110.0 ELKI6-m/s *Fantasy* at 0506 working WOO-Ocean Gate Radio (on 4402) with phone patch traffic. (Baker-OH)

4164.0 Foxtrot Tango with USN Link 11 coordination net at 0635. (Baker-OH)

4173.5 Unid station with slow keyed CW at 1110 some fading, lost to SITOR traffic at 1134. (Roger Parmenter-Hyannis, MA)

4179.5 D5HV-m/v *Spruce* with SITOR-A messages at 1520. (Hood-UK)

4188.0 9HRX4-m/v *Sea Eagle* working Portishead in CW at 1839. (Hood-UK)

4190.5 URVY-*Dauriya* (fish factory) working UIW-Kaliningrad Radio in CW at 2032. (Hood-UK)

4192.0 UKMT-t/h *ST-1313* working TAH-Istanbul Radio in CW at 2030. UAMY-*Mikhail Verbitskiy* (factory trawler) working UDK2-Murmansk in CW at 1847. (Hood-UK)

4198.0 UTWK-*Amur 2521* (sea-river cargo) working UCW4-St. Petersburg in CW at 1815. Also UAOY-*Ladoga 102* working Portishead with ETA for Harwich in CW at 1835. (Hood-UK)

4212.0 UGH-Provideniya Radio, Russia, with 50 baud RTTY traffic lists at 0910.(Yamaguchi-Japan)

4372.0 USN Giant Killer network heard at 0130. (Richard Clark-via Internet email)

4379.0 Blue Star-USN FACSFAC, Roosevelt Roads, Puerto Rico, at 0004 working S4JG *(USN aircraft general call sign-Larry)* for radio check. This frequency is apparently the night alternate to 8971. (Baker-OH)

4458.0 C-Single letter HF marker at 2309. (Dix-NY)

4483.0 Nightwatch 01 at 0529 working WAR46 with phone patch to DSN 939 prefix. (Baker-OH) *Interesting frequency selection Rick. This is a FCC frequency. Wonder what the designator is on this one-Larry?*

4610.0 XJQ3 repeating "V FC3Y DE XJQ3" at 1016 in CW. (Yamaguchi-Japan)

4627.0 KPB609-CAP Texas Wing at 0005 working Eagle Nest 601 as NCS with check in by Eagle Nest 611 and 612. (Baker-OH)

4735.0 Hersey-Joint Interagency Task Force East Operations Center, NAS Key West, Florida, at 1635 working J9 with Link 11 coordination communications. (Baker-OH)

4992.0 NCWA-USS *Mossbrugger* (DD-980) working DoD Cape regarding the status of a shuttle launch at 2209. (Baker-OH)

5355.0 Coffee Table at 1734 working Foot Rope. (Baker-OH) *Another interesting frequency Rick, might be worth watching-Larry.*

5710.0 Nightwatch 01 at 0551 working Andrews with communications checks. At 9621, SAM 26000 (USAF C-137C tail no 62-6000) working Andrews with phone patch traffic. (Baker-OH)

5544.0 Saudi 3828 working Jeddah LDOC with position report at 2230. (Hood-UK)

5700.0 Nightwatch calling 5926 at 1355. Nightwatch says, "The rhinos are raging." 5926 answers with, "The wood is good." (Wes-Pittsburgh, PA)

5753.0 4XML repeating "V 6FR7 DE 4XML" at 1205 in CW. (Yamaguchi-Japan)

5998.0 Radio Alpha 99 heard in CW and USB at 1855. This clandestine station sent a CW ID as follows: "Radio Alpha 99 Viva Cuba Libre radio Alpha 99." (Barry Wise-Annapolis, MD)

6285.0 UAKS-*Baltiyskiy 37* working UBB4-Kaliningrad Radio in CW at 1030. (Hood-UK)

6300.0 UTXG-*Sibirskiy 2109* working RUF9-Krasnodar Radio in CW at 1820. (Hood-UK)

6303.0 V3RE7-m/v *Lidiya* working UHP5 (unknown location) with message in English in 50 baud RTTY at 1935. UHP5 answered in CW on 6385.5. Have heard UHP5 on 3300/6385.5/6485.5/8452 and previous traffic shows this may be yet another station in St. Petersburg, Russia. (Hood-UK)

6375.0 CEW5-Unid station with V CW marker at 2259. Interference from WCC. (Jack Dix-Yonkers, NY)

6461.0 Gold 82 working Hobby 45 then Nash 91 at 1553. Frequency is not a typo. (Haverlah-TX) *Another neatly hidden away USAF tactical-Larry.*

6607.0 Unid station sending 5-letter groups in hand sent CW at 2239. (Dix-NY)

6802.0 Spanish female 5-digit numbers station at 0310 (UTC Saturday). (Newby-CA)

6954.0 Spanish female 5-digit numbers station at 0202 (UTC Saturday). (Newby-CA)

6956.0 Unid station requesting a 5-ton truck to go to 11th Marine admin "Butler Building" and pick up supplies for mobile PX at 0010. Also heard 3114 Alpha calling Foxtrot Lima Bravo at 0035. (Newby-CA) *This is a 3rd MAW tactical and training frequency. Locations primarily at Marine bases in California-Larry.*

7309.7 RFHI-FF Noumea, New Caledonia, with 100 baud ARQ-E3 controle de voie at 0916. (Yamaguchi-Japan)

7325.0 SAM 28000 working Andrews at 0220. (Haverlah-TX)

7560.0 Strong CW beacon transmitting, "Radio DC Don't Vote Republican" noted at 0045. (Mike Brewster-Annapolis, MD) *Yep, Mike you win the unusual log of the month award. Talk about making a political statement-Larry!*

7644.2 RFQP-FF Djibouti with 100 baud ARQ-E3 controle de voie at 1500. (Yamaguchi-Japan)

7653.5 MMC-Unid station with SITOR-A encrypted messages partly English at 0942. (Yamaguchi-Japan)

7687.0 SAM 682 working Andrews at 0301 on their India/Oscar frequency. (Haverlah-TX)

7693.0 3BT3-Vacas Meteo, Mauritius, with 75 baud RTTY weather reports in English at 1450. (Yamaguchi-Japan)

7737.7 DSCN-Unid station with SITOR-A encrypted messages partly in English at 1045. (Yamaguchi-Japan)

7747.5 OS-possible IFOR Bosnia at 2246 working 20C passing track report for a bulk carrier ELGF3-m/v *EWL Rotterdam.* OS was U.S. accented, 20C heavily accented English. (Baker-OH)

7808.0 BAA22-Beijing Meteo, China, with 50 baud RTTY weather code at 1435. (Yamaguchi-Japan)

7831.7 5ST-ASECNA Antananarivo, Madagascar (FMMI), with Metar codes using ARQ-E3 at 0452, miles off frequency. (Robert Hall-Capetown South Africa)

7951.5 Trotter-Unid station with SITOR-A encrypted messages partly in English at 0945. (Yamaguchi-Japan)

7970.0 Unid station with 50 baud RTTY repeating 5-letter groups at 0530. (Yamaguchi-Japan)

8001.0 RFHJ-FF Papeete, Tahiti, with 96 baud ARQ-E3 idler at 1440. (Yamaguchi-Japan)

8026.0 SAM 206 (USAF C-20B tail no 86-0206) at 0447 working Andrews VIP with phone patch to Howard Metro. (Baker-OH)

8053.0 HNF-KCNA Pyongyang, North Korea, with 50 baud RTTY RYs transmission at 0959. (Yamaguchi-Japan)

8341.0 7THV-m/t *Dahra* working 7TF-Boufarik Radio with arrival message for Port La Nouvelle in CW at 0936. (Hood-UK)

8343.0 TCGJ-m/v *Gokcan* working 7TF-Boufarik Radio in CW at 1542. (Hood-UK)

8347.0 J8DW7-*Star Sun* working Nagasaki in CW at 1524. (Hood-UK)

8375.0 9VJX-m/v *Ikan Tanda* working JNA-Tokyo Radio with AMVER message in CW at 1618. (Hood-UK)

8380.0 FNRW-Cable ship *Vercors* working FFT-St. Lys Radio with SITOR-A message at 1545. (Hood-UK)

8411.0 EVBO-Unid station with 50 baud RTTY RY's at 1034. (Yamaguchi-Japan) *EVBO is the vessel Aleksandrovsk Sakhalinskii-Larry.*

8500.0 UON-Baku Radio working 4JDL-t/h *Nizami* in CW at 1920. Lots of interference from VTH with 50 baud RTTY. UON not heard on this frequency before. They are usually on 12626.5. (Hood-UK)

8510.0 J2A8-Djibouti Radio with V CW marker at 1905. (Dix-NY)

8570.0 UBO3-Petrozavodsk Radio working UKGF-*Baltiskiy 105* in CW at 1846. (Hood-UK)

8570.5 UWS3-Kiev Radio with ID and traffic list in CW at 0830. Also on 6465/8570.5/12695.5. (Hood-UK)

8705.0 RFA-Astrakham Radio working UJSL-*Sormovskiy 3050* in CW at 1548. ID was RFA/RVD. (Hood-UK)

8839.0 Air France Concorde 002 working Gander Aeroradio for selcal check (EJ-AD) at 1141. (Hood-UK)

8853.5 Unid Hungarian Embassy with 125 baud DUP-ARQ idler and encrypted 5-letter groups at 1225. (Yamaguchi-Japan)

8968.0 Narcotic passing 26 character EAM at the H+51 timestamp. Looks like this is a regular time for command post aircraft to restore EAM to the network. Another timestamp could possibly be H+21. Possible TACAMO Central restoral slot. (Larry Van Horn-Brasstown, NC) Tiger Eye at 1956 working Offutt with immediate phone patch request to DSN 339 regarding request from MCC on status of part being shipped. (Baker-OH)

8971.0 Trident 720 (USN P-3C VP-26 NAS Brunswick) at 1958 working 5LU regarding Bird Dog communications. (Baker-OH)

9023.0 Dragnet Tango (USAF E-3 AWACS) at 1543 working Dragnet Uniform. Later Sidecar and Deerhunter up with NORAD training communications. (Baker-OH)

9057.0 Nightwatch at 1753 working WAR46 for radio check on S-309. (Baker-OH)

9122.5 WUG-U.S. Army Corp of Engineers at 1539 working WUI5, WUG/A, WUB, WUJ4, WUB5, WUB2, WUB4, and WUO for check in to regular Friday net (Baker-OH)

9330.0 XVN26-VNA Hanoi, Vietnam, with 50 baud RTTY French news at 1215. (Yamaguchi-Japan)

9983.7 RFFA-MOD Paris with an ARQ-E3 idler at 0517. (Hall-RSA)

10075.0 Cedar Rapids LDOC, Iowa, at 0024 working Connie 801 with ETA to SBGF. (Baker-OH)

10130.0 RBX73-Tashkent Meteo, Uzbekistan, with 50 baud RTTY weather code at 0930. (Yamaguchi-Japan)

10205.0 RTP78-Irkutsk Meteo, Russia, with 50 baud RTTY weather code at 0220. (Yamaguchi-Japan)

10213.1 CNM29-MAP Rabat, Morocco, with 50 baud RTTY news in French at 1130. (Robert Thompson-Kilgore, TX)

10315.0 NRWH-USS *Hayler* at 1918 working SESEF. First time I have seen this frequency used, may have intended to use 12315.0. (Baker-OH)

10384.2 5YE-Nairobi Meteo, Kenya, with 50 baud RTTY weather code at 1507. (Yamaguchi-Japan)

10548.6 NLHA-USS *Tarawa* (LHA-1) at 2311 working Neil Control regarding the statis of USN/USMC Pacific Joint Task Force Execise 96-1 heard all week on this frequency. (Baker-OH)

10812.0 4XML repeating "V GFR7 DE 4XML" at 0225 in CW. (Yamaguchi-Japan)

11056.0 Falcon (Base) working Roadrunner, Coyote, Bravo at 0330. Coyote had heartstroke victim. Arrangements made to helo medivac to Danang then C-130 to Bangkok. Possible MIA search teams in Vietnam. (Mike Holl, REO-SS Lng *Taurus*)

11175.0 Reach 67028 working Offutt GHFS with a phone patch to Hilda at 2058. (Greg Brazil-Pomona, CA) Syllabus with a Flash White Pinnacle message sent to National Military Command Center (NMCC) at 1301. Someone want to take a stab at a White Pinnacle message? (L.Van Horn-NC)

11181.0 Hawk 84 (B-1B crew training squadron at Dyess AFB) at 2015 working McClellan GHFS on a discrete with phone patch to Dyess Metro. (Baker-OH)

11187.0 Boomtown at 1819 working Coastal with RTTY coordination comms, letter callword sounded like Christmas Tree came up in net. (Baker-OH)

12435.0 TCPA-m/v *Bolu* working WCC-Chatham Radio with AMVER message in CW at 1506. (Hood-UK)

12450.0 CONF-m/v *Golfo di Mexico* working CLA-Havana Radio in CW at 1516. (Hood-UK)

12583.5 UUI-Odessa Radio working UYAD-*Maksim Gorkiy* in SITOR-A at 1335. (Hood-UK)

12600.0 7TK27-Boufarik Radio working 7THK-*Larbi Ben M'Hidi* (LNG carrier) for telex traffic in English and French SITOR-A at 1115. (Hood-UK)

12615.0 USU-Mariupol Radio, Ukraine, SITOR/CW marker at 0750. (Yamaguchi-Japan)

12664.5 FUM-French Navy Papeete, Tahiti, with 75 baud RTTY V/RY test tape at 0920. (Yamaguchi-Japan)

12830.0 RKLM-Archangelsk Radio calling 4LY in CW at 1218. (Dix-NY)

12858.0 6WW-Unid station with 75 baud/850 shift RTTY RY/Foxes/Le brick test messages at 1920. (Karl Meyer-Cameron, NC) *6WW is a French naval station in Dakar, Senegal-Larry.*

13092.0 IAR-Rome Radio, Italy, working Jolly Bianco with phone patch at 0726. (Hood-UK)

13933.0 MFA Sofia with a news broadcast about dollar/leva exchange problems (preventing dollar from surging past the psychological barrier of 77 Leva) using 150 baud RTTY at 1050. (Hood-UK)

14371.5 Long numbers message sent using 425/75 baud RTTY at 2100. (Parmenter-MA)

14376.0 Unid station sending 75 baud cyrillic RTTY at 1453. (Dix-NY)

14441.5 NNNOCVN-USN MARS station calling for any stateside station at 2154. Also NNNOCHS calling for a stateside station at 2156. (Jack McMahon-Depew, NY) *CVN is the USS Briscoe (DD-977) and CHS is the USS Vicennes (CG-49). If you want a list of MARS calls suggest purchasing the Grove Shortwave Directory-Larry.*

14487.0 English female 5-digit number station in USB at 1415. (Dix-NY)

14718.3 RFHI-FF Noumea, New Caledonia, with 100 baud ARQ-E3 idler at 0655. (Yamaguchi-Japan)

14925.7 RFHJ-FF Papeete, Tahiti, with ARQ-E3 idler at 0910. (Yamaguchi-Japan)

14936.5 NNNOMBO-USN MARS Manama, Bahrain, with SITOR-A telex at 0635. (Yamaguchi-Japan)

15682.0 English female 5-digit number station in USB at 1425. (Dix-NY)

15855.0 SNN299-MFA Warsaw, Poland, with POL-ARQ broadcast at 1144. (Hall-RSA)

15919.7 8WD4-Unid station with 50 baud RTTY broadcast consisting of RYs, 10 count and message "come to the aid of your party" at 1213. (Hall-RSA)

15929.4 PWX33-Brasilian naval radio with 75 baud RTTY broadcast consisting of ID, RY, SG and 10 count at 1157. (Hall-RSA)

15961.9 RFLI-FF Fort de France, Martinique, with ARQ-E3 controle de voie on BFL circuit at 1155. (Hall-RSA)

15970.5 KKN50-MFA Washington, D.C., with CW marker and ID at 1211. (Hall-RSA)

16014.4 RFFIC-FF Paris, France, with ARQ-E3 5-letter groups to RFVICPL-Frogship *Champlain* at Reunion at 1055. (Hall-RSA)

16087.9 RFVI-FF Le Port, Reunion, with ARQ-E3 controle de voie at 1032. (Hall-RSA)

16165.4 RFQP-FF Djibouti with ARQ-M2 controle de voie on PQB circuit at 1232. (Hall-RSA)

16261.9 RFTJD-Mislog Douala, Cameroon, with ARQ-E3 message to Milfrance Yaounde in French on HAI circuit at 1010. RFGW-Distransit Paris, France, with French ARQ-E3 traffic to Comisair Vincennes at 1014. (Hall-RSA)

16720.0 Unid station sending news about Philippines in English via CW at 1902. (Dix-NY)

16806.5 NRV-USCG Apra Harbor, Guam, with SITOR-B navigational warnings at 0525. (Yamaguchi-Japan)

16810.5 FFT81-St. Lys Radio, France, with SITOR-B gale warning at 1308. (Hall-RSA)

16318.5 Unid station with 75 baud RTTY Spanish messages at 0440. (Yamaguchi-Japan)

16851.0 UON-Baku Radio with ID and traffic list in CW at 1105. Also on 12626.5/16851.0. (Hood-UK)

16930.4 9MR-Malaysian Naval Radio Baharu, Malaysia, with 50 baud RTTY RY/SG ID (RMMJ) at 0950. (Yamaguchi-Japan)

16958.4 FUJ-French Naval Noumea, New Caledonia, with 75 baud RTTY RY test tape at 0715. (Yamaguchi-Japan)

16963.0 FUF-Unid station with 75 baud/850 shift RTTY RY/Foxes/Le brick test messages at 1920. (Meyer-NC) *FUF is the French Naval radio station in Martinique-Larry.*

17522.0 RCF-MFA Moscow, Russia, with 50 baud RTTY encrypted 5-letter groups at 0940. (Yamaguchi-Japan)

18704.4 DFS70-PIAB Bonn, Germany, with FEC-A broadcast of football results at 1027. (Hall-RSA)

18264.0 XVN48-VNA Hanoi, Vietnam, with 50 baud RTTY English news at 0715. (Yamaguchi-Japan)

18411.7 MFA Jakarta, Indonesia, with 96 baud SI-FEC encrypted 5-letter groups at 0920. (Yamaguchi-Japan)

22376.0 NMO-USCG Honolulu, Hawaii, with SITOR-B CQ, time and frequency schedule at 0730. (Yamaguchi-Japan)

SHORTWAVE BROADCASTING

The Global Forum

Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702
fax: (405) 233-2948, or (704) 837-2216 ATT: Hauser

ANTARCTICA LRA36 may soon reactivate 15476 (Gabriel Iván Barrera, Argentina, HCJB *The Latest Catch*) Previously on air weekdays around 2100-2300 (*PWBR* via *DXing with Cumbre*)

ARMENIA Yerevan in English 2030-2100 on 9965 (Eugene Gebruers, RVI *Radio World* via Steven Cline) Also announces "35 meters, eleven one hundred sixty five," i.e. 11615 (Tom Sundstrom, NJ via *BC-DX*) 11665? (Kevin Hecht, PA)

AUSTRIA RAI English to Ams: 1130 on 13730; 0130 on 9655; 0230 on 9655, 9870, 13730; 0530, 0630 via Canada 6015 (via Diane Mauer)

BELGIUM Contrary to April *MT*, p. 58, RVI's 1300 (Sun 1230) is on 13605; at 2330 quickly left 11815 due to Costa Rica, put both transmitters on 9925 (via Diane Mauer, Steven Cline, John Norfolk)

BHUTAN BBS a bit easier whilst on 5023.08 with English news at 1415 (Ron Howard, CA, *NU* via HCJB *TLC*) Then back to 5030 (Victor Goonetilleke, Sri Lanka, via Büschel via HCJB *TLC*)

BOSNIA-HERCEGOVINA On a date when Moscow missing from 7105, R. B-H heard at 0055-0200+ with pips and ID at 0100; not heard a week later. One night only, Romania was on 7105 blocking. After that R. B-H heard on 7108.09 at 0148-0300, and a week later on 7105 at 0000-0300+ (Brian Alexander, PA, *W.O.R.*)

BULGARIA R. Bulgaria 60th anniversary special test broadcasts, Sat Jun 1 at 2200-2300 on 9700, 11660; earlier at 0830-0930 on 6050, 9700, 12000, 13635, 13770, 15245, 15630. Reports should be postmarked no later than June 5 for individually numbered limited edition QSL cards to: R. Bulgaria, PO Box 900, 1000 Sofia - C (Atanas Tsenov and Ivo Ivanov, RB & via Cline, Büschel) DX Program *Radio Bulgaria Calling* announced sked is Fri 1945, 2345, Sat 1215, Sun 2145, Mon 0445, 1245 (John Norfolk, OK)

RADIO BULGARIA
4, Dragan Tsankov, Sofia fax (359 2) 650 560

CANADA CFRB got only 9-month license renewal (*FMedia*) Must also affect SW relay CFRX 6070 (gh)

CHILE R. Esperanza, 6090, seems expanded to all-night, every night, including English 0830-0900. Report with 2 IRCs or 2 US airmail stamps to Casilla 830, Temuco (Tony Jones, *Dxing with Cumbre*) English is at 0800-0830. Also active are two in Coyhaique: 6029.62, R. Santa María, 10 kW, Mon-Sat 0950-0400, Sun 1100-0400; 6080, R. Patagonia Chilena, 1 kW, M-F 1000-0400, Sat 1000-0600, Sun 1100-0400 (Gabriel Iván Barrera, *Onda Corta* via *Radio Nuevo Mundo*)

COSTA RICA RFPI expanded *Far Right Radio Review* to one hour, first airing Sat 2000, repeats Sun 2200, Tue 1800 plus 8, 15 hours later (RFPI via George Thurman) New 10 kW unit will be frequency-agile, 19 thru 49 meters, but antennas must be matched (RFPI *Mailbag*)

CROATIA CR, Zagreb on 7315 ex-7370 at 2305 (Joe Hanlon, PA, *W.O.R.*) Clashing with DW, and later, WHRI, which used to relay it on that same frequency! (gh)

CUBA Despite his interview with arch-enemy WRMI, Keith Perron was back at RHC in April for another stint. RHC in Spanish on 9830-SSB at 1305 //11760 (gh, OK) R. Rebelde, 5025 with wobbly but equal strength spurs on 5042.7v, 5007.8v at 0640-0700+ (Brian Alexander, PA) Don't take one for Surinam

ECUADOR HCJB's new 100-kW transmitter is being installed, with solid-state modulator, 64 modules, covering 6-17 MHz (HCJB *DX Partyline*) R. Tropicana, Cuenca, on 5559.6 = 4 x 1390 at 1211 folk music, ads, sometimes better in FM mode, loud enough to hear abroad (Rich McVicar, Quito, *BC-DX*)

EQUATORIAL GUINEA R. Africa, not daily, but one Sat 1108-1556* and *1647-2301* on 15185.61v with religion in English; Fri 2000-2318* on 15185.8v (Brian Alexander, PA) Following Sun we had it on 15186.0 at 2117, no trace of *VOA Express* (gh, OK)

ERITREA V. of Broad Masses on 7390v at *0324 with horn, also with other program on 7085 (Bob Hill, MA, *NU* via HCJB *TLC*)

GEORGIA Abkhaz Radio, Sukhumi, heard not only on 9494.75 but on new 9508.75 at 0430-0530, erratic (BBCM) Summer shift to 0330-0445; and 1430-1545 on 9495v (Rumen Pankov, Bulgaria, via *BC-DX* via HCJB *TLC*)

GERMANY DW has discontinued transmitter site announcements at beginning and end of each transmission (Jim Moats, OH) Might as well, since "BRD" site was often heard on relays, such as Canada! (gh) Some good English frequencies here intended for elsewhere: 1600 on 17800; 2000 on 9615; 2100 on 9765; 2100 on 9735, 11765, 15135; 2300 on 7235, 9690; 0200 on 9640 (Moats)

GREECE VOG to NAm at 1200-1350 on 15175, 15650; English at 1335 (John Babbis, MD, *W.O.R.*) 15175 may shift to 15170 (VOG via Babbis)

GUAM KTWR no longer blocked by WEWN on 11580; try for *Pacific DX Report* Mon 1615, inaudible here but may be on West Coast (gh, OK)

GUATEMALA R. Tezulutlán, 4835 heard at 1208 with English ID asking for donations direct to bank (Ulis Fleming, *DXing with Cumbre*)

GUYANA GBC faxes they would install new 10 kW SW at Sparendam in May (Ludo Maes via Guido Schotmans via James Goodwin via *BC-DX*) Probably back on 5950 (Harold Sellers, ODXA via *BC-DX*) Best at 0900 after WYFR closes (Hans Johnson, *DXing with Cumbre*)

HAWAII Final [?] summer sked of *DXing with Cumbre* on KWHR: Sat 0200 on 17510, Sat 0500 on 17780, 1430 on 9930, Sun 0200 on 17510, 1830 on 13625, Mon 0330 on 17510; see also USA—WHRI (*DWC*) WHR up to same old tricks—missing one Sun at 0200; dead air and late start at 1841. WVHA has plans for 3 transmitters in Maine, 7 in Hawaii of 50 or 100 kW (gh)

HUNGARY R. Budapest announced Z-96 in English: Eu 1900 on 3975, 6140, 7130, 9835; 2100 on 3975, 5935, 7250, 9835; NAm 0100 and 0230 on 6190, 9870—but their www page shows 9870 and 11870 instead! (Büschel & Tom Sundstrom, *BC-DX* via Thurman) Confirmed on latter pair, 9870 clashing with Austria (Sundstrom) Hungarian Radio, TV, on brink of bankruptcy, needed 4.5 gigaforint bailout (Zsofia Szilagyi, OMRI via Patrick Crumhorn, *Review of International Broadcasting*) Affects external service?

INDONESIA RRI Jakarta back on 9680 at 1130 in Indonesian, 1230 English on Tue (John H. Cobb, Jr, GA) That's the Aussie-financed and -accented language lesson, tho irregular on 9680, better heard here than VOI's so-called external hours in English. Says it's on stations in every province (gh, *W.O.R.*) *Kangguru 2* also heard Wed 1231 on Sorong 4874.6; address for program is PO Box 6756, JKSRSB, Jakarta 12067. Also has website: **http://www.indo.net.id/commercial/waterfall/kangguru/kangguru.html** (Ron Howard, *DX Window* via *DXing with Cumbre*)

INTERNATIONAL VACUUM *World of Radio* summer sked on World Radio Network: Eu Sat 0330 and 1600; NAm Sat 0530, 1900. Current and archived previous editions available on RealAudio; live Internet broadcast via Streamworks on NAm service times, accessible thru WRN home page **http://www.wrn.org/**

IRAN [non] V. of Mojahed keeps moving even during broadcasts to avoid jamming; at 1900-2100 observed around 3870, 4250, 4450, 4650, 5150, 5460 +/- 10 kHz; believed via Iraq (BBCM)

IRAQ [non] Opposition station Republic of Iraq Radio, Voice of the Iraqi People, believed based in Sa'udi Arabia, no longer heard on Arabsat, but still on SW: *1300-2100+ on 9568v and new 11713 (BBCM)

Mother of Battles R., Baghdad, variety

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

program in Arabic 2225-2259 on 7147, ID as *Umm al Ma'arik min Baghdad*; (Tony Rogers, *BDXC Comm*)

ISRAEL Kol Israel, full freq list at 1900-1930 is 7465, 9435, 11605, 15615, 15640 (Daniel Rosenzweig via George Thurman) At 0400, 7465 clashes with Norway (Joe Hanlon, gh)

ITALY Rai, English to us at 0050-0110 on 6005, seems relay may be Ascension, also announcing 9675 with correct metric equivalent of 31.01 so presumably not a typo for 9645, but 9675 covered by R. Canção Nova, Brazil, and 11800 inaudible (gh & Kevin Hecht, PA)

JAPAN R. Japan will run anniversary programs on June 1. Now has homepage, no caps: **http://www.nhk.or.jp/rjnet/** (R. Japan *Media Roundup*)

KAZAKHSTAN [non] R. Almaty relay 200kW 254° by Kiev includes English 0530-0600 loud and clear on 11705 ex-9560 (Wolfgang Buschel, *BC-DX*)

KIRIBATI R. Kiribati, 9825, 0800-0850 local language and island music (Bruce Churchill, CA, *Dxing with Cumbre*)

MALTA [non] V. of Mediterranean, which lost access to SW when DW relay closed, tested for one week in April to Europe via Italy, 0800-0855 on 9880, 0900-0955 on 11925, hoped to begin regular broadcasts quickly after assessing reports (Daniel Atkinson, Wolfgang Büschel, RVI via Steven Cline, HCJB *DXPL & TLC*, VOA *Communications World*)

MAURITIUS S. Sunassee, MBC chief technical officer, replied to our inquiry that MBC plans to resume SW sometime in future on previous sked, 0200-1300 on 9710, 1300-0200 on 4855 (HCJB *DXPL*)

MEXICO XERMX running 9705 into the night, but maybe only UT Mon for *La Hora Nacional* at 0300; taped IDs also mention 11770, but unconfirmed if active (gh, OK)

MOLDOVA R. Dnestr International, for Z-96 on 11750 at 2030-2100 in English, clashing again with BBC (Kevin Hecht via Joe Hanlon) Site is Grigoriopol, 310° megawatt (FCC via Hecht) R. Moldova Int'l, via 120 kW Bacau Galbeni, Romania, English at 0330, 0430, 2200, 2300 on 7520 ex-7500 (Kai Ludwig, *AMID* via *BC-DX*)

MONGOLIA R. Ulaan Bataar Z-96 in English until last Sun in Sept: 0930 EAs on 11850, 1200 Au, 1500 SAs, 1930 Eu on 9745, and all also on 12085. 12085 was fair at 0930, 9745.34 fair at 1930. They've given up on NAm. Went to DST March 24. Same program four times. Heavy accents and poor audio processing (Shel Remington, HI, *W.O.R.*)

NETHERLANDS ANTILLES RN Bonaire must be breaking down — 6165 often noted with bad hum, low modulation (gh, OK)

NEW ZEALAND For J-96, RNZI on same freqs but different spans: 1650-1950 on 6145, 1950-2215 on 9810, 2215-0100 on 11735, 0100-0500 on 15115, 0500-0700 on 9570, 0700-1200 on 6100 (Adrian Sainsbury, RNZI *Mailbox*) Contrary to sked, *On the March* actually ran on a Thu at 0905-0933 (gh) ZLXA now 24h on 3935, relaying RNZ National Programme at 1200-2030 (Arthur Cushen RNZI *Mailbox*)

NIGERIA R. Nigeria, Kaduna, reported that V. Of Nigeria, external service, off air since Oct. Would be back in April with new transmitting equipment. Had been using 7255 only (BBCM)

OMAN BBCWS will build new relay site at Al-Ashkharah on the mainland, to replace Masirah Island which will be obsolete and closed in 2001. Cost of 30 megapounds may be financed privately. Initial lease is for 10 years, with 4 x 300 kW SW, and 2 x 600 kW MW. Will serve 50 megalisteners in English and eight other languages (BBCM)

PALESTINE [non] V. of Palestine, V. of the Palestinian Islamic Revolution, from Iran, at 1230-1300 on 11745, which carries VOIRI in Arabic before and after (BBCM)

PERÚ New on 5980 until 0208* is a station with address Jirón Unión 242, Juliaca (Horacio Nigro, Uruguay via Roberto Belo via Thurman) It's Radio LTC, for Producción Leonicio Torres Calla, tho official name may be R. Comercial Collao (Takayuki Inoue N., *Relámpago DX* via *RNM*) Sked is 1100-1300, 0000-0200 M-F, 1100-1900 Sa-Su (Henrik Klemetz, HCJB *TLC*)

R. Cajamarca on 4279.36 ex-4238, 1130-1200 with message show, heavy interference. Ondas del Rio Mayo, Cajamarca, at 1043 with huaynos on 6818.41 ex-6803 (Rich McVicar, Ecuador, HCJB *DXPL*)

R. San Miguel Arcángel, San Miguel de Pallaques, at 0015 with messages on 6339.45 (McVicar, and Henrik Klemetz, Colombia, HCJB *TLC*)

R. Estelar, Moyobamba, 5766.9 at *1040 same transmitter as Estación Soritor previously on same frequency; also may be called R. Solar (Inoue & Klemetz, HCJB *TLC*)

POLAND Polskie Radio 5 changed one English broadcast to 1200-1255 on 6095, 7145, 7270, 9525, 11815 (P. Ochwal via Karel Honzík CSDXC via *BC-DX*) 11815 can be heard when REE eases up, and that's off on weekends (Ben McNimly, Ont., *Dxing with Cumbre*) see also INTERNATIONAL VACUUM

ROMANIA RRI Z-96 shows some changes in English: 0400 extended to an hour on the usual; additional at 2300-2356 on 7135, 9570, 9625, 11940 to NEu, USA (via Andreas Volk via Büschel via Thurman) Three are blocked and 9625 inaudible (Marie Lamb, *DWC*) 7125 ex-7135 (Tom Sundstrom, *DWC*) 9550 at 1900 in English wanders to 9542, 9539 (Büschel, *BC-DX* via Thurman)

RUSSIA Art Bell, overnight talk host from Pahrump NV on many US clears, talks about adding SW from here, perhaps St. Petersburg (Chet Copeland, DC)

SÃO TOMÉ VOA relay began first two transmitters in mid-April: English: 0300-0630 (Sa/Su 0700) on 6080; 1630-2200 (Sa/Su 1600-, M-F -2230) on 6035. Hausa, French, Swahili, Portuguese 0500-0530 (M-F 0630) 6045 (Dan Ferguson, *Cumbre DX* via *BC-DX*) 1600-1730 on 9815, 1730-2130 on 9780 (VOA *CW*) Two more are under construction; and when the 600 kW MW 1530 comes on, the old 100 kW MW will be converted to the 60-meter band (Kim Elliott, VOA *CW*)

SA'UDI ARABIA [non] Holy Medina Radio, anti-Sa'udi from Iraq, heard +0400-0600+ on 11785, and Finn Krone reported on AWR it was heard at 0400-1525 on 9530 (BBCM)

SEYCHELLES FEBA M96 and tentative J96 English: *Network* to SAs 1458-1600 M-Sa on 9810; different program to SAs 1458-1530 (Tu/We/Th 1515) on 11870 (FEBA)

SIKKIM AIR Gangtok regular on 3390 at 1200-1428, tho not in official AIR sked. Reports could be sent to: Mr. Deepak Kumar, AIR Gangtok, SW Transmitter, Old MLA Hostel, Gangtok 737 101 Sikkim, India. Tel: +91 11 3592 22636 (Manosij Guha, *DX Window* via *BC-DX* via Thurman)

SLOVAKIA RSI Z-96 'til Oct 27 in English: 0830-0900 Au 11990, 15460, 17550; 1630-1700 WEu 5915, 6055, 7345; 1830-1900 WEu same. 0100-0130 NAm 5930, 7300, SAm 9440 (Jürgen Kubiak, *BC-DX*)

SOMALIA V. of Alu Suma Waljama (?) is new station on 6545 at 1530 ID in Somali, a.k.a. Holy Qur'an Radio, Mogadishu, from this fundamentalist organization (BBCM via HCJB *TLC*)

SOUTH AFRICA For Southern Winter at sunspot minimum, Sentech shows no Channel Africa frequency higher than 9650 (in KiSwahili at 1500-1655) English: 0300-0455 on 5955, 3220; 0500-0555 on 5955, 9590; 1500-1755 on 3220, 7155; 1600-1655 on 9530. SABC domestic to 28 Sept: Afrikaans Stereo 0300-0545 on 3320, 0550-1530 on 6000, 1535-2300 on 3320. Radio 2000, 2300-0300 on 3320. R. Oranje, 0555-1525 on 5965, 1530-0550 on 3230 (SENTECH)

The four 100 kW on the "domestic site" are not exclusively for above stations; two are used for external to Mozambique, Zimbabwe, Zambia. To accommodate extra demand from relay clients, four ABB 100 kW are being installed, and antennas reoriented (Kathy Otto, SENTECH via Colin Miller, ODXA via *BC-DX* via Thurman) Some of the 100 kW were originally to be used as jammers. Channel Africa is considering adding important languages Arabic and Hausa (via RN*MN*) VOA new Portuguese service for Angola. *"Linha Direta, Linha Alberta"* is 1830-1900 M-F via S. Africa on 5970, 6135, 7225 (VOA *CW*)

SPAIN REE English at 2100 on 11775 again this summer, good here (Kevin Hecht, PA) REE Sephardic show moved to UT Tue 0415-0445 on 9690. Spanish to northern SAm is on 9745 at 0100-0400 Tu-Sa (REE sked) Disrupting HCJB but not on weekends (gh)

SRI LANKA Tamil Tigers clandestine uses 6825 LSB at Batticaloa with speeches, distress calls, coded messages in Tamil, no ID, in short bursts, moving around band. May be communications transmitter (Manosij Guha, ODXA and *DX Window* via *BC-DX* via Thurman) DW relay reactivated in mid-April with improved security (BBCM via *BC-DX*) Such as 21640 from 1120 (Tony Jones, Paraguay, *NU* via HCJB *TLC*)

SWEDEN R. Sweden at 0330 is listed on 7115, not 7155 (via Diane Mauer) 7290 at 0130, 0230 is often blocked by US hams for whom 7290 is their favorite AM frequency on 40 meters (gh)

SWITZERLAND Red Cross Broadcasting Service, tetraweekly 5-minute newscasts on Fris, repeated Sats, Suns, in English June 6-7-8 etc., 0800 on 9885, 11860; 1245 on 15415, 17515; 1645 on 12075, 15530; 1845 on 9885, 12075—and all on 13635 (Swiss Telecom) Patrick Piper of RCBS says they have decided to stop QSLing, no reason given (R. Japan *Media Roundup* via Diane Mauer)

SYRIA R. Damascus, 2005 in English good on 12085, poor on 15095; at 2105, 12085 gets weak and 15095 inaudible (Tom Sundstrom, NJ, *BC-DX* via Thurman)

TAHITI QSL from R. Tahiti says in short term RFO will only be on FM, satellite, and I was lucky to hear them on SW (Jim Bryant, TX, HCJB *TLC*) Check 15168v, 11827v

TAIWAN [non] VOFC via WYFR to Eu, Z-96 in English, 2200-2300 on 15600, 17750 (WYFR)

TRT **TÜRKİYE RADYO TELEVİZYON KURUMU**
TURKISH RADIO TELEVISION CORPORATION

TURKEY TRT Z-96 shows USB: 0700-0900 and 1300-1500 Turkish on 13670; 1730 German 9645, 1830 English 9535, 1930 French 9675; 2300-2400 English 11810. In Turkish 24h to NAm on AM: 0400-0700 on 9505, 2100-0400 on 11725; 0700-2100 on 9460, 2100-0700 on 9445 (TRT) Check for nice music, such as Sun 2135 on 11725 (gh, OK) Some USB actually on AM or LSB (Büschel) TRT has transmitter problems at new Emirler site, closed until early June for repair (Benno Klink, Germany, *BC-DX* via Thurman)

Polis Radio Istanbul is inactive despite reports to contrary (Harold Kuhl, *DX Window* via *BC-DX* via Thurman)

UKoGBaNI *BBC Worldwide* magazine is under review; stopped newsstand distribution in USA, and no longer accepts new subscriptions or renewals. Price may be lowered; most readers only wanted World Service schedules (RN*MN*) As we told BBC when they started this expensive mistake. Speaking of which, during the Week of Confusion, March 31-April 6, some BBC frequencies were FUBAR, especially 5975 supposedly from Antigua to NAm, but at various late-evening times had African or European stream, even Spanish, mixups not easily explained. Relay via WYFR 1300-1600 on 11865 ex-9590. Presumed Delano 9895 at 0230-0330, sometimes later. See also CANADA (gh)

UKRAINE RUI English is at 2100, 0000 and 0300, best on 7150 and despite Cuba, 9550 (Kevin Hecht, PA) 9550 quite good at 2128 (Dave Jeffery, NY) 0000 and 0300 on 7150, seems best if not only choice here (John Norfolk. OK)

A fire destroyed much of the Radio-TV center in Kiev March 9, disrupting domestic and external services. Damage estimated at 12 megadollars, and 20 gigakarbovantsi allocated for rebuilding (Ukrainian press sources via BBCM)

UNITED ARAB EMIRATES Dubai in English: 1030-1055 and 1330-1355 on 15395, 21605, 13675, 17825; 1600-1640 on 15395, 13675, 17825, 11795—in order best-to-worst (Eugene, RVI *Radio World* via Steven Cline)

USA Additional *World of Radio* times Fri 2215 on 9475 (then *Mundo Radial* at 2245), Sun 0300 on 2390, 2130 on 9475. *Ham Radio & More* Sun 2206 on 7435. *Internet Connection* Sun 1800 on 9475. *Ken's Country Classix* Sun 2030, *Old Record Shop* 2100 on 9475. On WWCR-3: *Opry North* from Green Bay, Sun 0800 on 5065, 2030 on 12160 (Adam Lock, WWCR) East side of Toledo OH has low-power WWCR relay on 97.9 FM, including *World of Radio* Sat 6:28 am ET (Artie Bigley via Thurman)

Although it hasn't happened yet, DXers are worried that more US SW stations will pile into the tropical bands following WWCR. Anker Petersen, DSWCI Chairman, wrote the FCC with a copy to George Jacobs who replied (gh) WWCR is NOT a client of mine. Out-of-band frequencies authorized by FCC are on a non-interference basis. A station receiving interference must report to the FCC or the ITU. As far as I know, none have been received at this time by the FCC (Jacobs via *DX Window* via *BC-DX* via Thurman)

WINB Z-96 registrations in case it returns: 11950 at 0000-0600, 15715 at 1600-2400 (George Jacobs & Associates)

WGTG, 9400 for Z-96 expanded to daily 1000-0400, mainly satellite networks such as Jeff Baker's Amerinet; uses rhombic toward México with broad coverage +/-55°. Second transmitter half completed by early April, will be available for 24h lease; to use 7-element wide-spaced yagi, dual band 5/7 MHz, preferably around 6960 if authorized (David Frantz, WGTG)

WRMI, 9955, no longer has Cuban exile programming weekday eves, but a lot more English. *Wavescan* sked: Tue 0015, 1300; Wed 0015; Thu 0015, Fri 0015, 1315; Sat (2nd/4th/5th) 2330; Sat 2345; Mon 0030, 0100 (Jeff White, *BC-DX* via Thurman) Some of these fail to appear (gh) Bro. Stair was on 9955 weekdays 1600-2400 (Diane Mauer, WI) April expanded to 1400-22300 weekdays, with *Viva Miami* M-F at 1330, 2430 (WRMI via Thurman) Ran across *Viva Miami* Sun 2030, Sat 2330 (gh) Mark Koernke did stay on a weeknight sked, and Tom Valentine, *Radio Free America*, also tried WRMI. Pastor Pete Peters said he would be on WRMI weeknights from 0100 UT (RFPI *Far Right Radio Review*) WRMI has applied for a second antenna, presumably toward Canada to be used part time with existing transmitter; later, a second transmitter (gh)

DXing with Cumbre Z-96 on WHRI: Fri 2230 on 5745, Sat 0500 on 5760, 7315, 2230 on 9495, 2300 on 5745, Sun 0330 on 5745, 1730 on 9495. See also HAWAII (Marie Lamb, DWC) 2300 and 1730 airings failed to materialize (gh)

VOA *Communications World*, Z-96 as amended, Sats: 1030 on 5985, 11720, 15425. 1230 on 6160, 9645, 9760, 11715, 15160, 15425;1730 on 6160, 9700, 9760, 15255, 1197, 10454-LSB, 11920, 12040, 13710, 15410, 15445, 17895, 909; 2130 on 6040, 9535, 9760, 1260, 10454-LSB; 2430 on 6130, 9455, 11695, 930. Also on WRN to Eu Sun 1400 (Kim Elliott, VOA CW)

UZBEKISTAN R. Tashkent, English to SAs 1200-1230 and 1330-1400 Z-96 on 15295, 9715, 7190 (Edwin Southwell, England)

VENEZUELA R. Occidente, Tovar, long inactive, heard on 9750 at 1606, ID mentioned 3225, seems not on at night (Henrik Klemetz, *Dateline Bogotá*, via HCJB *DXPL)*

R. Amazonas, 4940, is being urged to apply for a clearer frequency, 5040 (Jorge García Rangel, Club Diexistas de la Amistad, HCJB *TLC*)

VIETNAM [non] V. of Vietnam, English via Tbilisskaya / Armavir / Krasnodar, Russia 0100-0300 on 7250 as last summer, excellent signal. Spanish from same site, different transmitter, 0300-0400 on 7260 (Kevin Hecht, PA)

ZIMBABWE ZBC Radio 4 in English/Ndebele/Shona, 0300-0530 on 3396, 0530-1700 on 5975, 1700-2200 on 4828; ZBC Radio 2 in Ndebele/Shona, 0300-0545 on 3306, 0545-1600 on 6045, 1600-2200 on 3306 (BBCM)

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

Broadcast Loggings

SHORTWAVE BROADCASTING

Gayle Van Horn

0040 UTC on 9550
UKRAINE: Radio Ukraine International. Report on how Peace Corps. volunteers are faring with education and living in the Ukraine, // 7150. (John Hanz, Old Bridge, NJ)

0100 UTC on 9505
PERU: **Radio Tacna**. Spanish. Regional announcements to station promo. (Daniel L. Abrahamson, WI) Peru's **Radio Cora** heard on 4914 at 0418 with IDs, music and jingles. (Giovanni Serra, Rome, Italy)

0101 UTC on 6000
CUBA: Radio Havana. Usual rhetoric from Cuba condemning the USA. Spanish service noted 2327 on 1190. (Sue Wilden, IN, via e-mail)

0304 UTC on 5950
USA: Voice of Free China via Okeechobee, FL. Lady's newscast including update on Taiwan/Chinese relations including China's possible Olympic pullout if Taiwan participates. (Wilden, IN) Relay also noted on 5810 at 2245 with program of Chinese proverbs. (Fraser, MA)

0357 UTC on 5050
TANZANIA: Radio Tanzania. Afro pops to brief announcements and ID, "this is the external service of Radio Tanzania." Tam-tam sounds and time tips at 0400. IDs, African and international news to pop music and brief announcement from lady DJ. (Serra, Italy)

0407 UTC on 5960
MONACO: Radio Monte Carlo. Arabic. Male/female announcer with chat and news reading format. Brief commentary to soft-rock tune and 0419*. (Stokes Schwartz, Madison, WI)

0605 UTC on 5882
VATICAN CITY STATE: Vatican Radio. English programming to Europe discussing the three kings. (Stokes, WI) Station noted on 11635 at 1742, // 11625, 9660. (Serra, Italy)

0620 UTC on 5905
SLOVAKIA: Adventist World Radio. Fair signal quality for religious programming and station promo. (Sam Wright, Biloxi, MS; Frank Hilton, Charleston, SC)

0630 UTC on 7410
SWITZERLAND: Swiss Radio International. English service to Europe with national news and current affairs. (Schwartz, WI) SRI noted on 13635 at 1715. (Fraser, MA)

0721 UTC on 17815
ASCENSION ISLAND: **Radio Japan** relay. Male/female announcers with *Newsline*. Brief pop music break, more news and chat about Japanese sports. Monthly magazine show heard on // 17810, 15165, 7230, 5975. **RAI International** relay noted on 15320 at 1737, // 17870, 15230, 11840, 9710, 7235. (Serra, Italy)

0725 UTC on 5955
NETHERLANDS: Radio Netherlands. Dutch service to Europe. Frequency quote to Dutch song, suffering interference. Time pips at 0730 with ID. "Good morning" greeting to listeners followed by newscast. (Schwartz, WI) Italian service noted on 11730 2200-2230. (George Knight, Garfield, NJ)

0730 UTC on 5985
BELGIUM: Radio Vlaanderen International. Barely audible program for ten minutes of news. (Schwartz, WI) RVI noted on 13670 at 1410-1430, French 1430-1440. (Knight, NJ; Hillton, SC; Wright, MS; Brian Bagwell, St Louis, MO)

0745 UTC on 7450
GREECE: Voice of Greece. Ten minutes of news to Greek vocals and instrumentals. Great reception for this frequency and // 9425. (Schwartz, WI)

1130 UTC on 13730
AUSTRIA: Radio Austria International. Report on Austria's cold weather and tune *Putting On the Ritz*. (Bob Fraser, Cohasset, MA) Noted on 6155 at 2230. (Don N. Aspinall, VA via e-mail)

1140 UTC on 9650
SOUTH KOREA: Radio Korea International. *Shortwave Feedback* show including station time/frequency update for summer. (Paul Jablonowski, Greenfield, WI)

1230 UTC on 15115
ECUADOR: HCJB. *Morning in the Mountains* program, heard on // 12005. (Fraser, MA) Newscast noted on 15115 at 1325 (Wilden, IN)

1334 UTC on 11650
SWEDEN: Radio Sweden. Two males' music news from Stockholm, and discussion on the Swedish Grammies. (Wilden, IN; Hillton, SC)

1415 UTC on 11840
NORWAY: Radio Norway International. Report on alcohol drinking in Scandinavia. (Fraser, MA; Wright, MS)

1454 UTC on 6040
USA: WHRI. Religious programming from *Biblical Studies Institute* to 1457*. Announcement for frequency change to 15160 at 1500. (Knight, NJ)

1714 UTC on 3315
SIERRA LEONE: SLBS. Vern/English. Male vocals with percussion sounds, presented by male announcer. Time pips (1730), female possible ID and news in English (1730-1735). (Serra, Italy)

1758 UTC on 4769.97
NIGERIA: Radio Nigeria. Vern/English. Station announcements to ID and time checks at 1800. (Serra, Italy) Station noted on 4770 at 2215. (D. Aspinall, VA)

1803 UTC on 6549.45
LEBANON: Voice of Lebanon. English/Arabic/French. Female's English news to 1806. Two minutes of Arabic advertisements with music breaks, jingles and sound effects. French news 1815-1819 suffering interference of signal splatter. (Serra, Italy)

1852 UTC on 7740
ICELAND: Rikisutvarpid. Icelandic. Station sign-on by female announcer and talk of Reykjavik. Presumed announcement for seamen followed by two long bell notes as time pips. Station ID into news with corespondents reports, // 9275. (Serra, Italy)

1935 UTC on 7235
ITALY: RAI. News report on *International Women's Day*--and is it worth it? Noted that Radio France Int'l had the same question and noted that women's rights have decreased worldwide. (Fraser, MA)

1950 UTC on 17870
SPAIN: Radio Exterior Espana. Spanish. Soccer commentary to news break at 2000, // on 17890. (Patrick J. Barry, Mission Viejo, CA; Jablonowski, WI; Aspinall, VA)

1930 UTC on 3306
ZIMBABWE: ZBC. Vern. Afro pops music program, presented by male DJ with chat between tunes. Station interference and splatter noted. (Serra, Italy)

1950 UTC on 5047
TOGO: Radiodiffusion Togolaise. French/English. Male ID and news in English 1950-1959. Station IDs repeated during and at closing of news, music pauses and French announcements. (Serra, Italy)

2000 UTC on 7465
ISRAEL: Kol Israel. News of ongoing investigations of recent terrorist bombings, //9435. (Fraser, MA)

2005 UTC on 11990
KUWAIT: Radio Kuwait. *Islam, the Religion of Morals* - on how to control anger and revenge against the "uneducated," followed by Western pop music program. (Fraser, MA)

2037 UTC on 13695
USA: WEWN. Alice Von Hildenbaum's program to station promo. Address for St. Joseph Radio in Orange, California, to WEWN sign-off 2056. (Knight, NJ)

2045 UTC on 7285
POLAND: Polish Radio Warsaw. World and national news to pop music and sign-off with national anthem. (Aspinall, VA)

2058 UTC on 13690
CANADA: Radio Canada International. French ID at tune-in. English/French IDs to national anthem. Satellite broadcast information to programming for Europe and Africa. (Knight, NJ) RCI noted on 11855 at 1310, 9640 at 1324. (Wilden, IN)

2100 UTC on 15115
CHINA: China Radio International. Extended coverage on a recent earthquake in northern China, with reportedly high loss of life as well as livestock.. (Aspinall, VA)

2100 on 7345
CZECH REP: Radio Prague. International news including items on Cuba and Israel. Interesting feature on archaeology. (Aspinall, VA) News noted on 5930 at 1702 with pop music, IDs, // 9430. (Serra, Italy; Bagwell, MO)

2115 UTC on 9700
BULGARIA: Radio Bulgaria. French service with brief news update, and Bulgarian folk music. (Tom Banks, Dallas, TX) Station noted this frequency at 2240. (Fraser, MA)

2130 UTC on 6085
GERMANY: Bayerischer Rundfunk. German. Lady announcer with German music from Reinhard Mey. English tune *Dream a Little Dream* to text by Reingelnatz and others. Signal good with some interference, fading after 2200. (Thomas Huber, Middlebury, VT)

2151 UTC on 15275
USA: KAIJ. Dr. Gene Scott's theory on Christmas to *Can I Get a Witness* gospel tune. Frequency change to 13815 at 2159. (Knight, NJ; Bagwell, MO)

2200 UTC on 7415
USA: Voice of America. *All Band Music* show by Ray McDonald. (Aspinall, VA)

2220 UTC on 7180
RUSSIA: Voice of Russia. English service with *Focus on Asia and the Pacific* program to 2229. (Knight, NJ) Additional VOR monitoring reported as; 0000 on 7125, // 7240, 7250, 9665 (Hanz, NJ); 1500-2000 on 15400 (Jerry Plummber via e-mail, Loyd Van Horn, Brasstown, NC); 1900 on 9480/11630, 11675, 15400 (Hanz, NJ) 2100 on 7240, // 7250, 9480, 9710, 9665, 11750 (Hanz, NJ) 2130-2235 on 7180 (Schwartz, WI; Fraser, MA); 2300 on 7180 (Jablonowski, WI)

2240 UTC on 9900
EGYPT: Radio Cairo. News in brief with items from Ireland, Middle East and Bangladesh to program guide. Arabic service at 2245. (Fraser, MA) Station noted on 9988.03 at 1819 in Italian with mailbag show. (Serra, Italy; Wilden, IN)

2300 UTC on 7370
CROATIA: Croatian Radio. Choral national anthem to signal time pips and station ID. Newscast to 2310. (Wilden, IN)

2340 UTC on 9655
TURKEY: Voice of Turkey. *The Veiled World* program on how eunuchs controlled the sultan's palace. (Fraser, MA; Wilden, IN; Bagwell, MO; Van Horn, NC)

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

Hamming It Up on the Mir Space Station

NASA astronaut Shannon Lucid is hamming it up on the Russian space station Mir. Shannon was part of the Atlantis STS-76 crew and transferred during the mission to the Mir for a five month extended visit.

Reports by monitors during her first weekend on board the space station indicated that Shannon was conducting extensive contacts with hams worldwide on Mir's ham downlink frequency of 145.550 MHz. If the first weekend on board Mir is any indication, she will probably be one of the most active amateur operators onboard Mir in its history.

The 145.550 MHz downlink frequency is quite easy to hear on even the simplest of scanners and antennas. Complete information on the Mir amateur radio operation can be found in the March/April issue of *Satellite Times* magazine — *Contacting the Mir Orbital Complex* by *ST* columnist John Magliacane. Current Keplerian tracking element sets for the Mir space station can be obtained on the Celestial Web BBS at the following URL address: **http://www.grove.net/~tkelso.**

Reception reports for Mir's amateur activity can be sent to the following address: Dave Larsen N6JLH, P.O. Box 1501, Pine Grove, California 95665 USA. Include a self-addressed stamped envelope.

AUSTRALIA

Standard Time/Freq Station-VNG, Llandilo. Full data folder card signed by Dr. Richard Brittain-VNG/Time Officer. Picture postcard and data sheet sent via "economy air" in 67 days for one U.S. dollar and address label (used on reply). Station address: VNG/TIME Officer, National Standards Commission, P.O. Box 282, North Ryde, NSW 2113, Australia. (Mike Hardester, Jacksonville, NC) Received in 16 days for one U.S. dollar. (Wayne Childress, Helena, MT)

BRAZIL

Radio Brasil Central, 4985 kHz. Full data station QSL card and personal letter signed by Sergio Rubens de Silva. Received in 42 days for a Portuguese report and one U.S. dollar. Station address: Caixa Postal 330, 74001-970 Goiania, Goias, Brazil. (White, MS)

CAMBODIA

National Voice of Cambodia, 11940 kHz. Full data QSL letter signed by Chea Ngim, plus station frequency schedule and friendly cover letter. Received in five months (via two forwarding addresses) for an English report and no return postage. Station address: Monivong Blvd., Rd: 106, Phnom Penh, Cambodia (heard while stationed in Guam). (David A. Norcross, Bishop, CA) *Welcome back, David!*

CANADA

CCGS *Terry Fox*-CGTF, 2182 kHz USB (Ice Breaker). Full data prepared QSL card signed and stamped with ship's seal. Received in 13 days for an English utility report of working Resolute Coast Guard. Ship address: c/o Dartmouth Coast Guard Station, P.O. Box 1000, Dartmouth, NS. B2Y 328 Canada. (Steve McDonald, Port Coquitlam, BC, Canada)

GUATEMALA

Radio Cultural, 3300 kHz. Partial data QSL card signed. Received in 41 days for an English report, souvenir postcard and one U.S. dollar. Station address: Apartado 601, 01901 Guatemala City, Guatemala. (Childress, MT)

Radio Tezulutlan, 4835 kHz. Full data QSL card and letter signed by Maria Guay. Received in 59 days for a Spanish report and one U.S. dollar. Station address: 1 Avenida 1-31, Zona 3, Apartado 19, 16001 Coban Alta Verapaz, Guatemala. (White, MS)

JAMAICA

KLAS, 89.1 FM kHz. Full data reply on station letterhead, signed by Shirly E. Archer-General Manager, plus a KLAS souvenir T-shirt. Received via registered mail in three months for an English FM report, mint postage and a self-addressed-envelope. Station address: Island Broadcasting Services Limited, 19 Caledonia Rd., Mandeville, Jamaica, West Indies. (Hank Holbrook, Dunkirk, MD)

KUWAIT

Radio Kuwait, 11990 kHz. Full data QSL signed by N.M. Al Saffar and stamped by Ministry of Information, plus station sticker and data sheet. Received in 88 days for an English report and no return postage. Station address: P.O. Box 397, Safat 13004 Safat, Kuwait. (Paul Jablonowski, Greenfield, WI)

MEDIUMWAVE

WWLG, 1360 AM kHz. Confirmation letter signed by Dwight J. Weller-KB3LA, Technical Advisor. Received one year after original report. Address is different from one in NRC *AM Log* # 16: Weller-Audio Visual Engineering, P.O. Box 4040, Timonium, MD 21094-7251. Tel: 410-252-8351, Fax: 410-252-4261. (Hardester, NC)

HJJX, 770 AM kHz. Full data RCN QSL card, sticker and personal letter. Received in 150 days for a Spanish AM report and mint stamps. Station address: Radio Cadena Nacional, Apartado Aero 4984, Bogota, Colombia. (Randy Stewart, Springfield, MO)

SHIP TRAFFIC

Confidence 9VXH, 4077 kHz (Chemical Tanker). Full data prepared QSL card signed by Z. Fernandes and stamped with ship's seal. Received in 50 days for an English utility report, one U.S. dollar, mint stamps and self-addressed-envelope. Ship address: c/o Denholm Ship Management (Singapore) Pte. Ltd., 25-01 International Plaza, 10 Anson Rd., Singapore 0207. (Russ Hill, Oak Park, MI)

Lake Champlain V7AH3, 156.600 MHz (Bulk Carrier). Full data prepared QSL card stamped with ship's seal. Received in 79 days for an English utility report, one U.S. dollar, mint stamps and a self-addressed-envelope. Ship address: c/o Bay Ocean Management, 270 Sylvan Ave., Englewood Cliffs, Englewoods, NJ 07632. (Hill, MI)

S/T Overseas Ohio WJBG, 8382.5 kHz (Steam Tanker). Full data prepared QSL signed and stamped with ship's seal. Received in 22 days for an English utility report. Ship address: c/o Second Shipmor Assoc., Maritime Overseas Corp., 511 Fifth Ave., New York, NY 10017. (McDonald, CAN)

Europegasus P3SP2, 156.8/157.2 kHz (Bulk Carrier). Full data prepared QSL card verified. Received in 20 days for an English utility report and one dollar. Ship address: Vernicos Maritime Co., S.A., Lemos Maritime Bldg., 35-39, Akti Miaouli, 185 10 Piraeus, Greece. (Holbrook, MD)

SOUTH AFRICA

Channel Africa, 15240 kHz. Full data QSL card signed by Kathy Otto, plus three page frequency schedule and station sticker. Received in 33 days for an English report and one IRC. Station address: Sentech, Private Bag X06, Honeydew 2040, South Africa. (Walter Szczepaniak, Philadelphia, PA; Patrick Barry, Mission Viejo, CA)

SWAZILAND

Trans World Radio, 4775 kHz. Full data color station QSL card, signed by Mrs. Stravropoulos. Received in 31 days for an English report and 2 IRCs. Station address: P.O. Box 64, Manzini, Swaziland. (Patrick Griffith, Federal Heights, CO).

UNITED STATES

KAIJ, 13815 kHz. Full data antenna/logo card signed byFred Bithell. Received in 250 days for an English report, mint stamps and souvenir postcard. Station address: P.O.Box 120, Frisco, TX 75034 (G. Van Horn, NC) Received in 212 days for same. (Childress, MT; Griffith, CO)

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 Daylight Time) 4,5,6, or 7 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 (8:30 pm Eastern, 5:30 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 except for the "Newsline" listing, which begins on the next page.

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

New RCI Programming

This month's selected programs include the new RCI lineup. Now carried on RCI is the CBC program *Mystery Project*, a half-hour series of detective mystery dramas created by Canadian writers. Hear it at 2230 Sat on 5960, 9755, and 13760.

Radio Mexico Now in English

They're using a low-powered (10 kW) transmitter, but Radio Mexico International is now broadcasting in English. Thanks to Andy Sennitt of *WRTH* for the frequency schedule (via rec.radio.shortwave) which lists English at 1400-1430 and 1500-1530 (9705), 1900-1930 and 2000-2030 (5985/9705), and 0300-0300 (Mon-Sat) (5985).

Some daytime broadcasts monitored by Jim Frimmel from his North Central Texas location were:

1400 Tue/Fri: *Antenna Radio Summary* (magazine) (rep 1900)
1400 Sun: *Mailbag* (rep Tue 1500,Thu 2000)
1500 Fri: *Tour Through Mexico* (rep Sat 1900)
1500 Sat: *The World of Mexican Art* (rep Sun 1500,Tue/Sat 2000,0400)
1900 Sat: *UN Caribbean Magazine/Classical Music*

REE Format Change

Radio Exterior de Espana changed its program format in favor of a 30-minute newscast followed by feature programs. The change has resulted in the elimination of the weekday "Panorama" magazine. Check the centerfold listings at 0030, 0130, and 0530 for feature program details.

VOA Campaign Coverage

The presidential campaign is now in full swing. Check out these easy-to-hear in NAm programs for the latest on the American political scene: *Reporter's Notebook* (1710 Sat to af); *On the Line* (0110 Sun to am/carib); *Press Conference USA* (0130 Sat/Sun to am/carib); *Issues in the News* (0130 Mon to am/carib); *Inside USA* (1310 Tue to as); *Stateside* (1110 Mon-Fri to carib); *Talk to America* (1706 Mon-Fri).

New Broadcaster Plans Expansion

David Frantz, Station Manager, advised that WGTG would eventually have four transmitters in operation from his 3000 ft. mountaintop on the Georgia-Tennessee state line. Meanwhile, the operating hours of the first transmitter were extended to 1200-0300 hours daily using 9400 kHz.

Speed Dialing

Glenn L. Roberts and Jim Kelley began a new program in April called *The Net Connection Radio Show* which can be heard on WWCR #4 at 1800 UTC Sunday (2:00 PM EDT) on 9475 kHz. The program is devoted to answering call-in questions from listeners about the internet.

During the first program aired on April 7th, Glenn asked a caller why he was calling. The caller said he had just bought a shortwave receiver. When he switched it on for the first time, out came Glenn's voice announcing the telephone number for listeners to call, so he called in. Talk about coincidences!

BBC Worldwide to Fold?

Reliable sources report the demise of this BBC monthly publication which contains the complete program guide to BBC World Service in its centerfold "London Calling" insert. Details are sketchy at the time of *MT* publication but it is expected that "London Calling" will continue as the replacement for *BBC Worldwide*. More details next issue.

Gayle Van Horn, Frequency Manager
North Carolina swbcsked@grove.net

Dave Datko
California

Loyd Van Horn
Brasstown, N.C.

MT MONITORING TEAM
Next Reporting Deadline
June 22, 1996

Jim Frimmel, Program Manager
Texas DXComp@aol.com

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

NEWSLINE

"Newsline" is your guide to news broadcasts on the air. • All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. • All broadcasts are daily unless otherwise noted by the day codes.

0000 UTC
(8:00 PM EDT, 5:00 PM PDT)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (south as)
Canada (North-Quebec)
China Radio Intl
Croatian Radio
KWHR (Hawaii) [T-A]
Monitor Radio Intl [T-A]
Radio Australia
Radio Exterior de Espana
Radio New Zealand Intl
Radio Prague
Radio Thailand
Radio Ukraine Intl
Radio Yugoslavia [M-A]
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WWCR #4 (Tennessee) [T-A]
Radio Pyongyang
0010
China Radio Intl*
Voice of America (ca) [T-A]*
0015
Radio Cairo
0030
All India Radio
Radio Netherlands Intl
Radio Sweden [T-A]
Radio Thailand [T-S]
Radio Vilnius [M-A]
Voice of America (am) [T-S] (Special English)
Voice of America (as) (Special English)
Voice of Russia
0035
Voice of Iran
0045
BBC (am)*
BBC (as pac)*
BBC (south as)*
0050
RAI Intl Italy

0100 UTC
(9:00 PM EDT, 6:00 PM PDT)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [S]
Croatian Radio
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-A]
R Slovakia Intl [A]*
R Slovakia Intl [S/T-F]
Radio Australia
Radio Budapest
Radio Canada Intl
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl
Radio Norway Intl [M]
Radio Prague
Radio Sweden [T-A]
Radio Tashkent
Swiss Radio Intl
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Indonesia [F]
Voice of Russia
Voice of Vietnam
WWCR #4 (Tennessee) [T-A]
0110
Radio Australia [M-F]*
0113
Radio Havana Cuba [T-S]*
0130
BBC (as pac)
BBC (south as) [A-M]
Radio Austria Intl
Radio Havana Cuba [T-S]
Radio Netherlands Intl
Radio Sweden [T-A]
Voice of Greece
Voice of Russia [T-A]
Voice of Vietnam
0145
Radio Tirana
0152
Vatican Radio
0155
Radio Canada Intl [T-A]
Voice of Indonesia [F]

0200 UTC
(10:00 PM EDT, 7:00 PM PDT)
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as) (Newsday)
Canada (North-Quebec)
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio Korea
Radio New Zealand Intl [T-A]
Radio Romania Intl
RAE Argentina [T-A]
Voice of America (as)
Voice of Myanmar (Burma)
Voice of Russia
Voice of Vietnam
WHRI (Angel 2) [T-A]
WWCR #3 (Tennessee) [T-A]
WWCR #4 (Tennessee) [T-A]
0203
Voice of Free China
0213
Radio Havana Cuba [T-S]*
0215
Radio Cairo
Radio Nepal
0230
Radio Austria Intl
Radio Budapest
Radio Havana Cuba [T-S]
Radio Netherlands Intl
Radio Pakistan
Radio Portugal Intl [T-A]
Radio Sweden [T-A]
Radio Tirana
Voice of Russia
Voice of Vietnam

0300 UTC
(11:00 PM EDT, 8:00 PM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [S-F]
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [M-A]
Radio Prague
Radio Thailand
Radio Ukraine Intl
Voice of America (af) [A-S]
Voice of Russia
Voice of Turkey
WHRI (Angel 2) [T-A]
WWCR #3 (Tennessee) [T-A]
WWCR #4 (Tennessee) [T-A]
0301
Voice of America (af) [M-F]*
0303
Voice of Free China
0310
China Radio Intl*
0313
Radio Havana Cuba [T-S]*
0315
Radio Cairo
0320
Radio Philipinas [M-A]
Vatican Radio [T-S]
0330
BBC (af) [A-S]*
BBC (eu) [A]
Radio Dubai
Radio Havana Cuba [T-S]
Radio Prague
Radio Sweden [T-A]
Voice of America (af) [M-F] (Special English)
Voice of Russia
0340
Voice of Greece
0355
Radio Japan [W-M]

0400 UTC
(12:00 AM EDT, 9:00 PM PDT)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) [S-F] (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Bulgaria
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio New Zealand Intl [A]
Radio New Zealand Intl [M-F]*
Radio Norway Intl [M]
Radio Romania Intl
Radio Tanzania
Swiss Radio Intl
Voice of America (af)
Voice of America (me)
Voice of Israel
Voice of Russia
WWCR #4 (Tennessee) [T-A]
WYFR (Satellite Network) [A]
ZBC Zimbabwe
0403
Radio Pyongyang
0410
China Radio Intl*
0413
Radio Havana Cuba [T-S]*
0425
RAI Intl Italy
0430
BBC (af) [A-S]*
BBC (eu) [A] (Newsdesk)
Radio Havana Cuba [T-A]
Radio Netherlands Intl
Radio Yugoslavia
Voice of Russia
0431
Voice of America (af) [M-F]*

0500 UTC
(1:00 AM EDT, 10:00 PM PDT)
AWR Latin America [T-F]*
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as) (Newsday)
Canada (North-Quebec)
Channel Africa
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-F]
Radio Australia
Radio Cameroon
Radio Canada Intl [M-F]
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [S-F]
Vatican Radio [A]
Voice of America (af)
Voice of America (me)
Voice of Russia
WWCR #1 (Tennessee) [T-A]
0510
Radio Australia [M-F]*
0513
Radio Havana Cuba [T-S]*
0530
BBC (af) [A-S]*
Radio Austria Intl
Radio Havana Cuba [T-A]
Radio Romania Intl
Voice of Nigeria
Voice of Russia
0555
Radio Japan [A]

0600 UTC
(2:00 AM EDT, 11:00 PM PDT)
BBC (af)
BBC (am) [M-A]
BBC (as pac)
BBC (eu)
BBC (south as)
Deutsche Welle
Monitor Radio Intl [T-F]
Radio Australia
Radio Havana Cuba [T-S]
Radio Japan
Radio Korea
Radio New Zealand Intl [M-A]
Radio Norway Intl [S]
Swiss Radio Intl
Voice of America (af) [A-S]
Voice of America (me)
Voice of Kenya
Voice of Russia
WWCR #1 (Tennessee) [S]
WWCR #3 (Tennessee) [M-F]
0601
Voice of America (af) [M-F]*
0603
Radio Pyongyang
0613
Radio Havana Cuba [T-S]*

0615
Swiss Radio Intl (eu)
0630
BBC (af) [A-S]*
Radio Austria Intl
Radio Havana Cuba [T-S]
Radio Vlaanderen Intl
Vatican Radio [H]
Voice of Nigeria [M-F]
Voice of Russia
0645
Radio Romania Intl
Voice of Nigeria [T-F]*
0655
Radio Japan [W-M]

0700 UTC
(3:00 AM EDT, 12:00 AM PDT)
BBC (af)
BBC (as pac)
BBC (eu)
BBC (south as)
Monitor Radio Intl [T-F]
Papua New Guinea
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Radio Prague
Voice of Malaysia
Voice of Myanmar (Burma)
Voice of Russia
WWCR #3 (Tennessee) [M-F]
0703
Radio Pyongyang
Voice of Free China
0710
Radio Australia [M-F]*
0715
Swiss Radio Intl (eu)
0717
Radio New Zealand Intl [H]*
0730
HCJB (eu)
Radio Austria Intl
Radio Netherlands Intl
Voice of Greece
Voice of Russia [T-A]
0750
Russia (Radio Pacific Ocean) [A]
0755
Radio Japan

0800 UTC
(4:00 AM EDT, 1:00 AM PDT)
BBC (af)
BBC (as pac)
BBC (eu)
BBC (south as)
KNLS (Alaska)
Monitor Radio Intl [M-A]
Radio Australia
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [S]
Radio Pakistan
Voice of Indonesia [A-H]
Voice of Malaysia
Voice of Russia
0803
Radio Pyongyang
0810
Radio New Zealand Intl [M-F]*
0830
R Slovakia Intl
Radio Netherlands Intl
Voice of Russia
0855
Voice of Indonesia [A-H]

0900 UTC
(5:00 AM EDT, 2:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
China Radio Intl
Deutsche Welle
HCJB (pac)
Monitor Radio Intl [M-A]
Papua New Guinea [M]*
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Radio Prague
Radio Vlaanderen Intl [M-A]
Swiss Radio Intl
Voice of Russia
WWCR #1 (Tennessee) [M-F]
0910
China Radio Intl*
Radio Australia [M-F]*
0930
FEBC (Philippines) [M-A]
Radio Austria Intl [M-A]
Radio Netherlands Intl
Voice of Russia
0945
Deutsche Welle [M-F]*
0955
Radio Japan

1000 UTC
(6:00 AM EDT, 3:00 AM PDT)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
China Radio Intl
Monitor Radio Intl
Papua New Guinea
Radio Australia
Radio New Zealand Intl [S-F]
Radio Tanzania
Voice of America (as)
Voice of America (ca)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI (Angel 2) [A]
WYFR (Satellite Network) [M-A]
1010
China Radio Intl*
1015
Radio New Zealand Intl [M-F]*
1020
Radio New Zealand Intl [H]*
Vatican Radio [M-A]
1030
FEBC (Philippines) [M-F]*
Radio Austria Intl
Radio Dubai
Radio Netherlands Intl
Radio Prague
Voice of Nigeria
Voice of Russia
1045
Voice of Nigeria [A-S]*

1100 UTC
(7:00 AM EDT, 4:00 AM PDT)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [A-S]
Deutsche Welle
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Ghana [A-S]
Radio Japan
Radio New Zealand Intl (Newsdesk)
Radio Pakistan
Radio Singapore Intl
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WHRI (Angel 2) [A]
WWCR #1 (Tennessee) [A]
WYFR (Satellite Network) [M-F]
1102
Radio Mozambique
1103
Radio Pyongyang
1110
Radio Australia*
1130
Radio Austria Intl
Radio Bulgaria
Radio Finland [M-F]
Radio Korea
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Voice of Asia
Voice of Russia
WYFR (Satellite Network) [M-F]
1135
Voice of Iran
1145
Deutsche Welle [M-F]*
1155
Radio Japan [S-F]

1200 UTC
(8:00 AM EDT, 5:00 AM PDT)
BBC (af) [M-A]
BBC (am)
BBC (as pac) [M-A]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Papua New Guinea
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio Canada Intl
Radio France Intl
Radio Jordan
Radio Korea
Radio New Zealand Intl [H-T]
Radio Norway Intl [S]
Radio Singapore Intl
Radio Tashkent
Voice of America (as)
Voice of Russia
WYFR (Satellite Network) [M-F]
1203
Voice of Free China
1204
HCJB (am) [M-F]
1210
China Radio Intl*
1215
BBC (af) [M-A]*
BBC (as pac) [M-F]*
BBC (eu)*
BBC (south as) [M-A]*
1230
HCJB (am) [M-F]*
Radio Bangladesh [S-M]
Radio Bulgaria
Radio Cairo
Radio Canada Intl
Radio Finland
Radio Korea [S-W/A]
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Radio Vlaanderen Intl [S]
Voice of Russia [M-A]
Voice of Turkey
Voice of Vietnam
WYFR (Satellite Network) [M-F]
1231
Radio France Intl [T]*
1240
Voice of Greece

1300 UTC
(9:00 AM EDT, 6:00 AM PDT)
BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
BBC (south as) (Newshour)
Canada (North-Quebec) [A-S]
China Radio Intl
KNLS (Alaska)
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Canada Intl [S-F]
Radio Ghana
Radio Norway Intl [S]
Radio Prague
Radio Romania Intl
Radio Singapore Intl
Radio Tanzania [A-S]
Radio Vlaanderen Intl [M-A]
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (as)
Voice of Kenya
Voice of Russia
WYFR (Satellite Network) [M-F]
1303
Radio Pyongyang
1310
China Radio Intl*
Radiobras [M-F]*
1324
HCJB (am) [M-F]
1328
Radio Cairo
1330
All India Radio
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Canada Intl
Radio Dubai
Radio Netherlands Intl
Radio Singapore Intl [T-S]
Radio Sweden [M-F]
Radio Tashkent
Radio Yugoslavia
Voice of America (as) (Special English)
Voice of Russia
Voice of Vietnam
1335
FEBC (Philippines) [M-F]*
Voice of Greece
1355
Radio Singapore Intl [A-S]
Radio Singapore Intl [M-F]*

1400 UTC
(10:00 AM EDT, 7:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio Canada Intl [S]
Radio France Intl
Radio Ghana
Radio Japan
Radio Pakistan
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
WWCR #3 (Tennessee) [M-F]
1410
China Radio Intl*
1415
Radio Nepal
1424
HCJB (am) [M-F]
1430
FEBC (Philippines) [M-A]
Radio Netherlands Intl
Radio Romania Intl
RTM Morocco [S]
Voice of Myanmar (Burma)
Voice of Russia
WYFR (Satellite Network) [M-F]
1431
Radio France Intl [T]*
1445
All India Radio
Voice of Myanmar (Burma)
1455
Radio Japan [A]

1500 UTC
(11:00 AM EDT, 8:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac) [A-S]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
Channel Africa
China Radio Intl
Estonian Radio [M-F]
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl [S]
Radio Japan
Swiss Radio Intl
Voice of America (as)
Voice of America (me)
Voice of Russia
WWCR #1 (Tennessee) [M-F]
WWCR #3 (Tennessee) [M-F]
WYFR (Satellite Network) [A]
1503
Radio Pyongyang
1510
China Radio Intl [W-M]*
1511
China Radio Intl [T]*
1530
All India Radio*

FEBA (Seychelles)
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Netherlands Intl
Radio Portugal Intl [M-F]
Voice of Nigeria [M-F]
Voice of Russia
1535
Voice of Iran
1555
Radio Japan [A]

1600 UTC
(12:00 M EDT, 9:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio France Intl
Radio Jordan
Radio Korea
Radio Norway Intl [S]
Radio Pakistan
Radio Prague
Radio Tanzania
Voice of America (af) [A-S]
Voice of America (as)
Voice of America (me)
Voice of Ethiopia
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-A]
WHRI (Angel 2) [A]
WRNO (Louisiana) [M-F]
WWCR #3 (Tennessee) [M-A]
WWCR #4 (Tennessee) [M-F]
WYFR (Satellite Network) [M-A]
1610
China Radio Intl*
1612
Vatican Radio [S-F]
1615
Radio Tirana
Vatican Radio
1630
Channel Africa [F]*
R Slovakia Intl
Radio Canada Intl
Radio Dubai
Voice of America (af) [M-F]*
Voice of America (as) (Special English)
Voice of America (me) (Special English)
Voice of Ethiopia
Voice of Russia [S-F]
1633
Deutsche Welle [M]*
1638
Deutsche Welle [T-F]*
1645
BBC (am) [S-F]*
BBC (as pac) [M-F]*
BBC (eu) [M-F]*
Radio Canada Intl [M-F]

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [M-A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
Monitor Radio Intl [M-A]
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio France Intl
Radio Japan
Radio Jordan
Radio New Zealand Intl [M-F]*
Radio Pakistan
Radio Prague
Swiss Radio Intl
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WRNO (Louisiana) [M-F]
WWCR #4 (Tennessee) [M-F]
1703
Radio Pyongyang
1710
China Radio Intl*
Radio Australia*
1730
Radio Austria Intl
Radio Netherlands Intl
Radio New Zealand Intl [M-F]*
Radio Romania Intl
Voice of Russia
1740
BBC (af)*

1800 UTC
(2:00 PM EDT, 11:00 AM PDT)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio New Zealand Intl [M-F]*
Radio Norway Intl [S]
Radio Omdurman
Radio Tanzania
Radio Vlaanderen Intl
Radio Yemen
Swiss Radio Intl (eu)
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-F]
1802
Radio Mozambique
1830
BBC (af) [A-S]*
R Slovakia Intl
Radio Bangladesh
Radio Korea [S-W/A]
Radio Kuwait
Radio Netherlands Intl
Radio New Zealand Intl [M-F]*
Radio Sweden [M-F]
Radio Tirana
Radio Yemen
Radio Yugoslavia
Voice of America (af) [A-S] (Special English)
Voice of America (me) (Special English)
Voice of Russia
Voice of Turkey
1840
Voice of Greece [M-A]
1855
Radio New Zealand Intl [M]*

1900 UTC
(3:00 PM EDT, 12:00 M PDT)
All India Radio
BBC (af)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
China Radio Intl
Deutsche Welle
Estonian Radio [M/H]
HCJB (eu)
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Japan
Radio Korea
Radio New Zealand Intl
Radio Romania Intl
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-F]
WWCR #3 (Tennessee) [M-F]
WWCR #4 (Tennessee) [M-A]
1910
China Radio Intl*
Radio Australia [M-F]*
Radiobras [M-F]*
1930
Deutsche Welle [M-F]*
Polish Radio [A-S]
Polish Radio [M-F]*
Radio Austria Intl
Radio Netherlands Intl
Radio New Zealand Intl [S-H]*
Radio Sweden [M-F]
1935
RAI Intl Italy
Voice of Iran

2000 UTC
(4:00 PM EDT, 1:00 PM PDT)
BBC (af) (Newshour)
BBC (am)
BBC (as pac)
BBC (eu)
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [S]
Radio Portugal Intl [M-F]
Radio Prague
Radio Vilnius
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Greece [M-A]
Voice of Indonesia
Voice of Nigeria [M-F]
Voice of Russia
WHRI (Angel 1) [M-F]
WHRI (Angel 2) [M-F]
WWCR #4 (Tennessee) [M-F]
2003
Radio Pyongyang
2007
Radio Damascus [M-F]
2010
China Radio Intl*
2025
RAI Intl Italy
2030
Radio Dnestr (Moldova) [M/W-H/A]
Radio Finland
Radio Netherlands Intl
Radio New Zealand Intl [S-H]*
Radio Riga Intl [M-F]
Radio Thailand
Radio Yugoslavia
Voice of Armenia
Voice of Russia
Voice of Vietnam
2055
Radio Canada Intl [M-F]
Voice of Indonesia [M]
2057
Radio Kuwait

2100 UTC
(5:00 PM EDT, 2:00 PM PDT)
All India Radio
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
Canada (North-Quebec) [A-S]
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Cameroon
Radio Canada Intl
Radio Damascus [F]
Radio Exterior de Espana
Radio Havana Cuba [M-A]
Radio Japan
Radio Korea
Radio New Zealand Intl [A-M/H]
Radio Romania Intl
Radio Ukraine Intl
Radio Vlaanderen Intl
Radio Yugoslavia
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WHRI (Angel 2) [M-F]
WWCR #1 (Tennessee) [M-F]
WWCR #4 (Tennessee) [M-F]
2110
China Radio Intl*
Radio Damascus [S-M]
2112
Radio Damascus [F]
2115
BBC (af)*
BBC (eu)*
Radio Damascus [T]
2120
Radio Cairo
2130
Radio Cairo
Radio Havana Cuba [M-A]*
Radio New Zealand Intl [S-H]*
Radio Sweden [M-F]
Voice of Russia [M-F]
2135
Voice of Iran
2145
Radio Damascus [W]

2200 UTC
(6:00 PM EDT, 3:00 PM PDT)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
Canada (North-Quebec) [S]
China Radio Intl
Croatian Radio
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [M-A]
Radio New Zealand Intl [A-H]
Radio Norway Intl [S]
RAI Intl Italy
Voice of America (as)
Voice of Russia
Voice of Turkey
WHRI (Angel 2) [M-F]
WWCR #1 (Tennessee) [M-F]
WWCR #3 (Tennessee) [S]
2203
Voice of Free China
2210
China Radio Intl*
2215
Radio Cairo
2230
Radio Austria Intl
Radio Havana Cuba [M-A]*
Radio Prague
Voice of America (as) (Special English)
Voice of Russia
2240
Radio Cairo
Voice of Greece [S-F]

2300 UTC
(7:00 PM EDT, 4:00 PM PDT)
All India Radio
BBC (af) [S-F]
BBC (am) [S-F]
BBC (as pac)
BBC (eu) [S-F]
Canada (North-Quebec) [A]
Croatian Radio
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Bulgaria
Radio Canada Intl
Radio Japan
Radio New Zealand Intl [F-A]
Radio Prague
Radio Romania Intl
Voice of America (as)
Voice of Russia
WHRI (Angel 2) [M-F]
WWCR #4 (Tennessee) [M-F]
2303
Radio Pyongyang
2315
Radio Cairo
2330
Radio Netherlands Intl
Radio New Zealand Intl [S-H]
Radio Vlaanderen Intl
Voice of Russia
Voice of Vietnam
2335
Voice of Greece [S-F]

EEB TWO SALE...(This Week Only)

Watch EEB ads for Special "TWO" sale!!

THE CLEAR WINNER "AOR AR5000"

Now one receiver does more than both discontinued ICOM pairs, better, faster, and at a lower cost.

*10KHz - 2600MHz**

- All mode reception: AM, USB, LSB, CW, NBFM (2 BW), FMW, (3 BW)
- Auto track tuning front end .5 - 1000MHz
- 1000 memories, 10 banks
- CTCSS/DTMF/ANI Decod Included
- 6 filter 220, 110, 40, 15, 6, 3kHz. Opt. 5kHz
- RS232 compatible, Opt. software
- SDU 10.7MHz output • Write for details

* *Cellular blocked, No block for FCC approved users*

Introductory price...**$1995**

Global Positioning System

GPS is sweeping the industry. Know your location/altitude, anywhere in the world to a few feet. Trimble, Magellan, Garmin & Eagle in stock.

As low as **$199**

JEEP 1 Radio

Fashioned after the original Jeep dash. Rugged and water resistant. AM/FM/Cass/CD, end fire speakers. "O" ring water tight construction. Stores 30 CD's, 8 "D" (not incl.). 120VAC AC adaptor incl.

Nationally Advertised at $199.95

SALE $159

GE SUPERADIO II

Puts the fun back in AM/FM DX'ing. Larger ferrite rod antenna, 4 I.F. stages. Every one needs this great sounding, radio. T 2887

SALE $59

AOR AR7030

New leading edge HF Receiver. Rated 4 stars by IBS Passport in April MT. 0 - 32MHz. All mode, Synchro. Bullet proof front end. Wide dynamic range, look out Drake and JRC

SALE $1149

Shortwave Radio

LOWE HF150

Rugged HF, Full coverage, excellent audio. Dynamics, Synchro AM, much more. Our Jan PC ad price $649.95

SALE $519

SONY ICFSW1000T

Hi-Quality, all mode SWL, AM/FM Cassette Auto Reverse, Clock Timer, Tape Turn On. FREE Radio stand

SALE $539

SONY ICFSW7600G

Our Biggest Seller! All SWL, Synchronous detection, SSB, Key input, 22 memory channels. Opt AC not included! FREE Radio stand

NOW $179

Drake R8A Time to UpGrade

4 Star(IBS), over 12 improvements, over R8.

Now Just $1069

Scanners

BEARCAT BCT-10

BearTracker Hwy Info system. Programmed by state, punch in your state and hear highway/police bands, alert with meter, instant WX, Ch. lockout, windshield or visor mount, antenna, DC Cig cord. List $199.95

NEW

Special $169

BEARCAT BCT-7

BearTracker with alert, pre-programmed, select your state, hear the action!!! National ads at $199.95

SALE $169

BC230XLT

200 ch, 12 band, incl air & 800, same as BC220XLT with CRX charger and spare battery List $459.95

EEB $239

AOR AR2700

Scanner, .1- 1300MHz*, AM, FM, FMW, 500 memories, RS232, Opt. Digital 20 sec. Record, Scout compatible, NEW low Price! Reg. $399.95

SALE $349

AOR AR8000

Scan .1 - 1900MHz*, All mode with SSB, 1000 memory, 10x100ch., RS232, Opt. Software LIST $799

SALE $588

1 WEEK ONLY, JUNE 17 TO 22, 1996

Experience the miracle of seeing in the dark

Now low cost night vision scopes are available from Russia that offer quality optics, bright images and compact portable size at a fraction of the cost other scopes.

WHO NEEDS NIGHTVISION?

- Security for the home owner
- Neighborhood watch members
- Star gazers and amateur astronomers
- Police, night watchmen, boaters, hunters, campers, flyers, rescue teams
- Any one that has the need to see like a cat in the dark

THIS WEEK ONLY (TWO) SPECIAL

Famous NV100-1

- 100mm f1.4 night lens (Not low cost compact)
- Includes Infra-red illuminator
- Canvas carrying case
- 1 year warranty

List $499.95 EEB $347

TWO-sale price...$288

1 WEEK ONLY, JUNE 17 TO 22, 1996 · 1 WEEK ONLY, JUNE 17 TO 22, 1996 · 1 WEEK ONLY, JUNE 17 TO 22,1996

OPTOELECTRIC SCOUT • 10- 1400MHz •

LATEST VERSION

Counter, Digital capture of signal up to 400 channel, up to 250 hit history. REACTION-TUNE your AR8000 in an instant to local signals. RS-232 output cable optional.

SCOUT **$419.95**

Opt. DB232 **$29.95**

- **AR8000/Scout** package deal... Our discount price **$1039**
- **AR2700/Scout** package deal... Our discount price **$799**

Package includes Scout, scanner with modifications, cable, system checkout, 1 yr. warranty.

Spring/Summer WX

Summer WX is Coming...Get ready!!

Now your own weather station is affordable, more sophisticated, accurate, and easier to use than ever before.

The Davis Wizard III is our biggest seller and here are a few reasons.

- Temperature inside, outside Hi/Lo with alarm
- Time, Date (12 or 24hr.) with alarm
- Wind, wind direction, compass rose, speed, highspeed, alarm
- Wind chill, lo chill with alarm
- Option-rainfall daily, and total 7852 $65
- Option-Weatherlink IBM/MAC software $139
- New optional weather talker, need min IBM 280. Get WX via phone, auto dial out if WX alarms are triggered, use as "music on hold" and more 7861 List $395 EEB $349

WEATHER WIZARD III 7425 List$ 195

SALE $154

FREE Special offer buy any Davis WX station and EEB will include a FREE copy of "The Weather Book" ($18 value). Over 200 pages from the folks that developed USA Today style-setting weather pages.

CB Radios are HOT

COBRA 2010GTL

The Ultimate AM/SSB base with weather Alert!

- 40 channel
- SWR/Mode & Signal meter
- 13.8VDC or 120VAC
- Digital freq. indicator.

List. $659.95

SALE $377

COBRA HH-70

ALL Controls in Mic, Secure Install. No unit visible, 40ch., 4Watts Out. The Hottest Selling CB on the Market! LIST $169.95

SALE $97

PRO538W

- Inst CH. 9
- inst. WX
- Signal LED ind
- TX LED • PA
- Mic • Mobile mount

LIST.$109.95

SALE $77

Midland 79-290

- World's 1st SSB/AM Mobile w/Detachable control pane
- Rugged Metal Cabinet
- 7 Channel WX/Alert
- Inst. Ch. 9 • Mic • Mounts

Model 79-290 LIST $399.95

SALE $257

OTHER GREAT COBRA DEALS

93 LTD WX list $179.95 EEB $127
148GTL list $329.95 EEB $188
148FGTL list $379.95 EEB $238
22 LTD WX list $109.95 EEB $78

OTHER GREAT UNIDEN DEALS

GRANTXL list $259.95 EEB $166
PC122XL list $199.95 EEB $122
PC76XLW list $189.95 EEB $122

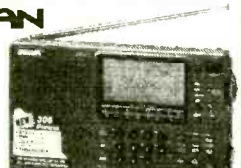
NEW...UNBELIEVABLE!

SANGEAN

ATS909

(See full page ad this issue)

Nothing over looked in this one



NEW

- 100kHz-30MHz, 88 - 108MHz
- 306 Alpha numeric memories
- ATS-Auto tuning, SW search
- Dual time system alarm, sleep
- 42 world city timers
- AM, FM, CW, LSB, USB

FREE -World Power Adaptor, Auto 120/240VAC

FREE - ANT 60, portable antenna

FREE - EEB radio stand

LIST $349.95 **CALL** for Intro Price

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- Prices subject to change
- Prices do not include freight
- Returns subject up to 20% restock fee
- FREE 1996 Catalog, 3rd Class, U.S.

EEB

Frequencies

0000-0030	Australia, Radio	11855as	13605pa	13745as	17750as
0000-0100 vl	Australia, VL8A Alice Spg	2310do			
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
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			
0000-0030 mtwfa	Canada, R Canada Intl	6040am	9535am	11940am	
0000-0100	Canada, R Canada Intl	5960na	9755na		
0000-0100	China, China Radio Intl	9715na	11655na	11760na	
0000-0100	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am			
0000-0010	Croatia, Croatian Radio	5895eu	7370eu		
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
0000-0100	Lebanon, Voice of Hope	6280va			
0000-0100	Lebanon, Wings of Hope	9960va			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na	9845na	
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100	Palau, KHBN/Voice of Hope	9965as			
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Philippines, FEBC/R Intl	15450as			
0000-0100	Russia,Voice of Russia WS	7070na	7125na	7125na	7250na
		9620na	9665na		
0000-0030 mtwhfa	Serbia, Radio Yugoslavia	6195af	7130na		
0000-0100	Spain, R Exterior Espana	9540na			
0000-0030	Thailand, Radio	9680af			
0000-0100	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na
		6055na	7150na	9550na	
0000-0100	United Kingdom, BBC WS	5965as	5970sa	5975va	6175na
		6195as	7265as	7325va	9590va
		9915sa	11750sa	11955as	
0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0100	USA, KAIJ Dallas TX	5810am	13815am		
0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	USA, KWHR Naalehu HI	17510au			
0000-0100	USA, Monitor Radio Intl	7535am	9430ca		
0000-0100	USA, Voice of America	5995am	6130am	7215va	7405am
		9455am	9770va	9775am	11695am
		11760va	13740am	15185va	15290va
		17735va	17820va		
0000-0100	USA, WEWN Birmingham AL	5825eu	7425na		
0000-0100	USA, WGTG McCaysville GA	9400am			
0000-0100	USA, WHRI Noblesville IN	5745am			
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100 m	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	USA, WWCR Nashville TN	5065am	7435am	9475am	13845am
0000-0100	USA, WYFR Okeechobee FL	6085na			
0030-0100	Australia, Radio	13605as	15240pa	15365pa	15415as
		15510as	17795pa	17860pa	
0030-0100	Ecuador, HCJB	9745am	21455va		
0030-0100	Iran, VOIRI	6015na	9022na	9685am	
0030-0056	Lithuania, Radio Vilnius	6120na			
0030-0100	Netherlands, Radio	5905as	7305as	9860as	11655as
0030-0100	Sri Lanka, Sri Lanka BC	15425as			
0030-0100	Sweden, Radio	6065am			
0030-0100	Thailand, Radio	11905na			
0035-0040	India, All India Radio	7110do	11830do	11870do	
0038-0055 1st m	Denmark, R Denmark Intl	7275va	7465va	9525va	
0050-0100	Italy, RAI Intl	6005na	9675na	11800na	

Selected Programs

Sundays

0000 USA, KWHR Naalehu HI: Prophetic Voice Broadcast. A program from Gospel Truth Ministries of Cincinnati.
0000 WHRI (Angel 2): Gospel Country. Les Roberts.
0010 China, China Radio Intl: News about China. Ten minutes of home news.
0010 Spain, R Exterior de Espana: Spanish Bookshelf. A glance at the works of some of Spain's leading writers.
0020 China, China Radio Intl: Travel Talk. An armchair guided tour of scenic spots in Chinese provinces.
0024 Spain, R Exterior de Espana: Distance Unknown. A program for shortwave listeners and DXers.
0029 China, China Radio Intl: The Cooking Show. Chinese recipes and cooking tips direct from Beijing.
0030 Sweden, Radio: Spectrum (1). Sarah Roxstrom with the latest on Swedish music, drama, art, and film.
0030 USA, KWHR Naalehu HI: Christ Gospel Broadcast. BR Hicks.
0034 Spain, R Exterior de Espana: Spanish Poparama. The latest pop music hits in Spain as well as some oldies.
0035 China, China Radio Intl: Music from China. Chinese music from traditional to pop to annual music festivals.
0056 Spain, R Exterior de Espana: Program Announcements. Descriptions of Spanish National Radio's programs and schedule information.

Mondays

0000 USA, KWHR Naalehu HI: Ever Increasing Faith. Fredrick "K.C." Price evangelizes from Los Angeles.
0000 WHRI (Angel 2): Open Bible Dialog. Joseph Chambers takes listeners' phone calls.
0005 Canada (North-Quebec): Onstage. Classical music concerts from around the world.
0011 Spain, R Exterior de Espana: Visitors Book. Who's visiting Spain this week.
0022 Spain, R Exterior de Espana: Spain's Golden Age. Focus on the period 1550-1650 in Spanish history.
0030 Sweden, Radio: In Touch with Stockholm (biweekly). See S 1130.
0030 Sweden, Radio: Sounds Nordic (biweekly). See S 1130.
0038 Spain, R Exterior de Espana: Radio Club. Listener letters are answered and music requests played.
0056 Spain, R Exterior de Espana: Program Announcements. See S 0056.

Tuesdays

0000 WHRI (Angel 2): Jack McLamb Show (live). Jack McLamb.
0005 USA, KWHR Naalehu HI: People to People (live). A program offering practical scriptural insights with Bob George.
0030 Spain, R Exterior de Espana: Spanish Music. Popular music currently heard in Spain.
0030 Sweden, Radio: Sixty Degrees North. See M 1130.
0033 Spain, R Exterior de Espana: Press Review. Review of the Spanish and international press.
0038 Spain, R Exterior de Espana: Entertainment in Spain. Current favorites and personalities from the world of stage and screen.
0048 Spain, R Exterior de Espana: Spanish Course by Radio. A course in Spanish with English commentary.
0048 Sweden, Radio: SportScan. See M 1146.
0057 Spain, R Exterior de Espana: Program Announcements. See S 0056.

Wednesdays

0000 WHRI (Angel 2): Jack McLamb Show (live). See T 0000.
0005 USA, KWHR Naalehu HI: People to People (live). See T 0005.
0030 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0030 Sweden, Radio: Sixty Degrees North. See M 1130.
0033 Spain, R Exterior de Espana: Press Review. See T 0033.
0037 Spain, R Exterior de Espana: Kaleidoscope. Spanish cultural life both in Spain and abroad.
0041 Sweden, Radio: MediaScan (1/3). See T 1141.
0047 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0057 Spain, R Exterior de Espana: Program Announcements. See S 0056.

Thursdays

0000 WHRI (Angel 2): Jack McLamb Show (live). See T 0000.
0005 USA, KWHR Naalehu HI: People to People (live). See T 0005.
0030 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0030 Sweden, Radio: Sixty Degrees North. See M 1130.
0034 Spain, R Exterior de Espana: Press Review. See T 0033.
0040 Spain, R Exterior de Espana: Window on Spain. A different region of Spain is described each week.
0042 Sweden, Radio: Money Matters. See W 1142.
0050 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0054 Radio Netherlands: Documentary. Can White Folks Play the Blues? (6th). See W 1154.
0054 Radio Netherlands: Documentary. Five Years of Yugoslavia (20th,27th). See F 1454.
0054 Radio Netherlands: Documentary. Year of the African Child (13th). See A 2354.
0057 Spain, R Exterior de Espana: Program Announcements. See S 0056.

Fridays

0000 WHRI (Angel 2): Jack McLamb Show (live). See T 0000.
0005 USA, KWHR Naalehu HI: People to People (live). See T 0005.
0030 Spain, R Exterior de Espana: Press Review. See T 0033.
0030 Sweden, Radio: Sixty Degrees North. See M 1130.
0034 Spain, R Exterior de Espana: Radio Club. See M 0038.
0043 Sweden, Radio: GreenScan. See H 1143.
0046 Sweden, Radio: Horizon (4/5). See H 1146.
0049 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0057 Spain, R Exterior de Espana: Program Announcements. See S 0056.

Saturdays

0000 WHRI (Angel 2): Jack McLamb Show (live). See T 0000.
0005 USA, KWHR Naalehu HI: People to People (live). See T 0005.
0030 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0030 Sweden, Radio: Sixty Degrees North. See M 1130.
0035 Spain, R Exterior de Espana: Press Review. See T 0033.
0035 Sweden, Radio: A Review of the Newsweek. See F 1135.
0040 Spain, R Exterior de Espana: Review of the Arts. A review of cultural activities in Spain and elsewhere.
0051 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0056 Spain, R Exterior de Espana: Program Announcements. See S 0056.

Frequencies

0100-0200	Australia, Radio	11855as	13605pa	13745as	13755pa
	15240pa 15365pa	15415as	15510as	17705as	17795pa
	17860pa				
0100-0200 vl	Australia, VL8A Alice Spg	2310do			
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200	Australia,DefenseForces R	13525as			
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	Canada, R Canada Intl	6120am	9535am	11715am	13670am
0100-0200	Costa Rica,RF Peace Intl	6205am	7385am		
0100-0110	Croatia, Croatian Radio	5895eu	7370eu		
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB	9745am	21455va		
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9640na
		11740na			
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0130	Hungary, Radio Budapest	9870na	11870na		
0100-0200	Indonesia, Voice of	9525na			
0100-0127	Iran, VOIRI	6015na	6175na	9022na	9685am
0100-0110	Italy, RAI Intl	6005na	9675na	11800na	
0100-0200	Japan, NHK/Radio	5960as	11790as	11840as	11860as
	11885as 11890as	11910as	17810as	17845as	
0100-0200	Lebanon, Wings of Hope	9960va			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0125	Netherlands, Radio	6020na	6165na	9845na	
0100-0200	Netherlands, Radio	5905as	7305as		
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0130 m	Norway, Radio Norway Intl	9560na			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	7070na	9620na	12010na	12050na
	13640na 13665na	15180na	15425na	15580na	
0100-0130	Serbia, Radio Yugoslavia	6195na	7130na		
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	Sweden, Radio	7120as	9435au		
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200	United Kingdom, BBC WS	5965as	5970sa	5975va	6175va
	6195as 7265as	7325va	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	9635as	9775am	11705as	11725as
	13740am 15170as	15205as	15250as	17740as	17820as
0100-0200	USA, WEWN Birmingham AL	5825eu	7425na		
0100-0200	USA, WGTG McCaysville GA	9400am			
0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0130 m	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	3315am	5065am	5935am	7435am
0100-0200	USA, WYFR Okeechobee FL	6065na			
0100-0130	Uzbekistan, R Tashkent	5955eu	5975eu	7285eu	
0100-0200	Vietnam, Voice of	5940na	7250na	9840na	14355na
		15010na			
0104-0200	USA, WYFR Okeechobee FL	9505na			
0115-0130 f	Greece, Voice of	6260na	9420na	9935na	
0130-0155	Austria, R Austria Intl	9655na			
0130-0150	Greece, Voice of	6260na	9420na	9935na	
0130-0200	Netherlands, Radio	9860as	11655as		
0130-0200	Sweden, Radio	7290am			
0138-0155 1st m	Denmark, R Denmark Intl	7465am	9560am		
0140-0200	Vatican State, Vatican R	5980as	7335as		
0145-0200	Albania, R Tirana Intl	6140na	7160na		

Selected Programs

Sundays

0100 USA, KWHR Naalehu HI: The Water of Life Broadcast. Doyle Davidson preaches from Plano, Texas.
0100 WHRI (Angel 2): Eleventh Hour Broadcast. Gary Wedemeyer.
0102 Italy, RAI Intl: Light Music.
0107 Canada, RCI: Innovation Canada. Canadian entrepreneurs, inventors, and researchers and their ideas and discoveries.
0110 Spain, REE: Spanish Bookshelf. See S 0010.
0124 Spain, REE: Distance Unknown. See S 0024.
0131 Canada, RCI: Earth Watch. Environment and ecology matters.
0134 Spain, REE: Spanish Poparama. See S 0034.

Mondays

0100 Canada (North-Quebec): Onstage. See M 0005.
0100 USA, KWHR Naalehu HI: Remnant Church of God. Ruth Tetzlaff evangelizes from Wisconsin.
0100 WHRI (Angel 1): Music. See S 0200.
0100 WHRI (Angel 2): Open Bible Dialog. See M 0000.
0102 Italy, RAI Intl: Light Music.
0107 Canada, RCI: The Arts in Canada. A look at the Canadian arts scene.
0111 Spain, REE: Visitors Book. See M 0011.
0122 Spain, REE: Spain's Golden Age. See M 0022.
0130 USA, KWHR Naalehu HI: Music. Contemporary christian music and inspiration.
0131 Canada, RCI: The Mailbag. See S 1237.
0138 Spain, REE: Radio Club. See M 0038.

Tuesdays

0100 USA, KWHR Naalehu HI: Turn Your Radio On. Bill Brasier plays southern gospel music.
0100 WHRI (Angel 2): The Prophecy Club. Stan Johnson discusses bible prophecy from Topeka, Kansas.
0102 Italy, RAI Intl: Light Music.
0104 USA, WYFR (Satellite Network): Echoes. Thank God for His Church (Leon Wardell) (18th).
0104 USA, WYFR (Satellite Network): Echoes. The King of Confusion (Ralph Bouma) (4th). Repeats of sermons from the Family Radio archives.
0104 USA, WYFR (Satellite Network): Echoes. The Power of God's Grace (Leon Wardell) (25th). Repeats of sermons from the Family Radio archives.
0104 USA, WYFR (Satellite Network): Echoes. Walking Before God (Ralph Bouma) (11th).
0111 Canada, RCI: Spectrum. See M 1241.
0130 Spain, REE: Spanish Music. See T 0030.
0130 WHRI (Angel 2): The Hour of Courage. See S 0400.
0133 Spain, REE: Press Review. See T 0033.
0138 Spain, REE: Entertainment in Spain. See T 0038.
0148 Spain, REE: Spanish Course by Radio. See T 0048.

Wednesdays

0100 USA, KWHR Naalehu HI: Music. See M 0130.
0100 WHRI (Angel 2): The Prophecy Club. See T 0100.
0102 Italy, RAI Intl: Light Music.
0104 USA, WYFR (Satellite Network): Echoes. Do Not Commit Adultery (Don Buchanan) (12th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. Never Will I Leave You (Don Buchanan) (5th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Liberty Wherewith Christ Has Made Use Free (Robert A. Cook) (26th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Sacrifices that Please God (Don Buchanan) (19th). See M 0104.
0111 Canada, RCI: Spectrum. See M 1241.
0130 Spain, REE: Spanish Music. See T 0030.
0130 WHRI (Angel 2): The Hour of Courage. See S 0400.
0133 Spain, REE: Press Review. See T 0033.
0137 Spain, REE: Kaleidoscope. See W 0037.
0147 Spain, REE: Spanish Course by Radio. See T 0048.

Thursdays

0100 USA, KWHR Naalehu HI: Music. See M 0130.
0100 WHRI (Angel 2): The Prophecy Club. See T 0100.
0102 Italy, RAI Intl: Light Music.
0104 USA, WYFR (Satellite Network): Echoes. Man's Incapability (Michael O. Hughes) (27th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Law: What Does God Require (Michael O. Hughes) (13th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Scales of Our Transgressions (Michael O. Hughes) (20th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. Thou Shalt Not Commit Adultery (Michael O. Hughes) (6th). See M 0104.
0111 Canada, RCI: Spectrum. See M 1241.
0130 Spain, REE: Spanish Music. See T 0030.
0130 WHRI (Angel 2): The Hour of Courage. See S 0400.
0133 Spain, REE: Press Review. See T 0033.
0139 Spain, REE: Window on Spain. See H 0040.
0149 Spain, REE: Spanish Course by Radio. See T 0048.

Fridays

0100 USA, KWHR Naalehu HI: Music. See M 0130.
0100 WHRI (Angel 2): The Prophecy Club. See T 0100.
0102 Italy, RAI Intl: Light Music.
0104 USA, WYFR (Satellite Network): Echoes. The Hatred of God Against Man (Hal Brunson) (7th/13th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Wrath of Man Shall Praise Thee (Hal Brunson) (21st). See M 0104.
0111 Canada, RCI: Spectrum. See M 1241.
0130 Spain, REE: Press Review. See T 0033.
0130 WHRI (Angel 2): The Hour of Courage. See S 0400.
0134 Spain, REE: Radio Club. See M 0038.
0149 Spain, REE: Spanish Course by Radio. See T 0048.

Saturdays

0100 USA, KWHR Naalehu HI: Home Schooling. Terry and Vicki Brady of the Home Education network take calls about schooling.
0100 WHRI (Angel 2): The Prophecy Club. See T 0100.
0102 Italy, RAI Intl: Light Music.
0104 USA, WYFR (Satellite Network): Echoes. But When He Saw Jesus (Henry Mahan) (22th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. He Touched Me (Henry Mahan) (8th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Call of Grace (Henry Mahan) (29th). See M 0104.
0104 USA, WYFR (Satellite Network): Echoes. The Life and Walk of Faith (Henry Mahan) (15th). See M 0104.
0111 Canada, RCI: Spectrum. See M 1241.
0130 Spain, REE: Spanish Music. See T 0030.
0130 WHRI (Angel 2): The Hour of Courage. See S 0400.
0135 Spain, REE: Press Review. See T 0033.
0140 Spain, REE: Review of the Arts. See A 0040.
0151 Spain, REE: Spanish Course by Radio. See T 0048.
0154 Radio Netherlands: Documentary. Can White Folks Play the Blues? (8th). See W 1154.
0154 Radio Netherlands: Documentary. Year of the African Child (15th). Eric Beauchemin reports from Nairobi about the event to be held on June 16th.

Frequencies

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, Radio	13605pa	13755pa	15240pa	15365pa
		15415as	17715as	17750as	17795pa
		17860pa			
0200-0300 vl	Australia, VL8A Alice Spg	2310do			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
0200-0300	Australia,DefenseForces R	13525as			
0200-0215	Bangladesh, Radio	4880do	15520do		
0200-0300 vl	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	6120na	9535am	9755na	11940na
0200-0300	Costa Rica,RF Peace Intl	6205am	7385am		
0200-0210	Croatia, Croatian Radio	5895eu	7370eu		
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB	9745am	21455va		
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	7285as	9640as	9690as	11545as
		11945as	11965as	12045as	
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0200-0300	Lebanon, Wings of Hope	9960va			
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0230	Netherlands, Radio	5905as	7305as	9860as	11655as
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		9625na	11940na		
0200-0300	Russia,Voice of Russia WS	7070na	9620na	12010na	12050na
		13645na	13665na	15180na	15580na
0200-0230	Serbia, Radio Yugoslavia	7130eu			
0200-0300	Slovakia, Adv World Radio	11610as			
0200-0300	South Korea, R Korea Intl	7275am	11725am	11810am	15575am
0200-0230	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	6135af	6175va
		7235va	9560va	9590va	9605va
		9915sa	11955as	15360as	
0200-0300	USA, KAIJ Dallas TX	5810am	9815am		
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	9430am		
0200-0300	USA, Voice of America	7115as	7205as	9635as	11705as
		11725as	15170as	15250as	17740as
		17820as			
0200-0300	USA, WEWN Birmingham AL	5825eu	7425na		
0200-0300	USA, WGTG McCaysville GA	9400am			
0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300	USA, WWCR Nashville TN	3315am	5065am	5935am	
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0300	Vietnam, Voice of	5940na	7250as	9840na	15010na
0215-0225	Nepal, Radio	7165do			
0230-0300	Albania, R Tirana Intl	6140na	7160na		
0230-0259	Austria, R Austria Intl	9655na	9870ca	13730sa	
0230-0300	Hungary, Radio Budapest	9870na	11870na		
0230-0255	Moldova, R Moldova Intl	7500na			
0230-0245	Pakistan, Radio	15485as	17705as	17725as	21730as
0230-0300	Philippines, R Pilipinas	17760me	17865me	21580me	
0230-0300 twhha	Portugal, R Portugal Intl	6095am	9570am		
0230-0300	Sweden, Radio	7290na			
0238-0255 1st m	Denmark, R Denmark Intl	7465am	9560am		
0245-0300	India, All India Radio	3945do	6045do	7110do	11830do
		15135do			
0250-0300	Vatican State, Vatican R	6095na	7305na		

Selected Programs

Sundays

0200 USA, KWHR Naalehu HI: DXing with Cumbre. A what's-on-the-air program hosted by Marie Lamb.
0200 WHRI (Angel 1): Music. Contemporary christian music and inspiration.
0200 WHRI (Angel 2): World of Prophecy. Texe Marrs and a guest discuss the evils and pitfalls of today and the outlook for tomorrow.
0205 Canada, RCI Montreal: Double Exposure. The comedy team of Bob Robertson and Linda Cullen present their award-winning brand of political satire and mimicry.
0207 Canada (North-Quebec): A Propos. A guide to the music of Quebec, both home-grown and international, francophone and anglophone.
0230 Sweden, Radio: Spectrum (1). See S 0030.
0230 USA, KWHR Naalehu HI: Living Faith Ministries. Bill Perg.
0232 Canada, RCI Montreal: The Royal Canadian Air Farce. The traveling comedy show that was brought back by popular demand.
0245 USA, KWHR Naalehu HI: For God So Loved the World. Five minutes of evangelism by Linda Leon.

Mondays

0200 USA, KWHR Naalehu HI: Methodist Hour. Music, interviews, and timely messages.
0200 WHRI (Angel 1): The Water of Life Broadcast. Doyle Davidson preaches from Plano, Texas.
0200 WHRI (Angel 2): The America's Promise Broadcast. Dave Farley preaches from Idaho.
0205 Canada, RCI Montreal: The Inside Track. An award-winning program of sports journalism, examining the impact of sports on the lives of Canadians.
0206 Canada (North-Quebec): Sunday Showcase. A Sunday night radio drama.
0230 Sweden, Radio: In Touch with Stockholm (biweekly). See S 1130.
0230 Sweden, Radio: Sounds Nordic (biweekly). See S 1130.
0230 USA, KWHR Naalehu HI: A Study in God's Word. See S 0615.
0230 WHRI (Angel 2): Truth for the World. Churches of Christ spokesman Jim Dearman examines Scripture.
0231 Canada, RCI Montreal: Now the Details. A program about the media.
0245 USA, KWHR Naalehu HI: Battle Line. A production of Indiana Christian University.
0245 WHRI (Angel 2): Church of the Living God. Arnold Rogers.

Tuesdays

0200 USA, KWHR Naalehu HI: Music. See M 0130.
0200 WHRI (Angel 1): Music. See S 0200.
0205 Canada, RCI Montreal: The Best of Morningside. See M 1305.
0206 WHRI (Angel 2): For the People (repeat). Chuck Harder talk radio.
0215 Canada (North-Quebec): Between the Covers. A story-time for grownups featuring weeknight book-reading of contemporary novels and short stories read in 15-minute installments.
0215 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0230 Canada (North-Quebec): That Time of the Night. Up to two-and-a-half hours of light classical music that is perfect for the end of the day.
0230 Sweden, Radio: Sixty Degrees North. See M 1130.
0248 Sweden, Radio: SportScan. See M 1146.

Wednesdays

0200 USA, KWHR Naalehu HI: Music. See M 0130.
0200 WHRI (Angel 1): Music. See S 0200.
0205 Canada, RCI Montreal: The Best of Morningside. See M 1305.
0206 WHRI (Angel 2): For the People (repeat). See T 0206.
0215 Canada (North-Quebec): Between the Covers. See T 0215.
0215 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0230 Canada (North-Quebec): That Time of the Night. See T 0230.
0230 Sweden, Radio: Sixty Degrees North. See M 1130.
0241 Sweden, Radio: MediaScan (1/3). See T 1141.

Thursdays

0200 USA, KWHR Naalehu HI: Music. See M 0130.
0200 WHRI (Angel 1): Music. See S 0200.
0205 Canada, RCI Montreal: The Best of Morningside. See M 1305.
0206 WHRI (Angel 2): For the People (repeat). See T 0206.
0215 Canada (North-Quebec): Between the Covers. See T 0215.
0215 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0230 Canada (North-Quebec): That Time of the Night. See T 0230.
0230 Sweden, Radio: Sixty Degrees North. See M 1130.
0242 Sweden, Radio: Money Matters. See W 1142.
0254 Radio Netherlands: Documentary. Can White Folks Play the Blues? (6th). See W 1154.
0254 Radio Netherlands: Documentary. Five Years of Yugoslavia (20th,27th). See F 1454.
0254 Radio Netherlands: Documentary. Year of the African Child (13th). See A 2354.

Fridays

0200 USA, KWHR Naalehu HI: Music. See M 0130.
0200 WHRI (Angel 1): Music. See S 0200.
0205 Canada, RCI Montreal: The Best of Morningside. See M 1305.
0206 WHRI (Angel 2): For the People (repeat). See T 0206.
0215 Canada (North-Quebec): Between the Covers. See T 0215.
0215 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0230 Canada (North-Quebec): That Time of the Night. See T 0230.
0230 Sweden, Radio: Sixty Degrees North. See M 1130.
0243 Sweden, Radio: GreenScan. See H 1143.
0246 Sweden, Radio: Horizon (4/5). See H 1146.

Saturdays

0200 USA, KWHR Naalehu HI: DXing with Cumbre. See S 0200.
0200 USA, KWHR Naalehu HI: Home Schooling. See A 0100.
0200 WHRI (Angel 1): Music. See S 0200.
0205 Canada, RCI Montreal: The Best of Morningside. See M 1305.
0206 WHRI (Angel 2): For the People (repeat). See T 0206.
0215 Canada (North-Quebec): Between the Covers. See T 0215.
0215 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0230 Canada (North-Quebec): That Time of the Night. See T 0230.
0230 Sweden, Radio: Sixty Degrees North. See M 1130.
0235 Sweden, Radio: A Review of the Newsweek. See F 1135.

Frequencies

0300-0400	Australia, Radio	13605pa	13755pa	15240pa	15245as
		15365pa	15415as	15510as	17750pa
		17795pa	17860pa		
0300-0400 vl	Australia, VL8A Alice Spg	2310do			
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 sm	Canada, R Canada Intl	6010na	9755na		
0300-0400	China, China Radio Intl	9710na	11715na		
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0400	Costa Rica,RF Peace Intl	6205am	7385am		
0300-0310	Croatia, Croatian Radio	5895eu	7370eu		
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB	9745am	21455va		
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6085na	6185na	9535na	9615na
		9640na			
0300-0315 s	Greece, Voice of	6260na	9420na	9935na	
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, NHK/Radio	11790na	11840as	15230na	17810as
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0300-0400	Lebanon, Wings of Hope	9960va			
0300-0325	Netherlands, Radio	5905as	7305as	9860as	11655as
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0330	Philippines, R Pilipinas	17760me	17865me	21580me	
0300-0400	Russia,Voice of Russia WS	7230na	12010na	12050na	13645na
		13665na	15180na	15580na	
0300-0400	S Africa, Channel Africa	3220af	5955af		
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655na	11890na		
0300-0315	Uganda, Radio	3340do	4976do		
0300-0400	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na
		6055na	7150na	9550na	
0300-0330	United Kingdom, BBC WS	5970sa	6135af	7235va	7325sa
		15360as			
0300-0400	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6190af	6195eu	9410va
		9600af	9605as	9895va	11760va
		12095af	15310as		
0300-0400	USA, KAIJ Dallas TX	5810am	9815am		
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	6035af	6080af	7105af	7340af
		7405af	7415af	9575af	9885af
0300-0400	USA, WEWN Birmingham AL	5825eu	7425na		
0300-0400	USA, WGTG McCaysville GA	9400am			
0300-0400	USA, WHRI Noblesville IN	5745am	7315am		
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400	USA, WWCR Nashville TN	3315am	5065am	5935am	
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0310	Vatican State, Vatican R	6095na	7305na		
0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do			
0320-0350	Vatican State, Vatican R	7360af			
0330-0357	Czech Rep, Radio Prague	9480as			
0330-0355	Moldova, R Moldova Intl	7500na			
0330-0400	Slovakia, Adv World Radio	9465af			
0330-0400	Sweden, Radio	7115na			
0330-0400 vl	Tanzania, Radio	5050af			
0330-0400	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 1st m	Denmark, R Denmark Intl	7165am	7465am	9565am	
0340-0350	Greece, Voice of	6260na	9420na	9935na	
0345-0400 irreg	Burundi, Radio Nationale	6140do			
0345-0400	Tajikistan, Tajik Radio	7245as			

Selected Programs

Sundays

0300 USA, KWHR Naalehu HI: Truth House. Evangelistic teachings by E.C. Fultcher plus his global shortwave club.
0300 WHRI (Angel 1): Music. See S 0200.
0300 WHRI (Angel 2): Biblical Studies Institute. Bob Tref evangelizes from Rapid City, South Dakota.
0310 China, China Radio Intl: News about China. See S 0010.
0320 China, China Radio Intl: Travel Talk. See S 0020.
0329 China, China Radio Intl: The Cooking Show. See S 0029.
0330 Sweden, Radio: Spectrum (1). See S 0030.
0330 WHRI (Angel 2): DXing with Cumbre. A what's-on-the-air program hosted by Marie Lamb.
0335 China, China Radio Intl: Music from China. See S 0035.

Mondays

0300 USA, KWHR Naalehu HI: The Sword of the Spirit. Mike Keyes evangelizes.
0300 WHRI (Angel 2): Truth House. Evangelistic teachings by E.C. Fultcher plus his global shortwave club.
0305 Canada (North-Quebec): Jazz Beat. Two hours of contemporary Canadian and international jazz hosted by Katie Malloch.
0310 China, China Radio Intl: News about China. See S 0010.
0313 China, China Radio Intl: Sports Beat. See S 1213.
0320 China, China Radio Intl: China Snapshots. See S 1220.
0325 China, China Radio Intl: In the Third World. See S 1225.
0330 Sweden, Radio: In Touch with Stockholm (biweekly). See S 1130.
0330 Sweden, Radio: Sounds Nordic (biweekly). See S 1130.
0330 USA, KWHR Naalehu HI: DXing with Cumbre. See S 0200.
0335 China, China Radio Intl: Song of the Week. See S 1235.
0345 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Tuesdays

0300 USA, KWHR Naalehu HI: Music. See M 0130.
0300 WHRI (Angel 1): Music. See S 0200.
0307 WHRI (Angel 2): For the People (repeat). See T 0206.
0310 China, China Radio Intl: News about China. See S 0010.
0319 China, China Radio Intl: Current Affairs. See M 1219.
0330 China, China Radio Intl: Press Clippings. See M 1230.
0330 Sweden, Radio: Sixty Degrees North. See M 1130.
0334 China, China Radio Intl: China's Open Windows. See M 1234.
0339 China, China Radio Intl: Investing in China. See M 1239.
0345 China, China Radio Intl: Idioms and Their Stories. See M 1245.
0348 Sweden, Radio: SportScan. See M 1146.

Wednesdays

0300 USA, KWHR Naalehu HI: Music. See M 0130.
0300 WHRI (Angel 1): Music. See S 0200.
0305 Canada (North-Quebec): That Time of the Night. See T 0230.
0307 WHRI (Angel 2): For the People (repeat). See T 0206.
0310 China, China Radio Intl: News about China. See S 0010.
0315 China, China Radio Intl: News Analysis. See T 1215.
0319 China, China Radio Intl: Current Affairs. See M 1219.
0330 Sweden, Radio: Sixty Degrees North. See M 1130.
0333 China, China Radio Intl: Press Clippings. See M 1230.
0338 China, China Radio Intl: Orient Arena. See T 1238.
0341 Sweden, Radio: MediaScan (1/3). See T 1141.
0345 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Thursdays

0300 USA, KWHR Naalehu HI: Music. See M 0130.
0300 WHRI (Angel 1): Music. See S 0200.
0307 WHRI (Angel 2): For the People (repeat). See T 0206.
0310 China, China Radio Intl: News about China. See S 0010.
0318 China, China Radio Intl: Current Affairs. See M 1219.
0330 Sweden, Radio: Sixty Degrees North. See M 1130.
0333 China, China Radio Intl: Profile. See W 1233.
0340 China, China Radio Intl: Learn to Speak Chinese. See W 1240.
0342 Sweden, Radio: Money Matters. See W 1142.

Fridays

0300 USA, KWHR Naalehu HI: Music. See M 0130.
0300 WHRI (Angel 1): Music. See S 0200.
0307 WHRI (Angel 2): For the People (repeat). See T 0206.
0310 China, China Radio Intl: News about China. See S 0010.
0315 China, China Radio Intl: News Analysis. See T 1215.
0319 China, China Radio Intl: Current Affairs. See M 1219.
0330 Sweden, Radio: Sixty Degrees North. See M 1130.
0334 China, China Radio Intl: Press Clippings. See M 1230.
0338 China, China Radio Intl: Focus. See H 1238.
0344 China, China Radio Intl: Cultural Spectrum. See H 1244.
0345 Sweden, Radio: GreenScan. See H 1143.
0346 Sweden, Radio: Horizon (4/5). See H 1146.

Saturdays

0300 USA, KWHR Naalehu HI: Turn Your Radio On. See T 0100.
0300 WHRI (Angel 1): Music. See S 0200.
0307 WHRI (Angel 2): For the People (repeat). See T 0206.
0310 China, China Radio Intl: News about China. See S 0010.
0320 China, China Radio Intl: Current Affairs. See M 1219.
0330 Sweden, Radio: Sixty Degrees North. See M 1130.
0334 China, China Radio Intl: China Radio Intl: Life in China. See F 1234.
0335 Sweden, Radio: A Review of the Newsweek. See F 1135.
0346 China, China Radio Intl: Global Review. See F 1246.

Hauser's Highlights
Voice of Islamic Republic of Iran, Tehran

Announced English:

1130-1230	11875, 11930, 15260
1530-1630	7290, 9635
1930-2030	7260, 9022
2130-2230	6175
0030-0130	6015, 9022

(Tom Sundstrom, USA, *BC-DX*)

Frequencies

0400-0500	Australia, Radio	11880pa	13605as	15240pa	15365pa
		15415pa	17715pa	17750as	17795pa
0400-0500 vl	Australia, VL8A Alice Spg	2310do			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500	Bulgaria, Radio	9700na	11720na		
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	9730na			
0400-0500	Costa Rica,RF Peace Intl	6205am	7385am		
0400-0410	Croatia, Croatian Radio	5895eu	7370eu		
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na
0400-0500	Ecuador, HCJB	9745am	21455va		
0400-0450	Germany, Deutsche Welle	5990af	6015af	6185af	7150af
		7225af	9565af	11765af	
0400-0500 twtfa	Guatemala, Radio Cultural	3300do			
0400-0415	Israel, Kol Israel	7465na	9435na	17545au	
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Wings of Hope	9960va			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430 m	Norway, Radio Norway Intl	7465na			
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0456	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		9625na	11940na		
0400-0500	Russia,Voice of Russia WS	12010na	12050na	13645na	13665na
		15180na	15580na		
0400-0455	S Africa, Channel Africa	3220af	5955af		
0400-0427	S Africa, Trans World R	7165af			
0400-0430	Slovakia, Adv World Radio	11600af			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0400-0430	Tanzania, Radio	5050af			
0400-0500	Turkey, Voice of	9560va	9655va	9685eu	
0400-0415	Uganda, Radio	3340do	4976do		
0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6180eu	6190af	6195eu
		7160af	9410va	9600af	11760va
		11955as	12095af	15280as	15310as
		15575va			
0400-0430	United Kingdom, BBC WS	3955eu	6180eu	9610af	
0400-0500	USA, KAIJ Dallas TX	5810am	9815am		
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17510as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, Voice of America	6035af	6080af	7170va	7405af
		9575af	9885af	11965va	15205va
0400-0430	USA, Voice of America	6145af	7340af		
0400-0500	USA, WEWN Birmingham AL	5825eu	7425na		
0400-0500	USA, WHRI Noblesville IN	5760am	7315am		
0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	USA, WWCR Nashville TN	3315am	5065am	5935am	
0400-0500	USA, WYFR Okeechobee FL	6065na	9985af		
0400-0445	USA, WYFR Okeechobee FL	9505na			
0400-0430	Vietnam, Voice of	7360na	9840na	12020na	
0400-0500	Zambia, Christian Voice	6065af			
0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0425-0440	Italy, RAI Intl	5975eu	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0430-0500	Australia, Radio	15510pa			
0430-0500	Australia,DefenseForces R	13525as			
0430-0500	Netherlands, Radio	6165na	9590na		
0430-0500	Swaziland, Trans World R	3200af	5055af	6070af	
0430-0500	Switzerland, Swiss R Intl	9905na			
0430-0500	United Kingdom, BBC WS	7150eu	15420af		
0438-0455 1st m	Denmark, R Denmark Intl	7465va	9565va	13805va	
0455-0500	Nigeria, Voice of	7255af			
0459-0500	New Zealand, R NZ Intl	9570pa			

Selected Programs

Sundays

0400 USA, KWHR Naalehu HI: Gospel Crusade Ministries. Scripture teachings by Roger Hedrick and free bible correspondence courses.
0400 WHRI (Angel 1): Bob Enyart (live). Bob takes listener phone calls about everyday Christian topics.
0400 WHRI (Angel 2): The Hour of Courage. Ron Wilson talks politics and the precious metals market.
0407 Canada, RCI Montreal: Innovation Canada. See S 0107.
0410 China, China Radio Intl: News about China. See S 0010.
0420 China, China Radio Intl: Travel Talk. See S 0020.
0429 China, China Radio Intl: The Cooking Show. See S 0029.
0430 USA, KWHR Naalehu HI: Prophetic Voice Broadcast. See S 0000.
0435 China, China Radio Intl: Music from China. See S 0035.

Mondays

0400 USA, KWHR Naalehu HI: Gospel Country. Les Roberts.
0400 WHRI (Angel 1): Turn Your Radio On. Bill Brasier plays southern gospel music.
0400 WHRI (Angel 2): Music. See S 0200.
0405 Canada (North-Quebec): Jazz Beat. See M 0305.
0407 Canada, RCI Montreal: The Mailbag. See S 1237.
0410 China, China Radio Intl: News about China. See S 0010.
0413 China, China Radio Intl: Sports Beat. See S 1213.
0420 China, China Radio Intl: China Snapshots. See S 1220.
0425 China, China Radio Intl: In the Third World. See S 1225.
0430 WHRI (Angel 2): Christian Country Music. Joe Brashier plays country music with a Christian slant.
0435 China, China Radio Intl: Song of the Week. See S 1235.
0445 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Tuesdays

0400 USA, KWHR Naalehu HI: Music. See M 0130.
0400 WHRI (Angel 2): The Prophecy Club. See T 0100.
0407 Canada (North-Quebec): That Time of the Night. See T 0230.
0410 China, China Radio Intl: News about China. See S 0010.
0411 Canada, RCI Montreal: Spectrum. See M 1241.
0419 China, China Radio Intl: Current Affairs. See M 1219.
0430 China, China Radio Intl: Press Clippings. See M 1230.
0430 WHRI (Angel 2): The Hour of Courage. See S 0400.
0434 China, China Radio Intl: China's Open Windows. See M 1234.
0439 China, China Radio Intl: Investing in China. See M 1239.
0445 China, China Radio Intl: Idioms and Their Stories. See M 1245.

Wednesdays

0400 USA, KWHR Naalehu HI: Music. See M 0130.
0400 WHRI (Angel 1): Bob Enyart (live). See S 0400.
0400 WHRI (Angel 2): The Prophecy Club. See T 0100.
0407 Canada (North-Quebec): That Time of the Night. See T 0230.
0410 China, China Radio Intl: News about China. See S 0010.
0411 Canada, RCI Montreal: Spectrum. See M 1241.
0415 China, China Radio Intl: News Analysis. See T 1215.
0419 China, China Radio Intl: Current Affairs. See M 1219.
0430 WHRI (Angel 2): The Hour of Courage. See S 0400.
0433 China, China Radio Intl: Press Clippings. See M 1230.
0438 China, China Radio Intl: Orient Arena. See T 1238.
0445 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Thursdays

0400 USA, KWHR Naalehu HI: Music. See M 0130.
0400 WHRI (Angel 1): Bob Enyart (live). See S 0400.
0400 WHRI (Angel 2): The Prophecy Club. See T 0100.
0407 Canada (North-Quebec): That Time of the Night. See T 0230.
0410 China, China Radio Intl: News about China. See S 0010.
0411 Canada, RCI Montreal: Spectrum. See M 1241.
0418 China, China Radio Intl: Current Affairs. See M 1219.
0430 WHRI (Angel 2): The Hour of Courage. See S 0400.
0433 China, China Radio Intl: Profile. See W 1233.
0440 China, China Radio Intl: Learn to Speak Chinese. See W 1240.
0454 Radio Netherlands: Documentary. Can White Folks Play the Blues? (6th). See W 1154.
0454 Radio Netherlands: Documentary. Five Years of Yugoslavia (20th,27th). See F 1454.
0454 Radio Netherlands: Documentary. Year of the African Child (13th). See A 2354.

Fridays

0400 USA, KWHR Naalehu HI: Music. See M 0130.
0400 WHRI (Angel 1): Bob Enyart (live). See S 0400.
0400 WHRI (Angel 2): The Prophecy Club. See T 0100.
0407 Canada (North-Quebec): That Time of the Night. See T 0230.
0410 China, China Radio Intl: News about China. See S 0010.
0411 Canada, RCI Montreal: Spectrum. See M 1241.
0415 China, China Radio Intl: News Analysis. See T 1215.
0419 China, China Radio Intl: Current Affairs. See M 1219.
0430 WHRI (Angel 2): The Hour of Courage. See S 0400.
0434 China, China Radio Intl: Press Clippings. See M 1230.
0438 China, China Radio Intl: Focus. See H 1238.
0444 China, China Radio Intl: Cultural Spectrum. See H 1244.

Saturdays

0400 USA, KWHR Naalehu HI: The Pat Boone Show. Pat Boone sings.
0400 WHRI (Angel 1): Bob Enyart (live). See S 0400.
0400 WHRI (Angel 2): The Prophecy Club. See T 0100.
0407 Canada (North-Quebec): That Time of the Night. See T 0230.
0410 China, China Radio Intl: News about China. See S 0010.
0411 Canada, RCI Montreal: Spectrum. See M 1241.
0420 China, China Radio Intl: Current Affairs. See M 1219.
0430 WHRI (Angel 2): The Hour of Courage. See S 0400.
0434 China, China Radio Intl: Life in China. See F 1234.
0446 China, China Radio Intl: Global Review. See F 1246.

Frequencies

0500-0600	Australia, Radio	11880pa	13605as	15240pa	15245as
		15365pa	15415as	17715pa	17795pa
0500-0600 vl	Australia, VL8A Alice Spg	2310do			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Australia,DefenseForces R	13525as			
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		
0500-0510	Croatia, Croatian Radio	5895eu	7370eu		
0500-0600	Cuba, Radio Havana	9505na	9830na		
0500-0600	Ecuador, HCJB	9745am	21455va		
0500-0550	Germany, Deutsche Welle	5960na	6045na	6185na	9515na
0500-0600 vl	Italy, IRRS	3985va			
0500-0530 vl/as	Italy, IRRS	7125va			
0500-0600	Japan, NHK/Radio	6110na	7230eu	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, Wings of Hope	9960va			
0500-0525	Netherlands, Radio	6165na	9590na		
0500-0600	New Zealand, R NZ Intl	9570pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4990do		
0500-0600	Nigeria, Voice of	7255af			
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	12010na	12040na	12050na	13645na
		13665na	15580na		
0500-0555	S Africa, Channel Africa	5955af	9590af		
0500-0600	Slovakia, Adv World Radio	7215eu			
0500-0556	Spain, R Exterior Espana	9540na			
0500-0530	Swaziland, Trans World R	6070af			
0500-0600	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6180eu	6190af	6195eu
		7150eu	7160af	9410va	9600af
		9640va	9740as	11760va	11955as
		15280as	15310as	15360va	15420af
	15575va	17640af	17885af		
0500-0600	USA, KAIJ Dallas TX	5810am	9815am		
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, Voice of America	6035af	6080af	7170va	7295af
		9775af	9885af	11965va	15205va
0500-0600	USA, WEWN Birmingham AL	5825eu	7425na	9370as	
0500-0600	USA, WHRI Noblesville IN	5760am	7315am		
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WWCR Nashville TN	3315am	5065am	5935am	
0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580af	
0500-0528	Vatican State, Vatican R	9660af	11625af	15570af	
0500-0520	Vatican State, Vatican R	4005eu	5880eu		
0500-0530	Vietnam, Voice of	7360na	9840na	12030na	
0500-0600	Zambia, Christian Voice	6065af			
0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0505-0600	Swaziland, Trans World R	3200af	5055af	9500af	
0515-0530	Switzerland, Swiss R Intl	6165eu	9535eu		
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0559	Austria, R Austria Intl	6015na			
0530-0600	Georgia, Georgian Radio	11910eu			
0530-0600	Kazakhstan, Radio Almaty	9690eu	11705eu		
0530-0556	Romania, R Romania Intl	11940af	15250af	15340af	17745as
		17790as			
0530-0600	Slovakia, Adv World Radio	11600eu			
0530-0600	Swaziland, Trans World R	6070af			
0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			
0538-0555 1st m	Denmark, R Denmark Intl	7465va	13805va		
0555-0600	Malaysia, Voice of	6175as	9750as	15295au	

Selected Programs

Sundays

0500 USA, KWHR Naalehu HI: Breakthrough. Rod Parsley conducts services from the World Harvest Church in Columbus, OH.
0500 WHRI (Angel 1/2): The Joy of Living Broadcast. Hurst-Smith Evangelists, Inc.
0510 Spain, R Exterior de Espana: Spanish Bookshelf. See S 0010.
0515 WHRI (Angel 1/2): A Study in God's Word. Hezakiah Smith reads Scripture from North Carolina.
0524 Spain, R Exterior de Espana: Distance Unknown. See S 0024.
0530 WHRI (Angel 1/2): The Mercies of God Radio Broadcast. Pastor Peter from Michigan preaches mercy for lost sinners.
0534 Spain, R Exterior de Espana: Spanish Poparama. See S 0034.

Mondays

0500 USA, KWHR Naalehu HI: Music. See M 0130.
0500 WHRI (Angel 1/2): John Hagee Today. Evangelizing by John Hagee of the Comerstone Church in San Antonio, TX.
0511 Spain, R Exterior de Espana: Visitors Book. See M 0011.
0512 Canada, RCI Montreal: Report to the Peacekeepers. Information about Canada for Canadian Forces overseas.
0522 Spain, R Exterior de Espana: Spain's Golden Age. See M 0022.
0530 WHRI (Angel 1/2): In Touch. See S 1200.
0538 Spain, R Exterior de Espana: Radio Club. See M 0038.
0555 WHRI (Angel 1/2): Alive Today. See S 1200.

Tuesdays

0500 USA, KWHR Naalehu HI: Music. See M 0130.
0500 WHRI (Angel 1/2): John Hagee Today. See M 0500.
0512 Canada, RCI Montreal: Report to the Peacekeepers See M 0512.
0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0530 WHRI (Angel 1/2): In Touch. See S 1200.
0533 Spain, R Exterior de Espana: Press Review. See T 0033.
0538 Spain, R Exterior de Espana: Entertainment in Spain. See T 0038.
0548 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0555 WHRI (Angel 1/2): Alive Today. See S 1200.

Wednesdays

0500 USA, KWHR Naalehu HI: Music. See M 0130.
0500 WHRI (Angel 1/2): John Hagee Today. See M 0500.
0512 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0530 WHRI (Angel 1/2): In Touch. See S 1200.
0533 Spain, R Exterior de Espana: Press Review. See T 0033.
0537 Spain, R Exterior de Espana: Kaleidoscope. See W 0037.
0547 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0555 WHRI (Angel 1/2): Alive Today. See S 1200.

Thursdays

0500 USA, KWHR Naalehu HI: Music. See M 0130.
0500 WHRI (Angel 1/2): John Hagee Today. See M 0500.
0512 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0530 WHRI (Angel 1/2): In Touch. See S 1200.
0533 Spain, R Exterior de Espana: Press Review. See T 0033.
0539 Spain, R Exterior de Espana: Window on Spain. See H 0040.
0549 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0555 WHRI (Angel 1/2): Alive Today. See S 1200.

Fridays

0500 USA, KWHR Naalehu HI: Music. See M 0130.
0500 WHRI (Angel 1/2): John Hagee Today. See M 0500.
0512 Canada, RCI Montreal: Report to the Peacekeepers. See M 0512.
0530 Spain, R Exterior de Espana: Press Review. See T 0033.
0530 WHRI (Angel 1/2): In Touch. See S 1200.
0534 Spain, R Exterior de Espana: Radio Club. See M 0038.
0549 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.
0555 WHRI (Angel 1/2): Alive Today. See S 1200.

Saturdays

0500 USA, KWHR Naalehu HI: DXing with Cumbre. See S 0200.
0500 WHRI (Angel 1/2): DXing with Cumbre. See S 0330.
0530 Spain, R Exterior de Espana: Spanish Music. See T 0030.
0530 USA, KWHR Naalehu HI: Remnant Church of God. See M 0100.
0530 WHRI (Angel 1): Music. See S 0200.
0530 WHRI (Angel 2): Music. See S 0200.
0535 Spain, R Exterior de Espana: Press Review. See T 0033.
0540 Spain, R Exterior de Espana: Review of the Arts. See A 0040.
0551 Spain, R Exterior de Espana: Spanish Course by Radio. See T 0048.

Hauser's Highlights
CZECH REPUBLIC: R Prague

Z-96, 100 kW, Eng to N America

2230-2257	9430, 11600
0000-0027	5930, 7345
0100-0127	6200, 7345
0300-0327	5930, 7345

(via *BC-DX*)

Hauser's Highlights
DENMARK: R. Denmark via Norway

Z-96 English to N. America
15 minutes monthly on 1st Sun and UT Mon (e.g., June 2-3)

1338	15340
1438	15340
1538	11840
1638	11840, 15340
2138	9590
2238	11840
2338	9485
0038	7465
0138	7465, 9560
0238	7465, 9560
0338	7465
0438	7465

(Erik Køie, R. Denmark via *BC-DX*)

FREQUENCIES

0600-0700	Australia, Radio	9860pa	11880pa	11910pa	13605as
		15240pa	15365pa	15415as	15510as
		15530as	17715as	17795pa	
0600-0700 vl	Australia, VL8A ALice Spg	2310do			
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0630	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	Canada, R Canada Intl	6050eu	6150eu	9740eu	9760eu
		11905eu			
0600-0700	Costa Rica,RF Peace Intl	6205am	7385am		
0600-0700	Cuba, Radio Havana	9505na			
0600-0700	Ecuador, HCJB	9745am	21455am		
0600-0650	Germany, Deutsche Welle	11915af	13790af	15185af	15225af
		17875af			
0600-0615	Ghana, Ghana Broadc Corp	3316do	4915do		
0600-0700 vl	Italy, IRRS	3985va			
0600-0700	Japan, NHK/Radio	11725as	11850au	17810as	
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Wings of Hope	9960va			
0600-0700 vl	Liberia, Radio ELBC	7275do			
0600-0700	Liberia, Radio ELWA	4760do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au	
0600-0700	New Zealand, R NZ Intl	9570pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4990do		
0600-0700	Nigeria, Voice of	7255af			
0600-0700	North Korea, R Pyongyang	15180as	15230as		
0600-0630 s	Norway, Radio Norway Intl	7180au	7295af	9590au	
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0700	Russia,Voice of Russia WS	12010na	12040na	12050na	13645na
		13665na	15470as	15490va	15490va
		15560va	15580na	17665va	
0600-0700	S Africa, Trans World R	11730af			
0600-0630	Slovakia, Adv World Radio	13715af			
0600-0700	Slovakia, Adv World Radio	5905am			
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0630	Switzerland, Swiss R Intl	9885af	11860af	13635af	
0600-0700	United Kingdom, BBC WS	3955eu	5975va	6005af	6175va
		6195eu	7145pa	7160af	9410va
		9600af	9640va	9740as	11760va
		11780eu	11940af	11955as	12095va
		15070va	15280as	15310as	15360va
	15420af	15575va	17640af	17790as	
	17885af				
0600-0700	USA, KAIJ Dallas TX	5810am	9815am		
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, Voice of America	6035af	6140va	7170va	7285af
		11805va	11950af	11965va	12080af
		15205va			
0600-0630	USA, Voice of America	6080af	9435af		
0600-0700	USA, WEWN Birmingham AL	7425na			
0600-0700	USA, WHRI Noblesville IN	5760am	7315am		
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WWCR Nashville TN	3315am	5065am	5935am	
0600-0700	USA, WYFR Okeechobee FL	5985eu	7355eu	9985af	13695af
0600-0645	Vatican State, Vatican R	4005eu	5880eu	7250eu	9645eu
0600-0700	Yemen, Yemeni Rep Radio	9780as			
0600-0700	Zambia, Christian Voice	6065af			
0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0603-0610 mtwhf	Croatia, Croatian Radio	5920eu	7370eu	9830eu	13830eu
0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
		11730af			
0615-0630	Switzerland, Swiss R Intl	6165eu	9535eu		
0630-0655	Austria, R Austria Intl	6015na			
0630-0700	Belgium, R Vlaanderen Int	5985eu	9925au		
0630-0700 as	USA, Voice of America	6080af			
0630-0658	Vatican State, Vatican R	11625af	13765af	15570af	
0638-0655 1st m	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0645-0655 as	Monaco, Trans World Radio	7115eu			
0645-0700	Romania, R Romania Intl	15250pa	15405pa	17720pa	17805pa
0655-0655 mtwhf	Monaco, Trans World Radio	7115eu			

SELECTED PROGRAMS

Sundays

0600 USA, KWHR Naalehu HI: New Testament Studies. Joseph Sorrell.
0600 WHRI (Angel 1/2): The Call to Worship. Services from Zion Chapel, Holland, Michigan.
0615 USA, KWHR Naalehu HI: A Study in God's Word. Hezakiah Smith reads Scripture from North Carolina.
0630 USA, KWHR Naalehu HI: Eternal Good News. Germaine Lockwood teaches from the Old Testament.
0630 WHRI (Angel 1/2): The Banner of Truth Broadcast. Sponsored by the Free Reformed Churches of North America.
0635 Belgium, R Vlaanderen Intl: Radio World. Updates to international broadcasting schedules.
0645 Belgium, R Vlaanderen Intl: PO Box 26. Listener letters are read and answered in this mailbox program.
0645 WHRI (Angel 1/2): From the Bible. Insight on life and its meaning in today's world with Terry Rousseau.

Mondays

0600 USA, KWHR Naalehu HI: World Harvest. Steve Sumrall.
0600 WHRI (Angel 1/2): The Radio Bible Hour. Dr. J. Harold Smith has been preaching on the radio since 1935.
0615 WHRI (Angel 1/2): Faith Seminar of the Air. Kenneth Hagin evangelizes.
0630 WHRI (Angel 1/2): Listen to Jesus. Clinton and Sarah Outerbach from The Redeeming Love Christian Center of Nanuet, NY.
0635 Belgium, R Vlaanderen Intl: Press Review. Stories on the front pages of the day's papers.
0641 Belgium, R Vlaanderen Intl: Belgium Today. Current affairs in Belgium.
0645 Belgium, R Vlaanderen Intl: The Arts. Cultural events in the news.
0645 WHRI (Angel 1/2): The Voice of Praise. Pastor Kenneth Ivey teaches from the word of God.
0651 Belgium, R Vlaanderen Intl: Tourism. Take an audio tour of the sights and sounds of Belgium.

Tuesdays

0600 USA, KWHR Naalehu HI: World Harvest. See M 0600.
0600 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.
0615 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
0630 WHRI (Angel 1/2): Listen to Jesus. See M 0630.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0639 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0645 WHRI (Angel 1/2): The Voice of Praise. See M 0645.
0646 Belgium, R Vlaanderen Intl: Focus on Europe. See M 2344.
0650 Belgium, R Vlaanderen Intl: Sports Report. See M 2349.

Wednesdays

0600 USA, KWHR Naalehu HI: World Harvest. See M 0600.
0600 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.
0615 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
0630 WHRI (Angel 1/2): Listen to Jesus. See M 0630.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0639 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0645 WHRI (Angel 1/2): The Voice of Praise. See M 0645.
0646 Belgium, R Vlaanderen Intl: Living in Belgium. See T 2345.
0650 Belgium, R Vlaanderen Intl: Green Society. See T 2349.

Thursdays

0600 USA, KWHR Naalehu HI: World Harvest. See M 0600.
0600 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.
0615 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
0630 WHRI (Angel 1/2): Listen to Jesus. See M 0630.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0639 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0645 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
0645 WHRI (Angel 1/2): The Voice of Praise. See M 0645.
0649 Belgium, R Vlaanderen Intl: Around Town. See W 2349.

Fridays

0600 USA, KWHR Naalehu HI: World Harvest. See M 0600.
0600 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.
0615 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
0630 WHRI (Angel 1/2): Listen to Jesus. See M 0630.
0636 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0641 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0645 WHRI (Angel 1/2): The Voice of Praise. See M 0645.
0646 Belgium, R Vlaanderen Intl: International Report. See H 2343.
0649 Belgium, R Vlaanderen Intl: Economics. See H 2349.

Saturdays

0600 USA, KWHR Naalehu HI: Faith Christian Church. Paul Shirek.
0600 WHRI (Angel 1): Turn Your Radio On. See M 0400.
0600 WHRI (Angel 2): The Call to Worship. See S 0600.
0615 USA, KWHR Naalehu HI: Music. See M 0130.
0630 USA, KWHR Naalehu HI: The Word of God Broadcast. Sister Polly preaches from the Knoxville House of Faith in Tennessee.
0630 WHRI (Angel 2): Music. See S 0200.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0640 Belgium, R Vlaanderen Intl: Music from Flanders. The weekly concert.

HAUSER'S HIGHLIGHTS
PHILIPPINES: FEBC, MANILA

News and Public Affairs

Daily	0130 on 15450	*World News & Sports*
M-F	1030 on 11635	*Asian News Update*
M-F	1335 on 11995	*News from Philippines*
Fri	0935, 1540,	
Sat	1445,	
Sun	1430	*Far East Forum*

(via Gigi Lytle)

FREQUENCIES

0700-0800	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15415as	15530as
		17715pa			
0700-0730	Australia, Radio	11880as	13605as	15245as	15365as
0700-0800 vl	Australia, VL8A Alice Spg	4835do			
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	5930eu	7345eu		
0700-0800	Ecuador, HCJB	5900pa	11615eu	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		
0700-0730 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, Wings of Hope	9960va			
0700-0800 vl	Liberia, Radio ELBC	7275do			
0700-0800	Liberia, Radio ELWA	4760do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	9750as	15295au		
0700-0710	Malaysia, Voice of	6175as			
0700-0800	Monaco, Trans World Radio	7115eu			
0700-0715	New Zealand, R NZ Intl	9570pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0800 vl	Palau, KHBN/Voice of Hope	9965as			
0700-0745	Romania, R Romania Intl	15250pa	15405pa	17720pa	17805pa
0700-0800	Russia,Voice of Russia WS	15470as	15560va	17570va	17665as
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	5975va	6175va	6190af
		6195eu	7145va	7325eu	9410eu
		9600af	9640va	9740as	11760as
		11940af	11955as	12095va	15070va
		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	9815am		
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KWHR Naalehu HI	9930as			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	7425na		
0700-0800	USA, WHRI Noblesville IN	5760am	7315am		
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	3315am	5065am	5935am	
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985af		
0700-0800	USA, WYFR Okeechobee FL	13695na			
0700-0800	Zambia, Christian Voice	6065af			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0703-0710 as	Croatia, Croatian Radio	5950eu	7370eu	9830eu	13830eu
0705-0800	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0710-0800 vl	Papua New Guinea, NBC	4890do			
0716-0800	New Zealand, R NZ Intl	6100pa			
0730-0755	Austria, R Austria Intl	6155eu	13730eu	15410me	17870me
0730-0800	Georgia, Georgian Radio	11910eu			
0730-0745 s	Greece, Voice of	9375eu	9425eu	11645au	
0730-0735	India, All India Radio	15185do	15260do		
0730-0800 vl/as	Italy, IRRS	7125va			
0730-0800	Netherlands, Radio	9720au	11895pa		
0738-0755 1st m	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	9375eu	9425eu	11645au	
0755-0800	Guam, AWR/KTWR	15200as			

0800 UTC

0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15530as	17715pa
		21725as			
0800-0900 vl	Australia, VL8A Alice Spg	2310do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0900 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Australia,DefenseForces R	15607af	18194af		
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	China, China Radio Intl	11755pa	15440pa	17690pa	
0800-0900	Costa Rica,RF Peace Intl	6205am	7385am		
0800-0830	Ecuador, HCJB	11615eu			
0800-0900	Ecuador, HCJB	5900pa	21455au		
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Indonesia, Voice of	9525as			
0800-0900 vl/as	Italy, IRRS	7125va			
0800-0900 mtwhf	Italy, IRRS	3985va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Wings of Hope	9960va			
0800-0830	Liberia, Radio ELWA	4760do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0820 mtwhf	Monaco, Trans World Radio	7115eu			
0800-0805 a	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9720au	11895pa		
0800-0900	New Zealand, R NZ Intl	6100pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 s	Norway, Radio Norway Intl	17860au			
0800-0850	Pakistan, Radio	15470eu	17895eu		
0800-0900 vl	Palau, KHBN/Voice of Hope	9730as	9955as	9965as	15140as
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	9835va	11800va	12025as	15470as
		15560va	15580as		
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670eu		
0800-0900	United Kingdom, BBC WS	6190af	6195va	9410eu	9600af
		9740as	9805va	11760as	11940af
		11955as	15070af	15280as	15310as
		15400va	15575me	17640va	17790as
		17830af	17885af		
0800-0815	United Kingdom, BBC WS	3955eu	7145va	12095eu	
0800-0900	USA, KAIJ Dallas TX	5810am	9815am		
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	9425pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	7425na		
0800-0900	USA, WHRI Noblesville IN	5760am	7315am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5065am	5935am	7435am	
0800-0900	Zambia, Christian Voice	6065af			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0803-0810	Croatia, Croatian Radio	5920eu	7370eu	9830eu	13830eu
0805-0835 mtwhf	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900	Chile, Radio Esperanza	6090sa			
0830-0900	Georgia, Georgian Radio	11910me			
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900	Netherlands, Radio	9720au	11895pa	13700pa	
0830-0900	Slovakia, R Slovakia Intl	11990au	15460au	17550au	
0838-0855 1st m	Denmark, R Denmark Intl	15220va	17860va		
0855-0900	Guam, TWR/KTWR	11830pa			

HAUSER'S HIGHLIGHTS

TURKEY: VOICE OF TURKEY, ANKARA

Z-96 in English

To	kHz	Time	Site	kW	Azimuth
Eu	9445	1230-1330	Çak	500	310
As	9630	1230-1330	Emr	500	90
Eu	9445	1830-1930	Çak	500	310
Eu	9535	1830-1930	Emr	500 SSB	335
Eu	7280	2200-2300	Çak	250	310
NAm	9655	2200-2300	Emr	500	290
Au	9560	2200-2300	Emr	500	105
NAm	11810	2300-2400	Emr	500 SSB	290
NAm	9655	0300-0400	Emr	500	290
Af	9685	0300-0400	Çak	250	152
Au	11705	0300-0400	Emr	500	105

Çakirlar 32 E 40 29 N 58 Emirler 32 E 51 39 N 29

(Vural Tekeli, TRT, via *R.I.B.*)

FREQUENCIES

0900-1000	Australia, Radio	5995as	7240as	9510as	9580pa
		9860pa	13605as	21725as	
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	4910do			
0900-1000	Australia,DefenseForces R	15607af	18194af		
0900-0930 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15545af	17595af	
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	17690pa	
0900-1000	Costa Rica,RF Peace Intl	6205am	7385am		
0900-0930	Czech Rep, Radio Prague	15640pa	17485af		
0900-1000	Ecuador, HCJB	5900pa	21455au		
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160as	9565af	12055as	15225af
		15410af	17800af	21600af	21680as
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000	Guam, TWR/KTWR	11830pa			
0900-1000 vl/as	Italy, IRRS	7125va			
0900-0930 mtwhf	Italy, IRRS	3985va			
0900-1000	Japan, NHK/Radio	9610as	11850au	15190as	
0900-0948 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	6280va			
0900-1000	Lebanon, Wings of Hope	9960va			
0900-1000	Malaysia, Radio	7295do			
0900-0930	Netherlands, Radio	9720au	13700pa		
0900-1000	New Zealand, R NZ Intl	6100pa			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia,Voice of Russia WS	9835va	11800va	12025as	15580as
0900-0930	Switzerland, Swiss R Intl	9885pa	13685pa	17515pa	
0900-1000	United Kingdom, BBC WS	6190af	6195va	9410eu	9740as
		11750as	11940af	12095eu	15070va
		15190sa	15280va	15400va	15575va
		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	9815am		
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13615pa
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na		
0900-1000	USA, WHRI Noblesville IN	5760am	7315am		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000	USA, WWCR Nashville TN	5065am	5935am	7435am	
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-0955 mtwhfa	Austria, R Austria Intl	6155eu	13730eu	15450as	17870au
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Mongolia, R Ulan Bator	11850as	12085as		
0930-1000	Netherlands, Radio	7260pa	9720au	9810pa	11895pa
		13700pa			
0930-1000	Philippines, FEBC/R Intl	11635as			
0938-0955 1st m	Denmark, R Denmark Intl	13800va	17860va		

1000 UTC

1000-1100	Australia, Radio	5995as	7240as	9510as	9580pa
		9860pa	13605as	15170as	21725as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	4910do			
1000-1100	Australia,DefenseForces R	13525as			
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		
1000-1100	Costa Rica,RF Peace Intl	6205am	7385am		
1000-1100	Ecuador, HCJB	5900pa	21455au		
1000-1100 as	Eqt Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Guam, AWR/KSDA	9370as			
1000-1100	India, All India Radio	13700as	15050as	17387au	17890as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1100 vl/as	Italy, IRRS	7125va			
1000-1100	Lebanon, Voice of Hope	6280va			
1000-1100	Lebanon, Wings of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1100	Netherlands, Radio	7260as	9720pa	9810pa	
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100	Nigeria, Voice of	7255af			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia,Voice of Russia WS	9835va	11655as	11800va	12025as
		15520as	17560as	17775as	17870va
1000-1100	Singapore, SBC Radio One	6155do			
1000-1030	Switzerland, Swiss R Intl	6165eu	9535eu		
1000-1100	United Kingdom, BBC WS	5965na	6190af	6195va	9410eu
		9740as	11750as	11760as	11940af
		12095eu	15070va	15190sa	15280va
		15310as	15400af	15575va	17640va
		17705va	17790as	17830va	17885af
1000-1100	USA, KAIJ Dallas TX	5810am	9815am		
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13840as
1000-1100	USA, Voice of America	5985va	6165am	7405am	9590am
		11720va	15425va		
1000-1100	USA, WGTG McCaysville GA	9400am			
1000-1100	USA, WHRI Noblesville IN	6040am	6185am		
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5065am	5935am	9475am	15685am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	7360na	9840as	12020as	15010as
1000-1100	Zambia, Christian Voice	6065af			
1030-1055	Austria, R Austria Intl	15450as	17870au		
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100	Guam, AWR/KSDA	9530as			
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1038-1055 1st m	Denmark, R Denmark Intl	9480eu	15220na		

HAUSER'S HIGHLIGHTS
ITALY: INTERNATIONAL RADIO RELAY SERVICE

IRRS for Z-96:

0500-0530	Sat/Sun	7125
0500-0930	M-F	3985
0530-0730	daily	3985
0730-1330	daily	7125
1330-2000	daily	3985
2000-2200	Fri-Sun	3980

(Benelux DX Club via BDXC)

RADIO JUGOSLAVIJA

HAUSER'S HIGHLIGHTS
SERBIA: R. YUGOSLAVIA

Z-96 in English

0000	Eu & NAm	7115 (not Sun)
0430	Eu & WNAm	7130
1830	Af	9720
	Eu	6100
2030	Au	7230
2100	Eu	6100, 6185

(Dr Jürgen Kubiak, *BC-DX*)

Frequencies

1100-1200	Australia, Radio	5995as	7240as	9510pa	9580pa
		9615as	9860pa	13605as	15170as
		15530as	15565as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	4910do			
1100-1200	Australia,DefenseForces R	13525as			
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	5900pa	12005va	21455au	
1100-1200	Ecuador, HCJB	15115am	21455am		
1100-1200 as	Eqt Guinea, R East Africa	15186af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17715af	17800af
		17860af	21600af		
1100-1200	Iraq, Radio Iraq Intl	13680eu			
1100-1200 vl/as	Italy, IRRS	7125va			
1100-1200	Japan, NHK/Radio	6120na	9610as	15350as	
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1200	New Zealand, R NZ Intl	6100pa			
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na	
1100-1115	Pakistan, Radio	15470as	17895as		
1100-1200 vl	Palau, KHBN/Voice of Hope	9730as	9985as	15140as	
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Russia,Voice of Russia WS	4740as	7150as	11655as	15460as
		15520as	15560as	16560as	17755as
		17775as	17870as		
1100-1200	Singapore, SBC Radio One	6155do			
1100-1200	Singapore,R Singapore Int	6015as			
1100-1130	Sri Lanka, Sri Lanka BC	11835as	15120as	17850au	
1100-1130	Switzerland, Swiss R Intl	13635as	15415as	17515as	
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
		15070va	15220va	15310as	15575va
		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	7395ca	9355as	9430au
1100-1200	USA, Voice of America	5985va	6110va	6165am	7405am
		9590am	9645va	9760va	11720va
		15160va	15425va		
1100-1200	USA, WEWN Birmingham AL	7425na			
1100-1200	USA, WGTG McCaysville GA	9400am			
1100-1200	USA, WHRI Noblesville IN	6040am	6185am		
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1100-1200	USA, WYFR Okeechobee FL	5950na	11830na		
1100-1200	Zambia, Christian Voice	6065af			
1130-1155	Austria, R Austria Intl	13730na			
1130-1200	Bulgaria, Radio	13790as			
1130-1200 vl	China, China Radio Intl	8660as	11445as	11700as	
1130-1200	Finland, YLE/R Finland	11900na	15400na		
1130-1200	Iran, VOIRI	11745as	11790as	11875me	11930me
		15260af	17750me		
1130-1200 a	Monaco, Trans World Radio	7115eu			
1130-1155 s	Monaco, Trans World Radio	7115eu			
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	7190eu		
1130-1200	Sweden, Radio	11650na	15240na		
1130-1159	Vatican State, Vatican R	15210va	15570va	17550va	
1135-1140	India, All India Radio	9595do	11620do	11710do	15185do
1138-1155 1st m	Denmark, R Denmark Intl	7295eu	17740af		

Selected Programs

Sundays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 USA, KWHR Naalehu HI: The Water of Life Broadcast. See S 0100.
1100 WHRI (Angel 1/2): Breakthrough. Rod Parsley conducts services from the World Harvest Church in Columbus, OH.
1130 New Zealand, R NZ Intl: Good Night from Wellington.
1130 Sweden, Radio: In Touch with Stockholm (biweekly). A mailbag program with on-the-air link-ups.
1130 Sweden, Radio: Sounds Nordic (biweekly). The very latest and best in Swedish rock and pop music, interviews with the stars, and what's happening on the youth scene.

Mondays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 USA, KWHR Naalehu HI: Biblical Studies Institute. Bob Tref evangelizes from Rapid City, South Dakota.
1100 WHRI (Angel 1/2): Music. See S 0200.
1130 New Zealand, R NZ Intl: Faith and Works.
1130 Sweden, Radio: Sixty Degrees North. Reports, interviews and analysis from Stockholm and other Nordic capitals.
1130 USA, KWHR Naalehu HI: Faith Seminar of the Air. Kenneth Hagin evangelizes.
1130 WHRI (Angel 1/2): The Hour of Courage. See S 0400.
1145 USA, KWHR Naalehu HI: Listen to Jesus. Clinton and Sarah Outerbach from The Redeeming Love Christian Center of Nanuet, NY.
1146 Sweden, Radio: SportScan. A weekly review of all the news in sports hosted by Keith Foster.

Tuesdays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 USA, KWHR Naalehu HI: Modern Manna. Danny Vierra tells you how to evaluate your life and make changes for better health.
1100 WHRI (Angel 1/2): Music. See S 0200.
1130 New Zealand, R NZ Intl: On the March.
1130 Sweden, Radio: Sixty Degrees North. See M 1130.
1130 USA, KWHR Naalehu HI: Faith Seminar of the Air. See M 1130.
1130 WHRI (Angel 1/2): The Hour of Courage. See S 0400.
1141 Sweden, Radio: MediaScan (1/3). Satellite news 85%; medium wave and shortwave news 15%.
1145 USA, KWHR Naalehu HI: Listen to Jesus. See M 1145.

Wednesdays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 USA, KWHR Naalehu HI: Biblical Studies Institute. See M 1100.
1100 WHRI (Angel 1/2): Music. See S 0200.
1130 New Zealand, R NZ Intl: Orient Express.
1130 Sweden, Radio: Sixty Degrees North. See M 1130.
1130 USA, KWHR Naalehu HI: Faith Seminar of the Air. See M 1130.
1130 WHRI (Angel 1/2): The Hour of Courage. See S 0400.
1142 Sweden, Radio: Money Matters. Al Simon presents news about the Swedish economy, business, consumer affairs, and Sweden's EU membership.
1145 USA, KWHR Naalehu HI: Listen to Jesus. See M 1145.
1154 Radio Netherlands: Documentary. Can White Folks Play the Blues? (5th). Does Helen Barrington answer the question in this report?
1154 Radio Netherlands: Documentary. Five Years of Yugoslavia (19th,26th). See F 1454.
1154 Radio Netherlands: Documentary. Year of the African Child (12th). See A 2354.

Thursdays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 USA, KWHR Naalehu HI: Modern Manna. See T 1100.
1100 WHRI (Angel 1/2): Music. See S 0200.
1130 New Zealand, R NZ Intl: Trading Post.
1130 Sweden, Radio: Sixty Degrees North. See M 1130.
1130 USA, KWHR Naalehu HI: Faith Seminar of the Air. See M 1130.
1130 WHRI (Angel 1/2): The Hour of Courage. See S 0400.
1143 Sweden, Radio: GreenScan. Environmental concerns and solutions.
1145 New Zealand, R NZ Intl: Trade Winds.
1145 USA, KWHR Naalehu HI: Listen to Jesus. See M 1145.
1146 Sweden, Radio: Horizon (4/5). Science and technology in Sweden.

Fridays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 USA, KWHR Naalehu HI: Biblical Studies Institute. See M 1100.
1100 WHRI (Angel 1/2): Music. See S 0200.
1130 New Zealand, R NZ Intl: Dateline Pacific.
1130 Sweden, Radio: Sixty Degrees North. See M 1130.
1130 USA, KWHR Naalehu HI: Faith Seminar of the Air. See M 1130.
1130 WHRI (Angel 1/2): The Hour of Courage. See S 0400.
1135 Sweden, Radio: A Review of the Newsweek. The major stories of the week, both from Sweden and their Nordic neighbors.

Saturdays

1100 New Zealand, R NZ Intl: Newsdesk (BBC).
1100 WHRI (Angel 1): Music. See S 0200.
1107 WHRI (Angel 2): For the People (repeat). See T 0206.
1130 New Zealand, R NZ Intl: Good Night from Wellington.
1130 Sweden, Radio: Spectrum (1). See S 0030.

THANK YOU ...

Additional contributors to this month's Shortwave Guide:

Jerry E. Anderson, San Antonio, TX; John Babbis, Silver Spring, MD; Brian Bagwell, St. Louis, MO; Patrick J. Barry, Mission Viejo, CA; Capt. Ken Barry, Blackpool, England, Bob Fraser, Cohasset, MA; Frank Hillton, Charleston, SC; Rev. Michael G. Mayer, Dover, DE; Jim Moats, Ravenna, OH; S.W. Nelson, Lebanon, MO; Giovanni Serra, Rome, Italy; Robert E. Thomas II, Bridgeport, CT; Larry & Loyd Van Horn, Brasstown, NC; John F. Wilson, Hockessin, DE; BBCMS; BBC *World Media*; BBC *Summary of World Broadcasts*; Internet Shortwave Newsgroups.

Frequencies

1200-1300	Australia, Radio	5995pa	6060pa	6080pa	7260as	
	9560as 9580pa	9615as	11800pa	15565as		
1200-1300	Brazil, Radio Bras	15445na				
1200-1230	Bulgaria, Radio	13790as				
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				
1200-1300	Canada, R Canada Intl	9640am	11815am	13650am		
1200-1300	China, China Radio Intl	7385na	7410as	9715as	11660as	
		11795pa				
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	6200am	7385am	15050am		
1200-1300	Ecuador, HCJB	12005am	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	13625am	15155eu	
		15195eu	15325af	15530ca	17575am	
1200-1230	Iran, VOIRI	11745as	11790as	11875me	11930me	
		15260af	17750me			
1200-1300	Iraq, Radio Iraq Intl	13680eu				
1200-1300 vl/as	Italy, IRRS	7125va				
1200-1300	Jordan, Radio	11940va	11970va			
1200-1300	Malaysia, Radio	7295do				
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do				
1200-1230	Mongolia, R Ulan Bator	9475as	12085as			
1200-1250	Myanmar, Voice of	5990do				
1200-1300	Netherlands, Radio	6045eu	7190eu			
1200-1206	New Zealand, R NZ Intl	6100pa				
1200-1230 s	Norway, Radio Norway Intl	9590eu	13800eu	15305eu		
1200-1300 vl	Palau, KHBN/Voice of Hope	9730as	9955as	9965as	9985as	
		15140as				
1200-1255	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu	
		11815eu				
1200-1300	Russia,Voice of Russia WS	4740as	4975as	11655as	11785as	
		15110as	15230as	15435as	15510as	
		15520as	17755as	17775as	17870as	
1200-1300	Singapore, SBC Radio One	6155do				
1200-1300	Singapore,R Singapore Int	6015as				
1200-1300	South Korea, R Korea Intl	7285va				
1200-1300	Switzerland, Swiss R Intl	6165eu	9535eu			
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	15070va	15220va	15310as	15575va	
	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, WGTG McCaysville GA	9400am				
1200-1300	USA, WHRI Noblesville IN	6040am	6185am			
1200-1300	USA, WJCR Upton KY	7490na	13595na			
1200-1300 s	USA, WRMI/R Miami Intl	9955am				
1200-1300	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am	
1200-1300	USA, WYFR Okeechobee FL	5950na	6015na	11830na	17750na	
1200-1230	Uzbekistan, R Tashkent	7190as	9715as	15295as		
1200-1300	Zambia, Christian Voice	6065af				
1207-1300 occsnal	New Zealand, R NZ Intl	6100pa				
1215-1300	Egypt, Radio Cairo	17595as				
1230-1300	Bangladesh, Radio	7185as	9648as			
1230-1255 s	Belgium, R Vlaanderen Int	13605na	15540na			
1230-1300	Bulgaria, Radio	15620as				
1230-1300	Canada, R Canada Intl	6150as	11730as			
1230-1300 mtwhf	Finland, YLE/R Finland	11900na	15400na			
1230-1235	India, All India Radio	4860do	6185do	17865do		
1230-1300 w	Indonesia, RRI Sorong	4875do				
1230-1300	Serbia, Radio Yugoslavia	11835au				
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670as		
1230-1300	Sweden, Radio	13740as	15240pa			
1230-1300	Vietnam, Voice of	7360as	9840as	12030as		
1238-1255 1st m	Denmark, R Denmark Intl	9590va	11840va	13800va	15305va	
1240-1250	Greece, Voice of	15650af				

Selected Programs

Sundays

1200 WHRI (Angel 1): Alive Today. D. Johnson.
1200 WHRI (Angel 2): In Touch. The ministry of Charles Stanley.
1206 Canada, RCI: Quirks and Quarks. Updating what's new and what's next in science.
1210 China R Intl: News about China. See S 0010.
1213 China R Intl: Sports Beat. News from sports.
1220 China R Intl: China Snapshots. A tour around cities and town in China with focus on local flavor and customs.
1225 China R Intl: In the Third World. A report on projects in developing countries.
1230 Sweden, Radio: In Touch with Stockholm (biweekly). See S 1130.
1230 Sweden, Radio: Sounds Nordic (biweekly). See S 1130.
1230 WHRI (Angel 1): Music. See S 0200.
1235 Belgium, R Vlaanderen Intl: Radio World. See S 0635.
1235 China R Intl: Song of the Week. A selection of the new pop music in China.
1237 Canada, RCI (Asia): The Mailbag. Listener letters, musical selections, and happenings in Canada.
1245 Belgium, R Vlaanderen Intl: PO Box 26. See S 0645.
1245 China R Intl: Listeners' Letterbox. Listener letters and information about China.

Mondays

1200 WHRI (Angel 2): The Voice of Praise. See M 0645.
1207 Canada, RCI: Double Exposure. See S 0205.
1210 China R Intl: News about China. See S 0010.
1215 WHRI (Angel 1/2): Reach Out. Pastor Jerry Lynn, Calvary Chapel of Albany, New York with Bible teaching.
1219 China R Intl: Current Affairs. Happenings in China.
1230 China R Intl: Press Clippings. Items from the Chinese press.
1230 Sweden, Radio: Sixty Degrees North. See M 1130.
1230 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
1234 Canada, RCI: The Royal Canadian Air Farce. See S 0232.
1234 China R Intl: China's Open Windows. Focus on a particular area of investment in China.
1239 China R Intl: Investing in China. A report on an aspect of foreign investment in Chinese industry.
1241 Canada, RCI (Asia): Spectrum. Current affairs, features, and a business report.
1245 China R Intl: Idioms and Their Stories. A regular feature for students studying Chinese.
1245 WHRI (Angel 1): Music. See S 0200.
1248 Sweden, Radio: SportScan. See M 1146.

Tuesdays

1200 WHRI (Angel 2): The Voice of Praise. See M 0645.
1210 Canada, RCI: 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.
1210 China R Intl: News about China. See S 0010.
1215 China R Intl: News Analysis. Background on current news events.
1215 WHRI (Angel 1/2): Reach Out. See M 1215.
1219 China R Intl: Current Affairs. See M 1219.
1230 Sweden, Radio: Sixty Degrees North. See M 1130.
1230 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
1233 China R Intl: Press Clippings. See M 1230.
1238 China R Intl: Orient Arena. Sporting events; personalities.
1241 Canada, RCI (Asia): Spectrum. See M 1241.
1241 Sweden, Radio: MediaScan (1/3). See T 1141.
1245 China R Intl: Listeners' Letterbox. See S 1245.
1245 WHRI (Angel 1): Music. See S 0200.

Wednesdays

1200 WHRI (Angel 2): The Voice of Praise. See M 0645.
1210 Canada, RCI: As It Happens. See T 1210.
1210 China R Intl: News about China. See S 0010.
1215 WHRI (Angel 1/2): Reach Out. See M 1215.
1218 China R Intl: Current Affairs. See M 1219.
1230 Sweden, Radio: Sixty Degrees North. See M 1130.
1230 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
1233 China R Intl: Profile. The activities of an interesting individual are examined.
1240 China R Intl: Learn to Speak Chinese. Chinese language lessons for English speakers.
1241 Canada, RCI (Asia): Spectrum. See M 1241.
1242 Sweden, Radio: Money Matters. See W 1142.
1245 WHRI (Angel 1): Music. See S 0200.

Thursdays

1200 WHRI (Angel 2): The Voice of Praise. See M 0645.
1210 Canada, RCI: As It Happens. See T 1210.
1210 China R Intl: News about China. See S 0010.
1215 China R Intl: News Analysis. See T 1215.
1215 WHRI (Angel 1/2): Reach Out. See M 1215.
1219 China R Intl: Current Affairs. See M 1219.
1230 Sweden, Radio: Sixty Degrees North. See M 1130.
1230 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
1234 China R Intl: Press Clippings. See M 1230.
1238 China R Intl: Focus. Looking at an issue of significance to China's development.
1241 Canada, RCI (Asia): Spectrum. See M 1241.
1243 Sweden, Radio: GreenScan. See H 1143.
1244 China R Intl: Cultural Spectrum. The rich cultural heritage of China in literature, music and art.
1245 WHRI (Angel 1): Music. See S 0200.
1246 Sweden, Radio: Horizon (4/5). See H 1146.

Fridays

1200 WHRI (Angel 2): The Voice of Praise. See M 0645.
1210 Canada, RCI: As It Happens. See T 1210.
1210 China R Intl: News about China. See S 0010.
1215 WHRI (Angel 1/2): Reach Out. See M 1215.
1220 China R Intl: Current Affairs. See M 1219.
1230 Sweden, Radio: Sixty Degrees North. See M 1130.
1230 WHRI (Angel 1/2): Faith Seminar of the Air. See M 0615.
1234 China R Intl: Life in China. Everyday living.
1235 Sweden, Radio: A Review of the Newsweek. See F 1135.
1241 Canada, RCI (Asia): Spectrum. See M 1241.
1245 WHRI (Angel 1): Music. See S 0200.
1246 China R Intl: Global Review. News about developing nations.
1254 Radio Netherlands: Documentary. Can White Folks Play the Blues? (7th). See W 1154.
1254 Radio Netherlands: Documentary. Five Years of Yugoslavia (21st,28th). See F 1454.
1254 Radio Netherlands: Documentary. Year of the African Child (14th). See A 2354.

Saturdays

1200 WHRI (Angel 1): Music. See S 0200.
1200 WHRI (Angel 2): The Gospel Trumpet Broadcast. From the 1st Netherlands Reformed Church in Grand Rapids, Michigan.
1210 Canada, RCI: As It Happens. See T 1210.
1210 China R Intl: News about China. See S 0010.
1215 USA, KWHR Naalehu HI: Music. See M 0130.
1215 WHRI (Angel 2): Music. See S 0200.
1220 China R Intl: Travel Talk. See S 0020.
1229 China R Intl: The Cooking Show. See S 0029.
1230 Sweden, Radio: Spectrum (1). See S 0030.
1230 USA, KWHR Naalehu HI: Day of Decision. See S 1430.
1230 WHRI (Angel 2): The Voice of Salvation. See S 1530.
1235 China R Intl: Music from China. See S 0035.
1236 Canada, RCI (Asia): Earth Watch. See S 0131.

Frequencies

1300-1400	Australia, Radio	5995pa	7240as	9560pa	9580pa
		9610as	11800pa		
1300-1330	Australia, Radio	6060pa	6080as	9510pa	
1300-1330 mtwhfa	Belgium, R Vlaanderen Int	13605na	15540na		
1300-1320	Brazil, Radio Bras	15445na			
1300-1330	Bulgaria, Radio	15620as			
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	9640na	11855na		
1300-1400	China, China Radio Intl	7385na	9715as	11660pa	
1300-1330	China, China Radio Intl	7410as			
1300-1400	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1300-1330	Czech Rep, Radio Prague	11660na	17845af		
1300-1400	Ecuador, HCJB	12005am	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			
1300-1330 vl/as	Italy, IRRS	7125va			
1300-1400	Lebanon, Wings of Hope	9960va			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia, RTM Kuching	7160do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1325	Netherlands, Radio	6045eu	7190eu		
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
		15430as			
1300-1330 s	Norway, Radio Norway Intl	13800as	15340na		
1300-1400 vl	Palau, KHBN/Voice of Hope	9730as	9955as	9965as	9985as
		15140as			
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1356	Romania, R Romania Intl	9690eu	11940eu	15365eu	17720eu
1300-1400	Russia,Voice of Russia WS	15460as	15560as	17755as	
1300-1400	Singapore, SBC Radio One	6155do			
1300-1400	Singapore,R Singapore Int	6015as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	13635as	15240as
1300-1400	United Kingdom, BBC WS	5965na	5990as	6190af	6195va
		9410eu	9515va	9590va	9740as
		11750as	11760as	11940af	12095eu
		15070va	15220am	15310as	15420af
		15575va	17640va	17705va	17830af
	17885af	21470af	21660af		
1300-1400	USA, KAIJ Dallas TX	5810am			
1300-1400	USA, KJES Mesquite NM	11715na			
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455na	13625au
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	15105am		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WRNO New Orleans LA	15420am			
1300-1400 a	USA, WVHA Greenbush ME	15745eu			
1300-1400	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1300-1400	USA, WYFR Okeechobee FL	5950na	11830na	13695na	17750na
1300-1400	Zambia, Christian Voice	6065af			
1302-1400	USA, WYFR Okeechobee FL	11550as			
1330-1355	Austria, R Austria Intl	6155eu	13730eu		
1330-1357	Canada, R Canada Intl	6150as	9535as		
1330-1400	Guam, AWR/KSDA	9650as			
1330-1400	India, All India Radio	11620as	13750as		
1330-1400 vl	Italy, IRRS	3985va			
1330-1400	Netherlands, Radio	9895as	13700as	15150as	
1330-1400	Sweden, Radio	9835as	11650na	15240na	
1330-1400	Turkey, Voice of	9445va	9630as		
1330-1355	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1330-1400	Uzbekistan, R Tashkent	7190as	9715as	15295as	
1330-1400	Vietnam, Voice of	7360as	9840as	12030as	
1335-1345	Greece, Voice of	15175na	15650na		
1338-1355 1st m	Denmark, R Denmark Intl	9590va	13800va	15305va	15340va
1345-1400	Vatican State, Vatican R	9500as	11625as	13765pa	

Selected Programs

Sundays

1300 USA, KWHR Naalehu HI: Christ Gospel Broadcast. See S 0030.
1300 WHRI (Angel 1/2): Gospel Crusade Ministries. Scripture teachings by Roger Hedrick and free bible correspondence courses.
1311 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.
1315 USA, KWHR Naalehu HI: From the Bible. Insight on life and its meaning in today's world with Terry Rousseau.
1330 Sweden, Radio: In Touch with Stockholm (biweekly). See S 1130.
1330 Sweden, Radio: Sounds Nordic (biweekly). See S 1130.
1330 USA, KWHR Naalehu HI: Cornerstone Ministries. Dwight Hammond.
1330 WHRI (Angel 1): The Gospel Blessings Broadcast. Glenn McHatten evangelizes.
1330 WHRI (Angel 2): The Banner of Truth Broadcast. See S 0630.
1337 Canada, RCI Montreal: The Mailbag. See S 1237.
1345 WHRI (Angel 1/2): Bible Pathway. Rick Hash with five minutes of Bible readings.
1350 WHRI (Angel 2): Southern Gospel Music. Joe Brashier is both disc jockey and host.

Mondays

1300 USA, KWHR Naalehu HI: Sounds of Praise. A LeSEA Production.
1300 WHRI (Angel 1/2): World Harvest (live). An hour of Christian music and information for WHRI supporters.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. Repeats of the CBC's morning program.
1311 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1315 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
1321 Belgium, R Vlaanderen Intl: Tourism. See M 0651.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Sweden, Radio: Sixty Degrees North. See M 1130.
1340 Canada, RCI Montreal: Spectrum. See M 1241.
1346 Sweden, Radio: SportScan. See M 1146.

Tuesdays

1300 USA, KWHR Naalehu HI: Sounds of Praise. See M 1300.
1300 WHRI (Angel 1/2): World Harvest (live). See M 1300.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1309 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1316 Belgium, R Vlaanderen Intl: Focus on Europe. See M 2344.
1320 Belgium, R Vlaanderen Intl: Sports Report. See M 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Sweden, Radio: Sixty Degrees North. See M 1130.
1340 Canada, RCI Montreal: Spectrum. See M 1241.
1341 Sweden, Radio: MediaScan (1/3). See T 1141.

Wednesdays

1300 USA, KWHR Naalehu HI: Sounds of Praise. See M 1300.
1300 WHRI (Angel 1/2): World Harvest (live). See M 1300.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1309 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1316 Belgium, R Vlaanderen Intl: Living in Belgium. See T 2345.
1320 Belgium, R Vlaanderen Intl: Green Society. See T 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Sweden, Radio: Sixty Degrees North. See M 1130.
1340 Canada, RCI Montreal: Spectrum. See M 1241.
1342 Sweden, Radio: Money Matters. See W 1142.
1354 Radio Netherlands: Documentary. Can White Folks Play the Blues? (5th). See W 1154.
1354 Radio Netherlands: Documentary. Five Years of Yugoslavia (19th,26th). See F 1454.
1354 Radio Netherlands: Documentary. Year of the African Child (12th). See A 2354.

Thursdays

1300 USA, KWHR Naalehu HI: Sounds of Praise. See M 1300.
1300 WHRI (Angel 1/2): World Harvest (live). See M 1300.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1309 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1315 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
1319 Belgium, R Vlaanderen Intl: Around Town. See W 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Sweden, Radio: Sixty Degrees North. See M 1130.
1340 Canada, RCI Montreal: Spectrum. See M 1241.
1343 Sweden, Radio: GreenScan. See H 1143.
1346 Sweden, Radio: Horizon (4/5). See H 1146.

Fridays

1300 USA, KWHR Naalehu HI: Sounds of Praise. See M 1300.
1300 WHRI (Angel 1/2): World Harvest (live). See M 1300.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1306 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1311 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1316 Belgium, R Vlaanderen Intl: International Report. See H 2343.
1319 Belgium, R Vlaanderen Intl: Economics. See H 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Sweden, Radio: Sixty Degrees North. See M 1130.
1335 Sweden, Radio: A Review of the Newsweek. See F 1135.
1340 Canada, RCI Montreal: Spectrum. See M 1241.

Saturdays

1300 USA, KWHR Naalehu HI: Spirit of Truth. Don Young offers words of encouragement and joy.
1300 WHRI (Angel 1): Listen to Jesus. See M 0630.
1300 WHRI (Angel 2): Modern Manna. Danny Vierra tells you how to evaluate your life and make changes for better health.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1310 Belgium, R Vlaanderen Intl: Music from Flanders. See A 0640.
1311 Canada (North-Quebec): The House. A lively and critical look at the national political scene and national issues hosted by Jason Moscovitz.
1315 USA, KWHR Naalehu HI: Bible Pathway. Rick Hash with five minutes of Bible readings.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1325 USA, KWHR Naalehu HI: Faith in Action. Betty Potterbaum of Hawaii interprets the Bible.
1330 Sweden, Radio: Spectrum (1). See S 0030.
1330 USA, KWHR Naalehu HI: Christ Gospel Broadcast. See S 0030.
1330 WHRI (Angel 1): Eternal Good News. Germaine Lockwood teaches from the Old Testament.
1330 WHRI (Angel 2): Biblical Studies Institute. See S 0300.
1336 Canada, RCI Montreal: Innovation Canada. See S 0107.
1345 USA, KWHR Naalehu HI: The Bread of Life Victory Hour. Brother Jack Meeks with music and teaching.
1345 WHRI (Angel 1): Word of Faith. Aaron Collins preaches from Jesus is Lord World Outreach Center in Racine, Wisconsin.

Frequencies

1400-1430	Australia, Radio	7240pa	9560as	9610pa	11695pa
1400-1500	Australia, Radio	5995pa	9580pa	9615as	11800pa
1400-1500	Australia,DefenseForces R	8743af	10623af		
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	9640na	11855na		
1400-1500	China, China Radio Intl	7405na	9530as	9785as	
1400-1500	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1400-1500	Ecuador, HCJB	12005am	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	Israel, Kol Israel	12077va	15615na		
1400-1500 vl	Italy, IRRS	3985va			
1400-1500	Japan, NHK/Radio	11705na	11895as	11915na	
1400-1500	Lebanon, Wings of Hope	9960va			
1400-1500	Malaysia, Radio	7295do			
1400-1500 vl	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1500	Netherlands, Radio	9890as	13700as	15150as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa			
1400-1500 vl	Palau, KHBN/Voice of Hope	9730as	9955as	9965as	9985as
		15140as			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	4740me	4940me	7225me	9595me
		9705me	11835me	11945me	11985me
		15320me	15350me	15540me	
1400-1500	Singapore, SBC Radio One	6155do			
1400-1430	Turkey, Voice of	9445va	9630as		
1400-1500	United Kingdom, BBC WS	5990as	6190af	6195va	7205as
		9410eu	9515na	9590va	9740va
		11750as	11865am	11940af	12095eu
		15070va	15220am	15260na	15575va
		17640va	17705va	17830af	17840va
	21470af	21660af			
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	7125as	7215as	9645as
		9760va	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	15105am		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500	USA, WWCR Nashville TN	12160am	13845am	15685am	
1400-1500	USA, WYFR Okeechobee FL	11550as	11830na	17750eu	
1400-1405	Vatican State, Vatican R	9500as	11625as	13765pa	
1400-1500	Zambia, Christian Voice	6065af			
1415-1500	Bhutan, Bhutan BC Service	5023do			
1415-1425	Nepal, Radio	7165do			
1415-1500 a	USA, WVHA Greenbush ME	15745eu			
1430-1500	Australia, Radio	6060na	6080as	6090me	11660eu
		11695pa	12080pa		
1430-1500	Canada, R Canada Intl	9555eu	11915eu	11935eu	15325eu
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 mtwhf	Portugal, R Portugal Intl	21515me			
1430-1500	Romania, R Romania Intl	11740as	11810as	15335as	
1430-1500	United Kingdom, BBC WS	15400af			
1438-1455 1st m	Denmark, R Denmark Intl	13800na	15340as		
1440-1500	Myanmar, Voice of	5990do			
1458-1500	Seychelles, FEBA Radio	9870as	11870as		

Selected Programs

Sundays

1400 WHRI (Angel 1/2): Christian Center Church (live). Dr. Lester Sumrall preaches.
1405 Canada, RCI Montreal: Sunday Morning (2nd hour). See S 1311.
1410 China, China Radio Intl: News about China. See S 0010.
1413 China, China Radio Intl: Sports Beat. See S 1213.
1420 China, China Radio Intl: China Snapshots. See S 1220.
1425 China, China Radio Intl: In the Third World. See S 1225.
1430 USA, KWHR Naalehu HI: Day of Decision. Bob Roman evangelizes from Texas.
1435 China, China Radio Intl: Song of the Week. See S 1235.
1445 China, China Radio Intl: Listeners' Letterbox. See S 1245.
1450 WHRI (Angel 1): Southern Gospel Music. See S 1350.

Mondays

1400 WHRI (Angel 1/2): Music. See S 0200.
1410 China, China Radio Intl: News about China. See S 0010.
1419 China, China Radio Intl: Current Affairs. See M 1219.
1430 China, China Radio Intl: Press Clippings. See M 1230.
1434 China, China Radio Intl: China's Open Windows. See M 1234.
1439 China, China Radio Intl: Investing in China. See M 1239.
1445 China, China Radio Intl: Idioms and Their Stories. See M 1245.

Tuesdays

1400 WHRI (Angel 1/2): Music. See S 0200.
1410 China, China Radio Intl: News about China. See S 0010.
1415 China, China Radio Intl: News Analysis. See T 1215.
1419 China, China Radio Intl: Current Affairs. See M 1219.
1433 China, China Radio Intl: Press Clippings. See M 1230.
1438 China, China Radio Intl: Orient Arena. See T 1238.
1445 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Wednesdays

1400 WHRI (Angel 1/2): Music. See S 0200.
1410 China, China Radio Intl: News about China. See S 0010.
1418 China, China Radio Intl: Current Affairs. See M 1219.
1433 China, China Radio Intl: Profile. See W 1233.
1440 China, China Radio Intl: Learn to Speak Chinese. See W 1240.

Thursdays

1400 WHRI (Angel 1/2): Music. See S 0200.
1410 China, China Radio Intl: News about China. See S 0010.
1415 China, China Radio Intl: News Analysis. See T 1215.
1419 China, China Radio Intl: Current Affairs. See M 1219.
1434 China, China Radio Intl: Press Clippings. See M 1230.
1438 China, China Radio Intl: Focus. See H 1238.
1444 China, China Radio Intl: Cultural Spectrum. See H 1244.

Fridays

1400 WHRI (Angel 1/2): Music. See S 0200.
1410 China, China Radio Intl: News about China. See S 0010.
1420 China, China Radio Intl: Current Affairs. See M 1219.
1434 China, China Radio Intl: Life in China. See F 1234.
1446 China, China Radio Intl: Global Review. See F 1246.
1454 Radio Netherlands: Documentary. Can White Folks Play the Blues? (7th). See W 1154.
1454 Radio Netherlands: Documentary. Five Years of Yugoslavia (21st,28th). Eric Beauchemin reports in a two-part special from the former Yugoslavia.
1454 Radio Netherlands: Documentary. Year of the African Child (14th). See A 2354.

Saturdays

1400 WHRI (Angel 1): Home Schooling (live). Terry and Vicki Brady of the Home Education network take calls about schooling.
1400 WHRI (Angel 2): Bible Pathway. See S 1345.
1405 WHRI (Angel 2): Music. See S 0200.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Canada (North-Quebec): Basic Black. Journalist, author and humorist Arthur Black talks to people with unusual occupations, passions and obsessions, and takes a quirky look at ordinary events and things.
1420 China, China Radio Intl: Travel Talk. See S 0020.
1429 China, China Radio Intl: The Cooking Show. See S 0029.
1430 USA, KWHR Naalehu HI: DXing with Cumbre. See S 0200.
1435 China, China Radio Intl: Music from China. See S 0035.

Hauser's Highlights
CANADA: R. Canada Intl

Some RCI programs as monitored at summer timings:

Sat	2007	*Innovation Canada*
	2105	*Royal Canadian Air Farce*
	2231:30	*Mystery Project*
	2307:30	*Quirks & Quarks*
Sun	0205	*Double Exposure & RCAF*
	1207	*Q&Q*
	1311	*Sunday Morning*
	2006:30	*Arts in Canada*
	2104:30	*Mailbag*
	2207	*Arts in Canada*
	2231	*Now the Détails*
	2305	*Global Village*
Mon	0105	*Arts in Canada*
	0130	*Mailbag*
	0231	*Now the Détails*
	1208	*Double Exposure & RCAF*

Peacekeepers' service at 1900 canceled (gh, *W.O.R.*)

RCI frequencies include:

1200	9640, 11855, 13650
1300	same except Sun no 9640
1330 Mon-Sat	17820
2000	17820, 15325, 13670, 13650, 11690
2100	same
2200-2400	5960, 9755, 13670
0100-0300	6120, 9755, 13670

Frequencies

1500-1600	Australia, Radio	5995pa	6060pa	6080pa	6090as
		7260as	9580pa	9615as	9710pa
		11660as	11695pa	11800pa	
1500-1600	Australia,DefenseForces R	8743af	10623af		
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	9640na	11855na		
1500-1600	China, China Radio Intl	7405na	9785as		
1500-1600	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1500-1600	Ecuador, HCJB	15115sa	21455va		
1500-1600 as	Eqt Guinea, R East Africa	15186af			
1500-1530	Georgia, Georgian Radio	6230me			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1600	Italy, Adv World Radio	7230eu			
1500-1600 vl	Italy, IRRS	3985va			
1500-1600	Japan, NHK/Radio	9535na	11915as	15355af	
1500-1600	Jordan, Radio	11940va	11970va		
1500-1600	Lebanon, Wings of Hope	9960va			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1515	Mongolia, R Ulan Bator	9745as	12085as		
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9890as	13700as	15150as	
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa			
1500-1600	Nigeria, Voice of	7255af			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1600 vl	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15140as
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1526	Romania, R Romania Intl	11740as	11810as	15335as	
1500-1600	Russia,Voice of Russia WS	7305me	9595me	9830va	9955af
		9975af	11775va	11835va	11945va
		12025af	12035va	15320me	15350va
		15540me	15560af	17750af	
1500-1600	S Africa, Channel Africa	3220af	7155af		
1500-1530	Seychelles, FEBA Radio	9810as	11870as		
1500-1600	Singapore, SBC Radio One	6155do			
1500-1600	Sri Lanka, Sri Lanka BC	9720as	15425as		
1500-1530	Switzerland, Swiss R Intl	12075as	13635as	15530as	
1500-1600	United Kingdom, BBC WS	5990as	6190af	6195va	7205as
		9410eu	9515na	9590va	9740va
		11750as	11865am	12095va	15070va
		15220am	15260na	15400va	17705va
		17830af	17840va	21470af	21660af
1500-1530	United Kingdom, BBC WS	11860af	11940af	15420af	17880af
		21490af			
1500-1600	USA, KAIJ Dallas TX	13815am	15725am		
1500-1600	USA, KTBN Salt Lk City UT	7510am			
1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, Voice of America	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	13760am	15105am		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1600 a	USA, WVHA Greenbush ME	15745eu			
1500-1600	USA, WWCR Nashville TN	12160am	13845am	15685am	
1500-1600	USA, WYFR Okeechobee FL	11830na	17750na		
1500-1502	USA, WYFR Okeechobee FL	11550as			
1500-1600	Zambia, Christian Voice	6065af			
1520-1530 mtwhf	Estonia, Radio	5925eu			
1530-1555	Austria, R Austria Intl	11780as			
1530-1545	India, All India Radio	3945do	6185do	7140do	7410do
		9530do	9565do	9685do	9910do
		11740do			
1530-1600	Iran, VOIRI	11875as	15260as	17750as	
1530-1600	Netherlands, Radio	9890as	15150as		
1530-1600	United Kingdom, BBC WS	7180as	11720as		
1538-1555 1st m	Denmark, R Denmark Intl	11840va	13805va	15230va	

Selected Programs

Sundays

1500 USA, KWHR Naalehu HI: Christian Center Church (live). Dr. Lester Sumrall preaches.
1500 WHRI (Angel 1/2): Message to Israel. A program for Jewish listeners.
1505 Canada, RCI Montreal: Sunday Morning (3rd hour). See S 1311.
1510 China, China Radio Intl: News about China. See S 0010.
1513 China, China Radio Intl: Sports Beat. See S 1213.
1515 WHRI (Angel 1/2): The Bread of Life Broadcast. Ron Kresge preaches from the Church of God at Norwalk, Connecticut.
1520 China, China Radio Intl: China Snapshots. See S 1220.
1525 China, China Radio Intl: In the Third World. See S 1225.
1530 WHRI (Angel 1): The Voice of Salvation. William Wilson of the Church of God of Prophecy presents music and inspiration.
1530 WHRI (Angel 2): Sandra Davis Ministries. Sandra Davis
1535 China, China Radio Intl: Song of the Week. See S 1235.
1545 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Mondays

1500 USA, KWHR Naalehu HI: Reach Out. Pastor Jerry Lynn, Calvary Chapel of Albany, New York with Bible teaching.
1500 WHRI (Angel 1/2): Music. See S 0200.
1510 China, China Radio Intl: News about China. See S 0010.
1515 USA, KWHR Naalehu HI: Life in the Word. Joyce Meyer offers help by example for everyday living.
1519 China, China Radio Intl: Current Affairs. See M 1219.
1530 China, China Radio Intl: Press Clippings. See M 1230.
1530 WHRI (Angel 2): Salvation Temple. Gloria Moore evangelizes from Philadelphia, Pennsylvania.
1534 China, China Radio Intl: China's Open Windows. See M 1234.
1539 China, China Radio Intl: Investing in China. See M 1239.
1545 China, China Radio Intl: Idioms and Their Stories. See M 1245.
1545 WHRI (Angel 2): Reach Out. See M 1215.

Tuesdays

1500 USA, KWHR Naalehu HI: Reach Out. See M 1500.
1500 WHRI (Angel 1/2): Music. See S 0200.
1511 China, China Radio Intl: News about China. See S 0010.
1515 China, China Radio Intl: News Analysis. See T 1215.
1515 USA, KWHR Naalehu HI: Life in the Word. See M 1515.
1519 China, China Radio Intl: Current Affairs. See M 1219.
1530 WHRI (Angel 2): Salvation Temple. See M 1530.
1533 China, China Radio Intl: Press Clippings. See M 1230.
1538 China, China Radio Intl: Orient Arena. See T 1238.
1545 China, China Radio Intl: Listeners' Letterbox. See S 1245.
1545 WHRI (Angel 2): Reach Out. See M 1215.

Wednesdays

1500 USA, KWHR Naalehu HI: Reach Out. See M 1500.
1500 WHRI (Angel 1/2): Music. See S 0200.
1510 China, China Radio Intl: News about China. See S 0010.
1515 USA, KWHR Naalehu HI: Life in the Word. See M 1515.
1518 China, China Radio Intl: Current Affairs. See M 1219.
1530 WHRI (Angel 2): Salvation Temple. See M 1530.
1533 China, China Radio Intl: Profile. See W 1233.
1540 China, China Radio Intl: Learn to Speak Chinese. See W 1240.
1545 WHRI (Angel 2): Reach Out. See M 1215.
1554 Radio Netherlands: Documentary. Can White Folks Play the Blues? (5th). See W 1154.
1554 Radio Netherlands: Documentary. Five Years of Yugoslavia (19th,26th). See F 1454.
1554 Radio Netherlands: Documentary. Year of the African Child (12th). See A 2354.

Thursdays

1500 USA, KWHR Naalehu HI: Reach Out. See M 1500.
1500 WHRI (Angel 1/2): Music. See S 0200.
1510 China, China Radio Intl: News about China. See S 0010.
1515 China, China Radio Intl: News Analysis. See T 1215.
1515 USA, KWHR Naalehu HI: Life in the Word. See M 1515.
1519 China, China Radio Intl: Current Affairs. See M 1219.
1530 WHRI (Angel 2): Salvation Temple. See M 1530.
1534 China, China Radio Intl: Press Clippings. See M 1230.
1538 China, China Radio Intl: Focus. See H 1238.
1544 China, China Radio Intl: Cultural Spectrum. See H 1244.
1545 WHRI (Angel 2): Reach Out. See M 1215.

Fridays

1500 USA, KWHR Naalehu HI: Reach Out. See M 1500.
1500 WHRI (Angel 1/2): Music. See S 0200.
1510 China, China Radio Intl: News about China. See S 0010.
1515 USA, KWHR Naalehu HI: Life in the Word. See M 1515.
1520 China, China Radio Intl: Current Affairs. See M 1219.
1530 WHRI (Angel 2): Salvation Temple. See M 1530.
1534 China, China Radio Intl: Life in China. See F 1234.
1545 WHRI (Angel 2): Reach Out. See M 1215.
1546 China, China Radio Intl: Global Review. See F 1246.

Saturdays

1500 USA, KWHR Naalehu HI: Eternal Good News. See S 0630.
1500 WHRI (Angel 1): Home Schooling (live). See A 1400.
1500 WHRI (Angel 2): More than Conquers. Carl Kallsen.
1510 China, China Radio Intl: News about China. See S 0010.
1511 Canada (North-Quebec): Double Exposure. The comedy team of Bob Robertson and Linda Cullen present their award-winning brand of political satire and mimicry.
1520 China, China Radio Intl: Travel Talk. See S 0020.
1529 China, China Radio Intl: The Cooking Show. See S 0029.
1530 USA, KWHR Naalehu HI: Rhema Radio Church. Kenneth Hagin, Jr. preaches from Tulsa, Oklahoma.
1530 WHRI (Angel 2): Walking in the Light. John Pietzonka evangelizes.
1535 China, China Radio Intl: Music from China. See S 0035.

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

1600-1700	Australia, Radio	5995pa	6060pa	6080pa	6090pa
		7260as	9580pa	9615va	11660pa
		11695pa	11800pa		
1600-1615	Bangladesh, Radio	7185as	9568as		
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	9640na	11955na		
1600-1700	China, China Radio Intl	11575as	15110af	15130af	
1600-1700	Costa Rica,RF Peace Intl	6200am	15050am		
1600-1627	Czech Rep, Radio Prague	5930eu	17485af		
1600-1630	Ethiopia, Radio	7165af			
1600-1700	France, Radio France Intl	6175eu	11615me	11700af	12015af
		12015af	15210af	15460af	15530af
1600-1650	Germany, Deutsche Welle	7225as	9875as	13690as	
1600-1700	Germany, Deutsche Welle	7185af	9735af	11965af	17800af
1600-1700	Guam, AWR/KSDA	7395as			
1600-1615 mt	Guam, TWR/KTWR	11580as			
1600-1630 whfas	Guam, TWR/KTWR	11580as			
1600-1630	Iran, VOIRI	11875as	15260as	17750as	
1600-1700 vl	Italy, IRRS	3985va			
1600-1700	Jordan, Radio	11940va	11970va		
1600-1700	Lebanon, Voice of Hope	6280va			
1600-1700	Malaysia, Radio	7295do			
1600-1700 vl	Mexico, Radio Mexico Intl	9705na			
1600-1625	Netherlands, Radio	9890as	13700as	15150as	
1600-1650 occsnal	New Zealand, R NZ Intl	6100am			
1600-1700	Nigeria, Voice of	7255af			
1600-1630 s	Norway, Radio Norway Intl	11840na	11860eu	13805eu	
1600-1630	Pakistan, Radio	9425af	11570af	11935af	13590af
		15555af			
1600-1700 vl	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	
1600-1700	Russia,Voice of Russia WS	7240eu	7325af	7350eu	7440af
		9480eu	9830va	9880eu	11675eu
		11775me	11945me	12025af	15350va
		15400eu	17875af		
1600-1700	S Africa, Channel Africa	3220af	7155af		
1600-1655	S Africa, Channel Africa	9530af			
1600-1700	S Africa, Trans World R	9500af			
1600-1700	Singapore, SBC Radio One	6155do			
1600-1700	Slovakia, Adv World Radio	13590as			
1600-1700	South Korea, R Korea Intl	5975eu	9515af	9870af	
1600-1630	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	12095va	15070va	15400af
		15420af	17840va	21470af	21660af
1600-1615	United Kingdom, BBC WS	5990as	7180as	7205as	17705va
		17830af			
1600-1700	USA, KAIJ Dallas TX	13815am	15725am		
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9355af	15715eu	17510af	18930af
		21640af			
1600-1700	USA, Voice of America	7125as	7215as	9645as	9700va
		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	13760am	15105am		
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700 a	USA, WVHA Greenbush ME	15745eu			
1600-1700	USA, WWCR Nashville TN	12160am	13845am	15685am	
1600-1700	USA, WYFR Okeechobee FL	11705na	11830na	15695eu	21525eu
		21745eu			
1600-1620 smtwhf	Vatican State, Vatican R	9940as	11640as		
1600-1630 a	Vatican State, Vatican R	9940as	11640af		
1600-1630	Vietnam, Voice of	7360na	9840eu	12030as	
1600-1700	Zambia, Christian Voice	6065af			
1615-1630	Albania, R Tirana Intl	7155eu	9740eu		
1615-1625	Egypt, Radio Cairo	11874af			
1615-1700	United Kingdom, BBC WS	9510as	11860af		
1630-1657	Canada, R Canada Intl	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Slovakia, Adv World Radio	15620af			
1630-1700	SLovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1638-1655 1st m	Denmark, R Denmark Intl	11840af	11860na	13805va	15340vs
1645-1700 mtwhf	Canada, R Canada Intl	9555eu	11935eu	15325eu	17820eu
1650-1700	Eqt Guinea, Radio Africa	15186af			
1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa			

Selected Programs

Sundays

1600 USA, KWHR Naalehu HI: Soul to Soul. Johnny Hale.
1600 WHRI (Angel 1): The Voice of Truth. L. R. Shelton evangelizes from New Orleans.
1600 WHRI (Angel 2): Universal Life. The radio program of the original christians in universal life.
1610 China, China Radio Intl: News about China. See S 0010.
1613 China, China Radio Intl: Sports Beat. See S 1213.
1620 China, China Radio Intl: China Snapshots. See S 1220.
1625 China, China Radio Intl: In the Third World. See S 1225.
1630 WHRI (Angel 1): Music. See S 0200.
1630 WHRI (Angel 2): Holy Vision Media. Matthew Guteta.
1635 China, China Radio Intl: Song of the Week. See S 1235.
1637 Canada, RCI Montreal (Asia): The Mailbag. See S 1237.
1645 China, China Radio Intl: Listeners' Letterbox. See S 1245.

Mondays

1600 USA, KWHR Naalehu HI: Music. See M 0130.
1600 WHRI (Angel 2): Lester Sumrall Teaching Series. The head of the Christian Center Church teaches.
1603 WHRI (Angel 1): Music. See S 0200.
1610 China, China Radio Intl: News about China. See S 0010.
1619 China, China Radio Intl: Current Affairs. See M 1219.
1630 China, China Radio Intl: Press Clippings. See M 1230.
1630 WHRI (Angel 1): Midnight Cry. C. Parker Thomas preaches from Southern Pines, North Carolina.
1630 WHRI (Angel 2): The Voice of Praise. See M 0645.
1634 China, China Radio Intl: China's Open Windows. See M 1234.
1639 China, China Radio Intl: Investing in China. See M 1239.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1241.
1645 China, China Radio Intl: Idioms and Their Stories. See M 1245.
1645 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.

Tuesdays

1600 USA, KWHR Naalehu HI: Music. See M 0130.
1600 WHRI (Angel 2): Lester Sumrall Teaching Series. See M 1600.
1603 WHRI (Angel 1): Music. See S 0200.
1610 China, China Radio Intl: News about China. See S 0010.
1615 China, China Radio Intl: News Analysis. See T 1215.
1619 China, China Radio Intl: Current Affairs. See M 1219.
1630 WHRI (Angel 1): Midnight Cry. See M 1630.
1630 WHRI (Angel 2): The Voice of Praise. See M 0645.
1633 China, China Radio Intl: Press Clippings. See M 1230.
1638 China, China Radio Intl: Orient Arena. See T 1238.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1241.
1645 China, China Radio Intl: Listeners' Letterbox. See S 1245.
1645 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.

Wednesdays

1600 USA, KWHR Naalehu HI: Music. See M 0130.
1600 WHRi (Angel 2): Lester Sumrall Teaching Series. See M 1600.
1603 WHRI (Angel 1): Music. See S 0200.
1610 China, China Radio Intl: News about China. See S 0010.
1618 China, China Radio Intl: Current Affairs. See M 1219.
1630 WHRI (Angel 1): Midnight Cry. See M 1630.
1630 WHRI (Angel 2): The Voice of Praise. See M 0645.
1633 China, China Radio Intl: Profile. See W 1233.
1640 China, China Radio Intl: Learn to Speak Chinese. See W 1240.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1241.
1645 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.

Thursdays

1600 USA, KWHR Naalehu HI: Music. See M 0130.
1600 WHRI (Angel 2): Lester Sumrall Teaching Series. See M 1600.
1603 WHRI (Angel 1): Music. See S 0200.
1610 China, China Radio Intl: News about China. See S 0010.
1615 China, China Radio Intl: News Analysis. See T 1215.
1619 China, China Radio Intl: Current Affairs. See M 1219.
1630 WHRI (Angel 1): Midnight Cry. See M 1630.
1630 WHRI (Angel 2): The Voice of Praise. See M 0645.
1634 China, China Radio Intl: Press Clippings. See M 1230.
1638 China, China Radio Intl: Focus. See H 1238.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1241.
1644 China, China Radio Intl: Cultural Spectrum. See H 1244.
1645 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.

Fridays

1600 USA, KWHR Naalehu HI: Music. See M 0130.
1600 WHRI (Angel 2): Lester Sumrall Teaching Series. See M 1600.
1603 WHRI (Angel 1): Music. See S 0200.
1610 China, China Radio Intl: News about China. See S 0010.
1620 China, China Radio Intl: Current Affairs. See M 1219.
1630 WHRI (Angel 1): Midnight Cry. See M 1630.
1630 WHRI (Angel 2): The Voice of Praise. See M 0645.
1634 China, China Radio Intl: Life in China. See F 1234.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1241.
1645 WHRI (Angel 1/2): The Radio Bible Hour. See M 0600.
1646 China, China Radio Intl: Global Review. See F 1246.

Saturdays

1600 USA, KWHR Naalehu HI: Turn Your Radio On. See T 0100.
1605 WHRI (Angel 1): Music. See S 0200.
1605 WHRI (Angel 2): Lifetime Commentary. AD Sturm.
1609 Canada (North-Quebec): Quirks and Quarks. Bob McDonald provides the update of the latest in science, technology, medicine, and the environment.
1610 China, China Radio Intl: News about China. See S 0010.
1615 WHRI (Angel 2): King of Kings. Jeni Goldstar discusses scripture.
1620 China, China Radio Intl: Travel Talk. See S 0020.
1629 China, China Radio Intl: The Cooking Show. See S 0029.
1630 WHRI (Angel 2): Music. See S 0200.
1635 China, China Radio Intl: Music from China. See S 0035.
1636 Canada, RCI Montreal (Asia): Innovation Canada. See S 0107.
1645 WHRI (Angel 1/2): The Gospel Trumpet Broadcast. See A 1200.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	7260as
		9580pa	9615as	9860pa	11660pa
		11695pa	11880pa		
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			
1700-1800 as	Costa Rica, Adv World R	13750am			
1700-1800	Costa Rica,RF Peace Intl	6200am	15050am		
1700-1727	Czech Rep, Radio Prague	5835eu	15640pa		
1700-1800	Ecuador, HCJB	11960eu	15540eu	21455eu	
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	6175eu	11615me	11700af	12015af
		12015af	15210af	15460af	15530af
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, NHK/Radio	6035na	9535na	9580as	11880as
		11930me			
1700-1730	Jordan, Radio	11940va	11970va		
1700-1800	Lebanon, Voice of Hope	6280va			
1700-1730	Lebanon, Wings of Hope	9960va			
1700-1800 mtwhf	New Zealand, R NZ Intl	6145pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1750	Pakistan, Radio	5825eu	11570eu		
1700-1800 vl	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	
1700-1755	Poland, Polish R Warsaw	6095eu	7270eu	7285eu	
1700-1800	Russia,Voice of Russia WS	7440af	9480eu	9830va	9880eu
		9955af	9975af	11775va	11960va
		12065me	15400eu	17875af	
1700-1755	S Africa, Channel Africa	3220af	7155af		
1700-1800	Swaziland, Trans World R	9500af			
1700-1730	Switzerland, Swiss R Intl	9505eu	9885me	9905eu	12075af
		13635af			
1700-1800	United Kingdom, BBC WS	3955eu	6190af	6195eu	7150eu
		9410va	9710as	9740as	11750as
		11760as	11860af	15070va	15400af
		15420af	17830af	17840va	
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	15725am		
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	6120as			
1700-1800	USA, Monitor Radio Intl	9355af	15715eu	17510af	21640af
1700-1800	USA, Voice of America	6035as	7125as	7215as	9645as
		9700va	9760va	11920af	12040af
		13710af	15255va	15395as	15410af
		15445af	17895af		
1700-1800 mtwhf	USA, Voice of America	5990va	6045va	7125as	7150va
		7170va	9550va	9770va	11870va
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1700-1800	USA, WGTG McCaysville GA	9400am			
1700-1800	USA, WHRI Noblesville IN	13760am	15105ca		
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, WRNO New Orleans LA	15420am			
1700-1800 th	USA, WVHA Greenbush ME	15745af			
1700-1730 s	USA, WVHA Greenbush ME	9930eu			
1700-1800 mwf	USA, WVHA Greenbush ME	9930eu			
1700-1800	USA, WWCR Nashville TN	12160am	13845am	15685am	
1700-1800	USA, WYFR Okeechobee FL	15695eu			
1700-1745	USA, WYFR Okeechobee FL	21745eu			
1700-1800	Zambia, Christian Voice	4965af			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1715-1800	United Kingdom, BBC WS	7160va			
1715-1730	Vatican State, Vatican R	4005eu	6245eu	7250eu	11810eu
1730-1755	Austria, R Austria Intl	6155eu	9665me	11780as	13730eu
1730-1800	Georgia, Georgian Radio	6080eu			
1730-1800	Guam, AWR/KSDA	9370as			
1730-1756	Romania, R Romania Intl	9750af	11740af	11940af	
1730-1800	United Kingdom, BBC WS	6180eu			
1730-1759	Vatican State, Vatican R	9660af	11625af	15570af	
1738-1755 1st m	Denmark, R Denmark Intl	7485va	11860va	15220va	
1745 1800 mtwhf	Canada, R Canada Intl	5995eu	9555eu	11915eu	11935eu
		15325eu	17820eu		
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	11715me	15160eu	15205eu	
1800-1900	Australia, Radio	6060pa	6080pa	6090pa	7260eu
		9580pa	9860pa	11660as	11695pa
		11880pa			
1800-1825	Belgium, R Vlaanderen Int	5910eu	13645af		
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	6200am	15050am		
1800-1900	Ecuador, HCJB	11960eu	15540eu	21455eu	
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 vl	Italy, IRRS	3985va			
1800-1900	Kuwait, Radio	11990na			
1800-1900	Lebanon, Voice of Hope	6280va			
1800-1825	Netherlands, Radio	6020af	9605af	11655af	
1800-1850 mtwhf	New Zealand, R NZ Intl	6145pa			
1800-1830 s	Norway, Radio Norway Intl	7485af	9590af	13805af	15220af
1800-1900	Russia,Voice of Russia WS	7240eu	7350eu	9480eu	9505va
		9830va	9955af	9975af	15400eu
1800-1900	Sudan, Radio Omdurman	9000af	9025af		
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	15070af	15400af
		15420af	17830af	17840ca	
1800-1830	United Kingdom, BBC WS	7150eu	7160va	9510as	11750as
1800-1900	USA, KAIJ Dallas TX	13815am	15725am		
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	9385eu	13770va	17510af	
1800-1900	USA, Voice of America	6035va	9760va	9770va	11920af
		12040af	13710af	15410af	15580af
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1800-1900	USA, WGTG McCaysville GA	9400am			
1800-1900	USA, WHRI Noblesville IN	9495am	13760eu		
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900 mtwhf	USA, WRMI/R Miami Intl	9925am			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900 ths	USA, WVHA Greenbush ME	15745af			
1800-1900 mwf	USA, WVHA Greenbush ME	9930eu			
1800-1900	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	15695eu	21745eu		
1800-1830	Vietnam, Voice of	7360na	9840eu	12030as	
1800-1900	Yemen, Yemeni Rep Radio	9780as			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1802-1900 s	Morocco, RTVM Marocaine	17815af			
1815-1900	Bangladesh, Radio	7190eu	9568as		
1830-1900	Albania, R Tirana Intl	7270eu	9740eu		
1830-1900 irreg t	Belarus, Radiosta Belarus	5940eu	7105eu	7205eu	7210eu
1830-1900	Georgia, Georgian Radio	6080eu			
1830-1857	S Africa, Trans World R	9525af			
1830-1900	Serbia, Radio Yugoslavia	6100eu	9720eu		
1830-1900	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1830-1855 irreg	Somalia, Radio Mogadishu	6710af			
1830-1900	South Korea, R Korea Intl	3955eu			
1830-1900	Sweden, Radio	6065va	9430va	9655va	
1830-1900	Turkey, Voice of	9445eu	9535eu		
1830-1900	United Kingdom, BBC WS	6005af	9630af	9740va	
1833-1900	Cote D' Ivoire, RDTV	11920do			
1838-1855 1st m	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	
1851-1900	New Zealand, R NZ Intl	9810pa			

FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6060pa	6080pa	6150as	7240pa
		7260as	9560as	9580pa	9860pa
		11660pa	11695pa	11880pa	
1900-1930	Azerbaijan, Voice of	4957eu			
1900-1920	Brazil, Radio Bras	15265eu			
1900-2000	Bulgaria, Radio	9700eu	11720eu		
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	6955me	9440af		
1900-2000	Costa Rica, Adv World R	13750am	15460am		
1900-2000	Costa Rica,RF Peace Intl	6200am	15050am		
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB	11960eu	15540eu	21455eu	
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1930 mt	Estonia, Radio	5925eu			
1900-1950	Germany, Deutsche Welle	9735af	11740af	11785af	13690af
		13790af			
1900-2000	Guatemala, Adv World R	5980am			
1900-1930	Hungary, Radio Budapest	3975eu	6140eu	7130eu	9835eu
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13750as	15075as	
1900-1930	Israel, Kol Israel	7465na	9435eu	11605na	15615na
		15640sa			
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			
1900-1930 as	Latvia, Radio	5935eu			
1900-2000	Lebanon, Wings of Hope	9960va			
1900-2000	Liberia, Radio ELBC	7275do			
1900-2000	Liberia, Radio ELWA	4760do			
1900-2000	Netherlands, Radio	4945af	6015af	6020af	9605af
		9890af	11655af	15315af	
1900-1950	New Zealand, R NZ Intl	9810pa			
1900-2000	Nigeria, Voice of	7255af			
1900-1956	Romania, R Romania Intl	9550eu	9610eu	11810eu	11940eu
1900-2000	Russia,Voice of Russia WS	7240eu	7350eu	7440af	9480eu
		11675eu	11765af	11785af	11945af
		15400eu			
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-1930	Switzerland, Swiss R Intl	6165eu			
1900-2000	Thailand, Radio	7210eu	11805eu		
1900-2000	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195va	9410va
		9630af	9740va	15070af	15400af
		17830af			
1900-2000	USA, KAIJ Dallas TX	13815af	15725am		
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9385af	13770va	15665eu	17510af
1900-2000	USA, Voice of America	6035af	7415af	9525va	9760va
		9770va	11870va	11920af	12040af
		13710af	15180va	15410af	15580af
1900-2000	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1900-2000	USA, WGTG McCaysville GA	9400am			
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WMLK Bethel PA	9465eu			
1900-2000 mtwhf	USA, WRMI/R Miami Intl	9925am			
1900-2000	USA, WRNO New Orleans LA	15420am			
1900-2000 ths	USA, WVHA Greenbush ME	15745af			
1900-2000 mwfa	USA, WVHA Greenbush ME	9930eu			
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-2000	USA, WYFR Okeechobee FL	21745eu			
1900-1930	Vietnam, Voice of	7360na	9840eu	12030as	
1900-2000	Zambia, Christian Voice	4965af			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1930-1955	Austria, R Austria Intl	9655me	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	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
1930-2000	Sweden, Radio	6065va			
1930-2000	Turkey, Voice of	9445eu			
1935-1955	Italy, RAI Intl	7235eu	9670eu	11905eu	
1938-1955 1st m	Denmark, R Denmark Intl	7520af	11860af	13805eu	15220au
1945-2000	Togo, Radio	5047do			
1951-2000	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	6060pa	6080pa	6150pa	7260as
	9580pa 9860pa	11660pa	11695pa	11855as	11880pa
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	Canada, Radio Canada Intl	15150eu	15325eu	17820eu	
2000-2100	China, China Radio Intl	6950eu	9440af	9920eu	11715af
		15110af			
2000-2100	Costa Rica,RF Peace Intl	6200am	15050am		
2000-2027	Czech Rep, Radio Prague	5930na	11600na		
2000-2100	Ecuador, HCJB	11960eu	15540eu	21455eu	
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2050	Germany, Deutsche Welle	7170eu	9615eu		
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2010	Greece, Voice of	7430eu	9375eu		
2000-2100	Guatemala, Adv World R	5980am			
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI	7260af	9022eu		
2000-2100 vl/fas	Italy, IRRS	3980va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2100	Lebanon, Wings of Hope	9960va			
2000-2100	Liberia, Radio ELBC	7275do			
2000-2100	Liberia, Radio ELWA	4760do			
2000-2030	Lithuania, Radio Vilnius	9710eu			
2000-2025	Netherlands, Radio	9895af	11655af	15315af	
2000-2100	New Zealand, R NZ Intl	11735pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
2000-2100	Nigeria, Voice of	7255af			
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2030 s	Norway, Radio Norway Intl	9590au			
2000-2100 vl	Papua New Guinea, NBC	4890do			
2000-2025	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2000-2030 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	15515af
2000-2100	Russia,Voice of Russia WS	7070eu	7350eu	9480eu	9665eu
		9880eu	11630eu	11675eu	
2000-2015	Sierra Leone, SLBS	3316do			
2000-2015	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	9870af	9885af	9905af	11640af
2000-2030	Turkey, Voice of	9445eu			
2000-2015	Uganda, Radio	3340do	4976do		
2000-2100	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
	6180eu 6190af	6195va	7325eu	9410va	9630af
	9740va 11750sa	11835va	11955as	12095eu	15070eu
	15400af 17830af				
2000-2100	USA, KAIJ Dallas TX	13815am	15725na		
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100 s	USA, KVOH Los Angeles CA	17775am			
2000-2100	USA, KWHR Naalehu HI	15405as			
2000-2100	USA, Monitor Radio Intl	9570pa	11550eu	13770eu	15665eu
2000-2100	USA, Voice of America	6035af	7415af	9760va	9770va
	13710af 15410af	15580af	17725af	17755af	
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2000-2100	USA, WGTG McCaysville GA	9400am			
2000-2100	USA, WHRI Noblesville IN	9495am	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 ths	USA, WVHA Greenbush ME	15745af			
2000-2100 mwfa	USA, WVHA Greenbush ME	9930eu			
2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2000-2100	USA, WYFR Okeechobee FL	17845eu	21525eu	21745eu	
2000-2030	Vatican State, Vatican R	7365af	9645af	11625af	
2000-2030	Zambia, Christian Voice	4965af			
2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do			
2005-2100	Syria, Radio Damascus	12085na	15095na		
2015-2045 as	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Intl	7110af	9710af	11840af	
2030-2100	Armenia, Voice of	9965na	11615na		
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Finland, YLE/R Finland	9855eu	15440eu		
2030-2035 mtwhf	Latvia, Radio	5935eu			
2030-2100 mwh	Moldova, R Dniester Intl	11750na			
2030-2100	Slovakia, Adv World Radio	9455af			
2030-2100 as	Sweden, Radio	6065va	9430va	9655va	
2030-2045	Thailand, Radio	9555eu	11805eu		
2030-2100	Vietnam, Voice of	7360as	9840eu	12020eu	
2038-2055 1st m	Denmark, R Denmark Intl	7485eu	9590me		
2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
		11715pa	15225pa		
2050-2100	Vatican State, Vatican R	4055eu	5880eu	7250eu	

FREQUENCIES

2100-2200	Australia, Radio	6060pa	6080pa	7240pa	7260as
		9580pa	9660pa	11660pa	11855as
		11880pa	11955pa	13745pa	
2100-2110	Bahrain, Radio	6010do			
2100-2125	Belgium, R Vlaanderen Int	5910eu			
2100-2200	Bulgaria, Radio	9700eu	11720eu		
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	7260eu	9755eu
		9805eu	11690eu	11945eu	13650eu
		13690eu	15150eu	15325eu	17820eu
2100-2200	China, China Radio Intl	5220eu	6950eu	9920eu	
2100-2130	China, China Radio Intl	3985eu	11715af	15110af	
2100-2200	Costa Rica,RF Peace Intl	6200am	15050am		
2100-2110	Croatia, Croatian Radio	5895eu	7370eu		
2100-2200	Cuba, Radio Havana	9550eu			
2100-2200	Ecuador, HCJB	11960eu	15540eu	21455eu	
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	7115as	9670as	9735af	9765as
		11755af	15135af		
2100-2130	Hungary, Radio Budapest	3975eu	5935eu	7250eu	9835eu
2100-2200	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 vl/fas	Italy, IRRS	3980va			
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	6280va			
2100-2200	Lebanon, Wings of Hope	9960va			
2100-2200 mtwhfa	Liberia, Radio ELWA	4760do			
2100-2125 mtwhf	Moldova, R Moldova Intl	7500eu			
2100-2200	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2156	Romania, R Romania Intl	5990eu	7105eu	7195eu	9690eu
2100-2200	Russia,Voice of Russia WS	7070eu	7250eu	7350eu	9480eu
		9580eu	9665eu	9710eu	9880eu
		11630eu	11750eu		
2100-2130	Serbia, Radio Yugoslavia	6100eu	6185eu		
2100-2200	Slovakia, Adv World Radio	6055eu			
2100-2130	Slovakia, Adv World Radio	9455af			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2110	Uganda, Radio	3340do	4976do		
2100-2200	Ukraine, R Ukraine Intl	4795eu	4820eu	5905eu	5940eu
		6010eu	6020eu	6055eu	6080eu
		6130eu	7135eu	7150eu	7240eu
		9550eu			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5975va
		6005af	6120as	6180eu	6190af
		6195va	7325eu	9410va	9740au
		11750sa	11835va	11955as	12095eu
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am	15725am		
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, Monitor Radio Intl	11550au	13770eu	15665eu	
2100-2200	USA, Voice of America	6035af	6160va	7415af	9535va
		9760va	11870va	11965va	13710af
		15185va	15410af	15445af	15580af
		17725af	17735va	17755af	
2100-2130	USA, Voice of America	11855af			
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200 s	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200 w	USA, WVHA Greenbush ME	9852eu			
2100-2200 fs	USA, WVHA Greenbush ME	9930eu	15745af		
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2100-2145	USA, WYFR Okeechobee FL	17555eu			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2105-2200	Syria, Radio Damascus	12085na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	15390am	17715am		
2130-2200	Australia, Radio	9610as	9645as	15365pa	17795pa
		17860pa			
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6175au			
2130-2200	Liberia, Radio ELWA	4760do			
2130-2200	Sweden, Radio	6065va	9430va	9655va	
2130-2145	United Kingdom, BBC WS	11680sa			
2138-2155 1st m	Denmark, R Denmark Intl	7205na	9495na	9590au	
2145-2200 a	Greece, Voice of	9425au			
2145-2200	United Kingdom, BBC WS	5990as	7160as	9580as	

2200 UTC

2200-2300	Australia, Radio	9475as	9580pa	9610as	9645as
		9660pa	11660pa	11695pa	11855as
		11880pa	11955pa	13745pa	13755pa
		15365pa	17795pa	17860pa	
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			
2200-2300	China, China Radio Intl	7170eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	15050am		
2200-2300	Cuba, Radio Havana	6180na	9505na		
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2230	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2200-2230	Iran, VOIRI	6175au			
2200-2225	Italy, RAI Intl	5975as	9710as	11815as	
2200-2300	Lebanon, Voice of Hope	6280va			
2200-2300	Lebanon, Wings of Hope	9960va			
2200-2300	Malaysia, Radio	7295do			
2200-2225 mtwhf	Moldova, R Moldova Intl	7500eu			
2200-2215	New Zealand, R NZ Intl	11735pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4990do		
2200-2230 s	Norway, Radio Norway Intl	9495au			
2200-2300 vl	Palau, KHBN/Voice of Hope	9985as	11735as	13615as	
2200-2208 vl	Papua New Guinea, NBC	4890do			
2200-2300	Russia,Voice of Russia WS	7070na	7125na	7250na	9665na
		11750na			
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, Adv World Radio	9455af			
2200-2300	Spain, R Exterior Espana	6125eu	11775af		
2200-2205	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	15600eu	17750eu		
2200-2300	Turkey, Voice of	7280eu	9560eu	9655na	11810na
2200-2300	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2200-2300	United Kingdom, BBC WS	3955eu	5905as	5975va	6175va
		6195va	7110as	9590va	9915va
		11695au	11750sa	11835va	11955as
		12095eu			
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	13770va	13840va	15405as	15665sa
2200-2300	USA, Voice of America	7215va	9705va	11760va	15185va
		15290va	15305va	17735va	17820va
2200-2230 mtwhf	USA, Voice of America	6035af	7415af	12080af	13710af
2200-2300	USA, WEWN Birmingham AL	7425na	11820eu	13615na	
2200-2300	USA, WGTG McCaysville GA	9400am			
2200-2300	USA, WHRI Noblesville IN	9495am			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA	7355am			
2200-2300 w	USA, WVHA Greenbush ME	9852eu			
2200-2300	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2200-2300	USA, WYFR Okeechobee FL	11580na	15566na		
2200-2245	USA, WYFR Okeechobee FL	17845eu	21525eu		
2210-2300 vl	Papua New Guinea, NBC	9675do			
2216-2300	New Zealand, R NZ Intl	15115pa			
2230-2255	Austria, R Austria Intl	5945eu	6155eu		
2230-2257	Czech Rep, Radio Prague	7345na	9430na		
2230-2300	United Kingdom, BBC WS	7325va			
2238-2255 1st m	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	9705as	9950as	11620as	13700as
		15145as			
2245-2300	Vatican State, Vatican R	7305as	9600au	11830pa	

Frequencies

2300-0000	Australia, Radio	9610as	9660pa	11645as	11660pa
		11695as	11855as	13745pa	13755as
		15365pa	17795pa	17860pa	
2300-0000	Bulgaria, Radio	7480na	9700na		
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			
2300-0000	Canada, R Canada Intl	5960am	6040am	9535am	9755am
		11940am	15305am		
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am			
2300-0000	Costa Rica,RF Peace Intl	7385am	15050am		
2300-2310	Croatia, Croatian Radio	5895eu	7315eu		
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	7235as	9690as	12045as	
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	6280va			
2300-0000	Lebanon, Wings of Hope	9960va			
2300-0000	Malaysia, Radio	7295do			
2300-0000	New Zealand, R NZ Intl	15115pa			
2300-2315	Nigeria, FRCN/Radio	3326do	4990do		
2300-2350	North Korea, R Pyongyang	11700na	13650na		
2300-0000 vl	Palau, KHBN/Voice of Hope	9985as	11735as	13615as	
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-2356	Romania, R Romania Intl	7125na	9570na	9625na	11940na
2300-0000	Russia,Voice of Russia WS	7070na	7125na	9665na	11750na
2300-0000	Turkey, Voice of	9560va	9655na		
2300-0000	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2300-0000	United Kingdom, BBC WS	3955eu	5975va	6175va	6195va
		7110as	7295as	7325va	9580as
		9590va	9915va	11750sa	11945as
		11955as			
2300-2330	United Kingdom, BBC WS	3915as			
2300-2315	United Kingdom, BBC WS	11835va			
2300-0000	USA, KAIJ Dallas TX	13740am	13815am		
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	7510	13625as	13770sa	15405as
2300-0000	USA, Voice of America	7215va	9705va	9770va	11760va
		15185va	15290va	15305va	17735va
		17820va			
2300-0000	USA, WEWN Birmingham AL	7425na	11820eu	13615na	
2300-0000	USA, WGTG McCaysville GA	9400am			
2300-0000	USA, WHRI Noblesville IN	5745am			
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000 twhfa	USA, WRMi/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000	USA, WWCR Nashville TN	5065am	7435am	9475am	13845am
2300-2305	Vatican State, Vatican R	7305as	9600au	11830pa	
2330-0000	Australia, Radio	9645as	9850as	13605as	15240pa
2330-0000	Belgium, R Vlaanderen Int	11815na			
2330-0000	Netherlands, Radio	6020na	6165na	9845na	
2330-0000	Sweden, Radio	6065sa			
2335-2345	Greece, Voice of	9395sa	9425sa	11595sa	
2338-2355 1st m	Denmark, R Denmark Intl	7275va	7490va	9485va	
2355-0000	Japan, NHK/Radio	9570as	11685au		

Selected Programs

Sundays

2300 WHRI (Angel 2): Music. See S 0200.
2305 Canada, RCI Montreal: Random Sampling. Host Liz Logan presides over an ever-changing collection of music documentaries, specials, and mini-series.
2335 Belgium, R Vlaanderen Intl: Radio World. See S 0635.
2345 Belgium, R Vlaanderen Intl: PO Box 26. See S 0645.
2355 Belgium, R Vlaanderen Intl: Music. Popular music wraps up this edition of the broadcast.

Mondays

2300 Canada (North-Quebec): 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.
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 USA, KWHR Naalehu HI: The Prophecy Club. Stan Johnson discusses bible prophecy from Topeka, Kansas.
2300 WHRI (Angel 1): Music. See S 0200.
2305 WHRI (Angel 2): People to People (live). A program offering practical scriptural insights with Bob George.
2330 USA, KWHR Naalehu HI: Moments in Bible Prophecy. Raymond Shockley teaches from the Book of Revelations.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2344 Belgium, R Vlaanderen Intl: Focus on Europe. A report on happenings in the European Economic Community (ECC).
2345 USA, KWHR Naalehu HI: Reach Out. See M 1500.
2349 Belgium, R Vlaanderen Intl: Sports Report. A roundup of the results of seasonal sports activities.
2355 Belgium, R Vlaanderen Intl: Music. See S 2355.

Tuesdays

2300 Canada (North-Quebec): As It Happens. See M 2300.
2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 USA, KWHR Naalehu HI: The Prophecy Club. See M 2300.
2300 WHRI (Angel 1): Music. See S 0200.
2305 WHRI (Angel 2): People to People (live). See M 2305.
2330 USA, KWHR Naalehu HI: Moments in Bible Prophecy. See M 2330.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2340 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2345 Belgium, R Vlaanderen Intl: Living in Belgium. Belgian lifestyles and activities.
2345 USA, KWHR Naalehu HI: Reach Out. See M 1500.
2349 Belgium, R Vlaanderen Intl: Green Society. Environmental issues facing Belgium.
2355 Belgium, R Vlaanderen Intl: Music. See S 2355.

Wednesdays

2300 Canada (North-Quebec): As It Happens. See M 2300.
2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 USA, KWHR Naalehu HI: The Prophecy Club. See M 2300.
2300 WHRI (Angel 1): Music. See S 0200.
2305 WHRI (Angel 2): People to People (live). See M 2305.
2330 USA, KWHR Naalehu HI: Moments in Bible Prophecy. See M 2330.
2334 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2344 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
2345 USA, KWHR Naalehu HI: Reach Out. See M 1500.
2349 Belgium, R Vlaanderen Intl: Around Town. Current happenings in Brussels and other centers of culture.
2355 Belgium, R Vlaanderen Intl: Music. See S 2355.

Thursdays

2300 Canada (North-Quebec): As It Happens. See M 2300.
2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 USA, KWHR Naalehu HI: The Prophecy Club. See M 2300.
2300 WHRI (Angel 1): Music. See S 0200.
2305 WHRI (Angel 2): People to People (live). See M 2305.
2330 USA, KWHR Naalehu HI: Moments in Bible Prophecy. See M 2330.
2334 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2343 Belgium, R Vlaanderen Intl: International Report. Commercial development in the European market.
2345 USA, KWHR Naalehu HI: Reach Out. See M 1500.
2349 Belgium, R Vlaanderen Intl: Economics. Interview with a person in the field of business, finance, or consumerism or a updating report.
2355 Belgium, R Vlaanderen Intl: Music. See S 2355.

Fridays

2300 Canada (North-Quebec): As It Happens. See M 2300.
2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 USA, KWHR Naalehu HI: The Prophecy Club. See M 2300.
2300 WHRI (Angel 1): Music. See S 0200.
2305 WHRI (Angel 2): People to People (live). See M 2305.
2330 USA, KWHR Naalehu HI: Moments in Bible Prophecy. See M 2330.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2340 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2344 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
2345 USA, KWHR Naalehu HI: Reach Out. See M 1500.
2349 Belgium, R Vlaanderen Intl: Tourism. See M 0651.
2354 Radio Netherlands: Documentary. Can White Folks Play the Blues? (7th). See W 1154.
2354 Radio Netherlands: Documentary. Five Years of Yugoslavia (22nd,29th). See F 1454.
2354 Radio Netherlands: Documentary. Year of the African Child (14th). See A 2354.
2355 Belgium, R Vlaanderen Intl: Music. See S 2355.

Saturdays

2300 WHRI (Angel 1): Music. See S 0200.
2300 WHRI (Angel 2): DXing with Cumbre. See S 0330.
2308 Canada, RCI Montreal: Quirks and Quarks. See S 1206.
2330 WHRI (Angel 2): Biblical Studies Institute. See S 0300.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Music from Flanders. See A 0640.
2355 Belgium, R Vlaanderen Intl: Music. See S 2355.

Hauser's Highlights

FRANCE: R. France Internationale

English, Z-96

1200-1300	via France	9805, 15155, 15195, 13625, 15530
	via Gabon	15325
	via Xi'an China	11600
	via Guiana to NAm	13625
1400-1500	via France	15405
	cia China	7110
	via Gabon	17560
1600-1700	via France	6175, 11615, 15210, 15460, 15530
	via Gabon	11700, 12015
1700-1730 (*BC-DX*)	via France	15210, 15460

UMBRELLA ORGANIZATIONS (no individual memberships)

Association of North American Radio Clubs (ANARC): Richard d'Angelo, 2216, Burkey Drive, Wyomissing, PA 19610. 18 member clubs across North America.
European DX Council (EDXC): Risto Vahakainu, Sec. Gen., P.O. Box 214, FIN-00101 Helsinki, Finland. 16 member clubs across Europe.
South Pacific Association of Radio Clubs (SPARC): Arthur Cushen, 212 Earn Street, Invercargill, New Zealand.

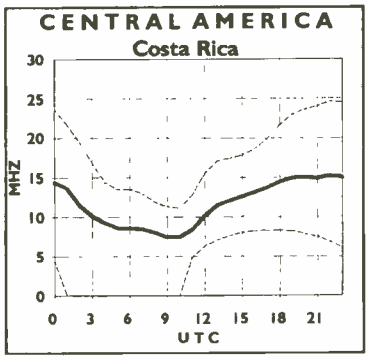
MONITORING CLUBS OUTSIDE NORTH AMERICA

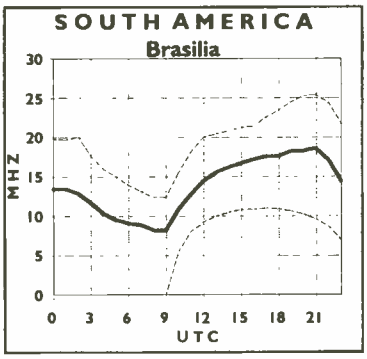
Associazione Italiana Radioascioto (AIR): C.P. 873, 34100 Trieste, Italy. Broadcasting all bands, utilities, pirates. *Radiorama* (Italian) 70,000 lira. April 25 annual mtg.
Australian Radio DX Club Inc: P.O. Box 227, Box Hill, Victoria 3128, Australia. SW, MW, Utilities. *Australian DX News.* Sample 2 IRCs or $2US cash.
British DX Club: Colin Wright, 126 Bargery Road, Catford, London, SE6 2LR, United Kingdom. UK and international. SW, MW, AM, FM DXing, pirate and clandestine. *Communication.* L10 UK, L12 Eur, L16 ww. Sample 3 IRCs or $2 US cash. Meets monthly in Twickenham (London).
Club d'ondes courtes du Quebec: Denis Pronovost, C.P. 61, Anjou, Quebec, Canada H1K 4G5. E-mail: papineau@msn.com. Exclusively shortwave. Annual $40 Canadian. *L'Onde*, monthly (French). Sample US$2.
Danish Shortwave Clubs International (DSWCI): Travleager 31, DK-2670 Greve, Denmark. SW, MW, Utilities. *Shortwave News* monthly (English). D.kr.225/45 IRCs Nordic countries. Sample 4 IRCs.
DX Australia: P.O. Box 422, Moonee Ponds, Victoria 3039, Australia. MW, SW. *DXers Calling.*
DX Club of India: Navin Patel, 1-Dutt Niwas, 809 - M.G. Road, Mulund, Bombay-400 080. India. India; MW/SW/Ham. *DX World* (quarterly) Rs 50/-, 30 IRCs outside India. 3 IRCs sample.
DX Club Paulista: Marcelo Toniolo Dos Anjos, C. Postal 592, Sao Carlos - SP (Brasil), 13560-970. South America. Shortwave, including utilities. *Actividade DX* (in Portuguese).
Finnish DX Association: Mr. Heikki Aarrevaara, Suomen DX-Liitto, P.O. Box 454, FIN-00101 Helsinki, Finland; +358-0-6949017 fax. Finland and worldwide. SW and BCB. *Radiomaailma.*
Friendship DXers Club: Ing. Santiago San Gil Gonzalez, C.DX.A - International, P.O. Box 202, Barinas 5201-a, Estado Barinas, Venezuela. Venezuela and Caribbean. DXing all bands. Cadena DX, YV-2-FSW, Sunday 1130-1330 UTC on 7113 kHz. Venezuelan membership free.
International DX Association: Bedanta Das, 1 - No. Galiahati, Near Night School, Barpeta - 781301, Assam, India.
International DX Organization: Radio Juel Club, c/o Ranjit Kr. Nath, G.C. Lana Galiahati, Barpeta, India. Ham/DX/SWL. Annual 60/-rs or 22 IRCs. *DX Around* (quarterly) sample plus club info 14 IRCs.
International Listeners Organization: Kalab Abbas, St. No. 1, H, No.231 Waris Rd, Sheikhupura, Pakistan 39350 South Asia. Broadcasting. *Listener Times.*
International Radio Youth Club: G.M. Mostafa Kamal, Amla Wapda Colony-1, Kushtia-7032, Bangladesh
National Society of Pakistani DXers: Mr. Liaqat Ali, E-161/1, Iqbal Park, Opposite Adil Hospital Defence Housing Society Road, Lahore Cantt., Pakistan. Worldwide. All wave. Has library, meets fortnightly 1400-1800 UTC at library. 4 IRCs for more info.
New Zealand Radio DX League: P.O. Box 3011, Auckland, New Zealand. MW, SW, FM, TV, utilities. *New Zealand DX Times.* Sample 2 IRCs. Branches meet monthly.
New Zealand DX Radio Association: Mr. R. Dickson, 88 Cockerell St., Brookville, Dunedin, New Zealand. MW, SW, amateur and utilities. *Tune-In.*
North Ontago Radio Listener's Club: P.O. Box 179, Oamaru, New Zealand.
Pakistan SW Listeners Club: Mrs. Fatima Naseem, Sultanpura, Sheikhupura , 39350 Pakistan; Pakistan; SWBC.
QSL Club de France: Patrick Frigerio, 40 Rue de Haguenau, 67700 Saverne, France. SWBC, pirates, CB-DX, hams, etc. *Courrier* (in French). 6 bulletins, 72 FF, EEC=16 IRCs, elsewhere 20 IRCs.
Shortwave Radio Communications Club: Atiqur Rehman, Dawood Street, Khalid Road, Sheikhupura, P.C. 39350 Pakistan. South Asia; MW/SW. *The Amateur* (Urdu language). Meets 1st Fri on SW Complex, S.K.P.
South African DX Club (SADXC): P.O. Box 18008, Hillbrow 2038, South Africa; MW, SW, utilities. $60 annual airmail to US; *The South African Shortwave Listener.*
Southern Cross DX Club Inc.: Stephen Newlyn, G.P.O. Box 1487, Adelaide, SA 5001, Australia. Worldwide and Pacific. All bands. *DX Post.* $25 annual in Australia. Meets last Fridays, 8pm, Thebarton.
Swedish DX Federation (SDXF): Box 3108, S-103 62 Stockholm, Sweden. 10 issues *Eter-Aktuellt.* Membership in Sweden 160 SC annual. SweDX BBS +46-(0)8-53034727; Fidonet 2:201/339; Internet sysop@swedx.ct.se
Stichting ScanSearch Military Aircraft Communications (SC-MAC): Gerbrand Diebels, Roer 29, 5751 TJ Deurne, Netherlands. Military aviation NW Eur (VHF/UHF) and worldwide (HF). *Airlift* (Dutch) bi-monthly. FL 35, up to FL 45 outside Netherlands.
Universal DX League: Mr. Kanwarjit Sandhu, 408, Krishna nagar, Ludhiana 141 001. India. India and Int'l; SW/MW/AM/FM/TV DXing/Pirate and Clandestine. *DX Post* bi-monthly, sample 4 IRCs. Annual 24 IRCs or US$10. SWL net: Sun 0300 UTC on 7080 / 1600 on 14150 SSB, VU3SIO net control.
Viamão DX-Club: Alencar Aldo Fossá, P.O. Box 101, Cunhas Road 1286, Jaguaribe Residential Park, 94400-970 Viamão, Rio Grande Do Sul, Brazil, South America. SWBC. Meets occasionally; multi-lingual.
Wonderful World of Shortwave: Baber Shehzad, 43 - Habib Colony, Bahawalpur, 63108 Pakistan. Asia and worldwide. SW listening; mail forwarding service. Annual 5 IRCs Asia & Middle East, 10 IRCs elsewhere. *WAVES* (quarterly).
Worldwide DX Club: Michael Bethge, Postfach 1214, D-61282 Bad Hamburg, FRG. E-mail 100657.2376@compuserve.com. Worldwide membership. SW/MW/Utilities. Annual DM 30.00 or 15 IRC's. *DX Magazine*, monthly (English, some German) Sample DM 1.75 or 2 IRCs.

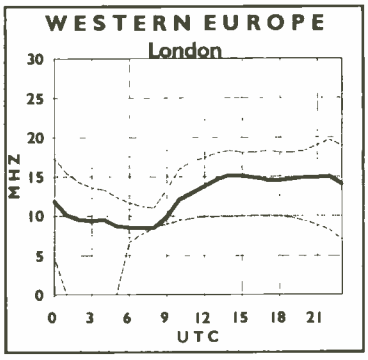
Ontario DX Association: Harold Sellers, General Mgr., P.O. Box 161, Station A, Willowdale, Ontario M2N 5S8, Canada: Internet 73737.3453@compuserve.com; (905) 853-3169 voice & fax, (416) 444-3526 DX-Change information svce; (905) 841-6490 BBS. Predominantly Province of Ontario; All bands. *DX Ontario.* Meet 3rd Wednesdays, Toronto
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: Box 500, 2245 Eton St., Vancouver, BC Canada V5L 1C9, (604) 255-8987 fax. Shortwave. *LOGJAM.* Meets 3rd Thurs. 7pm at 920 Davie St.
World DX Club: Arthur Ward, 17 Motspur Drive, Northampton, England NN2 6LY (in USA-Richard D'Angelo, 2216 Burkey Drive, Wyomissing, PA 19610). Worldwide.
All bands with emphasis on SW. *Contact.* $22 overseas airmail. Meets every 6 weeks in Reading, UK.
Worldwide TV/FM DXers Association (WTFDA): P.O. Box 514, Buffalo, NY 14205-0514. Worldwide membership; TV DX, FM BC, VHF utilities. *VHF-UHF Digest.* Annual convention. $24 annual in U.S. $2 for sample.
Worldwide Ute News: Rick Baker, ae411@yfn.ysu.edu for info - worldwide membership; non-broadcast under 30 MHz. Free electronic newsletter WUNNEWS, join by sending e-mail to majordomo@grove.net with following in e-mail message: "subscribe wun." Through World Wide Web: http://www.leonardo.net/berri/wun. For paper version: $18/yr to Tim Braun, PO Box 16533, Washington, D.C. 20041-6533. Sample $1.50.

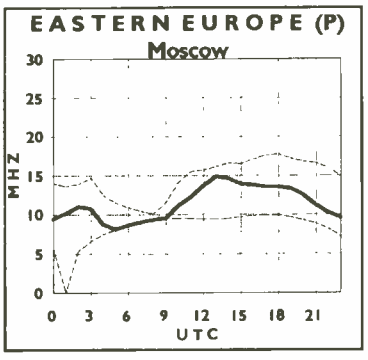
Propagation Conditions: Eastern United States

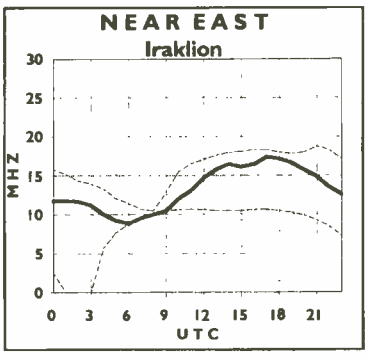
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear. The Sun Spot Number used this month for forecasting purposes is 5.

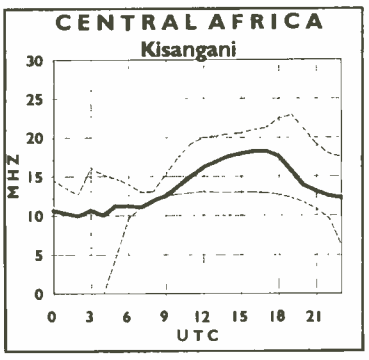


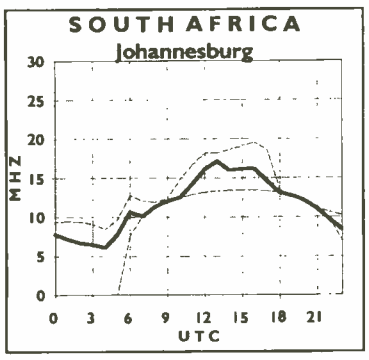


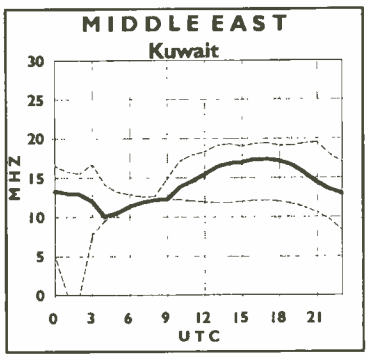


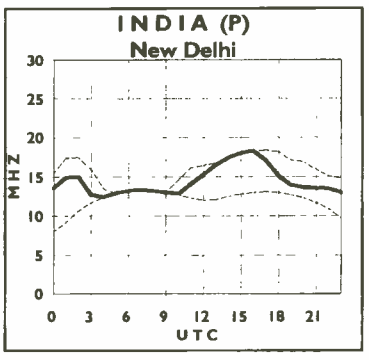


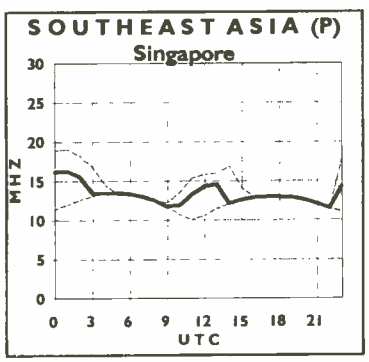


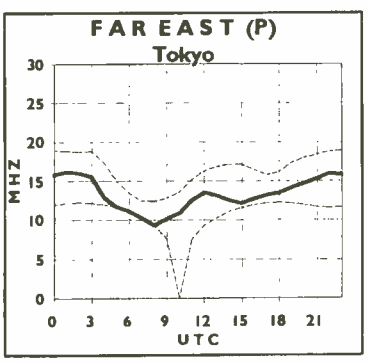


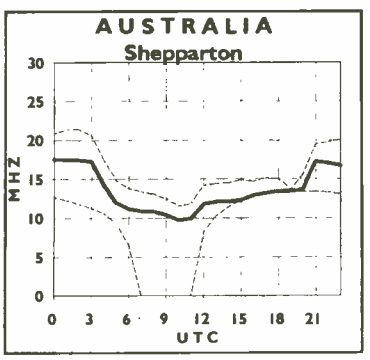






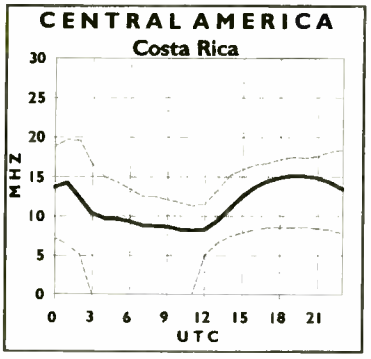


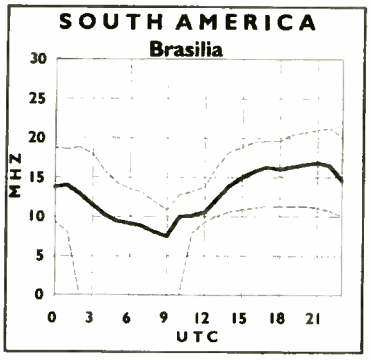


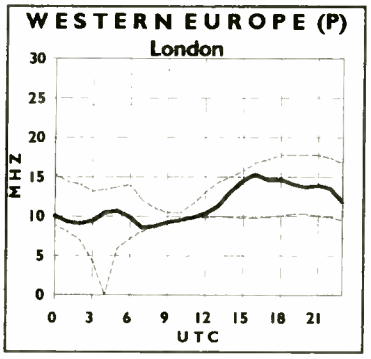


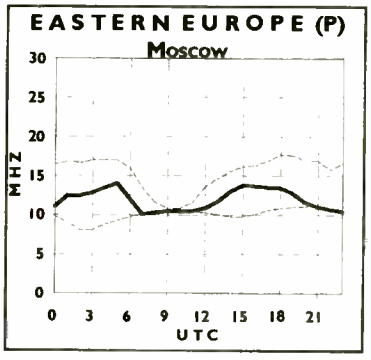
Propagation Conditions: Western United States

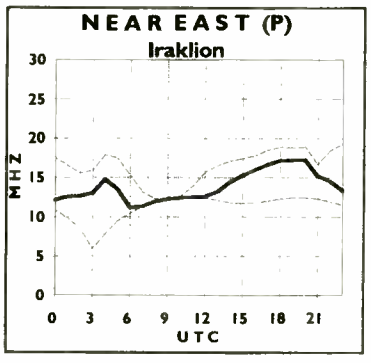
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.

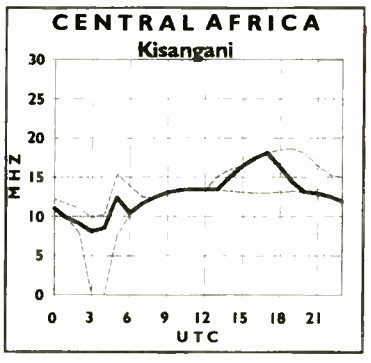


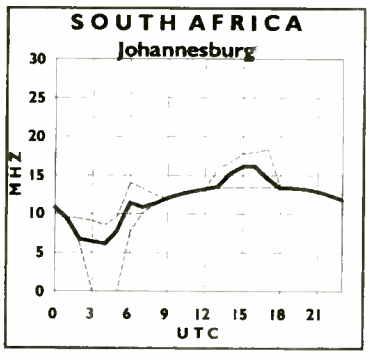


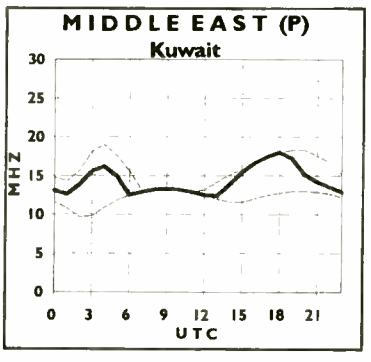


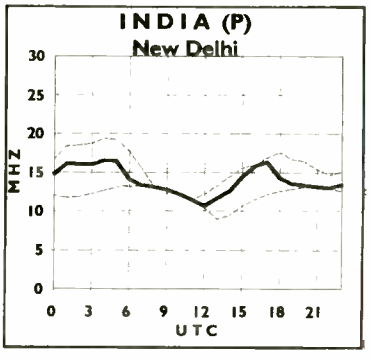


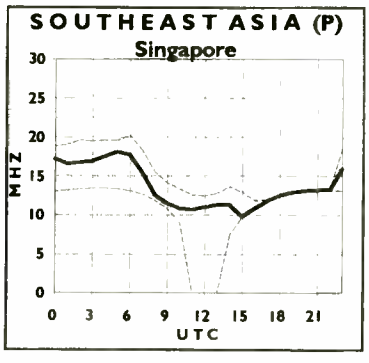


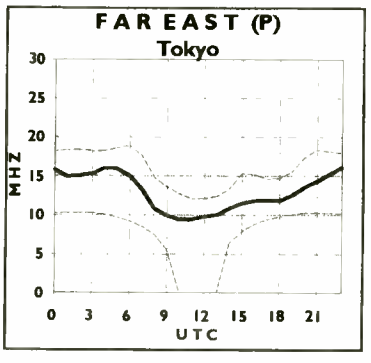


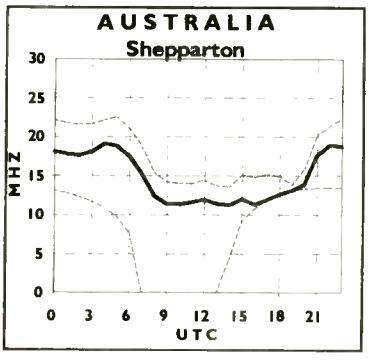












Kevin Carey, WB2QMY
kevinc@mdsroc.com

Surfing for Longwaves

Finding information about the low frequencies has always been a challenge. It was only a matter of time, however, before the Internet—that vast resource of online information—became home to a sizable number of longwave pages.

This month I've put together a list of World Wide Web (WWW) sites that contain information catering to basement band enthusiasts. The list is by no means exhaustive, but rather, is intended as a starting point for some of the more popular longwave sites. If you have favorites to add to the list, please send them along to me c/o *MT*, or via e-mail at the address at the top of this page. Happy surfing!

www-pw.physics.uiowa.edu/mcgreevy

This site contains natural radio information and numerous whistler sound files. Each sound file includes a description of the conditions under which the recording was made.

http://users.aol.com/lwcanews/lwcanews.html

This is a new page presented by the Longwave Club of America (LWCA).

http://server5550.itd.nrl.navy.mil/projects/haarp/elf/elf.html

At this site you will find information on the Navy's massive ELF system near Clam Lake, Wisconsin. This system operates near 76 Hertz (yes, Hertz!)

http://harpo.tnstate.edu/~dybkaj/home.htm

A site created by *MT* reader Jill Dybka. Contains a variety of information on her longwave listening activities with an emphasis on DXing for utility beacons.

http://www.bluefin.net/~mike/hobby.html

This site covers a variety of Part 15 (license-free) lowfer and medfer topics.

http://cellini.leonardo.net/berri/wun/

This is the Worldwide Utility Network (WUN) homepage. It carries the WUN newsletter, plus numerous files relating to "Ute" monitoring. LWLs will want to check out *"Surfing the Longwaves"* by WUN columnist George Karayannopoulos, N2OWO.

http://www.mdsroc.com/navaid

An electronic directory of most North American aero beacons. It is maintained by Christopher Piggott, WZ2B

http://www.cybercomm.net/~slapshot/speedx.html

A spin-off from the former SPEEDX club maintained by Bob Colyard. Geared mainly towards HF/Shortwave, but you can find some links to LF-related topics and postings as well.

http://www.chilton.com/scripts/radio/R8-receiver

Here's your chance to tune the longwaves live with a Drake R8 receiver based in Reston, Virginia! A link to this site is also available through the SPEEDX page above.

http://www.grove.net/mt95index.html

This is an offshoot of the Grove Enterprises homepage (http://www.grove.net). It contains a complete index to the *Below 500 kHz* column for 1995. Also includes information for obtaining reprints of past articles.

http://www-star.stanford.edu/~vlf/Welcome.html

If VLF phenomena is your thing, don't miss this homepage presented by the Very Low Frequency Group. It contains technical discussions exploring the strange happenings in radio's low end.

■ Longwave/Part 15 BBS

Although this one's not on the Internet, it is nevertheless a prime electronic resource for LF enthusiasts. You can access the BBS by dialing **(706) 672-0360** (Warm Springs, GA). This board is run by John Davis, *LF Notebook* editor for the Longwave Club of America.

■ MAILBAG

• John Musgrove (B.C., Canada) came up with a novel use for an ailing RDF receiver. When his Sonar RDF quit working, John replaced the receiver's guts with his modern Lowe HF-150 receiver, thereby retaining the use of the Sonar's excellent directional antenna.

By mixing the old with the new, he now has a dependable system that can be used effectively for maritime navigation. Photo 1 shows a picture of John's setup aboard his sailboat. The rotatable antenna is mounted on top of the old receiver cabinet. (For reference, the old Sonar receiver is shown to the right of the new setup.)

• Speaking of practical uses for longwave, an interesting letter arrived (via Internet) from Phil Collier (NY) who pilots a Saab SF-340 aircraft. Phil considers his LF gear an important part of his navigational tool set.

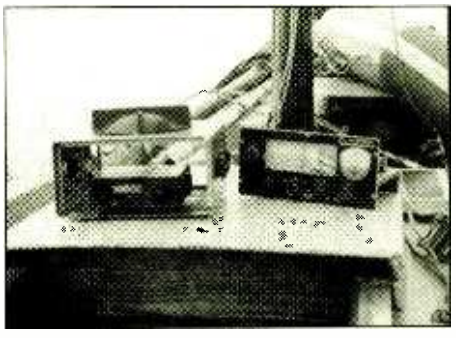
While there are many other navaids available to the modern pilot, Phil stressed that "beacons are important backups which provide navigation coverage to smaller airports and enhance approach procedures." Perhaps more advanced systems will take over entirely someday, but for now, Phil says that aviation beacons are "alive and well" and are a daily part of his flight activity.

• In the historical department, Bruce Kelley, Curator of the Antique Wireless Museum (Bloomfield, NY) forwarded a "happy ending" news story from Cape Cod, MA.

The story reported that for the second time since 1989, thieves had stolen the Marconi sculpture from "Old CC," the site of Marconi's 200 kHz transatlantic station in South Welfleet, Massachusetts.

This time, a general contractor found the sculpture stuffed into a trash bin. Not knowing the significance of his find, he loaded it into his van as a keepsake. He carried it around for over two months before one of his friends recognized it as the stolen Marconi bust. At that point the man immediately turned it over to authorities. Luckily, the sculpture showed only minor damages.

MT readers may recall the December '95 *Below 500 kHz* column where I chronicled a visit to "Old CC"—including a view of the sculpture mounted on its pedestal. Park authorities are now discussing moving the sculpture to an indoor display area.



John Musgrove's modified RDF system

That's it for this month. Enjoy the nice weather and I'll see you next month with some tips for improved summertime listening.

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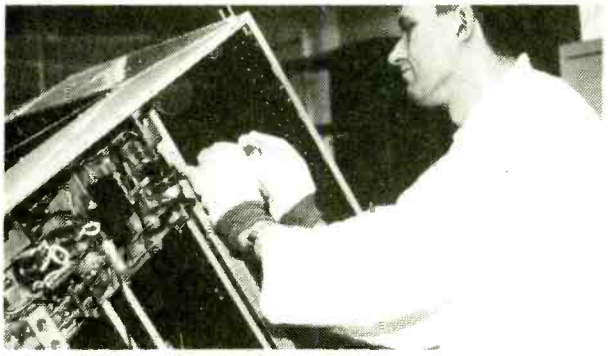

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TV's Most Exotic DX - or Was It?

Many pursuits have their "urban legends," exotic stories that are repeated (and occasionally embellished) through the generations. Stories that everyone swears are true, but nobody can conclusively prove. Usually, these stories have a grain of truth surrounded by mystery — and exaggeration. The story that follows is domestic-band DXing's own urban legend.

It was October of 1953 when Paul Huhndorff, chief engineer of channel 2 in Houston, Texas, received the letter. Huhndorff was quite familiar with DXers; *Radio-Electronics* had reported that nearly half of all DX reception reported to its pages was of his station. At one point, a columnist suggested the station seemed to be starting a national service! To this day, Houston's Channel 2 remains one of the most frequent TV DX catches. But this reception report was different.

The stamp and postmark were the first evidence. The letter came from a Charles Batley of London, England; it reported reception of the station at 3:30 pm London time (8:30 am in Houston) on September 14, 1953. Enclosed was a photograph showing what appeared to be a station ID slide, showing the call letters KLEE-TV.

Channel 2's previous best report had come from a Halifax, Nova Scotia, viewer. While U.S. amateur VHF signals had been heard in England in 1946 and 1947, the TV station operated at a higher frequency. Today, we understand that transatlantic reception of channel 2 signals *is* possible, but almost always, only coastal stations are involved. Reception of a Texas TV station in Europe is possible, but it would definitely be front-page news! This story, however, gets even stranger.

W. Albert Lee had put KLEE-TV on the air on January 1, 1949, as Houston's first TV station. For some reason, Lee was unable to continue operating the station; in May of 1950, he sold it to H&C Communications, Inc., owners of KPRC Radio. Upon approval of the sale, H&C changed the station's callsign to KPRC-TV, the call it still holds today. Read the previous two paragraphs again — Mr. Batley saw KLEE-TV *three years after it went off the air!*

The exotic report reached the general-interest press. Articles appeared in *TV Guide, Reader's Digest,* and several local newspapers. It was the peak of the Cold War, electronic developments, and UFO mania. Americans were being inundated with new and exotic technology, some of it amazingly helpful and some of it potentially brutally destructive. Was this exotic long-distance TV reception merely a natural phenomenon? Or was it the work of the Russians? Or the CIA? Or extraterrestrials? Were the signals reflected off some distant planet? Were they trapped in a duct within Earth's own atmosphere? Most accounts of the KLEE-TV incident end here.

How did it *really* happen?

Calmer minds in the scientific community suggested a hoax played by British hams, but even many in the scientific community felt it unlikely that hams could marshal! the resources to build a pirate TV station. Huhndorff's explanation was somewhat more down-to-earth: he suggested Batley had seen a distorted ad for Kleenex facial tissues. However, his search to determine which U.S. channel 2 station had aired a Kleenex ad at that time proved fruitless. (It does not appear that he tried to contact British stations)

After Huhndorff's attempt to prove the "Kleenex theory" failed, he decided to write Mr. Batley for more details. Batley referred him to two British inventors who'd built the equipment on which he saw KLEE-TV. Henry Taylor and George Baron told Huhndorff the TV used was enhanced for American DX, but of generally standard design. The difference was in the antenna; they'd used something called a "light cell." According to their claims, this device allowed them to receive several American stations as far away as California! Requests for further details on the "light cell" went unanswered.

Huhndorff would soon discover why. His station had since received several additional reports from Britain, and he learned that many other American stations had also received reports from England. Every report claimed reception of an ID slide — never any programming. Every reporter was in some way associated with Taylor and Baron. Some reporters claimed to have seen IDs from stations in the Soviet Union — written in English.

At this point, it was obvious that the KLEE-TV stunt was indeed a hoax. While Huhndorff was never able to contact Taylor or Baron, other individuals in Britain told him the pair were basically con men. It would appear they set up demonstrations for potential investors, then generated fake ID slides on the TV screen in the room. Their victims were asked to photograph the pictures and provided form letter reception reports to mail to the U.S.. They were well-known in England for other schemes, including one attempt to sell a "death ray" to the government.

Unfortunately, my sources on this story end here. I don't know if Taylor or Baron were ever prosecuted, or if they ever confessed to the hoax. It would certainly have been a complicated project, especially if the fake IDs had been electronically transmitted to the special TV sets. In any case, you now know most of the truth about DXing's own "urban legend."

Donald Pipa on Long Island received this QSL from RCN-770, Bogota, Colombia. Many other DXers should be able to log this station. Note the mailing address: Calle 37, No. 13A-19, Bogota, Colombia

Expanded-band notes

The FCC is trying again. A new list of stations to be given expanded-band frequencies has been released. The new list has 87 stations — eight more than

WNYC-820 and WNYC-93.9 are two of Donald's local stations. Owned by the City of New York, both are NPR affiliates.

the 1994 plan shot down by broadcasters. Only one station (KALT Atlanta, Texas, currently on 900) is shown on 1610 kHz. Under this plan, KXBT Vallejo, California, which recently began broadcasting on 1640, will have to move to 1630. I personally suspect stations won't be any happier with this new list, and suspect it'll end up in federal court. The list is too long to reproduce here, but you can find it on the Internet at **www.fcc.gov/mmb/asd/exband.html.**

QSLs are now arriving from KXBT-1640 and WJDM-1660. George Knight of New Jersey sent a copy of his WJDM QSL. Unfortunately, it won't reproduce legibly in *MT*. Chief Engineer Don Neumuller says the 1660 operation uses a Harris DX-10 transmitter feeding the same 80-foot tower in Union, New Jersey, used by their station on 1530. This is an unusually short tower; most AM broadcast towers are at least 100 feet tall. Neumuller's letter says the 1530 kHz transmitter will continue to operate until its license expires.

Mike King in Maryland has also received a WJDM-1530 QSL. Pat Griffith in Colorado has received the first KXBT-1640 verification I've heard reported. At this time, I'm not aware of anyone receiving a QSL from KTRK-1670 (or any of the other calls used by that station).

Bits and Pieces

• Reports in *DX News*, the publication of the National Radio Club, indicate that nobody in the Lower 48 logged the DX Test run by KICY-850 Nome, Alaska, on March 16. But it didn't go totally unheard. Don De Caria NF7R, who DXs from Japan, logged this exotic test. He also reports reception of the other Nome station (KNOM-780), as well as KPNW-1120 and KEX-1190 from Oregon, KGU-760 Honolulu, and tentative reception of CFUN-1410 Vancouver. Don uses an ICOM ham rig and a 120-foot long-wire antenna.

• Northeastern DXers should expect a new Spanish-speaking station on the AM dial. Charles Bernth reports WPAT-930 has made its long-expected move to a Spanish-language music format. Their FM station on 93.1 was sold to a different company and adopted a different Spanish-language format late in 1995.

• A few more WWW links for the domestic-band DXer have appeared. **http://www.xmission.com/~insearch/links.html** goes just about everywhere; it links to all known radio and TV stations on the Web, among many other places. Two sites provide an interactive link to the FCC's engineering databases: try **http://www.radiostation.com** and **http://radio.aiss.uiuc.edu/~airwaves/fccdb.html**.

Let us know what you're hearing on the domestic bands! Write P.O. Box 98, Brasstown NC 28901, or via the Internet to 72777.3143@compuserve.com. Good DX!

SKIPPING IN

Donald Pipa on Long Island, NY, received the following stations on his Sony ICF-SW77. He has QSLs from all of them, some of which appear elsewhere in this column.

540	CJSB	Ottawa, Ontario
760	WJR	Detroit, Michigan
770	RCN	Bogota, Colombia
1120	KMOX	St. Louis, Missouri

CJSB is no more; shortly after Donald logged it, the station moved to 106.9 FM and became CKQB.

George Zeller
George.Zeller@acclink.com

Micro Pirates Widespread

An FCC bust ended the career of a Lutz, Florida, micropirate that had operated on 96.7 MHz in the FM broadcasting band. According to an *Orlando Sentinel* article forwarded by *MT* reader August Pickett, FCC engineer Ralph Barlow "ended" the broadcasting career of Arthur Lonnie Kobres in Lutz. Kobres claimed that he had been busted because he discussed "details of an impending secret world order." Barlow denied that program content was related to the bust.

Anton Ninno of Syracuse, New York, says that he regularly hears JAM-FM, a local FM pirate on 90.7 MHz. Scores of stations like this are active in cities across the United States. It pays to check the low end of the FM broadcasting band in your area to see if you have any local pirate activity. They come and go, so a regular bandscan of the local FM band is necessary to find them.

Two excellent pirate radio World Wide Web home pages feature links to dozens of local pirate broadcasters. **Glen's Pirate Page** at http://206.130.20.1:80/~glen/ and **The Free Radio Network** at http://www.clandjop.com/~jcruzan/frn.html are good places to check. They contain references to a wealth of pirate information found on the internet, including local micropirates and the shortwave broadcasters that we feature in this column.

Clandestine Jammer

Mark Dawson of Alexandria, Virginia, writes in with an interesting log. On March 2 at 0330 he heard twenty minutes of upper sideband jamming on the 9830 kHz signal of **Radio Havana Cuba.** The jammer identified itself as **Radio Alpha 99,** with many "Viva Cuba Libre" slogans. Things like this are often intermittent, so it pays to constantly check the shortwave broadcast bands for unusual activity.

Cumbre Book Project

The excellent weekly internet shortwave newsletter, *Cumbre DX,* has organized a service project that is distributing last year's 1995 copies of the *World Radio and TV Handbook* and *Passport to World Band Radio* to economically disadvantaged DXers outside North America. Cumbre is sending last year's reference books as donations to radio hobbyists overseas who otherwise could not afford them. They ask for your help. Books that you no longer need, plus a $10 donation to cover shipping costs, can be sent to PO Box 392, Odenton, MD 21113.

If you wish to nominate a worthy recipient, letters to Odenton or e-mail via 73042.3644@compuserve.com on the internet will get the info to the right place. This is a very worthwhile effort, so your support will be appreciated

THE LOGICAL ALTERNATIVE

QSL # 10: G. Zeller

Confirming your reception on 6955 kiloHertz in the time range between 2303 and 2359 UTC on October 30, 1995 as evidenced by your logging in the December 1995 *A*C*E bulletin.**

73 and FFFR! Jeff Carmichael

Some pirates, like the Logical Alternative, QSL ACE logs.

Pirate Awards Program

Many North American DXers have earned awards for their collection of pirate and clandestine QSL's. The two best known awards programs are operated by ACE and NASWA in the United States. A less well known one is administered by Bruno Peccolatto, Associazione Italiana Radioascolto, via Soana 13, I-10085 PONTSANAVESE (TO), Italy. AIR awards information is available through the mail at this address, or via e-mail using pecolatto@eponet.it for your inquiry.

When to Hear Pirates

George Jadoon of Clovis, California, and Martin Thiel of Holiday, Florida, both ask a question that interests all of us: "When is the best time to hear pirates?" Our logs this month illustrate when stations were active recently, but pirates come and go on an unpredictable schedule. If present patterns hold, pirates should be active at somewhat later times in June because of the longer summer daylight. Times between 0000 and 0500 should be more active now than they were during the winter. Also, many listeners have been hearing pirates during weekday daylight hours between 1300 and 2300 UTC.

What We Are Hearing

Addresses used by the HUGE volume of pirate stations reported this month include PO Box 452, Wellsville, NY 14895; 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 17534, Atlanta, Georgia 30316; PO Box 25302, Pittsburgh, PA 15242; and Ostra Porten 29, S-44254 Ytterby, Sweden. For return postage, enclose three 32¢ stamps in the envelope to USA addresses; $2 US or two International Reply Coupons go to foreign drops. All frequencies are in kHz, with times listed in UTC.

Action Radio- 6955 at 2230. It's been a while since A. J. Michaels has shown up on the pirate bands. Barry heard him with Radio Animal of WKND and Wild Steve of XERK with a show emphasizing conversation. Addr: Pittsburgh. (Barry Williams, Enterprise, AL; Michael Prindle, New Suffolk, NY; Pat Murphy, Chesapeake, VA)

Altered States Radio- 6955 at 2200. William Hurt has returned with his well produced mix of eclectic music and commentary. Addr: Merlin. (Dennis Myhand, Mercedes, TX; Williams)

Free Hope Experience- 6955 at 0330. Major Spook plugs other pirate stations during most broadcasts. His original sketches add entertainment value to a diverse musical playlist. Addr: Blue Ridge Summit. (Rich & Talea Jurrens, Katy, TX; Robert Ross, London, Ontario; Ike Kelly, Houston, TX; Howard E. Lyon, Voice of Oz; Jesse Rose, Hampton, VA; Williams; Murphy)

Gerry Rigged Radio- 6955 at 2100. This new one generated several guesses about its identification, which was delivered by a somewhat distorted voice. It's now clear that the proper ID is this one for a station featuring old TV audio from shows like *Mr. Ed* and *Lost in Space.* Addr: Providence. (Neil Wolfish, Toronto, Ontario; Murphy)

K-2000- 6955 at 0600. This hilarious DX parody station won first prize in the 1995 Pirate Popularity Poll. Members of *The ACE* particularly cited their "Trial of the Century" program, where DXer John T. Arthur was acquitted after an O. J. Simpson-style show trial. Addr: Stoneham. (Williams; Jurrens)

KDED- 6955 at 0100. As previously announced here, they are supplementing their trademark Grateful Dead music with a forthcoming "Blabbermouth Show" featuring three minute bits sent in by listeners. Here's your chance to be heard on a pirate!

Addr: Providence. (Jerry Cootsworth, Merlin, Ontario; Rondy Ruger, North Hollywood, CA; Mark Fine, Remington, VA; Mike Ryan, Buena Park, CA; Dick Pearce, Brattleboro, VT; Kelly; Wolfish; Jurrens; Williams; Rose; direct from the stotion)

KIRK- 6955 at 0230. Jesse had the only log of this new one that I have seen so for. It plays punk rock with an incongruous slogan of the Voice of the Ozarks. Addr: None. (Rose)

KNBS- 6955 at 2000. Phil Muzik, during his tenth year of operation, came in third in the 1995 Pirate Popularity Poll released by *The ACE*. Comedy and irony are staple fare on this pro-marijuono station. Scott snagged their QSL! Addr: Wellsville. (Scott Krauss, Cleveland, OH; Wolfish; Murphy)

Midnite Radio-6955 ot 1900. They disappeared for a while, but they returned in April with o broadcast criticizing corporate America. Addr: Blue Ridge Summit. (Murphy)

Mystery Radio- 6955 at 0100. Their musicol format vories slightly from show to show, perhaps accounting for the "mystery." A recent effort was dominated by techno rock and industrial music. Addr: Stoneham. (Jurrens; Fine; Coatsworth; Willioms; Wolfish; Ruger; Ross)

New World Radio- 6955 at 0430. Not much is known about this new pirate. Borry heard them discussing the drug problem. They said to send reception reports to *MT*, but they should instead work with a maildrop. Addr: None. (Williams; Jurrens)

North American Pirate Relay Service- 6955 at 1730. Richard T. Pistek's NAPRS relays of Europirates give us o chance to hear stations otherwise inaudible in North America. Neil and Barry heord **Sunshine Radio International** via this route, while William heord **Radio Titanic International.** Addr: Wellsville. (William Hassig, Mt. Prospect, IL; Murphy; Wolfish; Williams)

Outlaw Radio- 6955 ot 0315. Their distinctive oir raid siren intervol signal precedes ond ends o mix of skits and porodies that ore well produced. A female announcer hosts the broadcasts and tosses in risqué comments. Addr: Providence. (Tom Prevo, Lincoln, NE; Coatsworth; Williams)

Partial India Radio- 6955 ot 1900. Sonjoy is sending out QSL's like the one we pictured in May. Both David ond John got one. Addr: Stonehom. (David Chapchuk, Scranton, PA; John Stern, Metuchen, NJ)

Radio 1620- 1620 ot 0100. David has been using his Kiwa medium wove loop lotely, ond he was rewarded with this good catch. They ployed blues music, but gave no locotion to send the cards ond letters that they requested. Addr: None. (David Gasque, Orongeburg, SC)

Radio DC- 6955 at 0000. It's election year, so this stotion's "Don't Vote Republican" Morse code message is being heard ogoin. Addr: None, sometimes verifies logs in *The ACE*. (Dawson)

Radio Doomsday- 6955 ot 0230. Nemesis, a veteran pirate, is not nearly os active os he used to be. But, when he's on, his professionally produced rock music shows and pirote rodio commentory ore usually widely heard with a good signal. Addr: Ytterby. (Chuck Porter, Troy, NY)

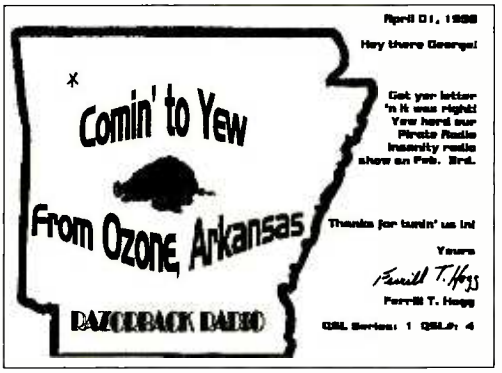
Radio Free Speech- 6955 at 2315. Bill O. Rights won second place in this year's Pirate Popularity Poll sponsored by *The ACE*. His frequent broadcosts, entertoining comedy, and free speech odvocacy led to this honor. Addr: Wellsville. (Wolfish; Jurrens; Murphy)

Radio Fusion Radio- 6955 at 0415. Like WBYR, this one ploys rap music. It came in next to lost in *The ACE* pirate popularity poll, but it's hard to tell why. Addr: Providence. (Williams)

Radio KAOS- 6955 at 2100. This well produced pirate follows the traditional pirate formot of rock music ond parody sketches. But, be advised thot their announced 800 toll free QSL number is actuolly a telephone sex line. Addr: None. (Lee Silvi, Mentor, OH)

Radio One- 6950 at 0200. After a long obsence, this slick rock oldies station hos returned. Its elaborate jingles and fost poce reflect highly professional production standards. Addr: Wellsville. (Kevin Graniero, Modison, WI; Lyon; Wolfish; Williams; Murphy; Prindle; Rose; Hassig)

Razorback Radio- The QSL that we pictured in April from the 1980's Razorback Radio hos been replaced by the new one thot is here this month. This mokes it clear thot the current version is a different station from the Razorback heard a decode ago. Addr: Stonehom. (Ross)



The "new Razorback Radio logo from Ferrill T. Hogg.

RBCN- 6955 ot 0000. Radio Bob's latest comedy effort was a celebration of the 20th anniversary of the TV character Mr. Bill, who suffered numerous misfortunes during the broadcast. Addr: Atlanta. (Bill McClintock, Minneapolis, MN; Joel Prout; Krouss; Willioms; Lyon; Hossig; Ross; Prindle)

ROCK- 6955 at 2015. Whot kind of music do they ploy? Your guess is correct. Where do you write to them? Toke onother guess. Addr: None. (Fine)

The Logical Alternative- 6955 ot 0100. Although it's only on occosionally, this one's new age music is selected for entertainment value. As we see here this month, their QSL's hove been orriving in moilboxes lately. Addr: None, but verifies logs in *The ACE*. (Jurrens; Ross; direct from the station)

Under Cover Radio- 6955 at 0115. This is an old log from Jonuory 8. Bob is looking for somebody else who heard this rock music pirote. It hod a booming signal in Morylond despite on onnounced 20 watt tronsmitter, but DX bulletins fail to note other logs. Addr: Unknown. (Bob Eisner; Germantown, MD)

Voice of Harlem- 6955 ot 0130. Suddenly we hove o whole stable of rap music stations; this is the lotest entry. Addr: None. (Hassig)

Voice of Indigestion- 6955 ot 0000. Although the nome does not inspire happy thoughts, their rodio shows ore entertaining. Rock, sketches, sound effects, and parody ads are normally heard. Addr: None. (Murphy; Rose; Williams)

Voice of Juliet- 6955 at 1500. This new operation is produced by a female announcer, but their mix of rock ond comedy sketches includes mole ortists. Signal strengths have been modest, but many of us have logged them. Addr: Merlin. (Coatsworth; Lyon; Murphy; Wolfish; Ross; Rose)

Voice of the Daleks- 6955 at 0230. Originally made famous on the Dr. Who television show, the Supreme Commander of the Dolek Empire now broadcasts his plans for taking over our planet via the pirate bands. Addr: Wellsville. (Myhand; Prevo; Murphy)

Voice of the Idiot Drivel- 6955 ot 2115. This new one also identifies itself as **VOID,** sometimes in CW Morse code. Rock, comedy, and sound effects have shown up in their shows. Addrs: Merlin ond Pittsburgh. (Ross; Murphy; Williams; Hassig)

WBYR- 6955 at 2315. The stotion's playlist consists of rop music. Its slogan is "Brickyard Radio." Addr: Providence. (Coatsworth; Wolfish)

WLIS- 6955 at 2130. Jack Boggan's stotion is easy to recognize from its format. He still plays interval signal tunes from legitimate shortwave broadcasters. The station offers 50 different QSL designs, and you can custom order one if you wish. Addr: Blue Ridge Summit. (Eisner; Hassig; Murphy; Wolfish; Ross; direct from the station)

WMOM- 6955 at 0145. With a slogan of "All Mom, all the time," they dedicate rock music to mothers. Barry's QSL came for a logging in *The ACE*. Addr: None. (Williams)

WPN, World Parody Network- 6955 ot 0515. Captoin Squirtlong mixes comedy with diverse musical selections. He's well integroted with the North American pirate radio movement, so news items ore often porodes for his well produced broadcasts. His Radio Free East Coast shows combine rock, comedy, and cameo announcements from other pirates. Addr: Wellsville. (Eisner; Prindle; Ross; Jurrens; Pearce; Hassig; Wolfish; Fine; Rose; Williams; Lyon; Krauss; Murphy)

WRV- 6955 at 1845. Pirate Pete at The Radio Virus infects the airwaves with rock music and plugs for pirate radio publications such as *The ACE*. Addr: Wellsville. (Ross; Wolfish; Pearce)

XEROX, Radio Duplicado- 6955 ot 2330. The station nome is legendory becouse of o hoax decades ago in the NASWA QSL column. This pirote hos token the good pun ond turned it into o genuine broadcoster, featuring reggae, Andean, and Peruvion music with host Bort Sombo. Addr: Wellsville. (Hossig; Ross)

Ike Kerschner, N3IK

Amplitude Modulation

AM, as it is commonly known, was for many years the only method of radiotelephone operation available to hams. Generally speaking, today's ham knows of AM only as commercial music radio.

However, AM does still exist on the ham bands. Careful listening any night on 160 or 75 meters will turn up quite a few AM signals. The casual listener will usually wonder what the loud squeal is he hears when tuning across an AM signal (it's the carrier).

Unlike SSB (Single Sideband) AM has two sidebands and a carrier to carry the sidebands; the AM signal will normally be about 6 kHz wide. It was this wide bandwidth that pretty much doomed AM on the HF bands back in the early 60's.

There are several methods of generating an AM signal. The best is called Plate or High Level Modulation, in which it is possible to insert the audio via the grid, screen, or cathode of our vacuum tube transmitters. But we are not going to investigate the technicalities of AM; rather let's discuss activity of this mode on today's ham bands.

The Heathkit Shawnee or Pawnee will provide good-sounding AM or CW operation on VHF at bargain prices.

Advocates of AM generally argue that AM sounds better than SSB: That's true, and listening to a good AM signal is a real joy. If AM were as space conserving as SSB it would still hold its own on the HF bands. 160 meters is perhaps the premier AM band today, with many AM nets and casual operators using this mode. 75 meters runs in second place. The other HF bands may harbor some AM activity, but I have not heard any except on 10 meters which will occasionally exhibit a flurry of activity.

Usually AM is found on specific frequencies in order to avoid conflict with the usual SSB mode of operations. Contacts on AM tend to be chatty with lots of "how to" and "where to get it" info and discussions of audio quality.

■ VHF

What really prompted this column was coming across several pieces of VHF AM gear at a hamfest. For example, a Gonset Communicator for two meters was on sale for 20 dollars: the owner assured me the unit worked fine (and it does).

Several Heath VHF rigs were at the same hamfest, asking a whopping five bucks for a six meter Shawnee and 10 dollars for a two meter Pawnee. They, too, work fine!

The Heath rigs also run CW. The Gonset uses only crystal control for the transmitter but the Heath rigs do have VFO's. The VFO's are acceptable, but if you want a truly stable signal I advise using crystals in these units, too.

■ The Point

While AM activity on HF is a bit difficult due to bandwidth problems, the same does not hold true at VHF. In fact, seeing a bunch of AM activity on two or six meters would be a real shot in the arm for those bands. All else aside, AM operation is worth it simply for the reason that it does sound good.

On VHF there is plenty of room for the broader signal and a lot of fun can be had using equipment purchased at bargain basement prices. There may be a bit more finesse required to use these older rigs, but that's all part of the fun. Why not pick up one of these older VHF rigs and get some activity started in your area? Anyone interested in building gear can find lots of circuits in older handbooks and magazines.

Let's hear from some of the AM addicts out there; tell us what is going on in your area.

See you on the last weekend in June 22-23 on Field Day, or maybe the VHF contest June 8-10 (...on AM)? 73 de Ike, N3IK

Learning ITU Phonetics

Paul Rauth from Frankfort, Michigan, found that story-telling helped him brush up on the phonetic alphabet when he got back into amateur radio. He challenges *MT* readers to see how short a story can be written, using the phonetic alphabet. Give it a try, and I wager you'll know the alphabet forward and backward by the time you're finished! Paul's story weighs in at 200 words.

Short Story

By P.A. Rauth WB8BPO

"One obscure night in Lima, during the month of November, Romeo and Juliet were staying at the hotel. They were waiting for Papa to arrive. As they waited they sipped a little whiskey.

Their friends, Charlie, Mike, and Oscar, had been playing golf in the afternoon. Mike, a member of the Zulu Nation in Southeastern Africa, had a good round and was declared the victor. Oscar, the Canadian from Quebec, came in second, Charlie, a rather shady character, broke his arm trying to get out of the rough. He went to the hospital to have an x-ray.

Meanwhile, a Yankee in uniform was in the ballroom dancing the foxtrot and tango. He had just received a tip on a drug shipment that probably weighed a kilo.

Papa finally arrived after a long trip from India. Papa was a nuclear physicist specializing in alpha particles. He announced he was going to the United States and would fly Delta Airlines to vacation in the Sierra Nevada Mountains.

The story ends happily as the Yankee in uniform caught Charlie trying to smuggle the kilo of drugs in his arm cast. The resounding echo, as all said bravo, could be heard throughout the hotel."

The End

SPECIAL EVENT CALENDAR

Monitoring Times is pleased to run brief announcements of radio events open to our readers. Send your anouncements at least 60 days before the event to: Monitoring Times Special Events Calendar, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net

Jun 1	Loveland, CO	N CO ARC / Michael Robinson AA0UB, 2236 Silver Trails Dr, Ft. Collins, CO 80526-6414; 970-282-1167. Location: Larimer Co Fairgrounds, 8am-3pm. Talk-in 145.515/145.115
Jun 1	Hermon, ME	Pine State ARC / Roger Dole KA1TKS, RR2 Box 730, Bangor, ME 04401; 207-848-3846
Jun 1	Teaneck, NJ	Bergen ARA / Jim Joyce, K2ZO, 286 Ridgewood Blvd., Wash. Twp., NJ 07675. 201-664-6725
Jun 1	Nashville, TN	Nashville ARC / O.D. Keaton, WA4GLS, 141 Medearis Dr., Old Hickory, TN 37138, 615-758-2329
Jun 1	Friendship, WI	Adams Co ARC / PO Box 232, Friendship, WI; 608-564-7887. Packet N9TD-1 on 145.03.
Jun 2	Newington, CT	Newington ARL / Fred Jarvis, N1KWJ, 34 Meadow St., Newington, CT 06111, 860-666-1952
Jun 2	Princeton, IL	Starved Rock RC / Debbie Burton N9DRU, 1153 Union St, Marseilles, IL 61341-1710; 815-795-2201
Jun 2	Chelsea, MI	Chelsea ARC / K. Alan Robbins, KB8VCK, 3800 Hooker Rd., Pinckney, MI 48619, 313-878-0363. Location: Chelsea Fairgrounds. 8am. Talk-in 146.980. $3 adm.
Jun 2	Holly, MI	Fenton Area ARA / Marty VanGorp, WD8RCI, 502 Sherman St., Holly, MI 48442, 810-634-9826
Jun 2	Woodbury, NY	Long Island Mobile ARC / Mark Nadel, NK2T, 22 Springtime Ln., Levittown, NY 11756, 516-796-2366
Jun 2	Butler, PA	Breezeshooters / Bob Ferrey Jr. N3DOK, 412-367-2393. Butler Farm Show grounds, Rte 68. $2 adm. Talk-in 147.96/.36
Jun 2	Manassas, VA	Ole Virginia Hams ARC / Kenneth Moan KM4UH, 12019 Bradley Forest Rd, Manassas, VA 22111; 703-369-5287
Jun 7-9	Arlington, TX	West Gulf Div Conv / Tom Gentry, K5VOU, PO Box 861829, Plano, TX 75086, 214-442-1721
Jun 8	Rathdrum, ID	Kootenai ARS / Hal Larson, N6DOI, PO Box 5222, Coeur d' Alene, ID 83814, 208-773-0863
Jun 8	Winston-Salem, NC	Forsyth ARC / Bill Patterson KD4RGB, PO Box 11361, Winston-Salem, NC 27116-1361; 910-723-7388
Jun 8	Riverdale, NJ	Split Rock, West Morris Wireless ARAs, Bernie Brownstein, WB2YOK, PO Box 251, Flanders, NJ 07836, 201-584-5399
Jun 8	Plattsburgh, NY	Champlain Valley ARC, Les Schmarder, WA2IQJ, RR 1, Box 236, Elizabethtown, NY 12932, 518-873-2189
Jun 8-9	Atlanta, GA	GA State Conv / Marty Reynolds AA4RM, 960 Lindridge Dr, Atlanta, GA 30324; 404-365-9280
Jun 8-9	Wenatchee, WA	Apple City ARC / Greg Johnson, WA7TSP, PO Box 5283, Wenatchee, WA 98807, 509-884-6314
Jun 9	Willow Springs, IL	Six Meter Club of Chic / Joseph Gutwein WA9RU, 7109 Blackburn Ave, Downers Grove, IL 60516-3925; 708-963-4922
Jun 9	Woodstock, IL	Cook Co Hamfest / 91st and Wolf Rd, McHenry County Fairgrounds
Jun 9	Darien Center, NY	Lancaster ARC / Charles Koester, WD2AIK, 11495 Cary Rd., Alden, NY 14004, 716-937-3592
Jun 9	Queens, NY	Hall of Science ARC / Arnie Schiffman WB2YXB, 47-01 111 St, Flushing Meadow, Queens, NY; 718-343-0172. Talk-in 444.200 rptr, 146.52s. 9am-3pm. $5 adm.
Jun 9	Hanover, PA	Hanover Area Hamming Assn / Ralph Stoffel, N3KZS, PO Box 381, Manchester, MD 21102, 410-239-8451. Location: Pleasant Hill Fire Co, 5 mi. S Hanover on Rte 94. Talk-in 146.895-. 8am -?, $5 adm.
Jun 9	Winfield, PA	Susquehana Valley & Milton ARCs / David Welker AA3BO, 229 Ridge Ave, Sunbury, PA 17801; 717-286-0787
Jun 14-15	Albany, GA	Albany GA ARC / Terry Lewis KD4KVY, 3821 Slade Ave, Albany, GA 31707; 912-432-0437
Jun 15	Dunellen, NJ	Raritan Valley ARC / Robert Pearson WB2CVL, 149 Emerson Rd, Somerset, NJ 08873; 908-846-2056. Location Columbia Park near Rt 259 & 28. 7am-2pm. $5 adm. Talk-in 146.625(r), 146.520(s)
Jun 15	Milford, OH	Milford ARC / Gerry Reisert KF8YB, 6464 Wardwood Dr, Loveland, OH 45140; 513-677-9255
Jun 15	Bluefield, VA	Bluefield Hamfest Assn / Benjamin Mills, N8XXA, 100 Backwoods Ave., Princeton, WV 24740, 304-425-6273
Jun 16	Orcutt, CA	Satellite ARC / Eric Lemmon, WB6FLY, PO Box 5117, Vandenberg AFB, CA 93437, 805-733-4416
Jun 16	Cambridge, MA	MIT RS & Harvard Wireless Club / Steve Finberg W1GSL, PO Box 397082, MIT Branch, Cambridge, MA 02139; 617-253-3776
Jun 16	Frederick, MD	Frederick ARC / Eric Gammeter, N8AAY, 10494 Balmoral Place, New Market, MD 21774-6947, 301-865-0865
Jun 16	Monroe, MI	Monroe Co RCA / Fred Van Daele, 4 Carl Dr, Monroe, MI 48162; 313-242-9487. Location: Monroe Co Fairgrounds on M50 at Raisinville Rd. Talk-in 146.72, 442.825. 8am-2pm $5 adm.
Jun 16	Macedonia, OH	Cuyahoga ARS / Rich James, N8FIL, 7620 Crestwood Ln., Northfield Center, OH 44067, 216-468-2035 or 800-404-2282
Jun 20-23	Washington, DC	Talk Radio '96, Nat'l Assoc of Radio Talk Show Hosts, Omni Shoreham Hotel, 617-437-9757
Jun 22	Spruce Pine, NC	Mayland ARC / David Biddix, KD4PXS, RR 3, Box 687, Spruce Pine, NC 28777, 704-765-4223
Jun 22-23		Field Day
Jun 23-24	Asheville, NC	DERA Workshops on Community Emergency Preparedness and Response Team Mgt. Contact 414-587-3636
Jun 28-30	Rapid City, SD	Black Hills ARC / Gary Peterson, K0CX, PO Box 294, Rapid City, SD 57709, 605-343-6739
Jun 29	Vallejo, CA	North Bay ARA / Joseph Thompson, KE6FCH, 925 Tennessee St., Vallejo, CA 94590, 707-644-8129
Jun 29	Paducah, KY	Paducah ARA / David Fraser, KQ4IU, 230 Jason Dr., Kevil, KY 42053, 502-488-2031
Jun 30	Wheaton, IL	Six Meter Club of Chicago / Joseph Gutwein, WA9RIJ, 7109 Blackburn Ave., Downers Grove, IL, 708-963-4922
Jul 4	Harrisburg, PA	Harrisburg RAC / Tom Hale, WU3X, PO Box 418, Halifax, PA 17032, 717-896-8087
Jul 5-6	Pascagoula, MS	Jackson County ARC / Charles Kimmerly, N5XGI, 19000 Busby Rd., Vancleave, MS 39565, 601-826-5811
Jul 6	Spec Event Stn	Cass Hubbard ARC operating N0SFJ, WF0Q, K0VBM 1400-2000 UTC to celebrate Centennial of Walker, Minnesota. Op on lower 80, 40, and 20 meters. For certificate send QSL and SASE to Cass Hubbard Amateur Radio Club, Gen Delivery, Walker, MN 56484.
Jul 6	Salisbury, NC	NC Alligators Group / Walter Bastow, N4KVF, 3045 High Rock Rd., Gold Hill, NC 28071, 704-279-3391
Jul 7	Wilkes-Barre, PA	Murgas ARC / James Post, KA3A, 15 Monarch Rd., Wilkes-Barre, PA 18702, 717-825-3940
Jul 11-14	Albany, NY	YL Radio League Conv / Second Area Young Ladies ARC, Wanda Traver, N2JBK, 48 Carroll St., West Henrietta, NY 14586
Jul 13	Goshen, CT	So Berkshire ARC / Robert Schoenfeld, KA1ARR, Spring Hollow Rd., Sheffield, MA 01257, 413-229-8695
Jul 13	Clinton, ME	ME Council of ARC / Robin Walls, N1NFK, 34 Tufton St., Brunswick, ME 04011, 207-442-9405
Jul 13	Texas City, TX	Tidelands ARS / Carl W. (Bill) Steele, WA5WVP, PO Box 73, Texas City, TX 77592, 409-948-0308
Jul 13	Oak Creek, WI	S Milwaukee ARC / P.O. Box 102, South Milwaukee, WI 53172-0102, 414-762-3235. Location: Am Legion Post #434 grounds, 9327 S. Shepard Ave. 7am-2pm CDT. Talk-in 146.52s. Free parking, picnic, and camping. $5 adm (incl free refreshments).
Jul 13-14	Indianapolis, IN	Central Div Conv / Rick Ogan, N9LRR, 5329 Lester St., Indianapolis, IN 46208, 317-251-4407
Jul 14	Sugar Grove, IL	Fox River Radio League / Diana Skube, WD9API, 4 N 210 Locust Ave., West Chicago, IL 60185, 708-293-7485
Jul 14	Bowling Green, OH	Wood County ARC / John Lagger, N8XKR, 7234 Latcha Rd., Perrysburg, OH 43557, 419-666-5939
Jul 14	Kimberton, PA	Mid-Atlantic ARC / Bob Haase, W3SA, 674 Valley View Rd., Wayne, PA 19087, 610-293-1919
Jul 14	Pittsburgh, PA	North Hills ARC / John Sibenac, KE3PI, 216 Kinvara Dr., Pittsburgh, PA 15237, 412-487-2740. Location: Northland Public Library (10 mi N or Pitt. on McKnight Rd). Talk-in 149.69/.09. Free adm. 8am-3pm.
Jul 19-21	Flagstaff, AZ	AR Council of AZ / John Lanza, KC7IM, 1109 El Sonoro Dr., Sierra Vista, AZ 85635, 520-458-7069

Just do it!

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.

Doug Demaw, W1FB

How to Tune Random-Length Antennas

Some shortwave listeners don't have the luxury of ample space for large outdoor antennas. Having been through that ordeal as an apartment-dweller SWL, I am keenly aware of the need to "make do" with random-length pieces of wire for use as indoor, or hidden outdoor antennas. Sometimes it is necessary to simply string 20 or 30 feet of no. 24 magnet wire around the ceiling or moldings near the floor.

Hanks of wire of that type are seldom good performers for SWLing, especially on the lower frequencies. Antenna efficiency is poor because there is too little wire to pick up weak signals. Furthermore, a casualy chosen length of wire will seldom present an impedance that matches receivers which are designed for 50-ohm antennas. The impedance mismatch further degrades the overall performance of the system. The long-standing rule that "maximum power (signal) transfer occurs only when unlike impedances are matched" holds true in this situation, too.

Simple techniques may be applied to extract maximum signal energy from short wire antennas. Making them resonant at the receive frequency is an important step forward. Creating a reasonable impedance match to the receiver is similarly beneficial. But, even if you have a long piece of wire erected out of doors, it may not perform optimally without matching it to your receiver. This month's column addresses some simple and inexpensive circuits that you can implement for use with random length single-wire antennas.

Too Short or Too Long?

It is useful to understand some basics regarding wire length versus the receiving or transmitting frequency. If an antenna is too short (less than 1/4 wavelength) it exhibits what is known as capacitive reactance (X_C). This means that it needs more inductance (X_L). When the amount of X_L is equal to the existing X_C, the reactance is cancelled and the antenna is resonant.

More inductance can be obtained by lengthening the antenna wire, or you can add a coil in series with the wire. Figure 1A shows how this is done. L1 is adjusted until the antenna becomes an electrical 1/4 wave. This condition becomes apparent when a weak signal from your receiver rises to a peak reading, as noted by ear or via your S meter. L1 in Figure 1 is called "lumped inductance." A coil with taps may be used with a clip lead to change the coil inductance.

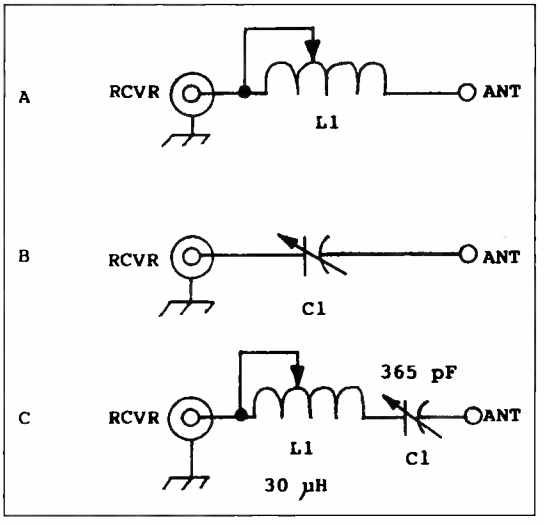


FIGURE 1: Examples of networks that are used to cancel the reactance in end-fed wire antennas in order to achieve resonance at the operating frequency. Circuit A cancels capacitive reactance. Capacitor C1 at B cancels inductive reactance. The combination of C1 and L1 at C can be used to cancel either type of reactance.

What if the antenna is too long to be resonant as a quarter wave on a particular frequency? This means that the antenna has too much X_L, and it needs to be cancelled by adding X_C. This can be achieved easily by merely adding a tuning capacitor in series with the wire, as illustrated in Figure 1B.

Neither of the foregoing procedures ensures a 50-ohm match to the receiver, but the impedance will be fairly low — 25 to 60 ohms, typically. This will improve reception. It is worth noting that 1/4- or 3/4-wavelength (or multiples thereof) end-fed wires present a low impedance at the feed point. Conversely, antennas that are 1/2 wavelength, or multiples thereof, present a high impedance (1000 to 2000 ohms, for example) at the feed point. Antennas of that variety cause a serious mismatch to exist at the receiver input port.

General-Purpose Tuning Network

A combination of capacitance and inductance, used in series, works well for dealing with nearly all random lengths of wire. This is because variable capacitance and inductance is available to the user. Some combination of the settings of the two series elements will resonate the wire and provide a close match to 50 ohms. Figure 1C shows the hookup for a general-purpose tuning system.

If this arrangement is used with a transmitter it can be adjusted precisely by inserting an SWR meter between the transmitter and L1 in Figure 1C. The coil and capacitor are adjusted to obtain an SWR of 1:1. A perfect match in this situation does not mean that the antenna is exactly resonant at the operating frequency, but it will accept transmitter power and will work fine on receive.

Resonant Tuner Method

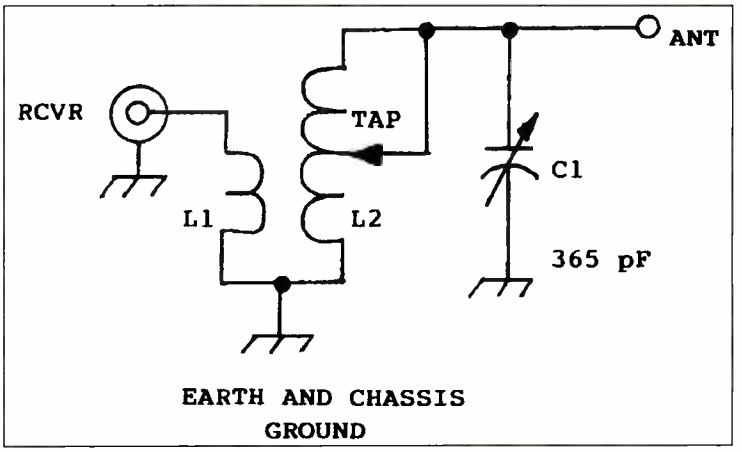


FIGURE 2: Parallel tuned resonant matching circuit for random-length wires of any size. C1 and L2 form a tuned circuit that is adjusted for the operating frequency. The tap on L2 is used to short out part of the coil to permit operation at higher frequencies. See text.

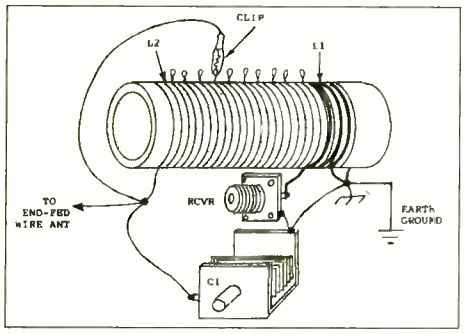


FIGURE 3: Pictorial diagram showing how the circuit in Figure 2 is assembled. L1 has 10 turns of no. 22 enamel wire wound over the grounded end of L2. There are 104 turns of close-wound no. 22 enamel wire (60 µH) used for L2. The coil form is 1 inch OD X 5 inches long. L2 may be tapped every 5 turns, starting at the 15th turn up from the grounded end. A short flexible wire with a small alligator clip can be used to select the coil taps. Alternatively, the taps can be chosen by means of a single-pole, multiposition rotary wafer switch.

Perhaps one of the oldest methods for tuning random lengths of antenna wire is the one shown in Figure 2. A tuned circuit is adjusted for resonance at the operating frequency (C1 and L2) with the wire antenna connected to the top of the coil. The wire then becomes a part of the tuned circuit and is effectively resonant. The receiver is coupled to the tuned circuit by means of a low-impedance link (L1) that is wound over the grounded end of L2. Coil L2 may be tapped, as shown, to permit its use over a wide range of frequencies, such as 1500 kHz to 30 MHz. The higher the frequency the smaller the inductance of the coil. This circuit is adjusted for maximum received signal. If used with a transmitter it is set for an SWR of 1:1.

There will be situations when the antenna wire can be matched more effectively by tapping it toward the grounded end of L2. This is particularly true if the wire presents a low impedance to the tuner. It might tune best when it is attached, say, midway down the coil.

I used this system with my transmitter many years ago when I had only a 60-foot piece of wire strung between my apartment window and a tree. It was an "invisible" antenna made from no. 26 enameled wire. Rubber bands served as insulators. The apartment complex had a covenent against outdoor antennas. I operated in this manner for two years without being sent to "radio prison!" I made the wire more invisible by spraying succeeding two-foot sections of it with beige, blue, green, and black paint.

Construction Tips

The coils required for the circuits in this article can be wound on PVC tubing. If they are for use with receivers only, the cardboard tube from a roll of toilet tissue will suffice. In the old days we experimenters used all manner of available items for coil forms, such as cornmeal boxes, toilet tissue tubes, and wooden dowel rods. The cardboard forms were coated with shellac to stiffen them. We boiled the dowel rods in canning wax before using them. However, for transmitting purposes you should use rigid, low-loss coil forms such as phenolic, fiberglass or polystyrene to preserve the coil Q (figure of merit) and to minimize dielectric losses.

The coil taps are made by twisting the enamel wire at each tap point while winding the coil. See Figure 3. The wire is twisted into a small loop which extends outward from the coil. The insulation is removed from the small loop and the bare wire is tinned with solder. Exercise care when removing the wire insulation. No two coil turns should be allowed to short circuit. That would spoil the Q of the coil and ruin the performance. A small piece of household waxed paper around the turn where the tap is made will help to prevent an unwanted shorted turn.

The tuning capacitor should have at least 200 pF of capacitance to ensure ample tuning range. A 365-pF variable capacitor from a discarded tube-type BC band radio would be ideal. Alternatively, a two-section miniature variable capacitor from a transistor radio can be used if the two sections are wired in parallel. This will provide roughly 200 pF of capacitance.

You can assemble your tuner on a piece of wood. No expensive metal chassis or project box is necessary. Your tuner can look ugly as long as it performs its task. A short clip lead may be used for selecting the coil tap you need. If you want to get fancy, use a multiposition single-pole wafer switch for accessing the coil taps.

Closing Comments

Weak-signal reception can be enhanced greatly by resonating and matching that random-length wire you are using for shortwave reception. The Figure 2 circuit will help to reject near-in-frequency strong signals that can overload your receiver. This may be a blessing if you live near commercial broadcast stations or a ham-radio operator.

Jean Baker, KIN9DD

Readers' Corner

Welcome aboard. This month the Readers' Corner takes over the column with some of the interesting information and frequencies our readers have contributed over the past few months. The stage is all yours, folks!

Citified Codes

Gary Mishler (IA), a corporate pilot who flies a Learjet Model 55 out of Des Moines, IA, provides another slant on city codes (see Jan '96 issue). He says, "Many people don't realize it, but all airports technically use four-letter identifiers. This is so Air Traffic Control and the planes' on-board navigation computers can differentiate them from the three-letter navigational aids that share the same name. For example, Des Moines, IA, has a VOR about five miles south of the airport. The VOR is called 'Des Moines' and has the ident DSM. The airport is also called 'Des Moines' but has the ident KDSM. Being cleared by ATC 'Direct DSM' means something different from being cleared 'Direct KDSM,' as they are five miles or so apart.

"Every airport in the 48 states is assigned to begin with K followed by three characters, while all the ground-based *en route* radio aids are three-letter (i.e., O'Hare VOR is ORD, while the airport is KORD). Airports in Canada start with C--, the Pacific area is P-- (Honolulu is PHNL), most of the Caribbean starts with M--, much of Europe is E--, etc.

"To make things even more interesting, the last three characters don't have to be all letters. Since there are only so many combinations of the 26 letters, combinations of letters and numbers are also used for many of the smaller airports that are not served by commercial airlines. For example Fayetteville, North Carolina's main airport, would be entered as KFAY, but the smaller Grays Creek Field, also in Fayetteville, is K2GC."

Aloft in Seattle

Keone Williams (Washington) contributed the frequencies listed in Table 1 for SeaTac (Seattle-Tacoma) International Airport. That must have taken hours of monitoring! Thanks, Keone.

Special Priority Passengers

Barbara E. (AZ), a First Officer for a major airline, informs us that any time we hear a pilot announce his callsign with the word "Lifeguard" included, it means that the plane is either transporting human organs (which can deteriorate rapidly unless specially prepared for the interval between the time that they're harvested and the actual transplant), or a very ill passenger. Consequently, priority handling for takeoff, enroute, and approach, is given to any flight with this designation. The flight can be a commercial airliner, military, or a general aviation aircraft.

Coincidentally, just a few days after receiving her letter, I monitored a TWA pilot on approach who advised the controller that his callsign was TWA 243, Lifeguard. He mentioned that in addition to the routine load of passengers, he was also carrying human eyes and other organs for transplants here in Indy.

Knotty Subjects

- Howard Ragan K7ATU (Oregon) elaborates on our definition of a knot (March 1998): "A knot is 1 nautical mile per hour or *1.152 statute* miles per hour. To find airspeed in mph, when given knots, multiply knots by 1.152. A knot is never referred to as "knots per hour" — only as "x knots." Howard is a Retired Air Force Technical Sergeant.
- James Ney (PA) says that the answer I gave regarding the question on airway intersections in the March issue was correct, but too brief. He suggests that anyone who's interested in the subject should go to their nearest Fixed Base Operator (AMR Combs, Rayethon, etc.) at their local airport and buy a copy of the NOAA IFR Enroute Low Altitude chart and/or the U.S. Terminal Procedures for their area. Those charts show the airway intersections in detail.
- Gary Arman (OH) has noted that Dakar (Senegal) Aeradio must have acquired some powerful transmitters/receivers as their transmissions have been received very clearly in his part of the country for the past several months. Quite a few other monitors in the midwest have mentioned that they've heard Dakar exceptionally well on various frequencies both day and night.

You will find Dakar Aeradio on the Major World Air Route Areas of South Atlantic (SAT-1): 3452, 6535, 8861, 13357, 17955, (SAT-2): 2854, 5565, 11291, 13315, 1795; also on Africa Area 1 (AFI-1) which uses the same frequencies as SAT-1. Remember, however, that each of these MWARAs are shared by many ground stations and sometimes they all seem to be trying to contact one another simultaneously, resulting in none of them being heard distinctly!

- I recently attended a large ham/computer fest and was almost overwhelmed by all of the good stuff that was offered for sale, trade, etc., including some marvelous old receivers (Hallicrafters, Heathkit, Regency, Transoceanic) in tip-top shape. Then, while looking through some radio-related computer software, I spotted a diskette called "Aero." It contains around 10 text programs with valid frequencies and data for VHF, HF, and UHF monitors.

This is a rare find for us aero monitors and needless to say, I *had* to buy it. When I got home and loaded it into the computer, I found that a lot of the info on it had been credited to *MT*. This is a "freeware" product, which means that you do not have to send the author a fee. Send a 3-1/2 inch diskette (sorry, I can't handle 5-1/4") and a self-addressed stamped disk mailer to Plane Talk, or send $5.00 and I'll provide the diskette and mailer.

That's all for now. Next month we'll have a look at the new state-of-the art equipment in use at Oakland Center's Oceanic Control.

FIGURE 1

SEA-TAC FREQUENCIES

App/Dep	119.200/338.200
	119.500/263.100
Twr	119.900
Grnd Cntrl	121.700
ATIS	118.000
Clearance	128.000

Boeing Company Flight Test Stations: 123.200, 123.225, 123.250, 123.275, 123.325

ELT Locator Test (Mountain Rescue Council): 121.600, 121.650, 121.700, 121.750

Airline Company and Ground Support:

Alaska Airlines - 460.750, 460.775, 460.825, 465.700, 465.775, 465.800

American Airlines - 129.200, 460.650, 460.675

Continental Airlines - 460.850; Delta - 460.750

Hawaiian Airlines - 460.800

Northwest Airlines - 131.700, 460.750, 460.875, 462.762

United Airlines - 129.500, 130.325 460.725

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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 will retail 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!

Call today to reserve your premium ICOM R-8500. Check our site on the World Wide Web for updates on specifications and pricing.

John Fulford, WA4VPY

Government Surveillance Frequencies: To Publish or Not to Publish?

Every once in a while, I come upon some federal frequencies that I do not publish, generally for one of two reasons. The first is that the frequency and/or the agency cannot be verified. The second is that the active frequency is just a little too sensitive to be published at that time. Often the agency using the frequency is one of those intelligence agencies who would prefer that I not publish them at all, or there is a current operation using that frequency during the time of my publication.

Though I try not to abuse it, I am a great believer in the First Amendment. After all, try publishing a column like mine in a country that has its version of the Official Secrets Act, or in a country where the mere possession of a scanner or a federal government frequency list would be *prima facae* evidence of spying.

The frequencies are out there, just the same. If they do not show up in my list, they will show up in someone else's list, or as a posting on the Internet. No frequency is sacred. If one knows where to look or in which publication to search, the tactical and operational frequencies of such agencies as the Central Intelligence Agency or the National Security Agency can be located and entered into your scanner for your own curiosity.

Here's a case in point ... During the Waco standoff, I obtained the frequencies used by the FBI and the ATF for their electronic surveillance of the activities inside the now infamous Compound. It was an interesting moral dilemma whether or not to publish them. Sure, it would fit the kind of sensationalist reporting that sometimes sells magazines, but it would have done no good except to put some agent's life in danger during the standoff. Besides, they were up in the microwave region where radio propagation is pretty well limited to line of sight.

When the Waco standoff ended, the frequencies went into my data base. Now, as this is being written, there is a standoff going on in the State of Montana involving the Freemen. It would be foolish to assume that there is not some form of electronic surveillance going on there as well.

Interestingly, as I was "surfing the net" the other night, I located a posting which had most of the Waco surveillance frequencies, plus a few others. Since they have now been put into the public arena, here is an updated list of federal surveillance frequencies.

Cooking with Microwaves

As has been previously published, agencies such as DEA have routinely used body transmitters in the **150-174 MHz** region. These will continue. There is too much money tied up in the equipment. The Postal Service even had a photograph of some of their equipment published in this column. These frequencies have been published before, so I won't repeat them here.

The new frequencies that are turning up are in the microwave region. (For our purposes, the microwave region starts at approximately 900 MHz and continues upward.)

The frequency range of **902-926 MHz** is turning up some interesting commercial devices that are available to the public, in addition to the government. This is a very popular new commercial range.

The range of **1710 MHz-1755 MHz** has been in demand by the Department of Justice. Both audio and video surveillance transmitters have been purchased by the DOJ. In 1995 alone, the DOJ purchased over 1400 of these devices, which have a power output of 1/4 to 1/2 watt.

The Department of the Treasury operates their own Treasury Video Surveillance System (as they call it) in the **1710-1850 MHz** range. The Treasury Department also has a corresponding frequency band they use in the **4635-4660 MHz** band they also use for tactical video surveillance.

Commercial devices intended for the "non-law enforcement public" are available in the **2400-2500 MHz** range.

The government also has frequency spectrum assigned to them in the **7/8 Gigahertz** range (7000/8000 MHz). The government has an interesting satellite band hidden there with a 8 GHz uplink to the birds and a 7 GHz downlink to the earth stations. This might be an interesting target band for which to build an earth station. The Department of State Diplomatic Communications Service is hidden in there, but it's all encrypted.

Why mention this relatively obscure band? Because with today's technology, nothing can be considered obscure. One day there will probably be scanners and commercially available receivers for this portion of the spectrum available off the shelf. According to a recently obtained Department of Justice electronic surveillance training manual, the government is beginning to use surveillance systems in the 7/8 GHz region, but the majority of them are in the 900 MHz to 5 GHz region.

The DOJ manual went on to recommend that frequency modulated devices should operate on the portion of the spectrum below 3 GHz and frequency hopping and spread spectrum devices should operate above 1.5 GHz.

Keep in mind that the professionals also operate using very low power devices which use the power and/or the telephone lines for a transmission antenna. These can be found in the region of **9 kHz to 300 MHz** (yes, 300 MHz). I personally saw a government unit in operation on 160 MHz using the telephone lines back in 1982.

Verified Surveillance Frequencies

The frequencies following are all based on hard documentation. This means that I have either seen the units or have knowledge of their use.

Listening Devices

Frequency	Use
30-50 MHz	Telephone line transmitters; Power outlet transmitters
44-50 MHz	"Baby room monitors"
72.1-75.4 MHz	Hearing assistance transmitters
80-88 MHz	In and out of band FM transmitters
88-108 MHz	
108-112 MHz	The "Watergate" transmitters were on 112 MHz
110-140 MHz	Digital professional transmitters seen here
136-144 MHz	DECO transmitters and a lot of European transmitters
162-174 MHz	Typical law enforcement body transmitters
174-216 MHz	Commercial wireless microphones
220-530 MHz	English UHF wireless microphones
395-410 MHz	DECO transmitters operate on 400 MHz; PK Electronics operate on 395-410 MHz. PK is a German surveillance company
470-608 MHz	Commercial wireless microphones
700-800 MHz	Commercial wireless microphones
880-970 MHz	Modified cordless telephones; Spread spectrum and frequency hopping

Video Bugs

Frequency	Use
380-480 MHz	U.S. non-government
430-450 MHz	Popular French video surv. system
700-900 MHz	Popular Italian surveillance system
809-960 MHz	902-928 MHz very hot
950-2500 MHz	
1100-1400 MHz	European video surveillance using PAL format
1700-1950 MHz	Government use
2400-2500 MHz	Government use; These are very popular in England/France

Tactical Surveillance Equipment

Frequency	Use
225-400 MHz	Throw away units. These are 10 microwatt-300 milliwatt power levels. Often found in "thrown away" beer cans.
290-330 MHz	Same idea, except in cigarette butts
1700-1900 MHz	Cigarette butts and most recently in pieces of broken off wood. These were the types used at Waco. They transmitted to a repeater buried outside the compound and were sent in daily with the food shipments.

Very Low Frequency and Carrier Current Transmitters

Frequency	Use
3-200 kHz	High grade professional
100-200 kHz	Older units
120-200 kHz	Pre 1990 intercoms
200-300 kHz	Post 1990 intercoms
300-400 kHz	Telephone line transmitters

Other Sneaky Tricks

Hardwire microphones can be dropped on a cable TV system on any unused frequency. Most systems use the range of 30 kHz to 300 kHz. There have been "devices" found transmitting video and audio back down the TV cable. The first reported device was supposedly found in an Eastern Bloc embassy in the Washington, D.C., area. It must have been some good video for a while! While you are pondering this thought, how many of you have TV cable boxes in your bedrooms? Just a thought...

While we are discussing the carrier current and hard wired transmitters, here is a list of frequencies and their threat levels (from those frequencies least subject to electronic surveillance to those which are most vulnerable).

Frequencies	Threat	Use
100-450 kHz	1	Most CC units
3 kHz-3 MHz	2	Pro-grade units
5 MHz-32 MHz	3	Watkins Johnson makes a very nice device for use here
3 kHz-200 MHz	4	CC on telephone wires
15 kHz-75 MHz	5	Audio/video microwire systems

The neatest little device looks like a piece of thrown away coaxial cable. There is a tiny microphone and transmitter inside of it. No battery is required. It develops electricity from the sound waves and the wire inside of the cable. ... Say, how long has that unusued piece of cable been lying behind your sofa? ... And you thought the cable installer was just lazy and didn't want to reach down to pick up that piece he "cut off" and left behind.

To finish up for this month, here is a list of some other **reported surveillance frequencies** (MHz) that I have not published before. Enjoy...

149.3500	165.0125	167.3375	167.3500
167.4875	168.0115	169.2000	169.4450
169.5050	170.2450	170.3050	171.0450
171.1050	171.4500	171.6000	171.7500
171.8450	171.8500	171.9050	172.0000
172.2000	172.2125	172.2375	172.2625
172.2875	172.3125	172.3375	172.3625
172.3875	172.5500	173.3375	

I would like to thank James Atkinson at: http://www.tcom.com and T. Atkins at: tatkins@unix1.sncc.lsu.edu for their Internet postings of material which helped with the composition of this month's column.

Ken Reitz, KS4ZR

1996 Satellite Broadcasting Guide

Involvement with any hobby includes the constant pursuit of information. In the early 1980's satellite TV was an up-and-coming hobby with books on the subject widely available at chain bookstores in most cities and satellite TV magazines available in even in the smallest towns. Another source of information was the TVRO Net, which operated on the 20 meter band every Sunday afternoon. There were so many amateur radio operators who were involved in satellite TV that several dozen would check in to the net each week. Since the early days, technological advances and the drastic drop in prices has made satellite TV more readily available than ever before. Indeed, industry sources report that there are a total of nearly 5 million households watching TV via DBS or "full view" dish in the U.S. (Approximately 2.3 million via "full view," 1.3 million via DSS 18" dish, and 1.1 million via Primestar's 3 foot dish.) Ironically, with more and more viewers there are fewer and fewer places to find information. The former hobby magazines turned into trade journals and the hobby books were replaced with enormously thick trade reference books with hefty price tags. Hobbyists interested in learning more about satellite technology without investing a fortune are left with two inexpensive alternatives. The first is *Satellite Times* — published bi-monthly at $19.95/year — the sister publication to *Monitoring Times* which seeks to bring up-to-date information and interesting articles on this subject to the hobby market. The second is the *Satellite Broadcasting Guide* — published yearly by Billboard books at $24.95.

Deja Vu

I last reviewed the *Satellite Broadcasting Guide* in the May 1994 issue of *MT*. My chief complaints then were the forty-some pages devoted to European TVRO receivers and the lack of an index. I'm happy to report that the chapter on out-dated Euro-receivers is gone (along with the half-page photo of *Guide* editor Bart Kuperus). Unhappily, the 1996 edition is still without an index and readers are again asked to spend time getting to know the book in the intimate way in which we are sure Mr. Kuperus has done.

To their credit, the publishers have seen fit to keep the handy 5-3/4 by 9 inch format which sets it directly apart from the much more expensive industry tomes using the 8-1/2 x 11 format, and it fits neatly on the bookshelves of most homes.

But, if it seems to you that the material is vaguely familiar, it is. In 1994 the book ran 366 pages; the trimmer model for 1996 features 352. But the first 100 pages are virtually identical word for word and graphic for graphic. That should certainly have cut down on production expenses.

Additionally, the *Satellite Broadcasting Guide*, taking its cue from the much larger trade references, now features advertising (including a half page ad from Grove Enterprises pitching *Satellite Times* and the Grove Internet Link). Surely, that too could have helped offset production costs, but apparently not. One notices that the retail price has actually gone up. The *Satellite Broadcasting Guide* is $5 more than it was two years ago.

This is not to say the first 100 pages aren't useful. The newcomer to the TVRO field will find it informative, but the old hand, who perhaps bought this book two years ago and now hoped to add an updated wealth of information to their TVRO reference library, will be sadly disappointed.

Still, the descriptions of basic satellite information involving transmission and reception, an explanation of international broadcasting standards, and advice on installation and compilation of charts and lists of frequencies, provide ample introduction to the hobby. It's a great way for those just getting started in the satellite TV hobby to learn how it all works.

What Went Right

One great feature of this book is the next 75 pages: a chapter entitled "Satellite Coverage Zones." Here, presented in alphabetical order from Anik to Turksat, are the footprint maps for the world's satellites. These maps indicate the area of the Earth covered each satellite's beam — often an oblong shape resembling a footprint.

Because of the curvature of the surface of the planet, the satellite's signal strength is greatest at the center of the footprint and drops off as the signal spreads out. Each gradient is indicated by a number showing the Effective Isotropic Radiated Power (EIRP) given in decibel watts (dBW).

The *Guide* thoughtfully provides a chart on the first page of this chapter which shows what size dish one would have to have in order to receive decent signals from a given satellite. Thus, by the maps, we learn that Anik E1 at 111.1 degrees west has a 38 dBW coverage over virtually all of Canada and that the signal drops to 30 dBW by the time it reaches the southern tier of the U.S. from central California to central Florida. The chart shows us that sparkle-free signals can be obtained in those regions with a 5 meter dish (about 15 feet in diameter). A standard 3 meter dish (about 10 feet) provides excellent results throughout the northern tier of the U.S.

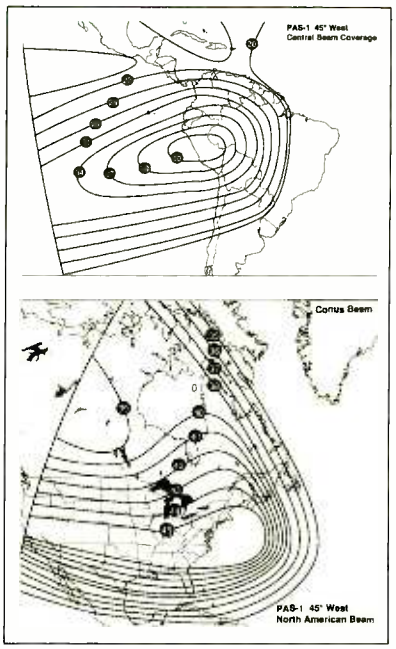
The value of these charts is particularly great to those who are anticipating installing a C band system but want to ascertain which size dish which would best suit their purpose. They also demonstrate the significant changes between the older and the newer satellites. For instance, the older Telstar 300 series satellites show 36 dBW in the center of their footprints, while the newer 400 series indicate 39 dBW. The resulting difference in recommended dish size, according to the chart, is about 3 feet.

Experience has proven these measurements to be accurate: 6.5 foot dishes are now adequate in the central U.S., whereas a 10 foot dish used to be the recommended size.

Incidently, the best place to live in the U.S. for optimum satellite signals is the east coast from Virginia to South Carolina and west to the central states of Missouri, southern Iowa and northern Arkansas. Here dBW signals are 3 dB more than in any other place. How does DirecTV's signal stack up? According to the charts, a whopping 55.8 dBw!

Who's On First

The other major section to this book is found in chapters 9, 10, and 11 concerning ITU regions 1, 2, and 3. Here satellites in each region are listed individually and each channel is described as to band, frequency, polarity, transponder, beam, program, country of origin, language, transmission mode, encryption system used, and audio subcarriers. This is valuable information, which, when used with the footprint charts, can indicate what you may or may not be able to see or hear from your location.



For instance, the charts indicate that Panamsat 1 at 45 degrees west should be visible with a 45 dBW signal throughout the center of the U.S. (assuming no trees, buildings or mountains are in the way). The transponder loading report tells us that most of the channels are spot beamed to Latin America and/or encrypted and that receivable programming will be sparse.

The next 50 or so pages apparently duplicates the list of radio and TV services for all three ITU regions, this time in alphabetical order. And the remaining pages include a more or less up-to-date list of addresses and phone numbers for broadcast services and a standard glossary of terms used in the satellite industry.

Recommendations

As I stated at the top of this piece, information on satellites can be an expensive proposition. The only other books which offer similar footprint charts are ones costing four times the price of this book. These footprint maps, plus the transponder loading charts, and the excellent introduction to the hobby, makes the *Satellite Broadcasting Guide* a worthwhile buy at $25.

Still, there's room for improvement. A discussion of European and American DBS services would be useful. Comparisons between DBS and "full view" systems could help consumers know where they might want to put their money. And, there's no excuse for not having an index. Any reference book covering this much information stands to save its readers valuable time by making it easy to find what they are looking for.

The *Satellite Broadcasting Guide* is sold through most electronics oriented mail order companies including the Grove catalog.

Transponder Notes

- The FCC has finally decided to go to bat for the home dish owner. After years of seemingly disjointed decisions and divided attention the Commission has issued a ruling, dated February 29 of this year, regarding C band and DBS antennas. The new regulations allow the consumer to petition the FCC directly for support in the case of unnecessary delays in permitting the construction of a dish. In addition, the Commission will make it more difficult for municipalities to restrict the use of DBS dishes of one meter or less. It is said that now the burden will be on the municipality to determine why a dish should *not* be erected.

This is virtually the opposite of how things have gone in the decades before. The irony is that it may be too late to have much of an impact on already declining C band sales which have fallen to around the 12,000 units per month mark. The greatest beneficiary of the Commission's actions will end up being the DBS players, all of whom have connections to cable and broadcast interests. These new regulations will be joined by as-yet-unwritten laws concerning restrictive covenants—the dictates of private home-owners associations.

- Gun-shy entrepreneurs are drifting away from erratic Chinese launches and unpredictable Russian capabilities. EchoStar Communications Corp., which plans to launch its own DBS service this year, has signed on with Arianespace for launch of its EchoStar II, the second in its DBS constellation.
- New channels up and running include the America's Lost Children Television Network on Spacenet 4 channel 14. Its purpose is self-evident. BookTV, another self-evident channel, is found on Galaxy 4 channel 9, Monday through Thursday from 7 to 8 PM ET. Global Shopping Network is on Galaxy 1 channel 24; and the Sundance Channel, a service of Robert Redford's film festival, will debut in July on an undisclosed location. And, finally, Radio Otto is on the air from Italy on Telstar 4 channel 18, audio subcarrier 5.8 MHz mono.
- Problems with Canada's Anik E1 continue. Several years ago ground controllers lost the satellite due to a momentum wheel failure. They later regained use of the bird but not until a panic among transponder lessees had precipitated a wide-spread shuffling of channels. The current problem has to do with the failure of one of the solar panels which has reduced the output to the transponders by half. Again, lessees have been forced to shuffle, most going to Anik E2, which has continued to perform flawlessly. Two adult movie channels have taken continuous use of two of the channels and there is quite a bit of CBC radio SCPC activity on several of the other channels.
- The number of channels which are digitally transmitted has greatly increased. Using either General Instruments' DigiCipher or Scientific Atlanta's digital compression system, 11 channels on the four traditional cable satellites are transmitted digitally. However, 53 channels on those same satellites are still using the VideoCipher IIRS system and 24 channels are still unencrypted.

Bill Cheek
Internet: bcheek@cts.com; BBS & FAX: 5:30-1:30 p.m. PDT: 619-578-9247
Compuserve: 74107,1176; World Wide Web: http://ourworld.compuserve.com/homepages/bcheek

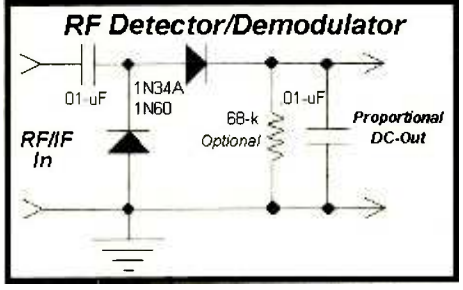
Cool Ways to Design Circuits—Part 3

Awesome. Cool. Cosmic!

Do I sound excited? I am. I've run amok with desktop publishing, desktop manufacturing, and "midnight engineering" (a term coined by Don Lancaster in his "Hardware Hacker" magazine columns). Using these techniques I've developed an efficient, cost effective way to apply them to the design, fabrication, and production of electronic circuits. I'm excited because you can do it, too.

Many hobbyists have no pressing need to produce printed circuits, but the same principles apply whether you are using perfboard or printed circuit board. If you only need an occasional, one-of-a-kind circuit, then perfboard with point-to-point wiring is fine, requiring lower cost and less time. While perfboard circuits may look temporary or prototypical, they can be reliable and durable.

FIG-1: SAMPLE CIRCUIT



My last two columns showed how to design and make perfboard circuits, and introduced ideas for printed circuits. The perfboard circuit is an interim step in my methodology to produce printed circuits, even though you may never actually build the perfboard. I often skip the prototype perfboard simply because I know it will work.

Printed circuits require more time and are costlier to prepare, but are relatively error-proof and easier to assemble. And, you can't beat 'em for multiple productions. The rest of this series presents the process of rolling your own pro-quality printed circuits, but just remember that perfboarding is still a part of the process, so read on, McDuff.

Recap of Parts 1 & 2

1. Choose a circuit project. This month's example in Fig-1 is a simple Detector/Demodulator that converts radio and even audio frequencies into proportional DC levels. This circuit is used in RF Detectors, oscilloscope demodulators, S-Meters, and AGC circuits, and is profoundly simple for this exercise.
2. Use a word processor and a Draw program to "create" a perfboard grid with .042" diameter holes spaced exactly 0.1" apart. See my April and May columns and Fig-2.
3. Use the Draw program to "place" components, traces, and holes on the virtual perfboard as shown in Figs 3-4. You need draw only one of these figures, and when done, use the Draw program's Rotate feature to make a mirror image copy (not a negative) of the first figure. Fig-4 is a mirror image of Fig-3. The Draw program "sends objects to the rear" (components) and "brings objects to the front" (wiring traces and holes). Scrutinize the two drawings for errors and an economical use of board space.
4. Copy (to the clipboard) just the wiring traces AND active board holes of one of the drawings, but leave the original drawings intact.
5. Paste the wiring trace and hole pattern into a new drawing (Fig 5). Then paste a second copy, and use the Draw Rotate feature to make a mirror image of the first pasted image. Armed with the two drawings in Fig 5, you're ready to make a printed circuit, depending on which process is best suited to your needs.

Printed Circuit Processes

There are two PCB processes suited for midnight engineering and hobbyist applications. One is what I call the photoresist process. I don't know much about this process because it seems too costly and cumbersome. It may offer certain qualitative value, but I went over to the "other side" to employ the Toner-Transfer System that offers better control and value for small scale operations.

Toner-Transfer System

1. Create a mirror-image of your PCB wiring traces, holes, and lettering. (Fig-5).
2. Copy and paste that mirror image into a new drawing (Fig-6). Customize it with a solid, black area for as much of the ground trace as possible. If you have lettered labels, make sure they are a mirror image of what you want to appear on the printed circuit.
3. Use a hairline rectangle to define the borders/edges of the PCB per desired proportions. Accuracy and exact dimensions are not important in this step — proportion is important. If the finished product is supposed to be 1" x 3", then so long as one dimension is three times the other, you're all set. Exactness comes later.
4. Study Fig-6 and your version of it. Now is the time to touch up the hole and pad diameters, as well as the width of the wiring traces. In general, traces should be no wider than one-half the space between hole pads, but this isn't critical unless a trace is routed between two adjacent IC pins where the spacing is 0.1", center to center. Hole and pad diameter subtract from the available "real estate" between pins. Otherwise, trace widths can be of any practical width, and the wider, the better, if you want to leave as much copper on the board as possible. The more copper left on

FIG-2: DESIGN GRID

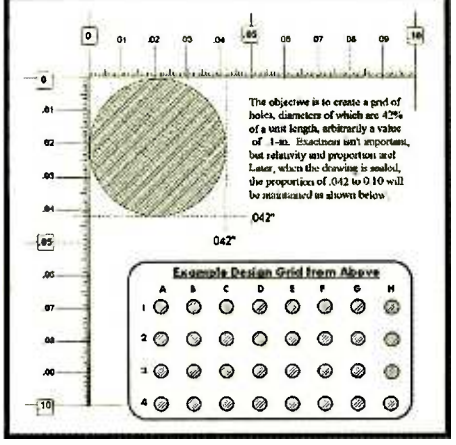
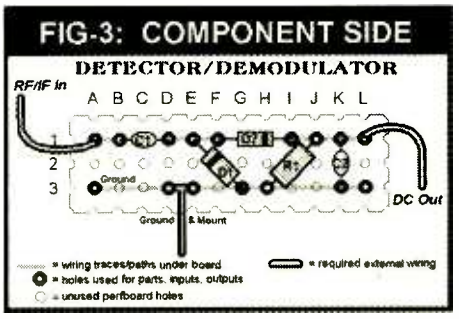
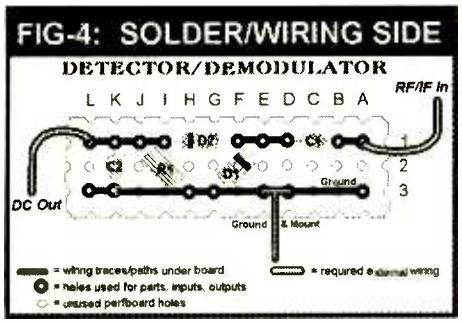


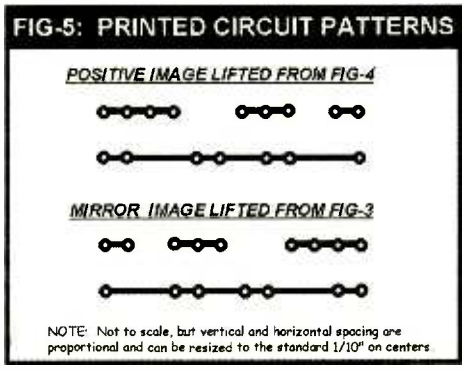
FIG-3: COMPONENT SIDE





the board, the less work required of the etchant solution, and the longer it will last. In general, ground and DC power traces should be as wide as possible; signal traces reasonably narrow. Digital and DC circuits are less critical with respect to layout and pattern than RF circuits.

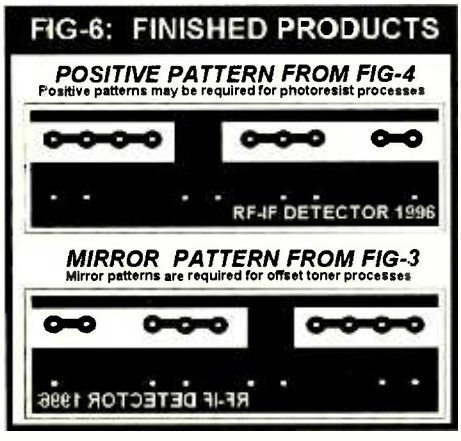
5. When satisfied with your version of Fig-6, export or copy the drawing into your word processor program, and scale it (drag by a corner) so that it is resized close to the actual desired dimensions. Use trial-and-error (by resizing and printing) or the built-in ruler if your word processor has one. When the printed image is exactly the desired size, ensure that IC pin spacings are 0.1", and you're all set. Save the word processor document to a hard or floppy disk.
6. Insert a specially treated Toner-Transfer sheet into the laser printer and print the image a final time.
7. Prepare your blank printed circuit board by cutting it to size; then steel-wool the copper until it is bright and shiny. Use #320 or finer wet emery paper to "rough" up the copper surface a little. Dry the bare board with a clean cotton rag and use isopropyl alcohol to cleanse it of any residue, film, or particles.
8. Cut the printed image from the Toner Transfer paper and overlay it, image down, onto the copper side of the board. Position it exactly, and apply an even heat (350-400°F) and pressure on the paper for 1-2 minutes. A steam iron (without the steam!) or even an electric skillet can do the job, though you will have to experiment with home processes to "get things right."



The heat must always be applied to the paper with the image in direct contact with the copper side of the board. The principle here is that the toner image fuses to the copper under the correct heat and pressure.

9. Soak the board and attached paper in water until the Toner-Transfer paper floats away from the board. Do NOT peel it off! This takes a couple of minutes.
10. Process the board in your favorite etchant solution (ferric chloride, ammonium persulfate, or sodium persulfate). I like the persulfates because they're safer, cleaner, water-clear, and a lot cheaper! You can get ammonium or sodium persulfate at a chemical supply for maybe $5/lb, which makes a gallon of solution!

Don't make up more solution at a time than you need, because the shelf life is about 4-6 weeks after the crystals are dissolved in water. Ferric chloride has a long shelf life, but it's nasty stuff.



Materials and Resources

The vital ingredient to the Toner-Transfer System is a special coated paper available directly from DynaArt Designs or their suppliers, DigiKey p/n TTS-5-ND or TTS-10-ND (800) 344-4539 and Mouser Electronics, p/n 5165-TTS5 or 5165-TTS10 (800) 346-6873. You need the right kind of printed circuit board: best for home processes is 1/4-oz or 1/2-oz PC board (most board stock is 1-oz rated). DynaArt Designs carries the right PC board and equipment to make the Toner Transfer System a real pro-quality operation for those who want to make the modest investment.

I just found a nice shareware drawing program called SmartDraw95, now in version 2.06, that's modestly priced and capable for light PCB design. Download SDRAW95.ZIP from **http://www. smartdraw.com/dwnload.htm** or from my BBS at the header of this column.

SmartDraw Software Inc.
9974 Scripps Ranch Blvd #35, San Diego, CA 92131, USA
Fax: (619) 549-2830; USA Orders: (800) 501-0314
Outside US or tech support: (619) 549-0314
E-mail: support@smartdraw.com ; WWW: http://www.smartdraw.com

DynaArt Designs
3535 Stillmeadow Lane, Lancaster, CA 93536-6624
Voice: (805) 943-4746 (9am-6pm, PST); Fax: (805) 943-3776
E-mail: dynaart@netport.com; WWW: http://www.dynaart.com

Next Month

This series concludes with a detailed presentation of the complete Toner Transfer System from DynaArt Designs that can be effectively and profitably applied by desktop engineers, proto-labs, and serious hobbyists. Included will be some hot tips and kinks for the not-so-serious hobbyist. E-mail tech support for all my articles is always available via the addresses in the header of this column.

Contest Time

Remember my offer for one more month: submit an idea or a project for this column and if selected, you'll receive an autographed copy of my latest book, *The Ultimate Scanner*.

Wayne Mishler, KG5BI

Computer LANs are going wireless (and other strange tales)

One of the biggest arguments of my life involved a mythical creature called a "joint" snake. As avowed in campfire talks this strange and wondrous snake, when threatened, would disjoint itself into small pieces to fool its attackers into thinking it was already dead. Then, when the danger passed, the snake would link itself back up and crawl off to safety.

It was Gramps told me the story, so of course it had to be true. And in good faith I did a show and tell on the subject for my second grade class. Everyone laughed, but there was one kid in the front row twice my size with two large upper front teeth (for biting off ears) whose laughter continued well into the 10 am recess period. Bruiser (that's what he like to be called) and I opened discussions on the matter behind the coal shed at precisely 10:01. For reasons I don't care to go into here, I chose not to mention the joint snake again until now. I figure it's safe to write about it because, as I recall, Bruiser was never much of a reader.

The joint snake incident came to mind when I discovered a strange and wondrous wireless communications technique called "spread spectrum technology." This technique takes a perfectly good radio transmission, breaks it up into tiny pieces, transmits the pieces on a broad spectrum of different frequencies, and then puts them back together again in the receiver as one continuous signal. Such transmissions are fairly secure since it's not easy to tune them in. And in one mode of this technology, called "frequency hopping" (more about this in a moment), there's less radio interference because the transmitter seeks out clear frequencies on which to transmit the pieces of data.

That, of course, is a gross oversimplification of a complex technology, but it gives you a snapshot view of the process which is central to the development to a number of important wireless products. The FCC and its counterparts outside the U.S. just recently set aside certain frequency bands for unlicensed use worldwide. There is special interest in the 2.4 GHz band which engineers say is ideal for high-speed wireless use, and in fact countless wireless products are being produced commercially for use in this band.

These include wireless computer local area networks (LANs). The availability of a new license-free band enables organizations to establish convenient and quality computer links without cumbersome regulations. And spread spectrum links in this extremely high frequency offer immunity to interference, increased network capacity, consistency in performance, mobility, and, of course, security.

The frequency hopping method allows several computer LANs to be in simultaneous use in the same area without interfering with each other. The technical name for this method (oddly) is Frequency Hopping Spread Spectrum (FHSS). The method is favored because of its superior immunity to interference. This is crucial on trading floors, in airports, and in other environments where several organizations may want to operate wireless LANs at the same time.

Of course the uses of spread spectrum technology are not limited to computer systems. It is also used in radio communications where security is essential, as in Air Force One and military communications.

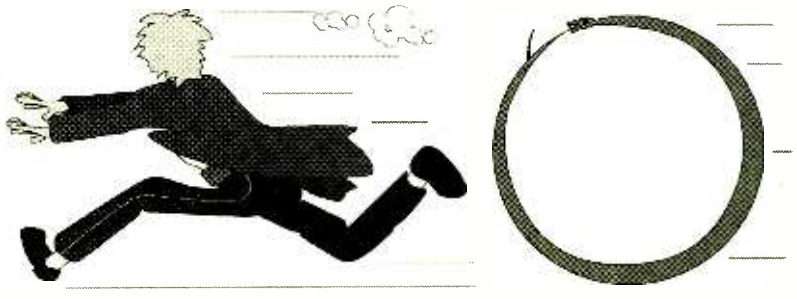
A company called MADAH-Com, with offices in the U. S. and in Israel, is using spread spectrum technology in a wireless public address system for commercial and industrial purposes. The new system is called WAVES—an acronym for wireless audio visual emergency system. As with the computer LANs, several WAVES systems can be operated simultaneously in the same area without cross-interference.

WAVES offers voice and visual paging, background and foreground music, surround sound, two-way site monitoring and control, and numerous other features. Being wireless, it is of course portable and easily installed just about anywhere. You can even control it by computer through special Windows software that is available. And because WAVES is so dependable and durable, it is ideal for use in emergency situations.

Which reminds me of Gramps and the "hoop" snake emergency. As Gramps told it, he was a young'n loading rocks into a mule-drawn wagon at the foot of a hill. When all of a sudden he looked up and saw a monstrous hoop snake (they're extinct now) at the top of the hill staring at him with mean, beady eyes.

Hoop snakes of course had deadly poisonous spikes on their tails. Make one mad and he'd take that spike in his mouth and roll at you like a hoop. Then he'd open his mouth and hit you with his tail and sink the spike into your flesh. There was no antidote for the poison.

Well, Gramps picked up a rock and chucked it at the snake and realized too late that hoop snakes don't care much for rock throwing. That snake, spike in mouth, came rolling down the hill at Gramps who with only seconds to react jumped into the wagon. The spike barely missed him but buried itself in the wagon tongue. That snake was so poisonous Gramps had to chop off the tongue to save the wagon.



John Catalano, PhD

Plumbers, Mail Carriers, and Computer Monitoring

Now what do these three have in common? I can hear many of you asking. No, this is not the lead-in to a joke. It started with a problem that one of my friends, a plumber, brought to me.

(Now, lest you think plumbers have no connection to electromagnetic waves, let me tell you that scientists in the 18th and 19th centuries working with the new phenomena of electricity and magnetism often used hydrodynamic analogies to explain and expand their knowledge. In fact, the famous Scottish physicist, James Clerk Maxwell, whose equations are still the basis of *all* of today's electromagnetic and electronic equations, developed them while observing water flow—the common form of power at the time.)

However, my plumber friend did not have a Maxwellian question for me. His request was much less theoretical and much more utilitarian: How does one manage the flow?

Keeping Track

Since he has quite a number of trucks and plumbers working for him and scattered all over the area, his main method of routing them to customers was via a telephone paging service. These small wireless receivers have been marketed to anyone who needs constant availability. For many occupations, such as doctors, contractors, and firemen, pagers are great. For people on the road making service calls, like plumbers, pagers can make the difference between walking or swimming around your monitoring room!

Pagers are also marketed as a way to feel important. I guess I just don't fit the typical American consumer profile. I fail to see how being summoned by a beep like a Pavlovian dog demonstration can make one feel important; I "lost" three of mine back in the '80s, until my boss got the message.

My friend, however, had a real problem. With ten to fifteen plumbing service trucks on the road and service calls peaking at 20 per hour, keeping track of what page went out to whom, and when, was a manager's nightmare. "Could some kind of computer program help?" he asked me.

How Does a Pager Work?

Ever see a long antenna protruding from a pocket pager? Of course not, because pager transmitters broadcast very strong signals in the 30-40 MHz and 150-160 MHz bands, as well as in the various parts of the UHF spectrum. In the early sixties, tuning around 27 to 30 MHz you could always hear series of audio tones. These were the primitive paging signals which used unique sequences and frequencies of audio tones to "select" and beep a pager receiver. These receivers were quite large by today's standards, and used tuned reed relays to decode the tones. Most had three reed relays in each receiver. Much the same system is still used by commercial aircraft today in the "selcal" (selective calling) system which lets Air Traffic Controllers "page" airliners to give them updated instructions.

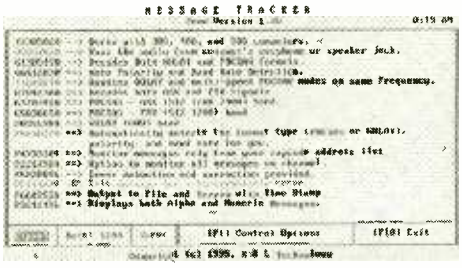


FIGURE 1: Message Tracker main screen

Today's hot pink pagers are very different and very high tech in comparison.They are capable of receiving and storing text messages which are transmitted in modulation forms using audio frequency shift keying (AFSK), similar to the Packet mode used by hams.

The most common paging signal modulations are POCSAG and GOLAY. POCSAG transmissions are sent at a fixed baud rate; that means the amount of time that the tones are either on or off is fixed. The format of the signal is broken into two major parts. The preamble is a long tone that you can hear. This indicates that "batches" (or packets) of data will follow.

These batches also have an internal structure. The first data "word" allows the transmitter and receiver to synchronize their data clocks and is called the sync word. What immediately follows are data words which contain the user specific info such as the address of the pager receiver to which the message is going, and/or the caller's message. These appear on liquid crystal displays or are stored in memory for later display. A number of different batches are sent during one transmission, which allows many pager customers to be paged with just one transmission. A far cry from the three audio tone pagers of the sixties!

But how does a plumbing business keep track of these digital messages?

Message Tracker To the Rescue

I had seen an ad for a product called Message Tracker, by K&L Technology of Garland, Texas. Message Trackers come in three different models: Basic, Plus, and Pro. We will look at the Plus model version. The Basic and the Pro use the same hardware and only differ in their software capabilities. The Pro uses a slightly different interface, but has expanded Plus software capabilities. The program requires a 386 or better computer, 3.5 inch floppy drive, and one RS-232 serial port. An LCD software command allows its use with laptop computers with liquid crystal displays.

Message Tracker consists of a 25 Pin Serial Interface Adapter, 3.5 inch HD program disk, and 45 page user manual. The serial adapter plugs into the serial port of the computer. The other end—a 1/8 inch (3.5 mm) audio plug—goes to your scanner's speaker output. Adjusting the scanner's volume is all it takes to get excellent results. The Pro version's adapter allows direct connect to the scanner receiver's discriminator circuit and includes a level control. This was not tested, but may result in less data errors. Those are all the connections needed.

Installation of the software is very quick and idiot-proof. The message screen is displayed in Figure 1. The large top area displays pager addresses on the left, with the corresponding messages to the right of each address. As more messages are received the screen scrolls upward. The program saves messages to disk for later review. Also, with the Plus and Pro versions you can review saved messages and search for a specific string of text from this screen.

Please note. Newly passed laws forbid the reception of pager signals not intended for the receiver. Therefore, for the figures, we have used the demo included with the program to show you its operation. The bottom left of the screen indicates the data rate of the message

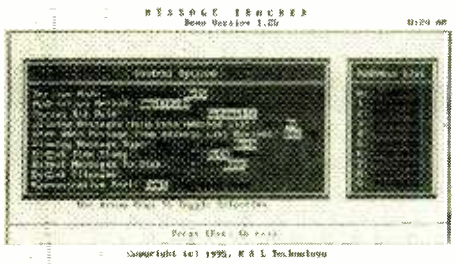


FIGURE 2:*Control option screen*

(1200 Baud). When a signal is detected, the "Signal" prompt is highlighted. If the data being received is not the correct amplitude, or the data stream his been interrupted, the "Error" prompt will be highlighted.

Pressing the F2 key brings up a plumber's dream screen—the control options in Figure 2. Here you can configure the program's every function. At the right side of the screen is the key to using Message Tracker in a business dispatcher application, like the plumber's. The Address List lets the user cut out the reception of all pager transmissions except those which match the pager addresses entered in this list. If these monitored pagers are owned by yourself, as is the case with my plumber friend, receiving messages for which you are paying and are therefore authorized to receive, is well within the law. If this was not the case it would be reminiscent of the line from the movie *Top Gun*, "... it's top secret. I could tell you, but then I would have to kill you."

There you have it! At the end of the day all my friend has to do is to review the saved message file which he can search by pager or customer, using the F3 key. He did order a Message Tracker and loves the efficient, high tech management tool that works great. The Message Trackers cost as follows: Basic $139.95, Plus $179.95, and Pro $239.95 plus $4 S/H. They are available from K&L Technology, P.O. Box 460883, Garland, TX 75046-0838, phone/fax (214) 414-7198. Check their ad in *MT* for the latest details. And remember, it comes plumber-recommended!

In-Coming!

Now let's "read the mail," a term used by hams to mean monitoring without talking. In this case, it really is reading the mail that you have sent to me. (Yep, now we worked in the mail carrier in the title.)

• Robert Samenook wrote in on the subject of a former "Computers & Radio" column that continues to draw lots of interest — The Optical Handheld Page Scanner. Robert says he had the same disappointing results with trying to scan in logs from magazines, *until* (drum roll, please) he upgraded his software to Scanware 2.0 including Direct OCR version 2.1. The upgrade from Logitech, the maker of his handheld scanner, cost "a few dollars," but turned in repeated reading "accuracies of over 99.9%." He just uses a ruler or straight-edge as a guide.

Robert, I'm impressed! If you send me program details, or better yet have Logitech contact me via *MT*, we will try again with open minds. Thank you for your kind comments about *MT* and the "Computers and Radio" column. People, stay tuned for more info on Scanware 2.0, as it comes in.

• We have received a second letter from Ron Cheshire on the same subject. Ron wrote of his attempts with optical scanners a few months back. Since that time and after much experimenting with hardware and software he has come to the conclusion "... that while OAR (optical character recognition) is OK for most uses, it just ain't ready for doing what we want to do." Ron, join the club. But between what Robert has reported above, and the new and "dramatically improved and reduced price" optical scanners as reported in professional electronic business literature, things may be changing in the world of optical page scanners. Thanks again, Ron, for writing.

• And finally this month, Mike Agner tells us of yet another ACARS decoder product from Universal called ACT-1. From the excerpt of the ACT instruction manual that Mike sent along it certainly looks like a product similar to Lowe's Airmaster or AEA's ACARS which we reviewed last month. Mike, if the people at Universal would like to contact me with details, we will give you the lowdown on yet another ACARS decoder.

By the way, we got a bit carried away when we reported that the ACARS programs could work on an XT computer. We tested both AEA's and Lowe's on an XT with 512K of RAM: no dice. I guess they need a faster 286, and/or 640K of memory.

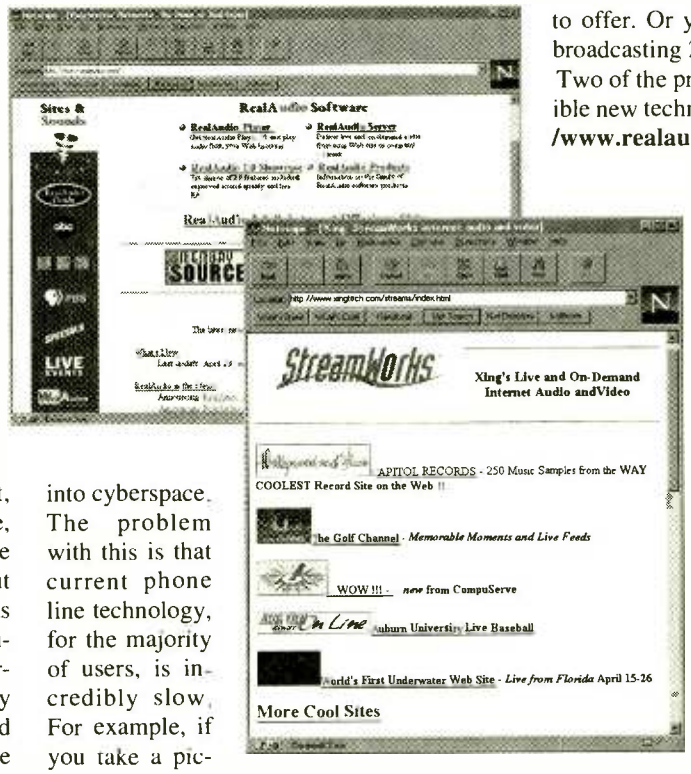
Next month we will start to look at AEA's new versions of PC PakRatt version 2.0, Log Windows version 3.0, and some new firmware for the PK-232MBX decoder. What did AEA add? Are the upgrades worth the effort and money?

Till next time, remember, during this time of good weather be very careful when putting up antennas. Check for mucho clearance from all overhead electric lines. Look for lots of open sky, or fry.

Bill Grove
bill@grove.net

Do You Hear What I Hear?

We have been chatting about all the great sites and nifty concepts available on the World Wide Web, but we haven't spent much time on the issue that brought you to *Monitoring Times:* audio. The Internet, the World Wide Web, and computers everywhere are brimming with audio ability and sources. From folks sitting at home recording the strange new bark their dog has adopted or sending audio holiday greetings, to composer hopefuls grabbing their makeshift batons and directing the digital signals radiating from the latest digitally-sampled midi files—the potential for audio sources are unlimited.



Luckily for us in the consumer market, large corporations like Microsoft, Netscape, Apple have embraced the idea of audio in the home and have launched a major push to put audio and video capabilities, also known as multimedia, into all the computers being manufactured today. Though they have been offering multimedia computers for years, only recently has it become part of the standard package. In fact, today it's hard to sell a home PC (Personal Computer) that doesn't have multimedia ability.

The basic components of a standard multimedia computer are mutually-compatible sound card, video card, and CD-ROM drive, plus a multimedia CD-ROM program. This enables you to hear sounds and watch video from the CD-ROM, so that your computer's vital resources, like your hard drive, are not eaten up by the massive files stored on the CD-ROM.

This ability has revolutionized the education, business, and entertainment markets by allowing companies to offer incredible amounts of information for very little cost. You can buy an entire set of encyclopedias, with pictures, sounds and movies, for less than $50! Just a few years back, buying your child a set of encyclopedias meant taking out a second mortgage on the house! Computers are also following this trend by becoming faster and cheaper with each new product that enters the market.

So what does this have to do with sound and the Internet?

With all these multimedia additions inspired by the advent of the CD-ROM, lots of folks are now wanting to expand this ability into cyberspace. The problem with this is that current phone line technology, for the majority of users, is incredibly slow. For example, if you take a picture of a dog and scan it or digitize it into the computer so the picture is the size of the average computer screen, then the size of the file is about 48k, or 49,152 bytes in size (in jpeg format). To bring that picture up on your screen from your hard drive is only going to take a second or two.

However, to send that picture to another computer across normal phone lines with an average modem (14,400 bps), that file's going to take about 30 to 60 seconds to transfer—30 times slower! Still, 30 seconds isn't bad. The problem arises when you start animating, or showing video. To show a cheetah running across the plains on a hunt is a quick video on a CD-ROM, but will require 30 to 60 *minutes* to transmit across standard phone lines.

Luckily for us, audio is easier. Audio uses less bandwidth than video. Instead of taking 60 minutes to transfer 30 seconds of video, you can even do live audio! Just like listening in to a distant AM station, you can "tune in" radio stations on the Internet. With the introduction of what is called "streaming," you literally hit the "play" button on someone else's computer and listen to what they have to offer. Or you can "tune in" to stations broadcasting 24 hours a day!

Two of the programs that offer this incredible new technology are Real Audio (**http://www.realaudio.com**) and StreamWorks (**http://www.xingtech.com**). These two leading-edge programs offer the ability to hear real, live audio across the Internet.

You will require a computer running either Windows 3.x, Windows 95, or a Macintosh; equipped with a sound card (Macs have them built in). Almost all home PCs sold today have sound cards in them. You'll also need a speaker hooked up to the sound card to hear the audio (stereo speakers are recommended) and, if you want to record sound, a microphone. Once you have these components, and you're hooked up to the Internet, then you're ready to go!

Although both Real Audio and Stream Works offer decent quality audio at both 14.4bps and 28.8bps, StreamWorks also supports ISDN and T1 access to the Internet—generally affordable only by commercial users. Real Audio offers the ability to work in conjunction with Netscape 2.0 and higher so that you can hear sounds coming from WWW pages! This is becoming quite popular, especially with radio-related sites, so that instead of just reading about the spy number stations, you can actually hear them, right from your computer!

Many other programs are streaming into the market that will make computer signals faster and cleaner across the Internet. For now, we're in our infancy, but it's a great time to get on and learn. There is a lot of information on audio on the Internet, as well as equipment that is cheap and programs that are free. Once again, the Internet is proving its diversity in allowing people with myriad interests to merge within one media.

As always, if you have any ideas or questions for future articles, I am available at bill@grove.net.

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST TO THE RADIO HOBBYIST

by Larry Miller

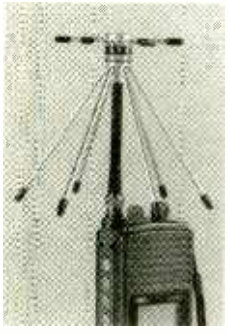
Guest reviewers: Bob Grove, Alan Johnson, Wayne Mishler

Sky-High Frequencies

Voice and data communications above 800 MHz are growing explosively, and for people with the new generation of scanners with 900 MHz coverage and above, there's a whole new world to explore.

The problem with these new scanners is the same one that old scanners had, only multiplied. What kind of antenna could possibly do a good job on every frequency from 30 MHz to 3 GHz? The answer is brutally short: none. This is especially so when you consider that the average whip or rubber duck resonates around 150 MHz.

Max System Antennas has come out with a new discone antenna especially designed for use on signals 800 MHz to 3 GHz. Looking something like the Max System 800 antenna, it fits directly on your handheld scanner or can, with a little ingenuity and a handful of parts from Radio Shack, be roof mounted as well.



The Max System Discone is available for $49.95 from your favorite radio store or direct from the manufacturer at 508-281-8892 or write to Max System Antennas at 4 Gerring Road, Gloucester, MA 01930.

Been There, Done That

You've DXed every station on the AM Band. FM is no challenge. Been there, done that. Shortwave lost its luster after you QSLed every station in *Passport* — twice. So now you're looking for new challenges. So start looking up.

Your home satellite dish system also hosts the same kind of fare you've heard on shortwave: news, music, interviews, sports, religion — you name it — and more. If you own an ICOM R7100 or R100, an SCPC splitter (Grove Enterprises SPL-2 for $79.95) will allow you to easily switch between watching your satellite system or listening to the audio services.

If you don't have the ICOM but do have a dish, the Universal SCPC-200 Satellite Audio Receiver (which replaces the SCPC-100) will process the audio for you from your home satellite system, allowing you access to the hundreds of single channel per carrier (SCPC) satellite radio broadcasts.

The SCPC-200 (shown above) doesn't require NASA training to operate. Frequency tuning is easy and direct. Automatic drift compensation and a 50 channel memory bank make listening a breeze. Listening to the SCPC 200 isn't hard on the ears, either. New to the '200 is an improved audio section that produces high-quality, low distortion broadcast quality sound at the line output or 8 ohm speaker. Frequency range is 950 to 1450 MHz; all C-Band and Ku-Band channels are compatible with the SCPC-200.

If you're looking to open a whole other world of monitoring, check out the SCPC-200. It's available from Grove for $399.95. To order call 800-438-8155.

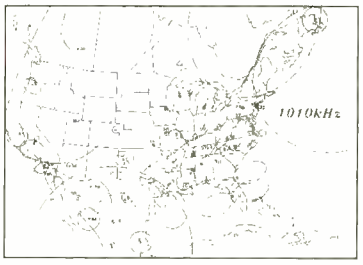
Night Pattern Book

In all of the radio hobby, there are few experiences that match the mystical thrill of pulling a distant, weak, signal out of the swirling ether of the AM or "mediumwave" band. This is the radio of The Shadow, Burns and Allen, of Elvis and the Beatles. It's the radio that most of us grew up on and on which most, if not all, DXers first cut their teeth. Whether you're an old timer or a radio beginner, spin through the AM dial tonight. I can almost guarantee you a thrill a minute.

Fortunately, AM is also one of the best-documented radio bands, and most of the best documentation comes from the venerable National Radio Club. The decades-old club is a storehouse of collective AM DXing knowledge, and virtually everything they publish is first-class.

For example, check out the new 4th edition of the *Night Pattern Book*. What you get is a set of computer-generated US maps overlaid with the night antenna patterns of every broadcaster in the continental United States. You can look up 1010 kHz, for instance, and see at a glance every station that's on the air on that frequency and where it is directing its signal. It's almost like sitting in the space shuttle, looking down on the Earth and seeing where each station's signal is going. To have a tool like this makes identifying new catches considerably easier.

You can get a copy of the NRC's *Night Pattern Book* for $22.95 postpaid. Send your check or money order to NRC, P.O. Box 164, Mannsville, OH 13661-0164. Be sure to say "hi" to Ken Chatterton when you order.



The Magic Band

In many parts of the country, six meters (50 - 54 MHz) is the last of the ham radio's "wide open spaces." For some reason, however, this ham band receives far less attention than others.

Ken Neubeck, WB2AMU, has written what he calls "a guide to the magic band." A labor of love, the book provides comprehensive information on six meter equipment and modes, along with a history of the band and explanations for the causes of various propagation characteristics.

Six Meters: A Guide to the Magic Band runs 80 pages and costs $12.00. It's available from Worldradio Books, P.O. Box 189490, Sacramento, CA 95818. Add $2.00 for shipping.

G5RV Knock-Off

The G5RV antenna has been around for years. Named for the British ham who invented it, it's a known signal producer in the 10 to 80 meter band range. What's less well known is that it's also a solid signal *puller*. We're telling you about the MFJ version of this classic antenna because it's only $29.95.

For the price, you get 102 feet of heavy-duty stranded copper wire (7 strands of 232 gauge wire that the manufacturer says is equivalent to 14 gauge) and 32 feet of high quality, low-loss 450 ohm ladderline. The ladder line is terminated on both ends with custom fiberglass insulators/strain reliefs and an SO-239 coaxial connector.

If all of this seems too cheap, MFJ says, rest assured. The antenna comes with their "No Matter What" one year unconditional guarantee. So if you're in the market for an antenna, check out the MFJ G5RV. At $29.95 you can hardly go wrong. To order,

call 800-647-1800 or write to MFJ at P.O. Box 494, Mississippi State, MS 39762.

More Scanner Mods

Early in this decade, scanner mods were all the rage. Led by the now famous "clip-one-diode-and-restore-cellular-coverage" mod for the PRO-2004 series of scanners, the hobby soon discovered that almost anyone could soup up their scanner. Out in front of this movement was one-time CB mod man and current *MT* columnist Bill Cheek.

So successful was Cheek that if there was a scanning "New York Times" best seller list, his first two books, *Scanner Mods 1 and 2*, would probably have been on it. He even put out a modification newsletter.

Over the years, however, modification fever has cooled somewhat. The problem is that there are few mods available for the current generation of scanners; those that do exist are often so complicated they rule out all but the most experienced technician. A third Cheek scanner modification book, *The Ultimate Scanner, Cheek 3*, reportedly did not sell so well as the first two books.

Now comes yet another scanner mod book from the publisher of *The Ultimate Scanner*, this time from a relative unknown, Jerry Pickard. It's a manuscript that has passed over my desk at least once. *Scanner Modifications and Antennas*, says the ad copy for the book, "[is a] remarkable book [that] covers every aspect of modifying a host of scanners... go[ing] much further into the mysterious world of antennas..."

The antenna portion of the manuscript was, quite frankly, not all that bad. The real question, however, is whether there's anything more to be said about scanner modifications. Secondarily, is Mr. Pickard the man to say it? The ultimate answer will be left up to the scanning public and whether the book jingles the cash register at Index Publishing. Listed at 164 pages, *Scanner Modifications and Antennas* is priced at $19.95 plus shipping. To order, call Index at 800-546-6707 or write 3368 Governor Drive, Suite 273, San Diego, CA 92122. Tell them that *MT* sent you.

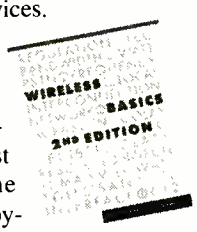
CB Mods

Kevin Ross's new book, *CB Modification Secrets*, shows you how to expand, enhance, and add to your CB. This brand new 206-page book includes instructions on frequency expansion, SSB clarifier and voice lock mods, adding VOX, a VFO, anti-theft transmitter disabler, IF gain control, mic sensitivity control, switch to change "instant channel 9" to "instant channel 19," add Roger Beep, a receive pre-amp, channel display auto dimmer and shut-off, and much more. Some mods are designated for specific radios but others are generic enough to apply to more than 200 radios from Cobra, Courier, G.E., Midland, Radio Shack/Realistic, SBE, Uniden/President and Wards.

Get your copy from CRB Research. The price is $21.95 plus $4.00 shipping. Use your credit card and call 516-543-0560 or write CRB Research at Box 56, Commack, NY 11725. Be sure to say "hi" to CB Judy when you order!

What's wireless?

You'll find the answer and considerably more in a new book called *Wireless Basics, 2nd Edition,* released this year by Telephony Books. The book is refreshingly concise (just 150 7x9 inch pages) yet comprehensive and complete in its survey of wireless services.



It gives you a snapshot of what wireless really is. Best of all, the book is enjoyable to read. It presents a complex technology in plain language, a tribute to its author, Harry E. Young.

Rhonda L. Wickham, Editorial Director of *Cellular Business* and *Wireless World* magazines, in writing the book's introduction, puts it this way: "As the telecommunications industry continues to shift gears, it is essential to understand the basics of wireless services, such as cellular, SMR (specialized mobile radio), paging, 2-way, mobile satellite and the new personal communications services, and to learn how they interconnect with the existing landline telephone network. This book presents all of those relationships in a straightforward and easy-to-understand format."

In case you're not a telecommunications expert (or even if you are), the first several chapters of the book give you the essentials you need to understand and appreciate wireless. One of these chapters is devoted to the basics of radio transmission and propagation. In fact, as author Young points out early-on in the book, wireless services "are radio-based offspring of the early pioneers such as Guglielmo Marconi."

Other chapters explain our terrestrial telephone system, 2-way radio, messaging, paging, cellular, air-ground communications, personal communications service, satellites, wireless data transmission, and much more, including a look at wireless and the law that regulates it. Of course there's a glossary to explain technical terms and acronyms.

This is a book you'll want to read and to keep handy for reference. It's $29.95 plus $4 shipping from Intertech Publishing, 800-543-7771.

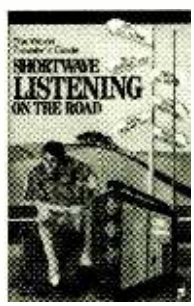
—*WM*

On the Road with Shortwave

The automotive listening environment poses particular problems and challenges to the shortwave listener. Andrew Yoder, whose numerous shortwave articles and books have peppered the radio hobby for most of a generation, has just released *Shortwave Listening on the Road* to help this niche market.

Although there are discussions about radio wave propagation and technical specifications, Yoder's work is by no means a technical tome; rather, it is a nuts-and-bolts beginner's approach to getting the most out of shortwave listening while traveling.

While it may be true that his immense list of country frequencies and schedules is subject to frequent change, the numerous hints for listening are enduring. Variants on random wire antennas, suggestions for accessories, lists of vendors, recommendations for specific models, and other helpful pages are of help to the newcomer to shortwave listening who spends considerable time on the road and is looking for pointers in the right direction.



Shortwave Listening on the Road is $17.95 from McGraw Hill, 1221 Avenue of the Americas, New York, NY 10020.

— *BG*

Essential Radio

On the same trip (or for DXing), you might want to take along a copy of *Essential Radio: The Traveler's Guide to AM & FM Stations in the United States*. This pocket-size book lists 5,000 FM and 1,000 AM stations, organized by state, city, format and frequency. It retails for $9.95 and can be obtained at your local bookstore or from the publisher, Peregrine Press, at 800-299-AMFM.

South Asian Radio

Maybe your taste in radio waxes a bit more exotic. If your interest is in South Asia, you may want to check out Alok Dasgupta's *South Asia Radio Guide*. This handy little 20 page booklet is specifically designed for South Asian listeners but, says Dasgupta, "it may be useful for those who are interested in DXing South Asia or to know more about the reception scene in South Asia."

Want to tune in a broadcast in Ao Naga, Assamese, Bhili or Kuki? Here's the information you need. Want to tune in English broadcasts? There's an English language section, too. You can get a copy of *South Asia Radio Guide* by sending 7 IRCS (available at your local post office) to Alok Dasgupta, 1123, R. N. Tagore Road, Calcutta-700 077, India.

Ask for Edition No. 8. Mr. Dasgupta says it will contain a bonus section listing all shortwave, mediumwave, and FM frequencies for All India Radio and other countries in the Indian subcontinent as well.

The Tropical Bands

For 23 years, the Danish Shortwave Clubs International has produced some very fine references for the shortwave DXer. Of particular note has been their *Tropical Bands Survey*. Compiled by Anker Petersen, it lists all active broadcasting stations in the 2000 to 5900 kHz range. Lists are arranged by frequency, power, location, and transmission time. Each station is classified by a code describing its current audibility.

The *Tropical Bands Survey* is based on monitoring information compiled from DXers all over the world. It's available for 10 IRCs (or 50 Danish Crowns) from DSWCI, c/o Bent Nielsen, Egekrogen 14, DK-3500 Vaerloese, Denmark.

Low Down Classic

For years—make that decades—Ken Cornell's collections of articles which have been assembled into books have been considered the standard reference for experimenters in the kilohertz region of the spectrum. His latest (10th) edition of the *Low and Medium Frequency Scrapbook* is even bigger, containing new approaches to old problems, like earthquake monitoring.

Whether the reader's interest is in VLF transmitting, low and medium wave reception, antenna design and experimentation, power supplies, test equipment, or even digital modes, Cornell's collection has something for everyone.

Theory, schematics, parts list, and sources are included to make the task easier.

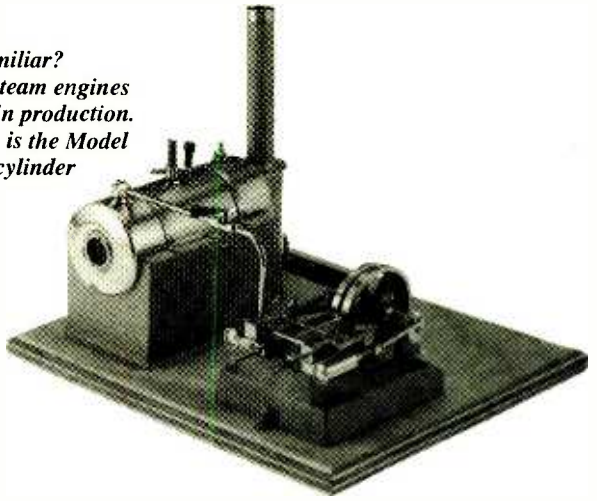
I pay particular attention to the simple receivers, active antennas, and vertical antenna designs since this information is hard to come by for this part of the spectrum.

$18.75 includes first class mailing, or $17.50 book rate, U.S. funds only, from Ken Cornell, 225 Baltimore Avenue, Point Pleasant Beach, NJ 08742.

— *BG*

Free Book

Want to end all radio interference once and for all? Sorry, we can't help you. But the FCC is willing to give you at least lead you in the right direction. According to the *W5YI Report*, you can now get a free copy of *Interference Handbook* — if you have a computer hooked to the world wide web. The address is **http://www.fcc.gov/bureaus/compliance/www/tvibook.html**. The book contains information for television owners as well as radio transmitter operators. There's also a list of electronic manufacturers where you can get help.



Look familiar? Jensen steam engines are still in production. This one is the Model 55 twin-cylinder monster.

All Steamed Up

The new Grove catalog is filled, as usual, with all of the tops in communications gear. There is also, from time to time, some really sharp stuff that has absolutely nothing to do with radio. A perfect example is found on page 39 of the May/June catalog. Check out the Jensen Steam Engines.

Jensen Steam Engines are not toys. I know for a fact. I got one as a gift many, many years ago as a kid. I still have it. It still works.

Each and every Jensen Steam Engine is a real, working steam engine, powered by solid pellet fuel tablets. Each and every one is a gleaming piece of first-class workmanship, a reminder of the type of craftsmanship that once made American products the envy of the world. Tanks are constructed of silver-soldered stainless steel and all fittings are nickel-plated brass. No plastic here!

One model, the twin-cylinder 55-G, even comes with an AC generator, which puts out enough power to light a flashlight bulb. (Sorry, 'fraid this is not going to run your radios during a power outage!) Though not a radio-related product, I can guarantee that the Jensen Steam Engine is a piece of history you'll enjoy owning or building yourself from a kit.

Grove carries three models of the Jensen Steam Engine, priced at $124.95 for the model 76 kit, $449.95 for the factory-assembled, twin cylinder Model 55, or $574.95 for the 55-G power plant. For more information and shipping costs, contact Grove at 704-837-7081 or 800-438-8155 to order.

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 Grove TUN-4A MiniTuner Plus

By Alan Johnson

This new product from Grove Enterprises is the culmination of a long series of antenna enhancement accessories. The TUN-4A is primarily advertised as an antenna preselector/amplifier, but it is in fact a complete antenna system control unit. It offers a built-in gas discharge surge protector for lightning protection, a two-position antenna switch, a variable 20 dB attenuator, a 20 dB preamp, a tunable preselector covering 400 kHz to 30 MHz, and outputs for two receivers — all in one cabinet and very reasonably priced at $99.95. A twelve volt power supply is an additional $4.95.

Compact and Versatile

All these features are packaged in a 9-1/2 x 2-1/2 x 4-1/2 inch (WxHxD) black cabinet. The control spacing and knob size are more than adequate for easy adjustment. The antenna input and receiver output connectors are SO-239 coaxial sockets. The attenuator control provides up to 20 dB of signal level reduction and works whether or not the preamp is activated. This is very handy, since attenuation is often of more use on today's crowded shortwave bands than amplification.

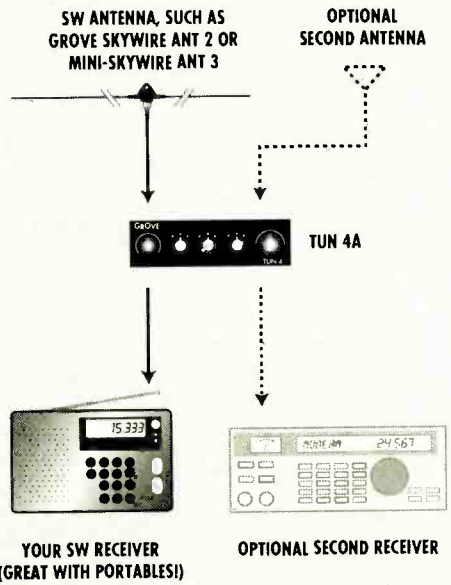
The antenna switch allows for selection of either of two antennas or can be switched to bypass the antennas to ground when one is not listening to provide an additional measure of lightning protection. The function knob selects between "Bypass," "Preselection," or "Amplification" (with preselection). The remaining two knobs are for the passive preselector: a four position band switch and tuning.

The TUN-4A is very sturdily constructed and all the components other than the variable capacitor and the coaxial connectors are mounted on a high-quality printed circuit board.

Operation

Operating the TUN-4A is straightforward. Once the antenna(s), receiver(s) and 12 volt power are connected, the unit is ready to use. The attenuator is in-line at all times, so it should be reset to its maximum strength position after using the preamp. The preselector tuning is relatively sharp, but normally does not require retuning within a given meter band.

The preamp is very quiet in operation, although it will amplify any noise or interference that is already present in the receiving environment. What I thought was hum in the TUN-4A turned out to be noise from my computer, which was also present with the unit out of line. I did not notice any spurious responses from local MW stations in the range below 5 MHz when the preamp was activated, indicating good dynamic range.



On some frequencies (although not many), there was a small signal loss when the passive preselector mode was compared to the bypass mode. This is normal insertion loss for a passive device and is more than offset by the additional front-end selectivity that is gained by use of the pre-selector. The signal peaking and the signal rejection that is present of out-of-band signals seems greater with the TUN-4A than with other single-tuned L-C preselectors that I have used in the past. Feedback from Bob Grove indicates that this is due to proprietary impedance matching transformers incorporated in the design for a high-Q or narrow bandwidth response.

In general, I am not an advocate of preamps, but I found that when using the TUN-4A with a Sony ICF-2010, that the preamp allowed me to copy hams on the 160 meter band that were inaudible without it switched in. On the communications receivers that I used with the TUN-4A, the preamp made signals louder, but the signals were still audible without the preamp.

Summary

I was very favorably impressed with the Grove TUN-4A. It offers a broad variety of useful functions in a single box at a very attractive price. It not only allows for signal level peaking, but allows control of two antennas, static protection, and permits use of two receivers from a single antenna without mutual interaction. The only addition that I would suggest for the TUN-4A would be a more convenient connection for an earth ground — a solder lug beneath one of the coaxial connectors is provided, but a binding post or bolt and nut would be easier to use. This would be a simple addition for a TUN-4A owner to make on his own.

I think the TUN-4A would be very useful for those hobbyists who are using a portable receiver for their main station receiver or are using a less than optimal outdoor wire antenna. For those listeners with premium receivers, the antenna control and dual receiver outputs may be the most attractive features of the TUN-4A, since such receivers should already have adequate front-end selectivity and sensitivity.

Grove Enterprises can be reached at P.O. Box 98, Brasstown, NC 28902-0098; 1-800-438-8155 (orders) or 1-704-837-7081 (technical information).

This product review was prepared for the Journal of the North American Short Wave Association and is reprinted by permission of the author.

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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- o Use any serial port, even COM3/4 when COM1/2 are in use. Will work with 4 and 8 port cards too!
- o Scan by PL/DPL tone with OS456, OS535 & DC440.
- o Scan multiple groups, banks and search ranges all at the same time! Alarms for priority channels.
- o Automatically unblock AR8000, band plan editor.
- o Logs air time, hits, signal, time/date, PL, DTMF & more.
- o Easy to use data editor. Exchange data with other file formats. Read/write channel memory and much more!

Equipment Supported:
OS456, OS535, R7100, R7000, R9000, FRG9600, DC440 AR3000(A), AR8000 (EPROM), Opto & AOR I/F supported.).

System Requirements:
IBM PC 386/486/586 with 4 MEG ram, hard disk, VGA, mouse, serial ports. Windows 3.1 or 95. Cables and interfaces for radios may also be required.

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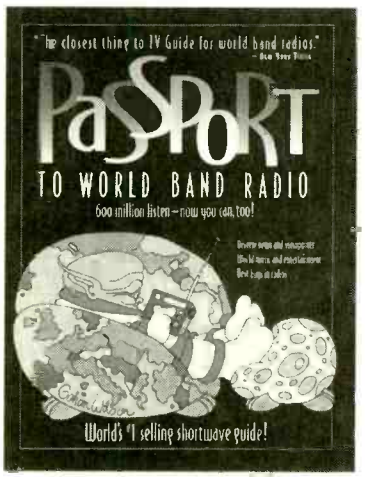

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Lawrence Magne
Editor-in-Chief, Passport to World Band Radio

Radio Shack's DX-394 Tabletop Receiver

Who among us doesn't lust after a great bargain, especially with tabletop receivers going for upwards of a thousand bucks? So, when the tabletop-model DX-394 Communications Receiver appeared on Radio Shack's shelves, tied to a thrifty price tag of $399.95, it was enough to make us drool!

The last time something like this came along was the legendary Philips/Magnavox D-2999. That was the original digital portatop, but it's been out of production for some years, now. It was a passable DX receiver, but mainly it was excellent for listening to programs—on shortwave, as well as AM and FM—and was convenient, to boot.

So, has Radio Shack replicated Philips' former success?

The straight answer is that the '394 is an attractive little tabletop radio that does several things well, but also does some things terribly. Unfortunately, our tests show that the intersection of the "goods" and "bads" means it doesn't fully realize its promise.

■ Positive first looks

Slip the '394 out of its packaging, and one thought immediately pops to mind: *scanner*. With its plastic case, plastic knobs, and soft rubber pushbuttons, the '394 looks like a close relative of any number of top-of-the-line scanners. This receiver is compact, too, measuring just 3-11/16" H x 9-3/16" W x 9" D, and light: just over 4-1/2 lbs. It tunes in precise 10 Hz increments from 150 kHz to 29.9999 MHz in the AM, LSB, USB, and CW modes. No FM, though.

On the front panel is a little 1/8" headphone jack, plastic knobs for volume, RF gain, mode, and fine tuning; a plastic main-tuning knob just over an inch in diameter and with a speed dimple, and thirty soft-rubber pushbuttons that perform a variety of useful functions.

The green illuminated liquid-crystal display serves as Information Central for the receiver. It includes indicators for frequency to the nearest 10 Hz; a 30- or 60-minute sleep timer; one of two 24-hour clocks (which can be seen when the receiver is turned off and—hurrah!—when the frequency is displayed); the status of five programmable timers; a novel signal strength "meter" that looks analog, but is actually digital; search limits; band selection; frequency; memory channel; noise blanker activation; tuning step; shortwave meter band selection; and receiver lock.

There are no less than 160 tunable memory presets, although they're divided up oddly: ten memories for each "band"—LW, MW, and SW—plus 130 more divided among 13 international broadcasting segments. In addition, there is a handy monitor memory, which serves as an electronic scratch pad where a frequency can be parked while you're trying to decide whether to assign it to a memory preset. Too, there's a "signal-seek" scan function for finding the next strong station in a band.

On the rear panel there are plugs for high- and low-impedance outboard antennas, tape output, external speaker, DC power (handy for mobile operation), and a switch for engaging an attenuator. Another plus is that the AC power supply is built in, so you don't have to cope with the safety and performance disadvantages of an outboard AC adaptor.

Atop the cabinet is a socket for a whip antenna supplied with the rig—handy if, say, you want to listen to the radio in another room or out on the patio. On the bottom, two substantial rubber-tipped plastic feet can be flipped down to poise the receiver for comfortable tabletop operation.

At first blush, then, the '394 seems decidedly well equipped for the task at hand.

■ Tuning only okay

Keypad tuning of the '394 is fairly straightforward, too. To enter a frequency, for example, you just press FREQ, enter the digits for the frequency, then press ENT. There is, however, a timeout function. So, if you fail to press a key for more than ten seconds during the process, the receiver reverts to the previous frequency. But the ten-second timeout is well chosen, giving you enough of a breather to steal a glance at your frequency reference while punching in the numbers.

Presets, though, are another matter. To program a memory preset, you tune to the frequency you wish to store, press PGM, enter the number of the desired preset (from 1 to 10—the presets are tied to bands, remember), then press ENT. The only real drawback is that the '394 uses a non-standard keypad configuration: 3 x 3, with the zero placed to the left, under the 7.

This sounds fine, until you try to call up a stored frequency. Unlike normal radios, you first have to choose the meter band of the station you're trying to call up, *then* push one of the ten presets available for that band. It's weird, clunky, and definitely a technological step backward.

The tuning knob uses variable-rate incremental tuning (VRIT) circuitry, so the faster you turn the knob, the more rapidly the frequencies zip by. Whether you like or dislike this is a matter of personal preference, but the '394's VRIT works well.

As to the "fine tuning" knob, we had rather hoped this would be analog, to allow for fine tuning of SSB signals between 10 Hz increments. Alas, it's digital, tuning no more finely than the tuning knob.

So, overall, the '394's tuning *modus operandi* comes off as being only okay, but nothing more.

■ Mixed-bag performance

Performance, though, is the 900-pound gorilla engineers have to wrestle with while keeping within budget—especially one as tight as this.

In many measurements, the '394 performs admirably. Sensitivity is good-to-excellent; blocking is good; and image rejection is excellent. There are seemingly four bandwidths, too: one for AM, one for SSB, and two for CW. All enjoy excellent ultimate rejection and ex-

cellent slope factors. So far, it would seem that the '394 is striding purposefully toward the winner's circle of Great Radio Bargains.

But along the way, the '394 stumbles no less than three times.

The first is with dynamic range. Simply put, the '394 has the worst dynamic range measurement of any tabletop receiver we've tested in recent years. Dynamic range and the related third-order intercept point measured at both 20 kHz and 5 kHz spacing are poor. In principle, this means the radio should be prone to overloading—particularly when connected to a large outdoor antenna, such as the Eavesdropper.

In practice, though, we found overloading, even along the East Coast with hefty outdoor antennas, to be a relatively minor problem, even though there have been reports here and there suggesting otherwise. The nice thing with Radio Shack products is that if you don't like them for any reason, you can bring them back to any Radio Shack store within 30 days for a complete, no-hassle refund. And there's no "re-stocking" charge, as there are at many other outlets.

So the best bet is to try it at your location and see how it goes. If you find the relative freedom from overloading we did, great. If not, send it back to the orphanage for a refund or exchange. It's not inconceivable that a second sample will work differently—maybe better, maybe worse.

Second, the four apparent bandwidths on the '394 are so similar that they are, for all practical purposes, virtually identical. The widest bandwidth (for AM) measures 7.2 kHz; the next (ostensibly for SSB), 6 kHz. Incredibly, both CW bandwidths are an identical and ultra-wide (for CW) 5.7 kHz, although for whatever reason each has a different BFO offset.

In addition, bandwidths *cannot* be selected independently of mode. Of course, that hardly matters, as all the bandwidths are so wide as to be essentially the same. What the '394 clearly needs is a second voice bandwidth of perhaps 4 kHz, with a third around 2.2 kHz—each selectable independent of mode. CW, of course, should be somewhere around 500 Hz, although most '394 buyers probably won't be tuning in CW signals, anyway.

Third, the audio of the '394, both through the top-mounted speaker and the headphone jack, is plagued by distortion—as high as from 12-30% at lower frequencies—in both AM and SSB modes. While the audio sounds acceptable at first, these levels of distortion can produce high levels of aural fatigue over time. This is not a receiver that lends itself to extended listening sessions for most folks.

Overall: an underachiever

As a tabletop model, the Radio Shack DX-394 is a classic underachiever: It offers great promise, but fails to live up to its potential. That's too bad, because we all love a bargain.

But at this price, the real competition isn't really so much tabletop models as it is portables—models like the venerable Sony ICF-2010, which goes for the same price. Here, the '394's dynamic range, sensitivity and some other performance characteristics come off relatively well, in part because portables are designed to work off batteries, and thus have to compromise performance slightly in order to keep battery consumption down.

Yet, even viewed this way, the '394 lacks the '2010's synchronous detection, and its bandwidths aren't quite up to those of the '2010. Given a choice between the two, our panelists opted for the '2010, hands down.

In all, this is a decent receiver for the money, and it's widely available. But it isn't equal to what the competition has to offer in the way of quality portables at comparable prices. And it clearly isn't in the same league as the portatop or tabletop models—all much more costly than the '394—rated highly in the 1996 *Passport to World Band Radio.*

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

Tips & Mods for Uniden/Bearcat BC9000XLT

It has been well over a year since I tested the 500 channel Uniden/Bearcat BC9000XLT in the March 1995 *Monitoring Times*. I was so impressed with the review unit, I bought two BC9000XLTs and have been using them ever since. The BC9000XLT, equipped with the optional CTCSS decoder module, is simply dynamite.

■ Buy the Service Manual

If you are interested in maintaining your scanner or in designing modifications, order a BC9000XLT Service Information Manual from Uniden.

My manual is poorly bound and several pages have fallen out. The fold-out schematic diagram is blurred, making some component values illegible. It's as good as the ICOM R7100A and Radio Shack PRO-2006 service manuals in content or construction, but the Uniden service manual is nonetheless captivating and contains the circuit and parts placement information required for servicing and experimentation.

■ Trick or Treat

The BC9000XLT service manual lists many keyboard tricks, most of which are used for testing the display, LED indicators, keypad, and clearing memory.

Here's a trick not mentioned in the manual:

1) Turn power off.
2) Turn power on while pressing the DELAY, 2, and 9 keys simultaneously, then release them.
3) Press the LOCK and PROGRAM keys simultaneously, then release them.

You will be serenaded by a series of beeps, accompanied by this message scrolling on the display in Times Square style: "Uniden America **** 1994 **** Presents You a New Bearcat BC9000XLT, Specifically Designed for Professional Scaner Users." (Note the misspelling of the word scanner.) You can turn the power off to stop the show and the scanner will revert to normal operation when powered back on, memories intact.

■ Add a Jack for CTCSS Reader

Although it will void your warranty, it's easy to add a baseband audio output jack to connect the BC9000XLT to a CTCSS or DTMF reader, such as the CSI CD-1. You only need to drill a hole on the rear panel, mount a phono jack, and wire it to the appropriate point on the main printed circuit board (Figure 1).

Drill and deburr a 1/4" hole through the BC9000XLT rear panel, in the vicinity of the jack labeled DC13.8V. Mount an RCA-type phono jack (Radio Shack #274-346) through the hole and fasten with the supplied hardware. On the top of the main board, find the test point labeled TP3, located about 3 inches behind the AUX jack. You can choose to solder a wire to TP3 from either the top or bottom of the printed circuit board, but it's easier to solder it to the bottom because the bottom solder pad is larger.

Connect a wire from TP3 to the center pin of the newly added jack. It's a good idea to use very small diameter coaxial cable, e.g. RG174/U, but ordinary hookup wire will suffice. If you use hookup wire, connect another wire from the ground lug of the new jack to a ground pad on the printed circuit board, or place a solder lug under the nearest screw which holds the board to the chassis and solder the ground wire to the solder lug.

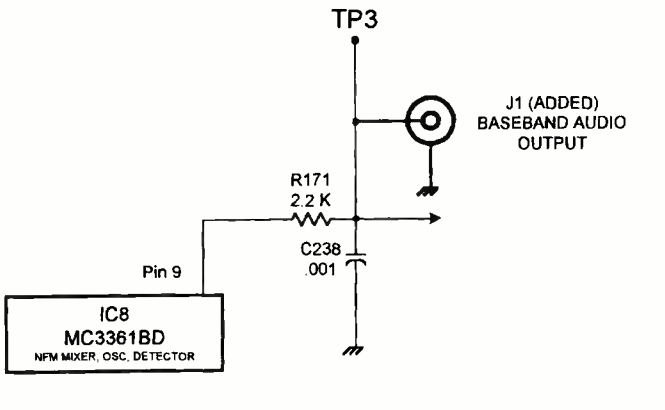


FIGURE 1 - BASEBAND AUDIO OUTPUT JACK ADDED TO BC9000XLT

■ Expand 800 MHz Coverage

The BC9000XLT sometimes hears images of 820 - 1059 MHz stations when tuning the 311 - 550 MHz range. Steve Donnell published a modification to increase image sensitivity in the older BC8500XLT (Sept/Oct 1994 *National Scanning* magazine, Box 360, Wagontown, PA 19376). It's simpler to do this in the BC9000XLT and requires only one part — a DPDT toggle switch.

When tuning 311 - 550 MHz, the BC9000XLT's first IF is 254.4 MHz. The images heard in this range are twice the IF higher (508.8 MHz) than the displayed frequency. To make the BC9000XLT more sensitive to these images and less sensitive to military air signals, you can add a switch

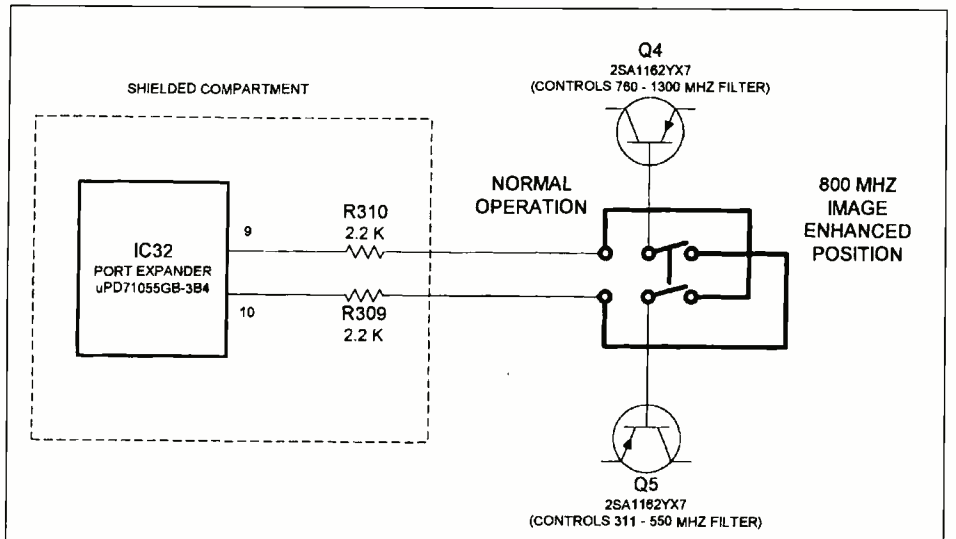


FIGURE 2 - DPDT SWITCH ADDED TO BC9000XLT TO ENHANCE 820 - 1059 MHZ IMAGES IN THE 311 - 550 MHZ TUNING RANGE

which turns off the 311 - 550 MHz filter and turns on the 760 - 1300 MHz filter in the front end.

I drilled a 1/4" hole in the rear panel and mounted a small DPDT toggle switch. I broke the foil traces going to the bases of surface mount transistors Q4 and Q5 and wired one pole of the new switch to each base (Figure 2). The modification is conceptually simple, but physically difficult due to the tiny size of the components and foil traces. It should be performed only by a skilled technician with the aid of the service manual. Therefore, I will not provide step-by-step instructions.

When the switch is set to the Enhanced position, tune the 311 - 550 MHz range and you'll hear strong 760 - 1300 MHz signals instead. The LCD panel will still display the 311 - 550 frequencies, so you must add 508.8 MHz to the display to determine the actual frequency. Don't forget to put the switch back in the Normal position for "stock" operation.

This month's Collector's Corner features a 1969 vintage Knight KG-221A VHF-high band, 5-tube monitor receiver. Photo by Pam Parnass, N9HRZ.

Auto-Store Strategy

The Auto Store mode searches between two limits and stores new, active frequencies into memory channels. While in operation, the audio is muted so you cannot hear the traffic nor see what frequency is being saved until after you stop the Auto Store and review the frequencies channel by channel.

Jeff Zeman uses his two BC9000XLTs to hunt for federal government frequencies and devised a way to control the Auto Store interactively. Jeff's technique is:

1) Establish a memory bank, say Bank A, which is programmed with 24 channels and one empty channel (contains 0.0000).
2) Program the upper and lower search limits with the range of interest.
3) Start an Auto Store operation, specifying bank A as the destination.
4) When the BC9000XLT finds a new active frequency, the display flashes "Store A end" and the audio us unmuted. This gives you the opportunity to hear the activity. If the traffic is a bore, i.e., a birdie or pager, press LOCKOUT so that frequency is never revisited.
5) If the traffic sounds interesting, press ENTER, and the frequency is displayed and stored in the empty channel.
6) Now that the frequency is visible, you can transfer it to another bank using the SEND key or erase it by pressing 0 ENTER.

Consider the Possibilities

The BC9000XLT is a great scanner as is, but its size and circuitry make it ripe for customization. The large cabinet provides plenty of space for additional circuitry, like a shortwave converter. A clever experimenter could coerce the per-channel AUX and ATT bits for other features. The tape recorder control relay could be used to activate a speech descrambler.

Clem Small, KR6A, CET

Getting High as a Kite Antenna

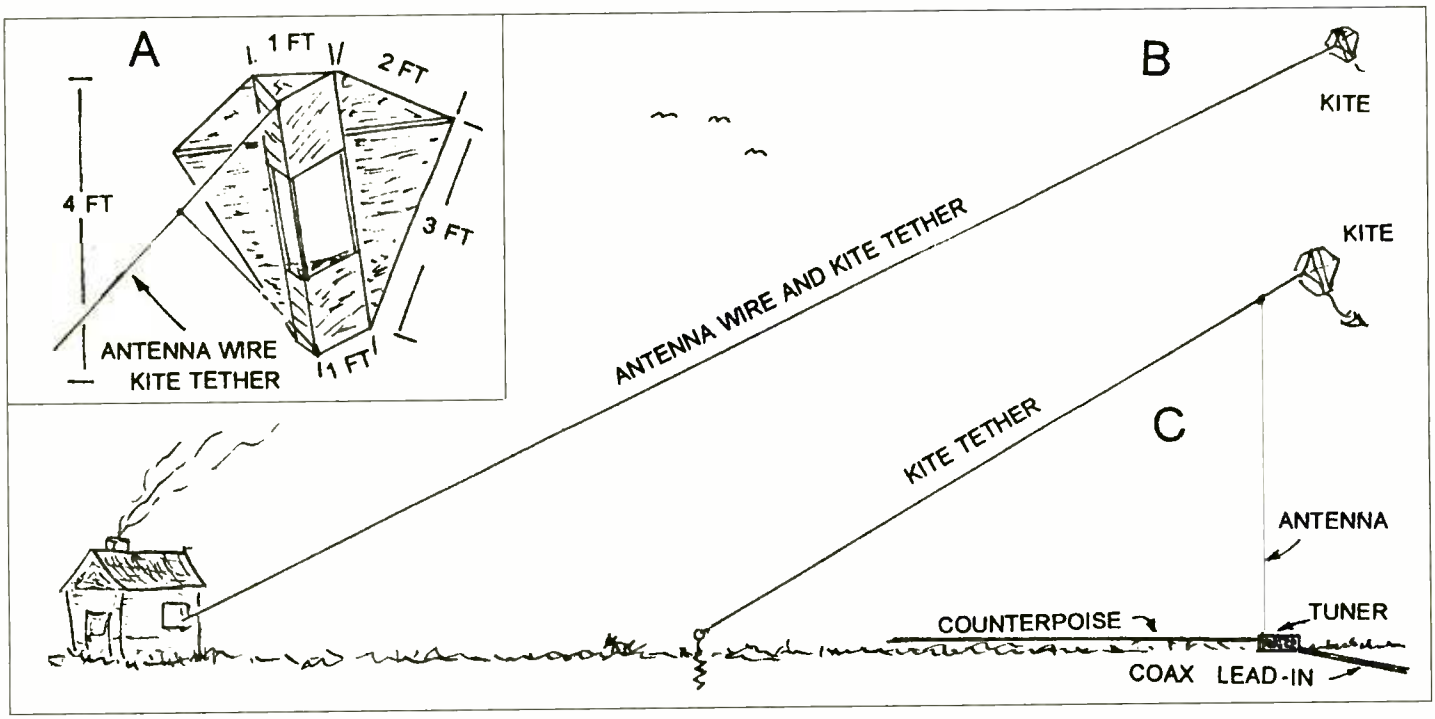


FIGURE 1: *Crawley's antenna-supporting kite (A), and a kite-supported antenna system representation for Gibilisco (B), and for Wilson (C).*

Ben Franklin was probably the first to utilize a kite-supported antenna. His antenna received energy transmitted by nature's giant, broad-spectrum, spark-gap transmitters: lightning bolts. His receiver, like the first ones used by Hertz, was a spark gap, one electrode of which was a metal key tied to the kite antenna downlead. The other electrode, if we are to believe what we see in some portraits representing this experiment, was Franklin's finger!

Whatever the facts of those early experiments, Franklin wrote a very serious warning to other experimenters saying that it was extremely dangerous to repeat his lightning experiment. Nevertheless, a few daring souls repeated it, and two actually were electrocuted in the process!

Mahlon Loomis used kites as aerials in the famous demonstrations of his wireless communication system. In fact, Loomis is reputed to have been the first person to use the term "aerial" to describe the antenna of a wireless communication system.

Since long antennas elevated by kites are reported to provide excellent support for radio reception as well as transmission, let's take a look at a few of the studies that have explored their possiblities. The May 73 issue of *73* magazine carried a one-page article by M. B. Crawley, EI4R, on making an enlarged version of a child's kite from bamboo poles and some old bed sheets (fig. 1A). Volume two of the *ARRL Antenna Compendium* has an article by Stan Gibilisco, W1GV, on using kites as elevated supports for very-long, wire antennas (fig. 1B). In this April's issue of the British Radio journal, *Practical Wireless*, Ron Wilson, G3DSV, has an interesting article in which he also discusses the use of kites as a means of temporarily elevating an antenna (fig. 1C).

System Components

Wilson uses a Conyne kite design; Gibilisco reports using a 7-foot delta wing "ultralight" for winds from 5 to 25 mph, and a smaller "Ferrari ram kite" for winds in excess of 25 mph, but he is also considering a Conyne kite such as Wilson's; and the kite depicted in Crawley's article appears to be the same design as Wilson's Conyne kite. Such large kites can pull with a lot of force, and both Wilson and Gibilisco used a strong cord tether which could hold the kite from flying away if the antenna wire broke.

Wilson advises against the use of a monofilament tether, urging the use of a "proper kite line" of " at least 50 kg (110 lbs) breaking strain for safety." If a kite trailing an antenna wire got loose it could be could be dangerous, especially if it drifted toward high-voltage power lines.

Gibilisco used 555 ft of hard-drawn, .035 in. aluminum-alloy welding wire (fig. 1A) as his antenna. As his RF ground he used a combination of a cold water pipe, the utility ground at a power socket, and a quarterwave radial for the band he was working.

Wilson's antenna was multistrand, PVC covered copper wire 26.5 meters (87 ft) long. His antenna also utilized a 5.2 m (17 ft) counterpoise connected to the ground terminal of his antenna tuner, and then strung out along the ground (directly beneath the antenna wire, I would guess). He suggests that an actual earth-ground connection might substitute for the counterpoise if necessary.

Crawley's tether-antenna was 260 ft of braided copper wire; he would have used some kind of ground connection also.

Safety

With large kites it is recommended that you take some time and learn how to fly them well before attempting to use them as antenna supports. And keep in mind that flying kites near airports can be dangerous, and probably against local laws.

Of course, you never fly your kite when weather is likely to produce lightning, or even when bad weather is forecast. And you must avoid flying the kite where there is even a small chance of contacting high-voltage power lines. In addition, there is a likelihood of static electricity discharge from these elevated long-wire antennas. Static electrical charges can accumulate on your antenna, and sparks up to three inches long have been observed from some of them, even in sunny weather! Wilson recommends that we avoid flying antenna kites during very hot weather when the air is dry.

To avoid the static electricity buildup from becoming dangerous, an antenna should be grounded *at all times*. This can be done during operation through the inductor of your tuner, if that circuit provides a path to ground. At idle times, and when reeling the kite out or in, you could use Gibilisco's technique of running the antenna wire through a small loop of bare wire which is earth-grounded. To protect your rig's front-end circuitry, as well as to provide a bit of protection for yourself, it would also make sense to use a gas-discharge EMP-protection device and a spark gap on these antennas.

Results

An interesting result of using wires as long as those reported here is that they exhibit reduced fading during reception due to a space diversity effect. When a signal arriving at a relatively long antenna wanders around a bit from time to time, it is still likely to be within the effective aperture of the long wire. This is due to the relatively greater space occupied by a larger antenna. The same movement by the incoming wave might place it outside the effective aperture of a smaller antenna.

Gibilisco's very-long, sloping wire produces a directional pattern which, despite its directional properties, exhibits fair reception in all directions due to a multiplicity of converging sidelobes.

Wilson's antennas can be positioned vertically, although he recommends a slant of 45 degrees for the antenna he used. With such a slant Wilson's antennas would be somewhat directional, but with less maximum directional-gain than Gibilisco's very long wires. The Wilson antenna can be oriented vertically to produce a nondirectional horizontal directivity pattern. The vertical patterning of the antennas from all of the studies herein discussed tend to have fair-to-excellent amounts of both high-angle and low-angle gain.

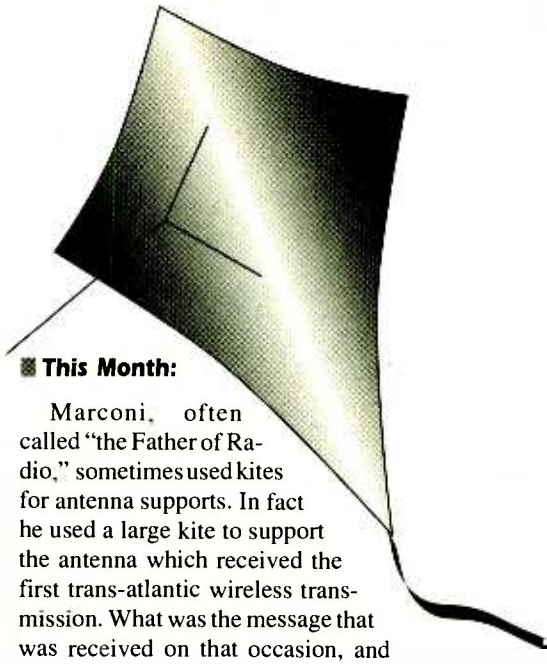
These antennas are all end-fed with an antenna tuner, and can be used for receiving or transmitting on any frequency in the HF, MF, or LF bands if you use an antenna tuner that will cover the desired frequencies. Kite supported antennas are often desirable for ham use on the lower HF frequencies because of the difficulty of raising one or more wavelengths of wire high enough above ground to have low angle radiation at these frequencies. For the SWL, BC DXer, and general monitoring enthusiast, these antennas should be excellent for receiving from HF on down through MF and LF.

RADIO RIDDLES

Last Month:

I asked you "Who developed the quarterwave groundplane antenna ..., and why does it usually have three or four radials rather than just two?"

Well, this antenna was developed by George Brown and his co-workers. They presented their company with a two-radial version. The marketing division, on seeing their two-radial design, suggested that the antenna would look more like an effective antenna if it had more radials. According to Brown, the marketing argument carried the day, and, even though the performance of these designs is very little different from that of the two-radial design, groundplane antennas still consistently have three to four radials.



This Month:

Marconi, often called "the Father of Radio," sometimes used kites for antenna supports. In fact he used a large kite to support the antenna which received the first trans-atlantic wireless transmission. What was the message that was received on that occasion, and why did reception of that message ultimately affect the value of stock in the trans-atlantic cable-telegraph industry?

You'll find the answer to this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

(Continued from Page 4)

Tropical Transmitting

On page 117 of the February issue, Jacques d'Avignon, *MT*'s propagation forecaster, contributed a short explanation of Near Vertical Incidence Skywave (NVIS). Ronald Erickson, AK0N, of Essex, Iowa, requested some clarification of Jacques' sentence, "By transmitting on a frequency in the tropical bands and loading an antenna that directs the energy mostly in the vertical plane (such as a Shirley or a Jamaica or simply a half-wave dipole), the local tropical station can cover its market with very low power and good reliability."

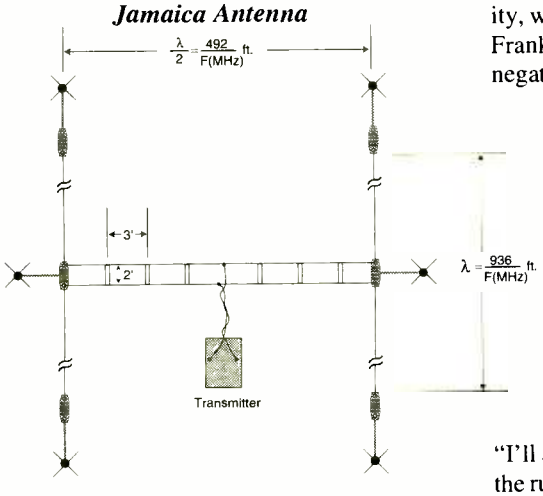
Erickson also asks, "What is a Shirley antenna or a Jamaica antenna, anyway? This former broadcaster would like to know!"

Jacques d'Avignon submitted these illustrations of the Jamaica and Shirley antennas. He says, "The drawings have been converted and doctored, and I cannot tell you where they came from at this point. They were conceived for jungle warfare operations over 50 years ago.

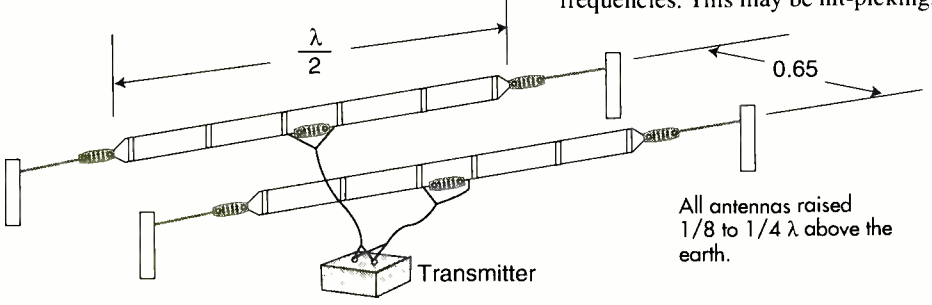
"The difference between the Jamaica and the half Jamaica is the length of the dipoles. In one case they are nearly a full wavelength, and in the other they are half a wavelength to save space.

"What I meant by 'directing energy in the vertical plane' is an antenna that radiates most of the energy towards the zenith. This can be a simple wire like the correspondent mentions in his letter, or a specialized antenna like the Shirley or the Jamaica. In South America and Africa many small stations use a simple dipole when transmitting in the tropical band, and if you look at the drawings you will see that these antennae are simply 'sophisticated' half-wave dipoles."

Jamaica Antenna



Shirley Antenna



In Defense of Franklin

MT writer Clem Small comes to the defense of Benjamin Franklin, in response to an "Ask Bob" item in April's issue. Small says, "To call Franklin a 'tinkerer' and not also a 'scientist' overlooks the fact that he made significant contributions to science.

"*Chamber's Biographical Dictionary* lists not only his research in electricity, which made him a Fellow of the Royal Society, but lists work in meteorology: 'discovering the course of storms over the North American continent, the course of the Gulf Stream, its high temperature, and the use of the thermometer in navigating it; and the various powers of different colors to absorb solar heat.'

"Isaac Asimov, in his revised *Biographical Encyclopedia of Science and Technology*, says, 'Franklin also performed an inestimable theoretical service to the science of electricity, with one accidental flaw...' He describes Franklin's flaw in relation to positive and negative electrodes being an excess or deficiency of electrical substance. Then he goes on to vindicate Franklin's work by pointing out that: 'However, if static electricity is considered as an accumulation of electrons or a deficiency of them, the situation as we understand it today is exactly what Franklin proposed.'" For more discussion on which direction electricity flows, turn to this month's "Ask Bob" column.

Clem Small adds, with respect to another question in the same column, "I'll argue a bit in favor of the statement that the rules for 'skip' reception and propagation are the same for shortwave as for scanner frequencies. This may be nit-picking, but I think of the 'rules' that govern our radio waves as the applicable laws of physics. The rules (laws of physics) for different wavelengths are the same for HF or VHF-UHF; it's just that when we plug in different wavelengths to our equations, they give different answers."

Touching Testimonial

This letter from Kevin Hoult of Seattle, Washington, was an especially enjoyable one. Kevin says, "After reading your admonitions about responding to *MT* features and columns we readers find useful, I wanted to give praise to Doug DeMaw, and 'DeMaw's Workbench.'

"My radio hobby roots go back to when my father built a crystal radio set for me for my 7th Birthday (1962). Shortwave followed, then scanning. One rainy day lunch break about two years ago, I picked up my first copy of *MT*. Needless to say, I was very late getting back to the office after lunch. I really couldn't pull my nose out of that magazine.

"Doug's 'Tape Recorder Interface' (Jan 1995) construction article later caught my eye, and for the first time since 1974, I fired up the soldering iron and tried it. I brought the completed unit into the office the next day, along with the issue of *MT*. Several of my co-workers were immediately taken by both my project and *MT*. Fortunately, an *MT* outlet is right around the corner.

"A major rebirth of radio hobbies has hit our office. Our purchasing manager has gone kit crazy, ordering from several *MT* advertisers; one of our district managers jumped back into scanning, another started aero-scanning (we are just blocks from Seattle's Boeing field), two other employees are looking at a ham ticket, my brother is a new scanning fan, my father is back into shortwave and is starting out in CB, and I have embarked on a new adventure as a Part 15 broadcaster. ALL of this was due to that first issue of *Monitoring Times* I brought to the office.

"Doug's 1995 series of articles and projects in 'DeMaw's Workbench' were responsible for my new passion, KFIR - 790 AM. I'm broadcasting with a crystal controlled version of Doug's 'Understanding Transmitters Without a License' project. I am currently building his 'Universal Amplifier' for KFIR's new antenna. Please feel free to call our KFIR Voice Mail line at (206) 789-8733 (789-TREE)."

May you all be as successful as Kevin in spreading enthusiasm for the hobby; and may all your best times be monitoring times!

—*Rachel Baughn*
mteditor@gove.net

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Rich Arland, K7YHA
P.O. Box 1782, Savertown, PA 18708; email address: k7yha@epix.net

CB — The Ultimate Frugal Radio

This month we will address what is sometimes an emotionally charged topic: Citizens' Band Radio, better known as CB.

Why would any self-respecting ham radio operator "lower" him/herself to discuss CB radio? Frankly, CB has gotten a bum rap for quite a few years and it's time to set the record straight. I first became involved in CB radio in 1959 when Dave Walker, a close friend of the family who lived on a ranch outside Potlatch, Idaho, made me his "Unit Two." Dave's original callsign (yes, we had callsigns back in the early days of CB) was 14Q0387. Soon, my father became involved and we received our own callsign, KFJ-0879. Our neighbors, Dick and Shorty McCrory and their son Bill (my lifelong friend and techno-buddy) soon became KFJ-0945.

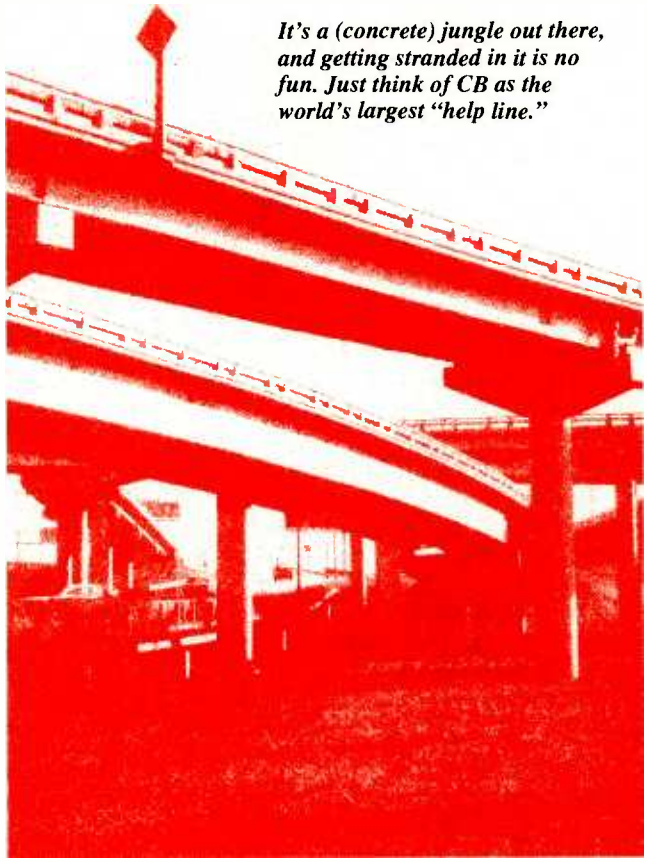
Both Bill and Dick later went on to get their ham radio licenses (WB7NLR & WD4HSE, respectively). Their exposure to CB radio undoubtedly provided the initial "push" to get involved in ham radio. There is no doubt that my involvement with CB radio also paved the way for me to start my ham radio career in 1963 at the tender age of 16.

As you can see, CB has one outstanding good point: it gets people, especially young people, involved with the radio hobby and can lead to careers in electronics. All too often, radio amateurs tend to dismiss CB as a vast wasteland of stupidity; all too often they are correct. However, these self-same operators fail to acknowledge the mindless drivel on 2 meter repeaters, the unbridled stupidity on 80 meters (try listening to 3895, 3898 and 3950 kHz for a while to experience how really obnoxious ham radio can become), or the "maritime mobile wars" on 14.313 MHz. About 2000 years ago, someone of some import said something about "casting the first stone....."

My reinvolvement with CB radio occurred almost by accident. One of my fellow employees needed his CB fixed, so I offered to help him out. After replacing a reverse polarity diode, the hash filter, and rewiring his power cord, I was listening around and came across someone calling for assistance on channel 9, the national distress/emergency frequency for CB. The CBer calling for help had just witnessed a hit and run accident about three blocks away from my home and wanted someone to call the Wilkes-Barre police and ambulance for the two injured pedestrians.

I immediately took down all his information and called the police dispatcher. I radioed the other CBer that his emergency traffic had been passed and help was on the way. My scanners lit up like a Christmas tree and I followed the action on the police and EMS frequencies. Thankfully, the two pedestrians struck by the car were later pronounced in good condition at a local hospital.

I felt a great deal of pride in what I had just done. Had I not been tuning around, the cops and ambulance would have undoubtedly had arrived, but possibly much later. I'd like to think that the other CB operator and I made a difference in two people's lives.



It's a (concrete) jungle out there, and getting stranded in it is no fun. Just think of CB as the world's largest "help line."

Photo by Mark Swarbrick

An army of volunteers ... with ears on

This leads me into the second positive point about CB radio: it's the world's largest "help line." Across the United States and many places in Canada, thousands of volunteers listen regularly to channel 9, the emergency CB frequency. REACT International[1] maintains emergency response teams, and REACT monitors (all volunteer help) listen to channel 9 twenty-four hours a day. This ensures that a quick call on channel 9 will mobilize emergency help in virtually any area of the country.

Having tried, many times in vain, to solicit help on several of the local 2 meter repeaters during traffic emergencies, I can say, with some authority, I can get more action faster on CB channel 9 than I can on any of the 2 meter repeaters in my area. This may not be true in all areas of the country but it's certainly true in Northeastern Pennsylvania. That's why, after my involvement in reporting the recent hit and run accident I have installed a CB set in my car and house and I continuously monitor channel 9 both at home and on the road.

Ham radio for the masses?

The third positive aspect of CB radio is that it offers low cost local communications to almost everyone. New CB radios are available from various sources for around $50 to $75. While these sets are not "high end" models, they will allow almost everyone to become active on the Citizens' Band frequencies. Mobile antennas cost from $10 to $50, and base station antennas cost from $50 upward. There is something to fit everyone's budget.

Instructions that come with CB rigs give enough information for simple hook ups. This gets you on the air quickly. Caution: It is prudent to listen, listen, then listen some more prior to jumping right into a conversation on CB. There are some unique "rules of the road" regarding CB radio (just as there are in ham radio). So listen and get acclimated first, before announcing your presence on a frequency. Remember, you want to make a *positive* impression on CB radio.

While new, low end CB rigs are quite inexpensive, used high end models are readily available at a fraction of their original cost. If you develop more than a passive interest in CB radio, sooner or later you will want to upgrade your radio gear. There is no better way to do this than to recycle a pre-owned rig.

Often, you can pick up used CB rigs at swapmeets, hamfest fleamarkets, "trader papers," or over the air on CB for pennies on the dollar. One word of caution: there are a lot of "Screwdriver Technicians" out there who think they know what they are doing when they go into a CB rig and modify it for higher power, additional channels, etc. Most of these people haven't a clue as to what they are doing. Their efforts may or may not yield desired results.

Always thoroughly check any CB rig to see that it has not been modified, or, in the event it has been, that the mods have been performed by a qualified technician and *fully documented*! Otherwise, you will be inheriting someone else's problems.

A tinkerer's dream

Lou Franklin, K6NH,[2] publishes three books that are "must" reading for anyone who has more than a passing interest in CB radio. *The Screwdriver Expert's Guide, Do it Yourself CB Repair and Modifications* is an excellent way to become familiar with CB radios in general and how to *properly* peak and tweak CB rigs (no, you no longer have to have an FCC license to do this work).

If you own a CB rig and don't have a copy of this book, go get it today! Almost all (about 75%) of the problems that occur with your rig are not internal to the rig at all. Lou shows you

Photo by Harry Boughn

how to deal with all but the really tough problems. The chapters on antennas and power mikes alone are worth the cost of the book. Lou dispels common CB myths with facts and experience, not manufacturer hype. If nothing else, this book will make you an informed buyer of CB equipment and accessories.

Lou's second book, *Understanding and Repairing CB Radios*, is geared for the professional technician. These are *very* in-depth discussions of the inner workings of all portions of CB sets. You must know advanced electronic theory (solid state and RF technology) to make any sense of this book, so beginners, save your money. This is for the professional technician who wants to make a buck or two repairing and modifying CB rigs.

It's an outstanding text. In five nights, I repaired four of the five CB sets that had been laying around the shack, using the information contained in this book. In one session alone, I made enough from the repair to pay for the cost of the three books I received from Lou.

One thing that is extremely evident is that there are very few *qualified* CB repair technicians working in the field. The major CB radio outlets (Radio Shack, REX, Circuit City, etc) would much rather sell you another rig than fix the one you own. This throw-away mentality has one positive effect: If you are good and offer quality repair work at reasonable cost, you can make money hand over fist in this market. Long-haul truckers would rather drive without their pants on than be without their CB rig. Once you start repairing CB rigs and become known at the various truck stops, there is no reason you can't turn this part-time hobby into a lucrative second income.

Lou's third book, *The CB PLL Data Book*, is a reference work on all the currently available phase-locked loop (PLL) synthesizers on the market. This book describes how PLLs work and shows how to modify them for extra channels, FM conversion, pin-by-pin function of each chip, etc. Very well-written and easy to understand, even for non-technical folks, this is a great book that will augment your technical library.

The information contained in these books will allow you to buy non-working rigs, and repair and/or modify them for use on CB or ham frequencies. Nothing beats recycling some of the older gear and giving it a new life. How about taking one of the older, 23 channel sideband rigs, and modifying it to work on 10 meters? These three volumes by Lou Franklin will help you keep your rigs running at peak efficiency for years to come.

As you can see, applying **K.I.S. Radio** principles to CB radio can result in some rather surprising and dramatic ideas. What better way to get into 10 meter SSB or FM than to recycle a CB radio? Not only will you learn a lot in the process, the pride in accomplishment when you tell others of your success will be self evident.

The radio hobby is all about experimentation. In the early days of radio, when everyone was an "amateur," the only way to get on the air was to experiment. Trial and error played a large part in the development of early radio. The same can be true today. Amateur radio is unique in that it allows you to build and operate your own transmitting equipment. Using newly acquired knowledge and skills to pursue other facets of the radio hobby is not only challenging but fun, too.

Exactly what can you do with old CB sets? Here is a laundry list: convert a 23 channel rig to 40 channels and modify it to transmit and receive FM on the 10 meter band (29.6 MHz); convert a 23 or 40 channel SSB rig to operate on 10 meters (28.0 to 29.7 MHz); take the aforementioned rig and add CW capabilities along with an extra 160 channels! That's just for starters. You can always do the mundane and fix CB rigs for friends or start a business. The possibilities are limitless.

Until next time, have fun and **K**eep **I**t **S**imple.

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[2] Lou Franklin, K6NH, c/o CBC International, P.O.Box 31500, Phoenix, AZ 85046 e-mail: lou@cbcintl.com FAX: (602) 996-8700

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bob@grove.net

***Q.** Where can I get a list of international broadcast feeders? (Lubos Rendek, NSW, Australia)*

A. You can't. With the possible rare exception of the VOA and Deutsche Welle, these old point-to-point HF SSB relays have virtually disappeared from the spectrum, favoring the vastly superior satellite relays. We have not had any loggings submitted in recent memory.

The last remaining frequency lists are in my *Shortwave Directory* and the *Klingenfuss Utility Guide*, both available from Grove Enterprises and other *MT* advertisers.

***Q.** Is the African-made BayGen windup radio available in the U.S.? (Nolan Lee)*

A. Not to my knowledge. While the idea of a windup spring-drive generator is a cute idea for a radio, there are a lot of things going against it.

First, the radio itself is nothing special, more like an over-the-counter portable, so you could wind up paying around $75 for an inferior novelty.

Second, while batteries in Africa are hard to find, in the U.S. they're everywhere.

Third, if you are looking for free power, try a solar panel on a rechargeable battery, then you won't have to crank it every few minutes.

Fourth, the minimum quantity quoted for import is quite large, discouraging dealers from carrying the radio on a trial basis.

***Q.** Where can I monitor packet on the HF frequencies, and what equipment will I need? Can I use this same equipment to monitor CW with a Sony ICF7600G portable radio? (Chris Desio, Deer Park, NY)*

A. You can use an inexpensive radio like the little Sony, but it will be more vulnerable to environmental electrical interference, low signal strengths with the whip antenna, and inflexible "tweaking" for best copy as compared to more expensive desktop receivers.

If you have a computer, you can get a simple decoder and software program like the MFJ-1278 from MFJ Enterprises or the PK232A from AEA, available from most ham radio dealers. Without a computer you will need a stand-alone demodulator like the popular Universal M-400.

Frequencies used by hams for packet on shortwave will be found in the following subbands: 3590-3635, 7080-7100, 10140-10150, 14095-14110, 18105-18110, 21090-21100, 24925-24930, and 28100-28190 kHz.

***Q.** I see ads for rechargeable NiCd cells as 1.25 volts, but series batteries—like six—at 7.2 volts; since six times 1.25 is 7.50, where did the other 0.30 volts go? (Robert Bender, Arlington Heights, IL)*

A. While a freshly charged NiCd might present a reading of 1.25 volts to a voltme-

Bob's Tips of the Month

More on Current Flow

In our April 1996 column, Mark Burns asked which way current flow goes—from negative to positive or positive to negative. I pointed out that Franklin arbitrarily pontificated that current flowed from positive to negative, while I defined current flow as a movement of electrons, in which case they go from negative to positive.

Reader Gerald Park, PhD, took umbrage, saying that my definition was "in opposition to nearly every electrical engineering professor in the world," and that conventional current flows from a more positive to a less positive (therefore negative) terminal. Since our resident engineer also was taught my negative-to-positive approach, we decided to see what other authorities proffer.

Stan Gibilisco, noted author and Editor-in-Chief of the *Amateur Radio Encyclopedia*, and co-author of the *Illustrated Dictionary of Electronics*, says, "Current is a flow of electric charge carriers past a point, or from one point to another. The charge carriers can be electrons, holes, or ions." He goes on to say, "The direction of current flow is theoretically the direction of the positive charge transfer...from the positive terminal...to the negative terminal. This is a matter of convention. The electron movement is actually in opposition to the current flow. Physicists use this interpretation of current flow purely as a mathematical convenience."

Similarly, the *ARRL Handbook for Radio Amateurs*, written by engineers, says, "...electric current (usually electrons) will flow..." and "Electrons move from the negative to the positive side of the voltage..." "*Conventional current* has the opposite direction, from positive to negative. This comes from an arbitrary decision made by Benjamin Franklin in the 18th century."

In other words, physicists continue the Franklin tradition of *defining* current as going from positive to negative, even though it's the electrons which actually do the moving, shifting from atom to atom, flowing from negative to positive.

Whether you choose the conventional definition or the actual movement, the same formulas apply since the same current density is present.

ter, as soon as it is 'loaded' (being discharged), it drops to a nominal voltage near 1.2 volts.

Correction

In my April column I overgeneralized concerning worldwide FM broadcasting bandplans. A letter from Benjamin Dawson, a consulting engineer, was most informative and we extract the following information.

Europe and Asia use 100 kHz intervals, as opposed to North America's 200 kHz, in their VHF-FM broadcast band. In some countries with large numbers of private—and even pirate—broadcasters, the spacing is only 50 kHz.

I would like to thank Mr. Dawson for sharing this professional insight.

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.

INDEX OF ADVERTISERS

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CLOSING COMMENTS

By Bob Grove, Publisher

The State of the Union

To hear the glowing reports from Washington, one might get the impression that our economy is getting better. Perhaps in some segments it is, but not in the hobby electronics marketplace. While our fellow Americans must have to have food and housing, they don't have to have new scanners and shortwave radios. When the economy slows, so does discretionary spending. Non-essential items are the first to go by the wayside, and may be the last to be restored when better times return.

The shrinking profit margin is not always easy for a merchant to detect at first. He may see little or no substantial decrease in the number of sales, lulling him into a false sense of security, but upon examination of his monthly profits, he notes a decrease in the bottom line. Upon further examination he realizes what has happened: His customers are buying smaller items, and they are shopping for the best bargains, so his profit margins are less.

This economic condition produces a self-destructive, downward spiral. When the marketplace is profitable, wide margins between dealer cost and resale allow reasonable, comfortable profits, but when times are bad, dealers begin to cut their margins to remain competitive. Eventually, the profit margin is so small it doesn't pay to remain in business. In recent months several amateur radio dealers closed their doors permanently; a number of small mail order firms similarly called it quits. Corporations merge, cutting jobs to reduce overhead, the new mega-magnates forcing smaller businesses out of the market.

Publishers of magazines and books face additional adversities. Over the past year, printing and mailing costs have soared, yet desktop publishing and the Internet are spawning ever greater competition. Look over the commercial hobby magazines and see the results—reduced writing staff and page count, larger type, more white space, reprints of previously-published articles, generic fillers, fewer ads, poorer editing—the consequences of reduced profits and downsizing.

So how does a depressed economy affect equipment availability? The quantity and quality of merchandise suffers. Fewer new scanners and shortwave radios emerge from the drawing boards; older models persist for longer lifetimes; product models are dropped but not replaced; foreign competition edges out domestic models. Apathy and disenchantment set in and marketplace begins to atrophy. Once the flywheel effect slows down, it's hard to get it rolling again.

Much of the foregoing may seem speculative, but dealers and manufacturers privately admit their sales are down anywhere from 20%-40%, depending upon whom you ask and how much they are willing to admit. While giant pageants like the Dayton Hamvention beat the drum for massive sales, the truth is that many—perhaps most—vendors barely make enough to pay their way, and often lose money. They are there to make a presence, to clear inventory, to introduce new products, and to make contacts. Profit is not a consideration at Dayton.

Will the economy get better? Yes. Soon? Probably not. Periodic swings in prosperity are a normal cycle for capitalism, but the downswings are hard to take. Business is economic Darwinism, a struggle for survival in which only the fittest survive. "Fittest," in this case, is defined by strength in the marketplace. This period of austerity will produce some needed cleansing of dead wood and inferior products, but some small companies with superior products will also fall to extinction. No one said the process was fair.

■ What can we do?

We all have a responsibility to perpetuate the hobby if it is to survive. As a consumer, you have a vested interest in the outcome. Your continued financial support drives this tiny segment of the economy. If there is a perception of waning interest, manufacturers and dealers look for other venues for their investments. This is already happening.

Commercial enterprises who are normally competitive need to freely exchange ideas for their mutual survival. While it is tempting to pull in and let the other guy fend for himself ("let the chips fall where they may"), the fact is that if half of the companies go down, the other half will NOT have twice as much business.

In fact, this is true of all players in the radio hobby—consumers, hobby groups, merchants, advertisers, and manufacturers all need to be sharing ideas about new ways to adapt to modern realities. Meanwhile, it is important for us to support each other's best efforts. Whether we do it for love or for livelihood, we rise or fall together. Only time will reveal the survivors. In the end, the real winner will be the radio hobby itself—whatever new form it may take.

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Multiple Radios; the ***OPTOLINX*** is the only interface that allows full duplex receivers, like the AOR AR8000 and AR3000A, to be connected with half duplex receivers, like the ICOM R7000, R7100 and R9000, for multiple radio computer controlled scanning, allowing complete versatility that no other interface can match.

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•*Future Software Development by Software Design Companies will allow Real-Time position mapping.*

FEATURES

- •Computer control AR2700 and AR8000 using supplied FFC cable
- •Computer control ICOM R7000, R7100 and R9000
- •Download Scout frequencies to the PC
- •NMEA-0183 interface for GPS and LORAN receivers
- •Interface AR3000A with **DC440** for decoding CTCSS, DCS, and DTMF data under computer control
- •Interface **M1** frequency counter for datalogging with **Optolog** software
- •Switch between full and half duplex radios using remote or external switch
- •9 pin mini DIN connector for single cable custom radio connection
- •Interface multiple radios in a star network configuration

•Built in NMEA-0183 Interface for GPS interface. OPTOLINX shown with Trimble GPS, and AOR AR8000 Scanner.

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