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Monitoring Times

A Publication of Grove Enterprises, Inc.

News, Reviews and How-to's for the Radio Hobbyist

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- Cross-Country Flight Communications
- The Clandestine Voice of Radio Free Bougainville
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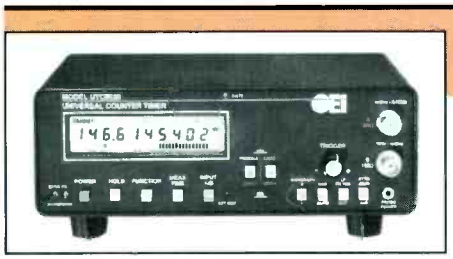

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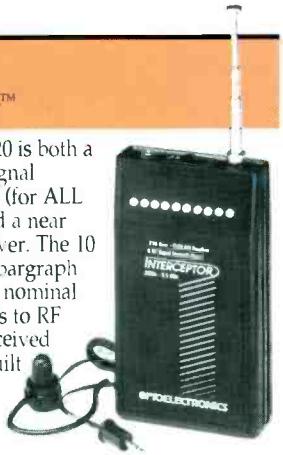

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February 1993

Monitoring Times

ATTENTION!
Keep an ear on Iraq!
See page 83 to monitor this potential hot spot!

Cross-Country Flight Communications

8

By James Montgomery

Ride along with avid pilot and radio hobbyist James Montgomery as he pilots his single engine craft from the great plains into the busy vortex surrounding Denver, Colorado. In this environment, flying the plane is a secondary skill; speedy and efficient communications are most important, and listening to the pros, says Montgomery, is the best classroom.

Log the Tough Ones!

12

By J.D. Stephens

No, we're not talking about sophisticated equipment to snag nearly impossible shortwave targets — Logging distant AM broadcast stations is a challenge which is accessible to anyone with a radio. But how do you overcome the static and interference on the overcrowded broadcast band? One solution is the DX Test; Stephens tells you how.

WMAQ ALL NEWS 67
WCBS NEWSRADIO 880
SPORTS RADIO 66AM WFAN
WABC 77AM
TALKRADIO · NEW YORK

Radio Free Bougainville

16

By Arthur Cushen

Noted shortwave monitor Arthur Cushen of New Zealand reports on this clandestine broadcaster operating from an amateur radio station in the Pacific Island of Bougainville. Geographically a part of the Solomon Islands, Bougainville has tired of being a political football, and has declared its independence. The consequence has been a devastating blockade by Papua New Guinea. The aim of the station is to advertise its plight to the world.

COVER PHOTO: Grove Enterprises accepts the Governor's Cup Award at the Governor's Mansion in Atlanta, Georgia (see page 7). Bob Grove, President (left), Kelly Davis, Vice President (right), of Grove Enterprises, and Georgia governor Zell Miller (center). Photo by Deborah Davis.

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The C-Span Audio Networks 18

By Jeff Chanowitz

It has taken five years, but C-Span's innovative idea of utilizing the same cable systems that bring television into the homes of cable viewers to provide high-quality audio transmissions is catching on. An entirely new audience has opened up for the thirteen international broadcasters now on the C-Span schedule.

Identifying VHF Low Band Skip 22

By Brian Webb

After last month's article, you may have started paying more attention to those unaccountable transmissions you've been hearing between 30-50 MHz. If they aren't from local law enforcement or businesses, who on earth are they? Webb gives you some tools and tips toward making a positive ID, or, at the least, an educated guess.

ATC for the 21st Century 26

By Jack Sullivan

The new communications system for air traffic controllers, now being tested by the FAA, is almost hands-free and fool-proof, and is expected to greatly increase controller efficiency and reliability. Sullivan has a sneak preview for *MT* readers.

And Much More ...

Aero monitoring seems to be a good indoor theme this wintry month. "Plane Talk" walks you through an explanation of types of radar and how they are used. You'll also find a new chart of Major World Air Route Areas from ARINC. Several new aeronautical resource books are in new editions; check out "What's New" for the titles.

If you just can't get excited by the terse, routine communications used by aviators, perhaps it's for lack of imagination! "Scanning Report" has a plan to change all that and bring the airport activity into your own living room.

With the U.S. military increasingly on the move all around the world, many monitors wonder if it's possible to overhear military satellites. The answer is yes, though it's not always easy. Tune in to the "Federal File" for some pointers.

Check out the departments below for more news, reviews and how-to's in the world of radio monitoring!

DEPARTMENTS

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LETTERS

What topic would you guess generates the most mail to the editor's desk? Privacy legislation? Complaints, corrections or new information? No, believe it or not, the topic that has brought the most response from the most diverse sources has been the time standard stations. Because of the level of interest, we were happy to bring you the tour of WWV by Wayne Heinen; but that only fueled the fires. Of the subsequent mail we received, the most informative and entertaining were some reminiscences of the WWV in the early years, supplied by Lloyd Matthiesen of Luverne, Minnesota.

Lloyd provided an article from *Science News Letter* from January 1947 lauding the new crystal clocks that kept the national standard. Lloyd says, "WWV first broadcast 440 Hz (in music, A above middle C) in February 1944. A 600 Hz tone was first used in 1950, and the 500 Hz tone was added July 1, 1971."

"An important factor in choosing a 600 Hz tone was to provide power companies a means of checking line frequency. The 60 Hz line frequency was applied to the horizontal plates of an oscilloscope, and the 600 Hz standard from WWV to the vertical plates. The resultant Lissajous pattern would rotate as the line frequency deviated from 60 Hz. It would become stationary when the line frequency hit exactly 60 Hz. The 500 Hz tone can be used in a similar fashion by the European power companies which use 50 Hz."

Lloyd sent a picture from a visit to WWV in 1967. Also of interest is an article he enclosed on Canada's time station, CHU, and its first voice broadcasting system. Lloyd comments that "the machine referred to was used until 1960, when it was replaced by a smaller and more reliable one. The machine described in this article gave many problems.

"Prior to 1955, when CHU first used the voice machine, it was necessary to decipher the minutes from the code shown in the table. They continued coding the seconds beeps for a year or two, and then dropped that mode altogether in favor of the spoken announcements."

Thanks, Lloyd, for that fascinating look into history. WWV has a special significance to many folks. Here's another story from John Vercellino of Downers Grove, Illinois:

"I was probably 11 or 12 years old, and I carted an old Philco console radio over from my neighbors. They were going to throw it away. I had the radio in the garage, turned it on, and came across a strange sound at 10 MHz, or 10 mcs at that time. It sounded like a clock ticking, and every five minutes or so, the station would identify with Morse code. Not knowing Morse, I had no idea what was going on. WWV was probably the first shortwave station I ever heard."

Engineer Leo Honea revises the propagation report from WWV (1967).

Take a look at this month's "Utility World" for more on time standard stations. You also might want to check out a new club: the ITDXA, or International Time DXer's Association. The last we heard, membership is free. Call 815-229-7121 or write 1119 Parkwood Ave, Rockford, IL 61107.

James P. Ashe of Weymouth, Massachusetts, wrote to NOAA for the publication recommended by Jacques d'Avignon to interpret the propagation information carried on WWV/H broadcasts, entitled "The Radio Frequency Users Guide to the Space Environment Services Center Geophysical Alert Broadcasts." What he received was a free aeronautical chart catalog.

According to the information we had from author Dave Rosenthal, the publication can be obtained by writing the Space Environmental Services Center, R/E/SE2, 235 Broadway, Boulder, CO 80303. Ask for publication ERL SEL-80.

As a parting shot; Did you know time stood still for one second last year? True enough: atomic clocks worldwide added a "leap second" to account for a decrease in the Earth's rotation. Scientists estimate that 850 million years ago a day was 20 hours long! Today, accuracy to a fraction of a second is necessary for such things as high-tech telephone transmissions and satellite reception of TV signals.

Table I—Coding of CHU Time Signals

Minutes	Second	50	51	52	53	54	55	56	57	58	59	60
1st		—		—	—	—	—					—
2nd		—	—		—	—	—					—
3rd		—	—	—		—	—					—
4th		—	—	—	—		—					—
5th		—										—

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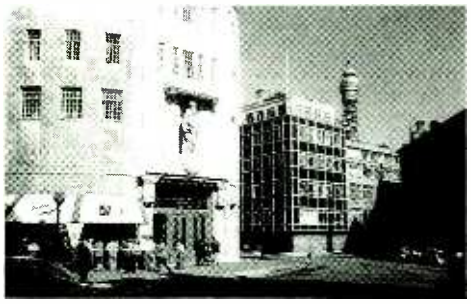
LETTERS

Thanks to Ken Mason of Washington, D.C. for that news item.

On the Shortwave Circuit

• R.C. Watts from Louisville, Kentucky, is becoming quite a globetrotting DXer! After attending the European DX Conference in Finland last summer, he happened to see hear about the BBC Radio Show—an opportunity to tour Broadcasting House and view many special exhibits. Artifacts and recordings from the earliest days of radio were on display.

R.C. comments, "The BBC had touched my life many times during the years since I first heard Big Ben from London on my grandmother's battery operated Silvertone. World War II had



just begun and my father was trying the new radio out. Was not much impressed at the time, being more inclined toward Jack Armstrong and the Lone Ranger.

"My real exposure to the BBC during WW II was through relays of the news via ZNS, Bahamas and the CBC. Later I began to depend on the BBC shortwave service, as I moved around the world with the U.S. Air Force.

"I'm still a fan and I never expected to ever see Broadcasting House, let alone enter it. It was a real joy to see all those things and to hear again the voice of Richard Dimbleby. Enclosed is a picture of Broadcasting House with the British Telecom Tower to the right in the background and the next Radio Show audience waiting to get in."

R.C. was planning to go on Radio China International's tour last month, and we trust he returned safely. I would like to suggest to R.C. and other readers who plan to attend the next *Monitoring Times* convention that you bring an album of your photos and other souvenirs from international broadcast stations or conferences.

• Director of the Office of External Affairs of the VOA, Joseph O'Connell, responded to George Zeller's comments in December's "Outer Limits" regarding VOA's treatment of audience mail. He says, "VOA has recently taken several budget cuts while having to maintain broadcasts in an increasing number of languages. Because priority understandably much be given to making programs and transmitting signals, support services such as audience mail have been reduced. The General Accounting Office concluded what shortwave listeners have always known: audience mail is an important part of the communication process of international broadcasting. As such, VOA will soon resume answering mail in all languages. (We never stopped answering mail in English.)

"Listeners in the United States are not part of VOA's intended audience, but as a courtesy the VOA Office of External Affairs verifies 'domestic' reception reports. We do this as time permits amid many other tasks assigned to External Affairs. Please bear with us: all U.S. reception reports are eventually answered."

Thank you, Mr. O'Connell, for taking the time to elaborate on the GAO report.

• Many readers forwarded a copy of the *Birmingham News* article headlined "Neighbors turned off by radio station." WEWN is a brand-new shortwave broadcaster founded by Mother Angelica and funded by Dutch philanthropists Piet and Trude Derksen. Four 500-kilowatt transmitters from Continental Electronics make the station the largest privately-owned shortwave radio operation in the world, said Ed Evans, manager of the now-surpassed Christian Science Monitor station WSHB.

However, says reader Robert Bowron Jr. of Birmingham, "an ugly flap has developed with the Alabama Power Company being sued by irate property owners; they apparently used more 'power' than they should have in securing available sites." The legal dispute concerns the route chosen by the power company to run the lines.

Other neighbors are disgruntled by their use of the road, and by the road being fenced off once it reaches the station. WEWN claims the old logging road has been in use as public access for more than 80 years, and that the road ends at the station. The security fence was erected for safety against the radiation hazard, it says.

• Lastly, Dave Jessop Sage of Boston, Massachusetts, writes regarding a service supposedly acting as a fund-raising arm for Radio Moscow. He says, "I think I got ripped off a few bucks for a Radio Moscow coffee mug by the North American Shortwave Service (or some name like that) out of Canada. After making three phone calls and it being out of stock or on back order, I said forget it. That was five months ago. I wonder if any other Radio Moscow listener dopes like me got duped?"

A group called the North Atlantic Radio Service supposedly does sell souvenirs for Radio Moscow International. Robert Dell is Manager, and the address is P.O. Box 1, Marion Bridge, NS Canada B0A 1P0; 24 hr order line 902-727-2727. Has anyone had other experiences with this company? *MT* wrote for more information back when they first announced their service, but we received no reply.

Equipment: Pros and Cons

• Earl Yamamoto of Kaneohe, Hawaii, did his own side-by-side test of the GE Superadio II and III. Here are his findings in a nutshell. In AM Mode: Audio - In treble control, the III is better than the II; however, the mid-range/bass response is mediocre on the III. Sensitivity - The III is noticeably less sensitive than the II. Selectivity - When tuning in a distant station, no noticeable difference in the "normal" setting between the two radios; however, in the III's "wide" setting, local AM stations dominate. In FM mode: Audio - III is much less full-sounding than the II. Sensitivity - About the same as the II.

Here is Earl's bottom line: "The G.E. Superadio II is more sensitive and sounds better than the GE Superadio III. Maybe I bought a mediocre Superadio III, or maybe I have an exceptional II. If you have a II and you want to buy a III, make sure the retailer has a reasonable return policy and do your own side-by-side comparison. Whatever you do, don't retire that ole No. II to the garage just yet."

• Columnist Doug DeMaw took exception to a product announcement in November's "What's New?" The Palomar Magnetic Longwire Balun is intended to allow use of a coax feed. Doug maintains that there is no way a balun transformer can be used with a long wire antenna. "Random length wires can exhibit a host of feed impedances over a wide range of frequencies. Some impedances may be as great as 2000 ohms. No broadband transformer can be designed to work correctly at impedances greater than approximately 500 ohms.

"Furthermore, feed lines do not pick up man-made noise if they are balanced or flat. Palomar's balun might, at some specific frequency in the HF range, provide a match between the wire antenna and coaxial cable. Coax does pick up noise, contrary to the claims of the article. At $39.95 per whack, there may be a lot of readers who feel they were ripped off!""

Our advice: contact Palomar for more information regarding the intended use for this product before buying. Certainly a coax feed to a balun-fed wire antenna would have less noise than a single wire feed led improperly into the radio, but the results may be less spectacular than the announcement implied.

• Roman Robakiewicz of Coventry, Connecticut, doesn't claim to be a "serious" monitor—he just likes to listen to the Coast Guard and spin the dial to see what's there. Still, "no matter how many banks I have in my PRO-2004 scanner, the one with the frequencies which interest me at the time is always entered only on paper."

Roman's suggestion comes from using his Texas Instruments TI-59 calculator. "When I shove the small magnetic tape into the slot to enter a different program, I often wonder why they don't do something like that with receivers. I think if that were an option on your SW-100 receiver, I'd be getting one."

The idea is certainly an intermediate step between total frequency and radio management

Continued on p. 109

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COMMUNICATIONS

News to Somalia

The Voice of America has inaugurated a special 15-minute news broadcast in the Somali language which airs daily at 0245 UTC on 6155, 7265, 9575, and 9885 kHz. According to VOA Africa division chief Margaret Binda, the program's aim is "to provide news of the world and especially news about what is going on in Somalia as efforts are made to distribute food and bring stability throughout the country."

For more frequencies related to relief efforts in Somalia, see this month's "Utility World" column.

New Hampshire Lawyers Say "Shhh...."

The New Hampshire Bar Association has ruled that Granite State lawyers cannot talk to their clients on cellular car phone because doing so may violate the profession's standards of confidentiality. Someone, you know, may be listening.

There have been no known cases where calls between lawyers and clients have been intercepted and publicized. Are the Granite State barristers overreacting? "It's not really for me to say..." says John Thibeault, business manager of Cellular One.

Canadian Monitors Face Prison

Calling cell phone monitoring in Canada "a problem that demands we act now before it becomes more serious," Communications Minister Perrin Beatty has pushed legislation that would put loose-lipped eavesdroppers in northern prisons.

Under the legislation, people who divulge what they've learned—verbally or by passing on transcripts of audio tape—could get up to a year in the slammer and $25,000 in fines. Companies or media that make use of such information face fines up to $75,000. Victims will also be allowed to sue the eavesdroppers.

The proposed Canadian legislation looks more like section 605 of the 1934 U.S. Communications Act than ECPA or the recent HR 6191. The Canadians wisely concluded that a ban on scanners is unenforceable.

And Now for Something Completely Different

America's largest cable TV provider is now threatening U.S. households with even more video sludge. Saying that the same cable companies already "...fill our homes with more TV channels than we know what to do with...," *Time* magazine reports that Tele-Communications Inc., which services some 9 million customers, is planning to install equipment capable of delivering over *500* different channels by early next year. The system will use compressed digital TV.

Not to be outdone, Time Warner, the fine folk who gave us the "inside" Madonna book, says that it could multiply the 150 channels it already offers to 1,500 channels. Hey, why ever leave the house?

Get a License

By the way, if you're operating a vessel or coast station on marine frequencies without a license, the FCC wants to remind you that they will fine you $10,000 and put you in jail for a year if they catch you. Nothing personal.

A recent study indicates a large number of unlicensed stations are on the air. The Commission, which plans to enlist the aid of the U.S. Coast Guard in the upcoming boating season, is concerned about "such unlicensed activity in a safety service..."

It's Up In The Air for Now

It's out of this world listening. The National Aeronautics and Space Administration has announced that they have added EVAs ("spacewalks") to the remaining shuttle flights leading up to the construction of Space Station Freedom. Astronauts performing EVAs can be monitored. With the proper blend of good equipment, good luck and skill, listeners who stake out 279.0 MHz can tune in the shuttle.

Intelligencer Journal photo by Barry Zecher

Reindeer Radio

This past Christmas saw a proliferation of lights, mechanical men, and other ornaments playing endless carols. But, when carols began sounding over police radios in Lancaster, Pennsylvania, the FCC was summoned to help locate the source of the devastating interference.

No one was more surprised than Mrs. Blanche Cosgrove, who answered her door to men wearing headphones and carrying electronic gear, asking to inspect her Christmas decorations!

The source was found to be three small plastic reindeer whose noses light up as they play "Jingle Bells." Although she had been playing them for three days, the problem did not begin until the third day when it increased by the hour. The ornament apparently emitted a signal on the police frequency which was picked up and amplified by a police radio repeater antenna two blocks away.

The FCC, which took the set for inspection, admitted it was a very strange case. The novelty item was manufactured in China, and was purchased in 1991. No other similar sets were found in the area stores this year.

Let the Monitoring Times Roll

There's more good DX coming, if solar physicist Richard Altrock is right. The sunspot cycle, which can provide the extraordinary reception that can lead to truly unique reception and treasured QSL cards, is 19 years long, not 11. Altrock says that the 11 year cycle is just the visible result of the invisible 19 year magnetic cycle of the sun. By the time sunspots are visible on the surface of the sun, he says, the magnetic activity in the corona (the solar atmosphere) has already been cranking up for eight years.

Repent

Thomas M. Haynie, WB4PVK, the satellite transmitter operator who in 1990 was convicted of superimposing a religious message on top of a skin flick on the Playboy Channel, has been upset about his punishment.

Although his 3-year jail sentence was suspended, and his $3,000 fine was reduced to $1,000, what got to Haynie was the FCC's decision to strip him of his radio license—specifically his ham license—never mind the commercial one.

In a letter to the FCC, Haynie pointed out that he was not a habitual offender, had no previous record, realized the seriousness of his offense and asked that they not revoke his ham license.

The FCC was not impressed. Thomas M. Haynie, WB4PVK, is now Thomas M. Haynie.

More War

It's been building up ever since the end of the Persian Gulf War. Nations in the region

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COMMUNICATIONS

Grove Awarded Governor's Cup

Grove Enterprises, publisher of *Monitoring Times*, was selected in December to receive the coveted Governor's Cup Award in recognition of their outstanding growth and involvement in community service.

Bob Grove, founder and president of the company, accepted the award at a special recognition ceremony in Atlanta at the Governor's Mansion, hosted by Georgia governor Zell Miller. The award was presented to Grove by West Virginia governor Gaston Caperton, chairman of the Southern Growth Policies Board.

The award honors exemplary economic development efforts by southern firms. Only three awards were given and Grove Enterprises was the only recipient in the eleven southeastern states to receive the award in the small business category.

The company, which began by publishing the *Federal Frequency Directory*, now manufactures and markets radio accessories and publishes *Monitoring Times* and radio books. Begun with one employee working off the kitchen table in 1980, sixteen persons now work at its headquarters in Brasstown. Grove Enterprises expects to expand further as some of its long-term projects begin to be realized.

have been racing to bombard each other with TV signals. The weapons may have changed but the use of TV signals is perhaps a natural turn in a part of the world noted for the use of poison gas and cluster bombs.

The Sultinate of Oman has reportedly installed a number of TV stations along its coast facing Iran. If you have friends in the Islamic Republic, tell them to check out Omani Channels 51 (Barka' and Jabal Harah), 5 (Shinas and Bahlah), 9 (Madha), 51 (Barka' and Jabal Harah) and 55 (Ghitri). Contact the Omani Information Ministry at 011-968-697672 for more information.

My Friends, Let Me Tell You..."

Mazaffar abd-al-Al, "director of beamed broadcasts" in Iraq's Radio and Television Department was waxing philosophical during a recent interview:

"How can we convey the truthful and noble voice of Iraq to the world and tell it the truth? Does the world listen to us? Does it hear our voice, follow our news, or know us as we really are and not as the evil ones want to portray us?

"The truth reaches out...to tell them the true news from honest sources and not from malicious sources which mix blood with milk...whereas it is in fact sugar-coated poison.

"Radio Iraq International began broadcasting...thanks to the sincere efforts to repair transmitters damaged in the 30-state aggression on our beloved Iraq. But I tell you, my friend, they have not been able to silence the voice of Iraq."

We thought you might want to know.

Freebie DX Book

The English language Service of KNLS is offering free copies of a 32 page book called, "DX Tips for Beginners." Write to KNLS, P.O. Box 681706, Franklin, TN 37068. The book is written by Carl Mann in cooperation with Universal Radio in Reynoldsburg, Ohio.

"Communications" is written by Larry Miller from a variety of sources, including material submitted by the following readers: David Alpert, New York, NY; Rachel Baughn, Murphy, North Carolina; Don Benninfield, Garland, Texas; Canadian Press; Bob Coburn, Londonderry, New Hampshire; Mark Fex, Windsor, Ontario; Michael Keller, Lancaster, PA: "Pete" Bernard Maquire, Montreal, Quebec; Nick Powell, Colorado Springs, Colorado; Radio Netherlands "Media Network"; George Sala, Sr., Manheim, PA; Charles Seps; Jim Shephard, Steve Weiner, Edison, New Jersey; *W5YI Report*.

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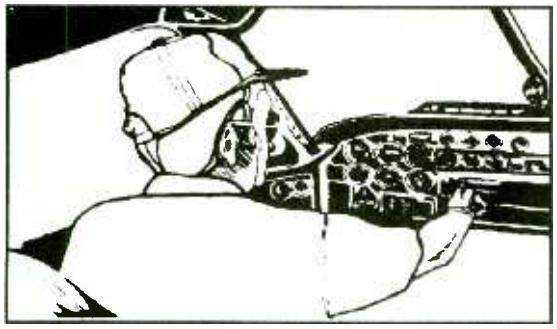

Cross-Country Flight Communications

By James Montgomery

"THIS IS UNITED FLIGHT #347 HEAVY, 2 MILES EAST OF THE AKRON VOR, UNDERSTAND WE ARE CLEARED DOWN TO FLIGHT LEVEL 180." I was monitoring 132.6 MHz and heard the pilot loud and clear in my headphones. I knew that a big jumbo jet with hundreds of people on board was maybe one minute away and less than two miles above my head.

It was 5 pm on a Friday afternoon. United, Continental, Delta and a dozen other cattle cars were all lining up to descend into Stapleton International Airport at Denver, Colorado.

I was pilot in command of a single engine airplane flying at ten thousand five hundred feet. The radio transmission I had just heard by air traffic control authorized the jumbo jet to descend to eighteen feet, only eight thousand feet from my flight level. (A mile is 5280 feet.)

I have been a pilot for over twenty years, I regularly fly from a family farm located on the great plains to Denver, Colorado, as well as using my "bird" for vacations throughout the U. S., Canada and Mexico. In addition, I have been an avid radio hobbyist since high school when I built my first solar radio with a galenium crystal.

I knew as I continued on to my destination, which was also Denver, my airspace would quickly begin to be squeezed. I was 70 miles away and already those big guys were beginning to slow down their airspeed for final approach into Denver. I was certainly going to make sure I stayed out of their way!

I decided to leave this principle FAA frequency which supervises air traffic East of Akron, Colorado, and descend also to provide an extra margin of comfort for my three passengers. Naturally every pilot hates to have passengers start yelling and screaming about the jumbo jet just outside the window!

But let me start from the beginning.

My trip had started several hours and hundreds of miles ago. After we were safely airborne, in level flight, and all on board computers were locked onto their proper frequencies and geographical coordinates, I settled into my regular trip to Denver, about 500 miles. (Most aviation frequencies are AM mode and generally are grouped by usage, so look around the range in your area for similar usage or invest in a chart which is available at your local airport's fixed base operator (a euphemism for an aviation gas station) or via mail order from several sources. A good place to start asking for a list of publications would be the Defense Mapping Agency Aerospace Center, 3200 South Second St., St. Louis, MO 63118-3399, or Sporty's Pilot Shop, Clermont Airport, Batavia, OH 45103.

It is a clear blue day, not a cloud in sight, visibility is over 100 miles. And here is one for Ripley's "Believe It-or-Not": Most midair collisions occur on days just like this. It can be so beautiful that the pilot forgets to look out for the other guy. So I always add a layer of "insurance" to my trip.

Many small airports without a tower, such as the one I departed, use 122.8 MHz as the unicom frequency where pilots are expected to talk to any other pilots in the area and advise of intentions, direction of flight, etc. This I had done but after departing the immediate airport area, I knew I could safely change frequencies. I changed one of my radios to the local FAA air sector control at 123.7 MHz.

I wanted to enjoy the view at about a mile and one half above the ground without worrying about other traffic. This is my standard speech to the good people at the FAA: "AH, GOOD AFTERNOON, THIS IS 777 KINGFISH, I AM A SINGLE ENGINE AIRCRAFT FLYING WEST BOUND AT TEN THOUSAND FIVE HUNDRED FEET. I WOULD LIKE TO ASK FOR FLIGHT FOLLOWING, IF YOUR TIME ALLOWS, SIR."

Sometimes they tell me no. I realize that they can get very busy directing the big boys; a constant communications link is the law for anyone flying above flight level 180 (eighteen thousand feet above sea level). But this is two hours before the "rush hour traffic" in and out of Denver and I suspect that all they have to do is watch a few transcontinental and Hawaii nonstop direct flights. The air traffic controllers via radar can advise each one of them about other nearby aircraft. This is the electronic loop with which I want to connect. And today, the controller (a lady, as is often the case) is happy to oblige:

"777 KINGFISH, THIS IS DENVER RADAR, CHANGE YOUR TRANSPONDER CODE TO 3217 AND SQUAWK PLEASE."

A typical small plane has several computers and seven or eight radios of different types. The transponder is a fixed frequency (1030 MHz) transmitter which continuously transmits and acts as an identifier to the radar station looking at the aircraft. The range is line of sight or maybe 100 miles if the plane is very high in the air. The 3217 code setting the controller has asked for is not a frequency, but a pulse code which gives my airplane a unique signal so that the controller can identify my radar image from all the other airplanes on the screen.

This is what the controller wants when I am requested to squawk. I key the transmitter of the transponder and at the same time transmit on 123.7 verbally: "THIS IS 777 KINGFISH, I'M SQUAWKING 3217."

Then, a miracle of the electronic age happens on the screen of the air traffic controller. He or she may be responsible for dozens of aircraft at the same time, but when I key the transmitter of my transponder, my radar blip on the radar screen will get bigger and flash. Now the FAA knows my exact position, and my altitude and can easily advise of any other aircraft converging on my position. Typical minimum low altitude space

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separation is five miles latterly and 2000 feet vertically. Unless they get too busy for me, I will stay plugged into this world of technology, flying with the big boys, until I reach my destination. Since I am flying under visual flight rules (VFR), they have the right to terminate their service to me.

Approximately half way to Denver, another sector controller takes over and I am usually advised to switch to 132.5 MHz. I also make sure my other navigational aids stay tuned to their proper frequency and geographical coordinates. It is very embarrassing to have the FAA tell you that you are off course on your way to your stated destination. I have never found them to be wrong!!

It is a smooth flight. About half way there, the purple, white-capped majesty of the Rocky Mountains start to make their presence known. Today we are flying over the farming district of eastern Colorado. The irrigation sprinklers form perfect green circles covering an area 1/4 to 1 mile in diameter. Our ground speed is 150 MPH or over two miles per minute. I know this from my "on board computer," the DME. This unit, (Distance Measuring Equipment) continuously talks (via another on board radio) to a site on the ground. I know within 1000 feet exactly how far I am from each way point and exactly how many minutes away at my present speed. This information is continuously updated and displayed on my cockpit panel.

I take time to monitor 122.0 MHz, the nationwide flightwatch frequency, where I can listen to a wide variety of general aviation aircraft asking for weather information and relaying conditions they are encountering. These are called PIREPS, Pilot Reports, and in marginal weather conditions are a great service to other pilots considering venturing into the same conditions. Try listening to this frequency on a mostly cloudy, or stormy day and it should be full of traffic. If you do not hear anything, try 122.2 or 123.6 MHz. Other frequencies may be primary in your area and a VFR chart will be needed.

Finally we are 70 miles east of Denver. The bigger, faster planes above me are already starting to get ready for landing. United, Continental, Federal Express, Delta will all be contacting their flight operations asking about ramp parking, connecting gates, requests for special assistance such as wheelchairs, and relaying other pertinent data such as needed routine maintenance, etc. See Table One for an extensive list of frequencies.

Being a light general aviation aircraft, fully aware of my limitations of weight and speed when up against the commercial jets, I have no intentions of landing at Stapleton! But as I drive by, I can take advantage of some of their services like the ATIS (Automatic Transcribed Weather Service); a continuous tape of conditions at the airport, current wind, altimeter and active runways.

I have chosen a "reliever airport" called Centennial, 18 miles to the south—a place for airplanes just my size with a speed of only two miles a minute! It is time to get out of the way of the "big boys" traveling five miles a minute or faster.

Between my current position and my destination is not only Stapleton International Airport, but also Buckley Air Field—an Air Force Base where supersonic military fighter jets buzz around. They communicate on their own UHF military frequencies and my plane can't talk to them. My airspace is being squeezed by the heavy commercial traffic in and out of Stapleton.

TUNE IN TO ALL THE ACTION!

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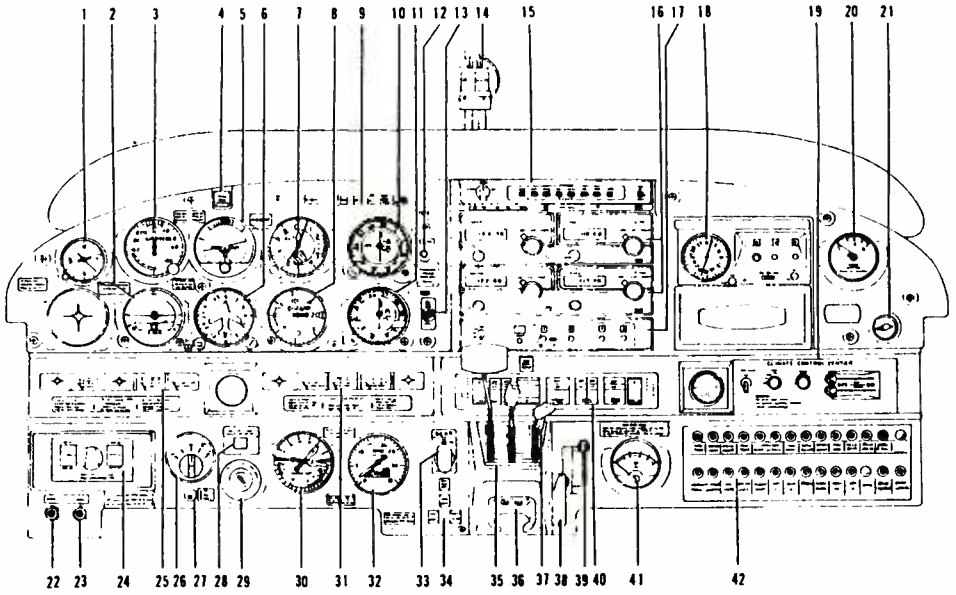

1. CLOCK
2. TURN COORDINATOR
3. AIRSPEED INDICATOR
4. WARNING - GEAR UNSAFE LIGHT
5. ATTITUDE GYRO
6. DIRECTIONAL GYRO
7. ALTIMETER
8. VERTICAL SPEED INDICATOR
9. ANNUNCIATOR DISPLAY
10. OMNI AND GLIDE SLOPE INDICATOR
11. OMNI INDICATOR
12. PRIMER BUTTON
13. AIR CONDITIONER DOOR LIGHT
14. COMPASS
15. AUDIO CONTROL PANEL
16. COMMUNICATIONS TRANSCEIVERS
17. TRANSPONDER
18. ADF
19. CLIMATE CONTROL CENTER
20. GYRO SUCTION GAUGE
21. CIGAR LIGHTER
22. MIKE JACK
23. PHONE JACK
24. AUTOPILOT - AUTOCONTROL IIIB
25. CLUSTER GAUGES
26. OMNI COUPLER
27. NAV 1, NAV 2 SWITCH
28. ELECTRIC TRIM SWITCH
29. IGNITION SWITCH
30. MANIFOLD PRESSURE/ FUEL FLOW GAUGE
31. CLUSTER GAUGE
32. TACHOMETER
33. GEAR SELECTOR SWITCH
34. GEAR INDICATOR LIGHTS
35. CONTROL QUADRANT
36. MIKE ATTACHMENT
37. MIXTURE CONTROL LOCK
38. FRICTION LOCK
39. ALTERNATE AIR
40. CONTROL SWITCHES
41. EGT
42. CIRCUIT BREAKER PANEL

The cockpit panel keeps the pilot and ground personnel apprised of the plane's position, speed and altitude through several communications links.

Flying skills at this point are the least of a general aviation pilot's worries. I strongly believe that flying the airplane is a secondary skill in this environment. Understanding quickly what else is going on in a twenty mile plus circle is of primary importance. Remember my aircraft, at two miles a minute, is the slowest player in the field. Another "vehicle" twenty miles away could ruin my day in less than five minutes.

Proper radio communication techniques are essential for navigation in and out of a busy metropolitan area. If you have an interest in monitoring this type of communication, search for frequencies near the ones I have listed in this article. Different areas of the country generally use the same frequency for similar purposes. 25 kHz is the standard spacing. And of course, send your questions to *Monitoring Times*.

If you are a private pilot, I encourage you to invest in a scanner and spend some time just listening to hear how the "pros" do it. A few hours of monitoring will quickly reveal the experienced pilot and the novice. Most pilots are highly professional, but unnecessarily lengthy transmissions and misunderstood instructions only cause confusion, delay and possible danger to the rest.

The FAA controller quickly gave me instructions to switch to 119.3 MHz which I knew was the close in radar approach frequency. I had no sooner switched the dial, than I heard an advisory to another aircraft: BE ADVISED BUCKLEY HAS DEPARTING TRAFFIC.

This was the opportunity, and challenge, I had been waiting for. A chance to watch, from an observing platform two miles high, a high performance aircraft take off and depart on a clear blue day. I quickly switched other radios to monitor the Buckley tower on 121.0 VHF/289.6 UHF and ground control on 121.6 VHF/275.8 UHF. Within a matter of minutes, I heard confirmation that two F-16 fighters were on the verge of departure. Military aircraft do not transmit excessively; the responses were very short and clipped such as "WILCO" (Will Comply).

While all of this was going on I kept hearing in the background, in my headphones, the following: THOR,....THOR, CONTACT FAA ON 357.6, RENDEZVOUS POINT IS BAKER. I never heard a response. On the third or fourth transmission, I realized that the FAA was not transmitting on a normal frequency, but was using the emergency channel 121.5 MHz. As a matter of habit, I have always tuned a spare radio to this frequency which is normally very quiet. Obviously this was not a normal transmission but they had lost contact and were searching for some type of aircraft via radio.

Unfortunately, I had no time to continue to monitor this situation. Buckley airfield was less than ten miles off my left. My radio tuned to Buckley Tower suddenly became active with clearances for takeoff. Suddenly the two fighter planes departed from left to right across my front. In less than a minute the pair were at my altitude, a minute later they were only black specks high in the sky, speeding to a destination known only to the military. My radio scanning hobby allowed me to quickly react and monitor this situation from a unique vantage point.

Two minutes later I was crossing under their flight path and getting ready to land at Centennial Airport. The FAA handed me off to the local tower: KINGFISH 777, YOUR DESTINATION IS AT TWELVE O'CLOCK, FIVE MILES, CONTACT CENTENNIAL TOWER ON 118.9.

Minutes later we were on the ground. As I went through the normal post flight checklist and wheeled my bird into the hanger, my mind went back to the events which had just occurred. A camera is seldom close by when you need it, nor a tape recorder. Subsequent monitoring never revealed any further transmissions related to the unknown aircraft THOR. I do know THARP has been used as an acronym for Tactical High Altitude Reconnaissance Aircraft. I do not believe the F-16 flights were related to the THOR transmission.

I will never forget the mental picture I have of the two military jets, side by side, roaring silently to altitude in front of me. On this day, thanks in large measure to my radio scanning hobby, I was truly "flying with the big boys."

MT

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Table 1

Aircraft
VHF-AM

117.000	Denver VOR
118.300	Stapleton tower E/W
118.500	Colo Springs Muni Approach North
118.600	Jeffco Tower
118.900	Centennial Tower
119.200	Denver Approach
119.300	Denver TCA Overflight Jeffco/Centennial/ Buckley Approach
119.500	Stapleton Tower N/S
120.200	Stapleton Approach North
120.300	Centennial ATIS Appr/Dep
120.800	Stapleton Approach South
121.000	Buckley ANG Tower <Civilian Air Traffic>
121.100	Denver Approach TCA to Buckley/ Centennial/Jeffco
121.500	INTERNATIONAL AIR EMERGENCY CHANNEL
121.600	Buckley ANG Ground Control <Civilian>
121.650	Stapleton Ground Control <Gate>
121.700	Jeffco Ground Control
121.800	Centennial Ground Control
121.900	Stapleton Ground Control
122.000	Flight Watch <Nationwide>
122.200	Denver Flight Service Station
122.300	Denver Flight Service Station
122.350	Denver Flight Service Station
122.400	Denver Flight Service Station
122.600	Denver Flight Service Station
122.700	Boulder/Loveland Muni Airport <Multicom>
122.750	Multicom
122.800	Weld County/Ft Collins/Aurora Airport <Multicom>
122.875	Multicom
122.900	Multicom
122.950	Jeffco/Stapleton/Centennial Airport Unicom
123.000	Longmont/Tri-County/Centennial Unicom
123.050	St. Anthony's/Air Life/Denver/P.D. Helicopter Unicom & Dispatch
123.075	St. Anthony's/Air Life Helicopter Unicom & Dispatch
123.300	Gliders
123.450	Flight Test/Air to Air Unicom
123.500	Gliders
123.700	Centennial Tower <Alternate>
123.850	Stapleton Departure
124.450	Stapleton ATIS Dep
125.300	Stapleton Approach East
125.600	Stapleton ATIS arr
125.800	Denver Center low S.E.
125.950	Denver Center Akron low N.E.
126.250	Jeffco ATIS App/Dep
126.500	Denver Center low N.W.
126.600	Denver Center low S.W.
126.800	AFA Tower
126.900	Denver Radar TCA Overflight to Jeffco/ Centennial/Front Range
127.500	Denver Center Akron
127.550	Denver Center high N.E. sct#33 240+
127.600	Stapleton Clearance delivery
128.050	Stapleton Departure North
128.200	Denver Center S.W.
128.600	Centennial Clearance Delivery
128.650	Denver Center low W.
128.700	Denver Center high S.E. sct#28 240-350
128.850	Mexicana
128.950	ARINC/United
129.000	ARINC
129.050	ARINC
129.100	TWA
129.200	ARINC
129.250	Midwest
129.300	ARINC/United
129.325	ARINC
129.350	ARINC/United
129.400	ARINC/United
129.425	ARINC/United
129.450	ARINC/United
129.500	ARINC/United
129.550	Delta
129.700	ARINC
129.725	Combs Gates
129.750	ARINC
129.775	ARINC
129.875	Braniff
129.925	ARINC/Continental
129.950	ARINC/Continental/Rocky Mountain
130.000	ARINC
130.100	Western
130.175	ARINC
130.200	ARINC
130.225	Continental/United
130.250	ARINC/Continental
130.350	ARINC/Continental
130.425	ARINC
130.525	ARINC
130.550	Braniff
130.575	Denver Beech
130.625	ARINC
130.775	Continental
130.900	ARINC/Continental
130.950	Delta/Republic
130.975	ARINC
131.075	UNITED
131.100	ARINC
131.150	ARINC
131.200	ARINC
131.250	Republic
131.300	ARINC
131.350	United
131.425	Beckett Aviation
131.450	ARINC
131.550	ARINC
131.600	ARINC
131.625	ARINC
131.700	Northwest
131.925	Federal Express
131.950	American Airlines
132.000	Aspen Airways
132.100	Denver Center high S.W. sct#23 240+
132.125	Denver Center high W. sct#4 240+
132.175	Denver Center high E. sct#17 370+
132.225	Denver Center high S. sct#29 240-350
132.750	Denver Center
132.850	Denver Center high S.E. sct#5 240+
133.000	Denver Center
133.525	Denver Center high S. sct#5 240+
133.750	Denver Center high E. sct#16 240+
133.850	Denver Center high S.E. sct#39 350+
134.200	Denver Center high N. sct#34 240+
134.475	Denver Center high S.W. sct#36 240+
135.025	Denver Center high N.E. sct#35 240+
135.125	Denver Center high W. sct#4 240+
135.200	Denver Center high N.W. sct#14 240+
135.400	Denver Center high S. sct#30 350+
135.500	Denver Center high E. sct#8 240+
135.650	Denver Center high W. sct#3 240+
135.750	Denver Center
141.100	Buckley ANG-Helicopter Net Secondary
142.400	Buckley ANG-Helicopter Net Primary

UHF-AM

227.300	Buckley-Helicopter Net Secondary
230.800	Buckley-Helicopter Net Primary
232.700	MOA/Restricted-"Dutchman"
235.100	SAC
236.550	Thunderbirds-A/A-Solos 5-6
236.600	Thunderbirds-A/A
237.200	MOA/Restricted-"Dutchman"
241.400	Blue Angels-A/A
241.400	Thunderbirds-A/A
242.400	Buckley-Helicopter Net Tactical
243.000	INTERNATIONAL AIR EMERGENCY
250.800	Blue Angels-A/A
250.850	Thunderbirds-Team Leader
251.600	Blue Angels-A/A-Solos 5-6
253.625	Fort Carson MOA/Lowry VIP net
255.400	Denver Flight Service Center
257.800	Stapleton Tower
258.200	Radar Bomb Scoring Site-La Junta
260.200	Air Refueling Route AR643-Secondary
267.800	Buckley ANG-Testing operations
268.100	Buckley ANG-Tactical Ops Special Use
269.000	Cheyenne Airport-ANG Ops
269.300	Denver Approach
271.900	MOA/Restricted-"Beaver Dam"/Radar Bomb Scoring Site-Cheyenne
272.700	Denver Center
273.500	Thunderbirds-A/A
275.350	Blue Angels-A/A-1 to 4
275.800	Buckley ANG Ground
281.200	MOA/Restricted-"Blood Alley"
281.500	Cheyenne Airport-App/Dep
281.500	FAA Center-Cheyenne
282.200	Denver Center
282.600	Buckley ANG-Tactical Special Use
282.800	Buckley ANG-Tactical Use
283.500	Thunderbirds-A/A
284.000	Denver Approach
284.700	Denver Center
285.500	Denver Center
286.400	MOA/Restricted-Ft Carson
286.400	Buckley ANG-Tactical Special Use
287.300	Buckley ANG-Range Control-"Airburst"
287.400	Buckley ANG-Tactical Special Use
288.100	Denver Approach N.
289.600	Buckley ANG Tower
290.200	Denver Center
292.100	MOA/Restricted-"Blood Alley"
294.700	Thunderbirds-A/A
296.700	Buckley ANG-Tactical Special Use
301.500	MOA/Restricted-"Blood Alley"
303.000	A/A Intercom
306.900	Denver Center
307.100	Denver Center-Remote-High
307.300	Denver App/Dep
311.000	SAC Command Post
314.200	MOA/Restricted-"Spirit"
317.500	FAA Center-Pueblo
319.300	MOA/Restricted-Ft Carson
319.300	Buckley ANG-Tactical Special Use
320.100	Air Force Academy Tower
320.900	Air Refueling Route AR622-Secondary
321.000	SAC Command Post-Secondary
322.300	Denver Center/Thunderbirds A/A
322.600	Thunderbirds-A/A
325.800	MOA/Restricted-Ft Carson
334.100	Continental/Western Airlines
334.700	Republic/Trans World Airlines
335.500	FAA Center-La Junta
344.200	MOA/Restricted-"Blood Alley"
344.600	Buckley ANG METRO
348.600	Cheyenne Airport-Ground
350.300	Denver ARTCC-Remote-High
351.200	Buckley ANG-Operations
351.800	Denver Departure
352.900	Air Refueling Route AR622-Primary
354.200	MOA/Restricted-"Spirit"
357.600	Denver Center
359.100	Buckley ANG-Tactical Special Use
360.400	Blue Angels-A/A
361.400	MOA/Restricted-"Blood Alley"
361.400	MOA Restricted-"Cornfed"
363.000	Denver Approach S.
363.400	MOA/Restricted-"Blood Alley"
370.300	Denver Departure
370.400	Air Refueling Route AR643-Primary
372.200	Buckley ANG-Ops
381.400	Buckley ANG-Tactical Special Use
381.500	Denver App/Dep
382.900	Thunderbirds-A/A
383.300	Cheyenne Airport-ANG Ops
384.400	Blue Angels-A/A
385.500	Stapleton Clearance Delivery
385.700	SAC
387.000	Ft. Collins/Loveland Airport
388.000	Denver App/Dep
394.000	Thunderbirds-A/A
395.100	MOA/Restricted-"Cornfed"
395.900	Blue Angels-A/A

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Most of us enjoy some form of radio hobby listening or DXing, whether it be amateur radio, DXing shortwave broadcasters, scanning, or some other form of DXing.

Unfortunately, some of these pursuits can require specialized equipment, costing hundreds, even thousands of dollars. But, there is one portion of the radio frequency spectrum that anyone can enjoy with nothing more elaborate than a table radio—the AM Broadcast Band. Here is a special technique to help you...

Log the Tough Ones!

By J.D. Stephens

For many radio enthusiasts, DXing the standard AM broadcast band (BCB) is one of the most fascinating aspects of the DXing hobby. In the United States alone, the AM BCB (540 to 1600 kilohertz) is home to almost 4,000 stations. Many long-time BCB DXers number their loggings in the thousands. Some have heard all 50 states and many foreign countries on the BCB.

With the proliferation of many new AM outlets during the last 10 years, plus the switch to 24 hour programming for many stations, congestion on the AM BCB has greatly increased. It is now more difficult to log new stations, especially those at great distances. With the advent of modern, more efficient equipment requiring less upkeep, Monday morning silent periods (long a traditional time during which stations would go off the air for transmitter maintenance) have become fewer and fewer each year, lessening a DXer's opportunity to hear a weaker station in the lull.

Fortunately, there is a way that even a novice DXer can still hear those low-power, rare stations in this day of ever-crowded AM band conditions: ***DX tests.***

What is a DX Test?

A DX test is a special broadcast by a station specifically for the purpose of allowing DXers a chance to hear them. Also, the tests give interested engineers or station managers a chance to see just how well their transmitter can "get out." FCC rules permit such tests, provided they are conducted during "experimental hours" (midnight to 6:00 AM local time at the station). During tests, stations are also allowed to use their full power and normal antenna pattern (which in many cases is omnidirectional).

When Do I Listen?

Since some stations still go off the air on Monday mornings, this is usually when the band is least crowded. Consequently, it is more likely that a testing station will be heard at greater distances. Therefore, most DX tests are still arranged for Monday mornings. Scheduling problems do occasionally make it necessary to conduct tests on weekend mornings, or even during the middle of the week.

What Will I Hear?

The format of DX tests varies with each station. Most tests include frequent voice announcements and some easily identifiable music which can cut through the interference (typically march music or polkas). Many stations also include test tones or Morse code (which can include the station callsign and location) during the test. Because of its unique characteristics, Morse code can really cut through interference and help DXers at distances of 1000 miles or more make a positive identification. In many cases, the Morse code is the only portion of a test that DXers at great distances can identify!

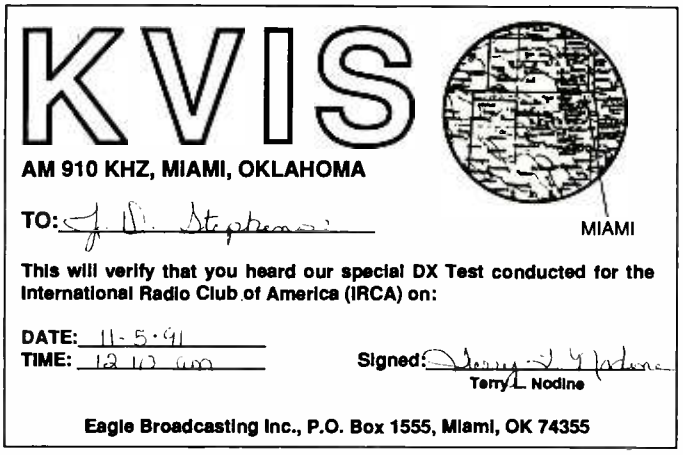
Where Do I Find Out About DX Tests?

Many DX tests have been scheduled by two radio hobby clubs. The Courtesy Program Committee (CPC) of the International Radio Club of America (IRCA) is one. IRCA is a club devoted to the hobby of AM BCB DXing. Information on DX tests appears in their club bulletin ***DX Monitor.***

Another AM BCB club, the National Radio Club (NRC), also arranges DX tests through their CPC, publishing test information in their club bulletin, ***DX News.*** Information on DX tests can also be obtained by listening to the major DX programs such as *World* of *Radio* and *Signals*. DX test information is also posted regularly on computer bulletin boards, including the ANARC bulletin board and Fidonet.

What Kind of Equipment Do I Need?

You don't need elaborate equipment to hear DX tests. Any receiver capable of tuning the BCB will do. I regularly use a moderately-priced Sony portable and a 50 foot longwire antenna. Some DXers have regular success in hearing DX tests on nothing more elaborate than a 20 dollar table


KVIS

AM 910 KHZ, MIAMI, OKLAHOMA

TO: J. D. Stephens

MIAMI

This will verify that you heard our special DX Test conducted for the International Radio Club of America (IRCA) on:

DATE: 11-5-91

TIME: 12 10 am

Signed: Terry L. Nodine

Eagle Broadcasting Inc., P.O. Box 1555, Miami, OK 74355

Some stations print up QSL cards especially for DX tests.

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Tiny 500-watt WPCF in Panama City, FL, was heard coast-to-coast during a DX test.

radio! A loop antenna, however, will help null out interference from unwanted stations. Once you choose the radio and antenna to use, all you need is a little patience and luck to be rewarded with some very exciting catches.

What About QSLs?

If you collect verifications, you're in luck! Since stations that conduct DX tests are especially interested in how far their signal is travelling, almost all of them readily verify reception reports. Some stations have their own special QSL cards printed especially for the test, but most seem to send out a letter.

When you send a reception report to a station that has conducted a DX test, be as specific with your information as possible. Note the time of each program detail (music type, tones, Morse code, etc.). If you recognize a song title, include it! Although stations do not keep a record of song titles played during their hours of regular operation, most stations will note the titles and order of play for the music broadcast during a DX test.

If you hear Morse code, try to copy as many of the characters as possible, and include this information in your report. For those who don't know Morse code, a tape recorder is a good idea, as this will allow you to play the code over and over while you reference a Morse code chart to translate the characters. Many stations appreciate receiving a tape recording of their test, as this will allow them to actually hear how the signal was received at your location. As a courtesy, always include a first class stamp for return postage.

Mail your report as soon as possible after the test, because some stations will not respond to reception reports for a DX test after a certain amount of time has passed. Above all, be friendly and be honest! More than one station has been turned off to the idea of DX tests and DXers as a whole because of a DXer's rudeness or "manufactured" reception report.

So, Who's Tested Lately?

In recent years, stations in Alaska and Hawaii, as well as stations in Maine, Delaware,

DX Catches

Some stations are heard at great distances during a DX test. Here are some "real winners":

STATION	LOCATION	HEARD IN
KONA-610	TRI-CITIES, WA	HUNTSVILLE, AL
WTMA-1250	CHARLESTON, SC	BELLFLOWER, CA
WDOV-1410	DOVER,DE	LOS ANGELES, CA
KUAI-720	ELEELE, HI	WALNUTPORT, PA
		OWENS CROSS ROADS, AL
KUMA-1290	PENDLETON, OR	MEMPHIS, TN
WBHY-840	MOBILE, AL	HIDALGO, MEXICO

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Stations which conduct DX tests receive a certificate of appreciation for their public service files.

and Rhode Island have tested. These states are very difficult (if not impossible) for DXers living far away from the stations to hear during their regular hours of operation. DX tests allow every DXer a chance to hear rare states and low-power stations that otherwise would be virtually impossible for them to log, even with elaborate equipment.

Some Final Thoughts

Almost anything can happen during a DX test. Last January, a DX test was scheduled from 5,000 watt KUAI-720 in Eleele on the island of Kauai in Hawaii. As many of you know, Hawaii is a state that is very, very difficult to hear for DXers in the Eastern part of the U.S. It's not an easy catch even for Western DXers except for the Pacific Coast states (California, Oregon, and Washington).

Not only did the sheer distance involved make this one tough, but the fact that two 50,000 watt clear channel, 24-hour stations operate on 720 kHz—KDWN in Las Vegas and WGN in Chicago—made this one a pie-in-the-sky dream for many DXers. However, by special arrangement with the International Radio Club of America (who arranged the test), WGN in Chicago agreed to *go off the air* for at least a portion of the test period, allowing DXers in Alabama, Florida, Pennsylvania, and several other Eastern U.S. states to hear their first Hawaiian on the BCB!

Most DX tests are scheduled during the prime DX season which runs from October to March of each year, although there may be a few tests which are scheduled during the months of September and April. Right now we are in the middle of the DX season, so check the sources listed for times and dates. Good DX!

MT

J.D. Stephens is the Chairman of the Courtesy Program Committee (CPC) of the International Radio Club of America (IRCA). A DXer since 1976, J.D. is employed by Boeing Aerospace as a software engineer working on the Space Station Freedom program. His DXing interests include shortwave broadcast, AM broadcast band, pirates and utilities.

In addition to his membership with IRCA, J.D. is also a member of the North American Shortwave Association (NASWA) and the Association of Clandestine Enthusiasts (ACE).

Sources

DX Programs:

Please note: All days and times are in UTC. Times, days and frequencies may be subject to change.

World of Radio

VIA WRNO WORLDWIDE, NEW ORLEANS, LA, U.S.A.

SUNDAY	0300 UTC	7.355 MHz
	2130 UTC	15.420 MHz
	2300 UTC	7.355 MHz
SATURDAY	2300 UTC	7.355 MHz

VIA WWCR WORLDWIDE, NASHVILLE, TN, U.S.A.

SUNDAY	0405 UTC	7.435 MHz
	0800 UTC	7.435 MHz
MONDAY	0000 UTC	7.435 MHz
FRIDAY	2215 UTC	15.685 MHz

VIA RADIO FOR PEACE INTERNATIONAL, COSTA RICA

SUNDAY	0200 UTC	7.375, 7.385, 13.630, and 15.030 MHz
	1000 UTC	
	2300 UTC	
MONDAY	0700 UTC	7.375, 7.385, 13.630, and 15.030 MHz
TUESDAY	1900 UTC	7.375, 7.385, 13.630, and 15.030 MHz
WEDNESDAY	0300 UTC	7.375, 7.385, 13.630, and 15.030 MHz
	1100 UTC	
FRIDAY	2000 UTC	7.375, 7.385, 13.630, and 15.030 MHz
SATURDAY	0400 UTC	7.375, 7.385, 13.630, and 15.030 MHz
	1200 UTC	
	1800 UTC	

Signals:

VIA WWCR WORLDWIDE, NASHVILLE, TN, U.S.A.

SUNDAY	0435 UTC	7.435 MHz

DX Publications:

DX test information is also published in:

DX MONITOR, The official bulletin of:
THE INTERNATIONAL RADIO CLUB OF AMERICA (IRCA)
P.O. Box 70223,
Riverside, CA 92503-0223

and:

DX NEWS, The official bulletin of:
THE NATIONAL RADIO CLUB (NRC)
P.O. BOX 5711
Topeka, KS 66605-0711

Please enclose 1 U.S. dollar or 3 IRCs when requesting a sample bulletin.

DX Radio Tests

These tests were arranged The International Radio Club of America (IRCA):

Monday, February 1, 1993: KOFI-1180, Kalispell, MT, will conduct a DX test between 4:00 and 5:00 am EST. The test will include Morse Code. Power will be 10 kW. Reception reports may be sent to: Mr. Bill Roberts, AA7HM, announcer. Mr. Roberts requests that reception reports be sent to his home address of: 130 10th Street East, Kalispell, MT 59901.

Saturday, February 13, 1993: WWCC-1590, P.O. Box 1104, Honesdale, PA 18431 will conduct a DX test between 12:00 and 12:30 am, the power will be 500 watts, and from 12:15 to 12:30 am, full power of 2.5 kW will be used. Reception reports may be sent to: Mr. John Duda, KB3ZW, Chief Engineer.

Saturday, February 13, 1993: KVOX-1280, P.O. Box 97, Moorhead, MN 56561 will conduct a DX test between 3:00 and 3:10 am EST. The test will include Morse code, tones and voice IDs. Reception reports may be sent to: Mr. Art Walker, Operations Manager.

Wednesday, February 24, 1993: WSMI-1540, P.O. Box 10, Litchfield, IL 62056 will conduct a DX test between 1:00 and 1:10 am EST. The test will include Morse code, tones and voice IDs and will be part of the station's monthly frequency check. Reception reports may be sent to: Mr. Brian Talley, N9OWV, Chief Engineer. Mr. Talley requests an SASE be included with all reports.

These tests were arranged by National Radio Club (NRC):

Sunday, February 7, 1993: KLEE-1480, 212 East Main St., Ottumwa, IA 52501, will conduct a DX test from 0100 to 0200 EST with 500 watts non-directional. The program will consist of 1 kHz test tones and both voice and Morse code IDs. Reports should go to Bill Bishop, Program Director.

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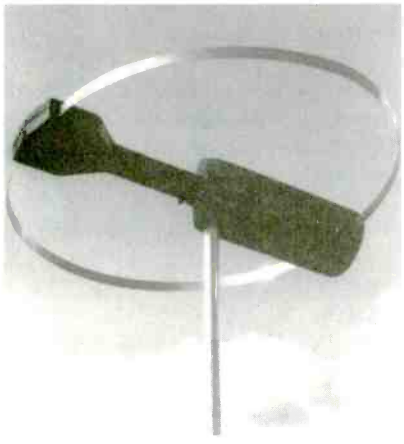

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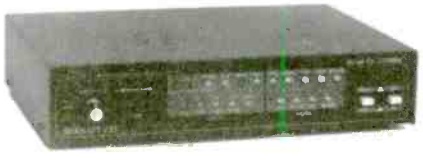

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Radio Free Bougainville Broadcasts the Plight of the People

By Arthur Cushen

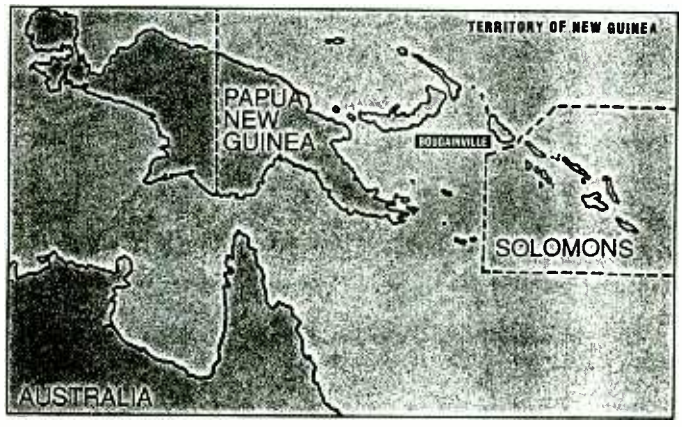
On the other side of the world from Somalia, Africa, lies the Island of Bougainville. This member of the Solomon Island chain is experiencing a blockade by Papua New Guinea which prevents any incoming assistance. Malnutrition, dying children and inadequate medical help are the message Radio Free Bougainville is attempting to tell the world.

It was on January 31, 1992, that Radio Free Bougainville commenced operation on 3880 kHz with a transmitter supplied by the International Amateur Radio Network. The license to operate amateur station CIA and Radio Free Bougainville was granted to the International Radio Amateur Network, c/o Sam Voron, 2 Griffith Avenue, Roseville, NSW, Australia 2069 on 14 January 1992.

The license covered the amateur bands for two-way operation, while the frequency range of 3800-4000 kHz was set aside for Radio Free Bougainville. The radio license was issued by the Interim Government of Bougainville and was signed by the Secretary of State Martin Miriori. The information from Radio Free Bougainville indicates that the Bougainville Interim Government consists of eight ministers headed by the President, Francis Ona.

The purpose of the amateur radio license is to allow humanitarian assistance through the internationally recognized non-political, non-religious, non-commercial United Nations instituted amateur radio frequencies. The passing of third party non-commercial messages and messages which do not facilitate the business of an individual or organisation is permitted. These will normally be messages of a personal nature or messages relating to providing emergency assistance to the people.

The license also states that the people of Bougainville have a right to use communications and that the right to use radio waves is as God given to every person as is the air we breathe. The license further contains details of the operation, power restriction and the requirement not to cause interference to other legal users of the shortwave bands.

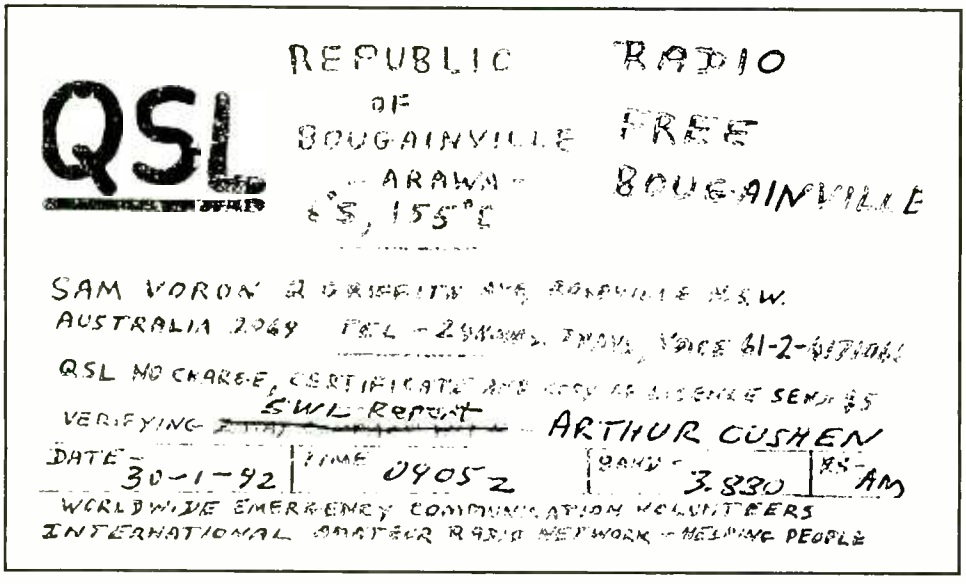


A frequency change has been made to 3870 kHz, which has resulted in an increased signal around 1000 UTC. At that time there is a 20 minute news bulletin in Pidgin, followed by recorded music. At 1100 there are further announcements, including some in English, as well as reference to the Republic of Bougainville and Independent Bougainville.

It is only ten years ago that a similar station in the south Pacific sought to gain freedom for its inhabitants. There was Radio Venarama in 1982, broadcast from Espirito Santo in the former New Hebrides. Its attempt to break away was short lived, as the powers of Britain and France were called in to Port Vila and the British jammed the station off the air. Later its spokesman, Jimmy Stephens, was captured and jailed at Port Vila, which is the capital of Vanuatu.

This clandestine operation was a little different from Radio Free Bougainville—it had the backing of foreigners whose main interest was the major resources on Espirito Santo. With the co-dominion of France and Britain ending in the New Hebrides with the formation of the Republic of Vanuatu, it had seemed the time to strike for freedom.

Radio Bougainville is reporting not just a propaganda message but one of stark reality on the island. Schools, churches and other organizations are using the station for notices and information on an island starved for media information. The operation also airs Government


QSL

REPUBLIC OF BOUGAINVILLE
ARAWA
6°S, 155°E

RADIO FREE BOUGAINVILLE

SAM VORON ... AUSTRALIA 2069 ... QSL NO CHARGE, CERTIFICATE ... VERIFYING SWL Report ARTHUR CUSHEN

DATE 30-1-92 | TIME 0905Z | BAND 3.880 | MS AM

WORLDWIDE EMERGENCY COMMUNICATION VOLUNTEERS
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statements and the prolonged hope that the world will recognize Bougainville as a republic.

Many shortwave listeners have heard the broadcasts, including many in North America. My first report was intercepted by the Republic of Bougainville representative in Honiara in the Solomons who redirected my report to Sam Voron (2 Griffith Avenue, Roseville, NSW, Australia 2069), who confirmed reception with a verification card. The agent in Honiara also informed me that there was a group in New Zealand actively supporting the republic, particularly with supplies of a medical nature. As proof that mail does get through to the studios at Arawa, acknowledgements of mail received have been broadcast on Radio Free Bougainville.

A Rocky Road

The history of Bougainville has an unusual twist as it was always part of the Solomon Islands until World War II. After the battles of Guadalcanal and the defeat of Japan in the South Pacific, Bougainville became part of the Australian Trust Territory of Papua New Guinea. When Papua New Guinea gained its independence, it also claimed Bougainville as part of its territory.

The cessation movement started in May 1989 when the enormous open-cast copper mine at Panguna was shut down after repeated attacks on personnel, vehicles and machinery by militant landowners led by Francis Ona, now head of the Interim Government. In May 1990 the Bougainville Revolutionary Army unilaterally declared independence. Papua New Guinea imposed a blockade around the island which was "lifted" nine months later, but which is effectively still in place today.

Australia and New Zealand have jointly attempted to quell the uprising and in 1990, three New Zealand war ships were located off the coast of Bougainville and the leaders of the Bougainville Republic and Papua New Guinea met in peace talks. Although these were unsuccessful, there have been several scheduled ceasefires.

Disease Rampant

But Bougainville's current plight has been unknown to the outside radio world until the opening of Radio Free Bougainville in January 1992. Since then listeners have heard the details of death, and destruction on the island. The population is living in poverty; common medical assistance, even soap, is not available, babies die at birth and reports indicate that the hospital has neither light nor water. Vaccination of children is unheard of because since 1989 the refrigeration and storage of the vaccines has not been possible.

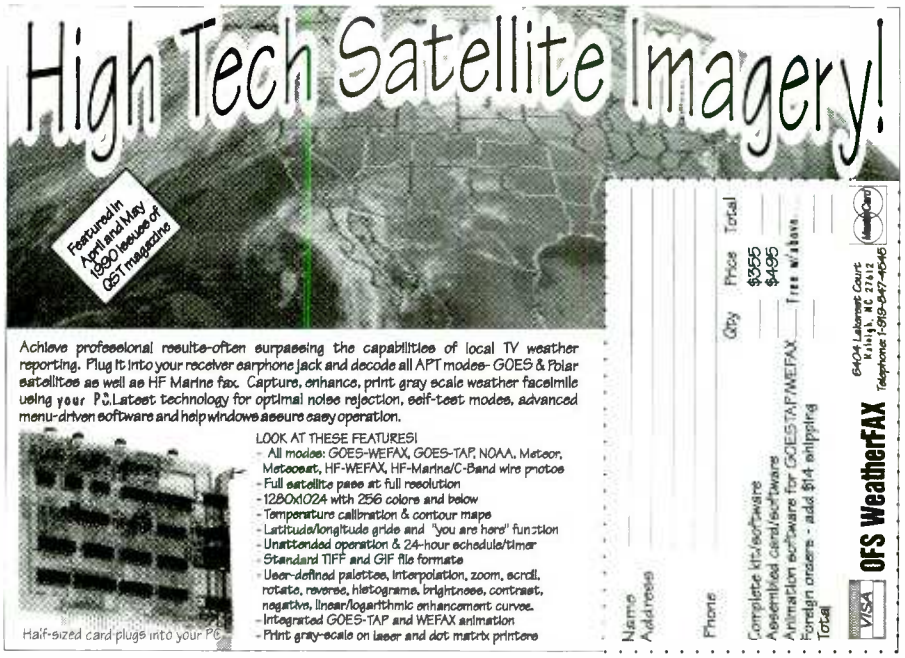
The main supply line into Bougainville, including the necessary oil to power the Bougainville transmitter, comes from the Solomon Islands. Last year, some medical supplies were reaching Bougainville through the Solomon Islands across a virtually open border to Southern Bougainville. A PNG raid in March, however, destroyed a fuel dump on Shortland Island and in recent months, harassment of the Bougainville population has increased.

Radio Free Bougainville, like many stations have in the past, is attempting to plead its case for independence. In the case of Bougainville, the huge copper mines have meant tremendous income for Papua New Guinea. This crisis has come about because the population has risen to claim their land and part of the profits made from the copper mines. There seems to be no end to the problem and, here in the South Pacific, Australia and New Zealand have stood by and watched the devastation of the island and the deaths of many of its people.

Bougainville has an honored name in U.S. history as many Americans along with Australian and New Zealand servicemen died or suffered severe casualties in 1943 while freeing the population from the Japanese invasion.

Bougainville, traditionally a part of the Solomon Islands, has had a sad history. It was formerly a German colony, then passed to Australia, then was captured by the Japanese and now the Government of Papua, New Guinea, has sovereignty over it. Shortwave listeners are in a unique position to follow history still in the making here in the South Pacific through radio.

MT



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The C-SPAN Audio Networks

By Jeff Chanowitz

It started as a simple concept: Use satellite and cable technology to relay the signals of international broadcasters into the homes of television viewers hooked up for cable. Despite various obstacles, today over five million households are covered and 77 cable systems carry the service nationwide. The C-SPAN Audio Networks have emerged an unqualified success and are transforming international broadcasting irrevocably.

C-SPAN's daily schedule includes the VOA, Radio Beijing, Radio Austria International, Radio Sweden, Radio France International, Radio Japan, Radio Korea, Radio Havana Cuba, Radio Deutsche Welle, Israel Broadcasting Service, the Christian Science Monitor's World Service and with the BBC (airing 24-hours a day), Beth Talisman, the audio networks manager, is confident that the service is successfully fulfilling its mission of "providing another point of view of world events."

The audio networks are unique in that shortwave listeners can enjoy high-fidelity signals without the expense of having to buy a satellite dish. While using some shortwave relays and pretaped programs on the service, most programming is received via satellite.

Here's how it works: Many shortwave broadcasters relay their programs via satellite to Radio Canada International's studios for retransmission to North America via Sackville, Canada. C-SPAN downlinks (receives the signal from the satellite) the signals before it goes to RCI's transmitters, and it relays them to cable companies throughout the United States.

Overcoming Obstacles

Despite the viability of the technology, a number of barriers had to be overcome to get the audio networks off the ground. In 1989, C-SPAN was a traditional cable network providing coverage of the U.S. House of Representatives, the Senate and other political events. Then, Brian Lockman, network operations vice-president at the time, came up with a new idea. As an enthusiastic shortwave listener, Lockman thought that it would be a good idea to provide C-SPAN's audience with views from different countries. Since foreign television broadcasts were too expensive, he decided to bring shortwave radio stations to cable television. While technology for such a service existed, convincing international broadcasters was another matter.

"A lot of things like marketing and technology that we took for granted here required a lot of explanation." Talisman commented. In one incident, she recalled having to describe cable television to Radio Beijing and what C-SPAN was going to do with their programs once they received them.

In addition, many international services were so accustomed to American stations only taking excerpts from their newscasts that they were dumbfounded at the fact that C-SPAN wanted the whole broadcasts, unedited, and on a daily basis. But, as Talisman explained, "Once the service understood what we were doing, they got the concept of audio cable."

Over four years later, not only is getting international services on the audio networks no longer a problem, but "Everybody who is a major player in international broadcasting has been in contact with us," says Talisman. With 12 services on audio 1 and the BBC on audio 2, the audio network's programming is in the process of continual expansion. Recently, Radio Finland (YLE) has expressed an interest in airing programming on the audio networks and Talisman is also in the process of looking for "an English voice from the Arab world" to add to the line-up.

Regarding broadcasters from the Eurasian region, Talisman expressed a wait-and-see attitude. The changes taking place at Radio Moscow have caused plans for rebroadcasts on the audio networks to be cancelled. As for the former Soviet republics, Talisman commented, "Many of the independent republics have yet to decide what they want to do and it is going to take a while to see what they want as far as international broadcasting is concerned."

The "Weekly Radio Journal" staff (l to r): Chris Montgomery, Engineer; Beth Talisman, Audio Networks Manager; and Tom Patton, the program's producer.

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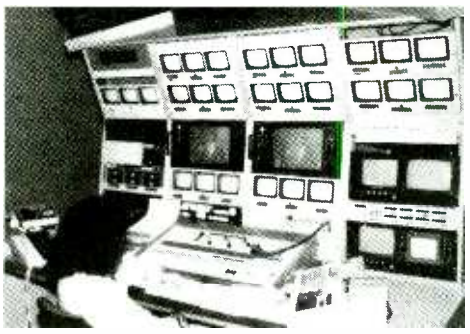
C-SPAN's headquarters.



The C-SPAN control room.

Listener Response

Despite gaining in prestige among international broadcasters, the key to the success of the audio networks lay in attracting a sizable audience. The Gulf War in January of 1991 played a key role in accomplishing this goal. Talisman stated, "The war was very good to us and international radio in general, in that the entire concept of listening to international services became less unusual."

The dramatic increase in listeners was evident in the increase of mail that Talisman received after asking listeners to participate in an audience survey. On the questionnaires mailed out, listeners were asked why they listened, what programs they listened to, and the different stations they listen to on shortwave. Talisman remarked, "The response has been very gratifying."

According to the responses from listeners, the audio network's audience has grown from C-SPAN's "typical information junkie," which Talisman defines as "a person who wants to know everything about everything," to include a diverse audience that listens for many different reasons. The comments of one listener in Hawaii is typical. He stated, "Being a regular shortwave listener to listen to these programs without noise, interference, and static, in my opinion, is a revolutionary breakthrough."

Many listeners see the audio networks as an important outlet for alternative media programming, such as one in Oregon who stated, "I listen for a broader perspective available on national or local news shows." Another in Florida commented, "I listen to Radio Havana Cuba. I get a perspective not available otherwise."

Shortwave listeners can also be counted among the audio network's biggest fans. One SWL (a *Monitoring Times* reader) in Pennsylvania stated, "I tell colleagues about you when they show interest in shortwave." Talisman acknowledges the role shortwave listeners have played in getting cable services to offer the audio networks. She stated, "following the article in *MT* on the networks (Dec. 1990), two cable services in Colorado signed up." Talisman added, "When people at *MT* run our grid, there is always a huge reaction."

The comments and remarks that listeners have sent to the audio networks don't go unheeded. When listeners requested improvements in the reliability of the audio networks and asked for better signal quality of the international broadcasters aired on the service, C-SPAN didn't just sit still. Talisman stated, "We took to heart what people had to say."

To improve the quality of the reception of stations received via shortwave, the audio networks designed special, custom made antennas for each of its shortwave receivers. In addition, to increase the reliability of their satellite feeds, the engineers at C-SPAN have developed a new technology especially designed for the purpose. Talisman stated, "We are interested in providing people with a quality service...We are not interested in people being upset and not wanting to listen!"

From a listener in Hawaii...

"Being a regular shortwave listener to listen to these programs without noise, interference, and static, in my opinion, is a revolutionary breakthrough.

Tuning In

The schedule for the C-SPAN audio 1 service is printed twice a year. To request a copy, the number to call is 202-707-3200 or write

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C-SPAN Audio 1 Daily Program Schedule

Taped Programs | Live Programs

Eastern Times	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Pacific Times
6:00am	Radio Japan					Classical Music / Radio Korea		3:00am
7:00am	Classical Music			Paris Rendezvous	Israel Magazine	Classical Music		4:00am
8:00am	Open House	As It Happens (*Canadian Broadcasting Corporation*)						5:00am
9:00am-10:00am	Classical Music and Schedule Information or Historic Speeches Programs					Paris Rendezvous / Sweden Today / Israel Magazine	Sunday Morning (*Radio Canada International*)	6:00am-7:00am
11:00am								8:00am
Noon	Wkly. Radio Journal					Classical Music		9:00am
1:00pm-8:00pm	Voice of America Worldwide English Service					Voice of America Worldwide English Service		10:00am-5:00pm
8:00pm	Radio Havana Cuba					Radio Havana Cuba		5:00pm
9:00pm	Classical Music					Classical Music		6:00pm
10:00pm	Deutsche Welle (Germany)					Radio Japan		7:00pm
11:00pm	Radio Havana Cuba					Radio Havana Cuba		8:00pm
Midnight	China Radio International					China Radio International		9:00pm
1:00am	Voice of America					Voice of America		10:00pm
2:00am-6:00am	Classical Music and Schedule Information					Classical Music and Schedule Information		11:00pm-3:00am

C-SPAN, 400 N. Capital Street, Suite 650, Washington, D.C. 20001.

The schedule for the audio 2 service is listed in *World Wide* magazine. Its address is P.O. Box 76, Bush House Strand, London, England, WC2 B4PH.

Those interested in receiving the C-SPAN Audio Networks should call their local cable operator. If your local operator offers C-SPAN television, they will have the ability to receive the audio networks. Talisman warns, "Don't be surprised if you have to educate your cable service as to what this is." If you don't get any response, then write to C-SPAN and they will contact your cable operator and explain the advantages of carrying the audio networks.

If you have your own satellite TV system, C-SPAN is carried on Galaxy 3, Channel 24. Audio 1 can be heard on 5.22 MHz on the sub-carrier and Audio 2 is on 5.40. According to *MT's* satellite expert, Ken Reitz, C-SPAN's policy is that it "will not scramble its video or audio."

New Competition?

Seeing the success of the audio networks, a London-based company has formed the World Radio Networks. The new audio service aims to provide similar programming to that of C-SPAN in Europe and hopes to place international broadcasters on radio stations throughout the United States. Talisman disavowed any prospect of competition between the two services, stating, "It's not necessarily competition...we are cable and they are over the air broadcasts." Talisman also noted the marked difference between C-SPAN's non-profit, public service philosophy and the money-making venture of the World Radio Networks adding unequivocally, "We are in the business of providing information and more knowledge to people...There is no competition."

Despite being in its infancy, the World Radio Networks and the C-SPAN audio networks have actually cooperated. Recently, during a short test period, the World Radio Networks relayed C-SPAN's new program, *Weekly Radio Journal*. The hour-long program, which is also aired on more than 40 radio stations throughout the U.S., provides an overview of the major public affairs events covered by C-SPAN and C-SPAN 2 each week. So far, with only a limited relay, the response from listeners has been encouraging. Talisman stated, "We got lovely letters from listeners in Germany via our relay there."

The Future

Like many international services, the audio networks are not immune to cost cutting. Recently, budget constraints have caused the relay of the Voice of Free China to be discontinued. Even with its success, the audio networks continue to be run on a shoestring budget. Talisman remarked, "This is still a tight ship; it is myself, one other person, and a part-time engineer."

Yet, the audio networks' future seems very bright. In addition to the *Weekly Radio Journal*, future expansion continues with the airing of the *Historic Speeches Series*, which highlights memorable and historic speeches in history from Rev. Martin Luther King, Presidents John F. Kennedy and Richard Nixon, as well as other influential figures. Says Talisman, "Our main goal is to expand our audience so that people who want to have the service can have it."

No doubt, in keeping with its successful philosophy of public service and innovation, many more cable subscribers will be discovering the different voices and viewpoints the C-SPAN Audio Networks have to offer.

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VHF Low Band Skip (Part II)

Identifying DX

By Brian Webb

Last month we covered what causes VHF skip and when and where to look for it. But the most difficult facet of VHF skip DXing isn't hearing skip, it's identifying what you've heard. The two best sources for identifying U.S. nongovernment stations are the *Police Call* frequency directories and FCC records. Gene Hughes' *Police Call* directories list police, fire/paramedic, local government, state government, and some federal government stations.

These books, however, don't list the vast number of U.S. business stations. In spite of that, they're a good source of information and they're affordable (the entire nine volume set can be bought for about $100.00).

The best source of information on nongovernment U.S. stations is the FCC Master Frequency File. It lists stations in frequency order by state and city. Unfortunately, this microfiche list costs over $700, putting it out of reach for most radio hobbyists. And while companies such as Grove Enterprises sell the computer database in affordable regional chunks, you really need access to the entire database for skip identification. (Again, at a cost of hundreds of dollars.)

You don't need to own the entire database to obtain this information, however. You can examine the list by visiting your local FCC field office. If that's not possible, you can call your local field office by telephone and ask them to look up a few stations (be sure not to do this too often!).

Another option is to pay the Downtown Copy Center (a government contractor) to research the information for you. They charge $15 per hour and require detailed instructions on what you want them to do. Their address and telephone number are as follows:

Downtown Copy Center
Attn: Virginia Cannon
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Telephone: 1-800-541-1194

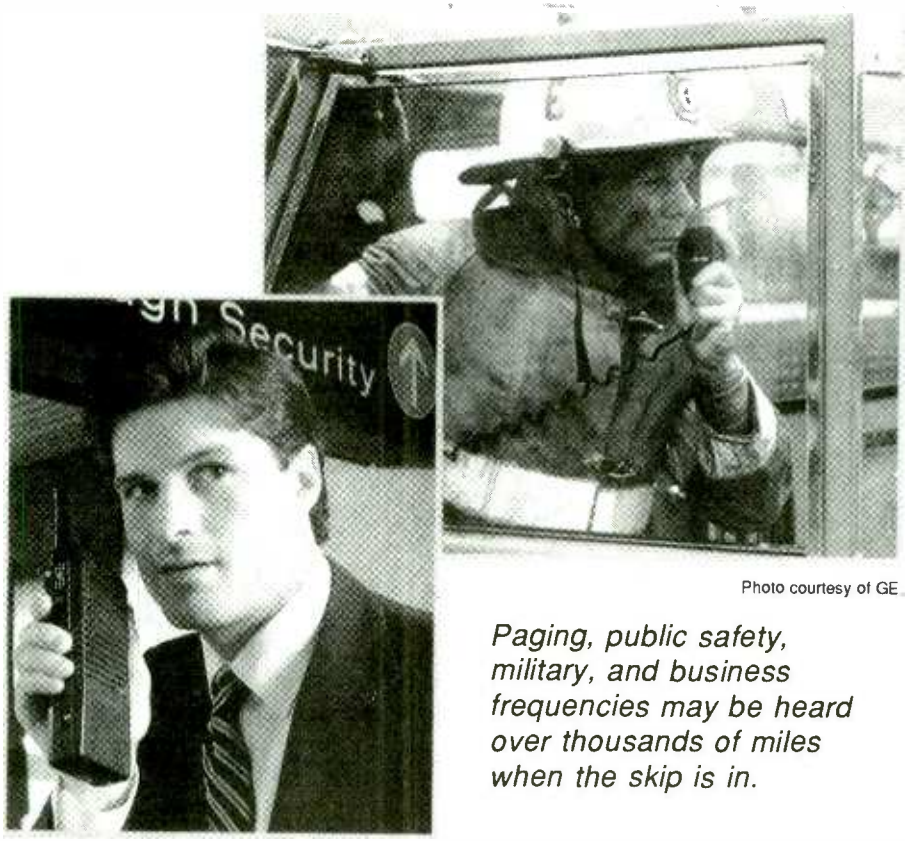

Photo courtesy of GE

Paging, public safety, military, and business frequencies may be heard over thousands of miles when the skip is in.

Unfortunately, identifying stations from countries other than the U.S. is much more difficult. Since most of the non-U.S. skip heard in North America isn't in English, the language needs to be identified and the communications translated. An additional problem is that non-U.S. stations usually don't identify themselves. This is because foreign governments aren't as strict as the FCC regarding station IDs and many foreign stations aren't even licensed (especially true in Latin America). Even if a station is licensed, the licensing authority is usually unwilling to answer questions from DXers.

According to international agreement, whenever a government issues a license, the International Telecommunications Union in Berne, Switzerland, is supposed to be informed. This often doesn't happen, but when it does, the license data is entered into a database called the International Frequency List.

It would seem that the IFL would be a great tool for identifying DX, but that isn't the case. Not only is the IFL incomplete, it's very expensive, costing over $1,400 (U.S.) for the microfiche version and over $700 (U.S.) for a CD ROM. To make things worse, very few copies of the IFL exist in the U.S. However, the Downtown Copy Center in Washington, DC, can retrieve the IFL from the FCC library and research information for a fee. Contact them at the above address if you're interested.

In spite of these obstacles, it is possible to identify non-US skip. The most important clues are the language spoken, accent heard, and references to place names.

The first thing to do is identify the language and then locate someone to translate a recording of your catch. High schools and colleges are good sources for translators. Not only can you find foreign language instructors, you can often find native speakers of the language among members of the student body. Also, check the local businesses in your town and look for businesses owned by Latin American and other immigrants.

Once you've identified a prospective translator, approach him/her and ask for assistance. Play a recording of the intercept to your translator and ask him/her to attempt to identify the nation-

(turn to p. 25)

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Table 5: Selected Frequencies For F_2 DXing

Freq. (MHz)	Mode	Signal Type	Language	Callsign(s)	Location	Comments
30.000	NBFM	Voice	ss		Central Mexico	Army stations
30-060	NBFM	Voice	ss		Cordoba Prov., Argentina	Ranches
30.150	NBFM	Voice	EE		U.S.	Military
30.280	AM	Voice	EE	BBC	Antigua	Harmonic of 15.140 MHz
30.300	NBFM	Voice	EE	Control 2	Air Ground Combat Center, CA	Marines
30.350	NBFM	Voice	EE	Crestline, Long Rifle Red Beach, Short Pistol	Camp Pendleton, CA	Marines
30.450	NBFM	Voice	EE	Clear Creek, Jack Mount, Range Control	Fort Hood, TX	Army
30.460	AM	Voice	ss	Radio Habana Cuba	Habana, Cuba	Harmonic oi 15.230 MHz
30.475	NBFM	Voice	ss	25,29,35	San Salvador, El Salvador	Taxi company? Mobile units have two digit IDs.
30.500	NBFM	Voice	EE		U.S.	Military
30.545	NBFM	Voice	ss		Central Mexico	Cordless phone or radio telephone
30.660	NBFM	Voice	EE		San Francisco, CA	Municipal bus system
30.690	AM	Voice	ss	Radio Nacional	Buenos Aires, Argentina	Harmonic of 15-345 MHz
30.760	NBFM	Voice	EE		U.S.	Very active business frequency
30.820	AM	Voice	GG	Deutsche Welle	Antigua	Harmonic of 15.410 MHz
30.900	NBFM	CW	--	KGB732	Allegheny County, PA	Port Authority of Allegheny Co. IDs in CW
30.940	NBFM	Voice	EE	BI Control, KDZ411/ KNGW228/Miami, KJ1564/Homestead, KJT686/Clewiston, 102,157,330,433,501,609	Southern FL	South Florida Water Mgmt. District. Base stations ID with FCC callsign and location. Mobile units three digit IDs.
31.020	NBFM	CW	--	WNIM250	Broomall, PA	Southeastern Pennsylvania Transportation Authority. IDs in CW.
31.060	NBFM	Voice	EE	New Orleans, 510, 515	LA	Louisiana Department of Wildlife and Fisheries. Base stations ID with location. Mobile units have three digit IDs.
31.160	NBFM	Voice	EE		Los Angeles, CA	Super Car Charter Carrier (taxi company). Listen for San Fernando Valley addresses.
31.280	NBFM	CW	--	WRS549	Central SC	IDs in CW
31-350	NBFM	Voice	ss	Radio Aviso	Montevideo, Uruguay	Paging station. Voice ID at start of hour.
31.420	NBFM	CW	--	XKC23, XKC66, XKC239	Montreal, Canada	Stations ID in CW.
31.460	NBFM	Voice	EE	KIG954	Elizabeth City, NC	North Carolina Division of Forest Resources. Daily weather report at 13:00 ± 30 min.
31.480	NBFM	Voice	EE	heard include Harvey Base, Harvey, Louisiana; oil tankers throughout western hemisphere (ID as Gulf Fleet XX); and workboats and oil platforms in	Western Hemisphere Gulf of Mexico.	Busy U.S. industrial frequency. Stations
31.800	NBFM	CW			CT	Della Construction Co. IDs in CW.
32.100	NBFM	Voice	EE		U.S	Military
32.250	NBFM	Voice	EE	Channel 1	Camp Pendleton, CA	Marines
32.500	NBFM	Voice	EE		U.S.	Military
32.700	NBFM	Voice	EE	Range Control	Fort Irwin, CA	Army
32.750	NBFM	Voice	EE	Channel 2	Camp Pendleton, CA	Marines
32.820	NBFM	Voice	ss		Concepcion, Argentina	Paging station
33.060	NBFM	Voice	EE	KME594, KNAB678, KNAB762, WNAY204	Los Angeles, CA	Los Angeles city street maintenance
33.180	NBFM	Voice	EE	heard include Leeville Base (ChevronOil), Leeville, Louisiana and workboats	LA and Gulf of Mexico	Traffic related to oil production. Stations and oil platforms in Gulf of Mexico.
33.300	NBFM	Voice	EE	KAR933	Bloomington, TX	Natural Gas Pipeline Co. of America
33.375	NBFM	Voice	ss	Control, QM306, QM308, 304, 305,317, 319, 333, 337,339, 347	Cuba	Farm net
33.380	NBFM	Voice	ss	Mantenimento Coord-inacion	Vespucio, Argentina	Base station. Traffic with maintenance personnel in field.
33.440	NBFM	Voice	EE	Cherokee, Station 15, 15-3, 1502, 1503	Cherokee County, GA	Cherokee County FD
33 .640	NBFM	Voice	EE	KDC288	Hollis, NH	Hollis FD. Voice ID at 00 and 30 min. past hour.
33.700	NBFM	Voice	EE	OCD	Los Angeles, CA	Los Angeles City FD
33.740	NBFM	Voice	EE	WNAL734	Rockingham County, VA	FD. Voice ID at 00 and 30 min. past hour.
33.500	NBFM	Voice	ss		Mexico	Military
33.860	NBFM	Voice	EE	KGC676	Hagerstown, MD	FD. Voice ID at 00 and 30 min. past hour.
33.900	NBFM	Voice	EE	KQA216	Cleveland, OH	Cleveland FD. Voice ID at start of hour.
34.110	NBFM	Voice	ss	Blanco, Central, L5, Mantenimento, Mobil Mexico Blanco, 5, 7, 18, 20, 31, 32, 47, 59, 77, 89, Planta 3	Yucatan Penninsula,	
34.250	NBFM	Voice	EE		U.S.	Military
34-310	NBFM	Voice	EE	Video Channel 1	White Sands Missile Range, NM	Traffic related to weapons testing.
34.480	NBFM	Voice	pp		Sao Palo, Brazil	Taxi or bus company
34.830	NBFM	Voice	EE	frequency used for repeater outputs and simplex. Base stations often	U.S.	U.S. Fish and Wildlife Service. This ID location.
35.100	NBFM	Voice	EE	KBO417	Los Angeles County, CA	Bel Air Patrol. Voice ID at start of hour.
35.200	NBFM	CW		KNKC911	Southern CA	San Diego Paging, Inc. Several paging stations with same callsign.
35.260	NBFM	CW		KOS225	PR	North Communications of Puerto Rico. Several paging stations with same callsign.
35.280	NBFM	Votce			Argentina	Several paging stations
35.340	NBFM	CW		KNKK371, Johnstown, PA; KNKK398, New Scotland, NY; KNKK403, Canton, OH; KNKK408, Evansville, IN; KNKK423, Youngstown, OH; KNKK439, Huntington, WV; KNKK447, Binghamton, NY; KNKK456, Davenport, IA; KNKK565, Little Rock, AR; KNKK580, Daytona Beach, FL; KNKK581 Cedarville, OH; KNKK582, New Berlin, WI; KNKL261, Mishawaka, IN; KNKL300, Richmond, VA;		U.S. Central, Inc. Paging Stations.
35.340	NBFM	CW		KOR995,	CA	Mobilecomm of California,Inc. Several paging stations with same callsign.
35.360	NBFM	Voice	ss		Rosario, Argentina	Studio-to-transmitter link for 95-76 MHz FM
35.540	NBFM	CW		KOR793	OR and WA	Clifford and Barbara Moeller. Several paging stations with same callsign.
35.550	AM	Voice	pp		Brazil	Paging station
35.600	NBFM	CW		KNKG760	AZ	Phoenix/Tucson Paging Corp. Several paging stations with same callsign.
35.625	AM	Voice	pp		Brazil	Paging station
35.640	NBFM	CW	--	KTS543	Chicago, IL	Cook County General Hospital. Paging station.
35.650	AM	Voice	pp		Brazil	Paging station
35.680	NBFM	CW		WNIZ885	Los Angeles, CA	California Hospital Medical Center. Paging station.
35.680	NBFM	CW		WNGJ364	New Rochelle, NY	New Rochelle Hospital. Paging station.
35.725	AM	Voice	pp		Brazil	Paging station
35.880	NBFM	Voice	pp		Thousand Oaks, CA	Thousand Oaks Cab Co.
35.460	NBFM	CW		KOP303	Langley, WA	Whidbey Telephone Co. Paging station.
35.500	NBFM	CW		KPD783	ID and WA	Big Country Communications. Several paging stations with same callsign.
36.695	AM	Voice	ss		Colombia	Studio-to-transmitter link for a station of Cadena Super de Colombia.
36.700	NBFM	Voice	ss	Gavillan	Southern Mexico	Army stations.

Abbreviations:

CW	Identifies in Morse Code	FD	Fire Department	NBFM	Narrow Band FM
EE	English	GG	German	pp	Portuguese
FCC	Federal Communications Commission	ID	Identification	ss	Spanish

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An Outdoor Sloping Dipole

Improved reception of low band skip can be had with an outdoor sloping dipole cut for the VHF low band (Figure 1). This type of antenna is cheap, easy to build, does a decent job of picking up signals from 3-1,000 MHz, and it only needs a single support.

If you decide to build a sloping dipole, the first step is to go outside and decide where to erect the antenna. Look for a tree limb or other support that's at least 21 feet high (6.40 m). Make sure that the antenna will be far enough from any power lines to prevent accidental contact. Then estimate the distance from the antenna jack on your scanner to the center of the dipole. Take the estimate and then add 10 feet (3.04 m) to it. The resulting sum is the length of coax you'll need.

Buy high quality coax. I prefer Remeeflex miniature RG-8/U because of its low loss and small diameter. Using less expensive coax probably won't affect VHF low band reception, but it will reduce performance at higher frequencies, especially above 400 MHz.

The antenna elements can be fabricated from any copper wire between 18 and 22 gauge. The wire can be solid or stranded, insulated or bare. Stranded is more flexible and easier to work with. If your receive site is near the ocean, you may want to use insulated wire because it resists corrosion better.

To make the dipole elements, cut two lengths of wire that are each 7 feet 5.25 inches (2.32 m) long. Take 1 inch (2.6 cm) of wire at the end of each element and twist the wire together to form a loop. Then use a soldering iron to heat the wire and run solder into the twists.

Then strip off two inches of the plastic jacket from the end of the coax. Unravel the braid. Strip 1 inch (2.6 cm) of insulation from the center conductor. Solder one wire element to the center conductor and one to the braid.

Coax easily absorbs moisture and the feed point of the dipole is fragile. This makes it necessary to encapsulate the feed point to waterproof and strengthen it. I prefer a sealant called Plumbers Goop; it's very tough and adheres well to most materials. Epoxy resin is also a good choice. Although many people use RTV Silicone Sealant, I try to avoid it because it contains acetic acid which will corrode the wire and solder joints. However, you can still use it if you first wrap the feed point in electrical tape before applying the RTV.

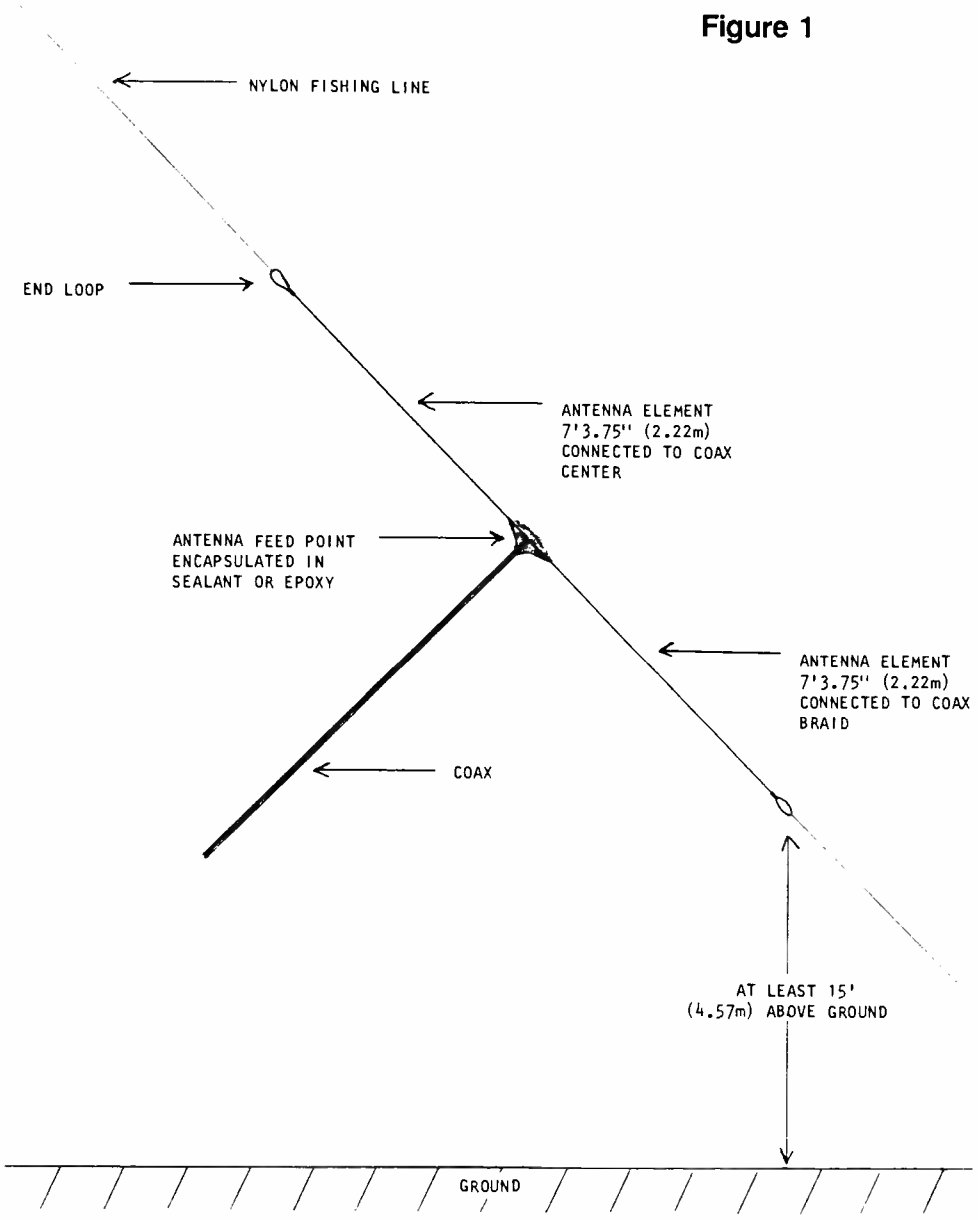
If you wear soft contact lenses, remove them or put on goggles before working with the RTV. The acid fumes from RTV are easily absorbed into the lenses and can ruin them. Whichever sealant you use, be sure to apply enough to waterproof the feed point and prevent the wires from flexing.

We're now ready to erect the antenna. Take a roll of heavy duty nylon fishing line and attach it to the antenna support. If you plan to use a tree limb, find a way to get the line over the limb and down the other side. If you're going to use a building for a support, try to screw an eyebolt into the side and then pass the nylon line through the hole and let it drop all the way to the ground. Then tie the line to the loop of the antenna element that's connected to the center conductor of the coax.

Pull on the far end of the line until the antenna is as high as you can get it. Then tie down the end of the line and cut it. Tie the line to the loop of the grounded antenna element and then tie it to a stake in the ground or other suitable end point.

Next, route the coax into your house to your radio. Put an RF connector on the end of the cable and plug it into your scanner. Tie down the coax near your radio and push the remainder of the cable outside of the building. In theory, the coax should run from the antenna feed point at a right angle for at least 7 ft. 3-3/4 in. (2.22m). Once this has been done, your antenna should be complete.

Figure 1



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Morse Code Identifications

Some stations identify themselves using medium and high speed Morse code. Unless you're proficient at copying CW, you'll probably have to slow down recordings of station IDs so that you can make out the characters. If you plan to use a data demodulator to decode CW station IDs, you'll need to vary the audio frequency of your recordings so that they fall within the unit's audio pass band.

You can change the speed and audio frequency of recordings by using a variable speed controller. This device plugs into your cassette unit's remote jack and works by varying the voltage to the motor in the tape drive.

You can make one by soldering a 100 ohm pot to a subminiature audio plug. If the audio is too high, adjust the pot to the point where you can decipher the characters by ear, or until your digital demodulator can read the Morse code.

If the audio frequency is too low, try playing the recording of the ID in one cassette at normal speed and feed the audio into a second cassette recorder operating at reduced speed. Then play the audio from the second audio recorder into the digital signal decoder and vary the audio frequency by adjusting the pot.

Another approach is to have the speed controller plugged into your recorder's remote jack to reduce the recording speed whenever you're DXing for CW IDs. This will result in recordings with a higher audio frequency when played back at normal speed.

ality of the voices based on the accent. Have your translator listen for references to place names. Once he/she is finished, get a detailed description of the subject matter discussed on the tape.

A good place to find information that can help you identify your DX catches is a public or college library. Probably the most valuable source of information is a book called The *Columbia Lippincott Gazetteer of the World.* To my knowledge, this book is the most complete directory of place names available.

Another source of information found in many libraries are detailed road maps of the US, Canada, and foreign countries. An often overlooked resource are telephone directories for other areas. Check and see which directories your library has in its inventory.

Summary

My main objective in this article was to present information on how to target low band skip and how to complete your logging entry by making an identification. If you decide to try DXing the 30-50 MHz band, I'd be interested in what you hear. Of course comments and questions regarding this article are also welcome. I can be contacted at the following address:

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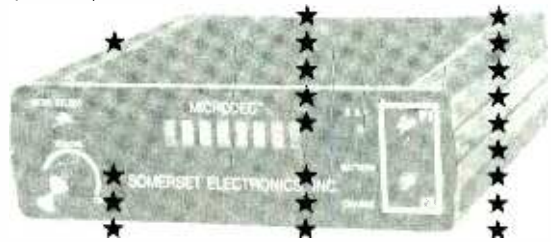

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VSCS

The New Air Traffic Control Communications System For the 21st Century

By Jack Sullivan

One of the principle missions of the Federal Aviation Administration (FAA) is the upgrading of our current air traffic control (ATC) system. Their goal is to streamline and modernize existing ATC systems which include radar, data processing and communications systems.

One of the major systems being acquired as part of the communications modernization is the Voice Switching and Control System (VSCS). The VSCS connects air traffic controllers with the transmitters and receivers at remote air/ground radio sites, and with neighboring ATC facilities.

The system in place today was originally designed around 1960's technology (toggle switches, relays and vacuum tubes) and replacement parts are becoming increasingly difficult and expensive to obtain. As air traffic demands continue to increase, the current systems are becoming less and less efficient in terms of reliability, controller productivity and the utilization of critical resources such as airspace and radio frequencies. The existing voice switching network—designed, manufactured and operated in part by AT&T—is operating almost at its maximum capacity.

Working with contractors such as Hughes Aircraft Corporation, IBM and Harris Corporation, the FAA is getting ready to upgrade the more than twenty Air Route Traffic Control Centers (ARTCCs) around the country and the Terminal Radar Control Facilities (TRACONs) serving certain major metropolitan areas. The first communications element of the modernization to be installed (due in the Seattle Center in 1994) is the system that will control the air-to-ground-to-air VHF and UHF voice communications familiar to most monitoring enthusiasts.

How will VSCS work and how will its coming implementation affect those interested in monitoring ATC communications? It was the search for answers to these questions that led me to contact the Harris Corporation, the VSCS developers and manufacturers from Melbourne, Florida, and the FAA Technical Center, located at the Atlantic City International Airport in Pomona, New Jersey. The FAA Center had received a prototype VSCS system for inspection and testing earlier last year.

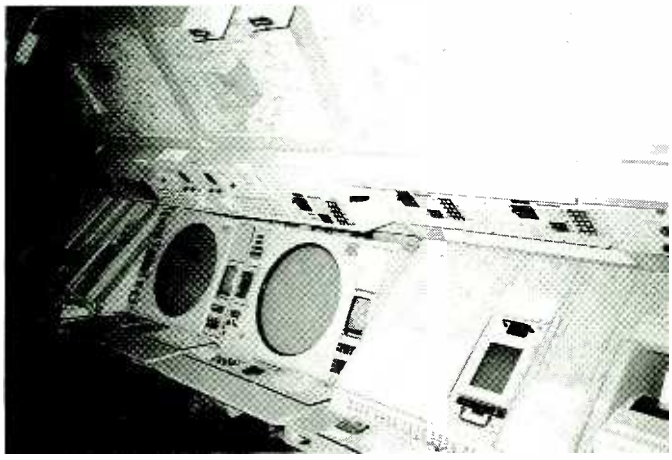
Harris was kind enough to supply me with a press kit on the VSCS system, including color slides of the overall system and the color touch-screen computer display that is the controller interface with the VSCS network. The FAA Tech Center was also generous in allowing me to visit their facility, examine the VSCS prototype and to interview Mr. Russ Spadea, the Acting Manager in charge of the Voice Switch Automation Division.

The most obvious change from the present setup is the attractive, user-friendly color computer screen. The Magnavox touch-screen computer display shown in the illustration will replace the row of buttons and hand-written labels found in the current system. Normally dark when the position is unattended, the screen glows to life as soon as a controller plugs in his headset.

Instead of pressing a button to select a VHF/UHF frequency pair at a certain remote site and then keying the push-to-talk (PTT), the controller now simply looks at the screen, selects the desired box (normally colored green) and touches it. Powerful computer circuits automatically route his headset voice through the "voice switch"—the solid-state electronic network that instantly connects him to the desired equipment at the proper location. (The selected green box turns black and blinks while the remote transmitters are activated.)

When an aircraft calls the controller, the green box symbolizing the remote communications site that is receiving the signal switches to flashing yellow while the automatic voice switch network routes the audio to the proper controller's headset. One major difference in the new VSCS system is the visual identification of which receiver (VHF or military-only UHF), is picking up the signal.

The current system simply combines the two audio channels in the controller's headset, not



A current 1960's vintage air controller's position.

The VSCS system in operation at a simulated Air Route Traffic Control Center. Screens are dark until the controller plugs in a headset.

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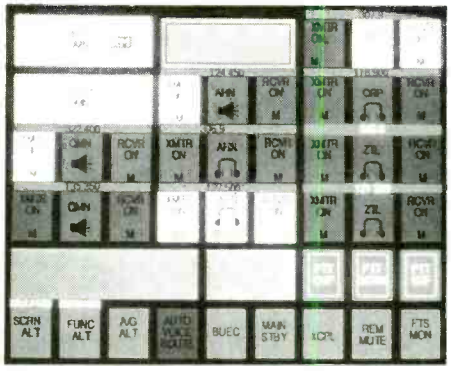
the aircraft is operating in. Not having this information sometimes means the controller may be required to repeat the frequency given in a handoff clearance to another sector, substituting VHF for UHF or vice versa when the aircraft responds that it needs the other frequency. Touching either the UHF or VHF box for a given sector automatically activates both transmitters. (The box labeled BUEC controls a separate remote air-to-ground communications that is available to the controller as BackUp Emergency Communications.)

The green boxes on the VSCS screen contain a 3-letter abbreviation for the airspace sector involved, along with either an earphone or speaker symbol, depending on which has been selected by the controller. The blue border above the box gives the information on the VHF or UHF frequency available for control of that sector. Remote transmitters and receivers can be selectively disabled or turned off, producing a colorless or white box.

The emergency frequencies for VHF (121.500) and UHF (243.0) are in boxes under red borders. In the case of the emergency channels, the PTT function can be selected for either channel or both. This helps to eliminate unnecessary interference on these universally guarded radio channels. (Like other boxes, the emergency channels can be turned off at individual controller positions. If, however, all of the emergency receivers in an ATC facility were to be turned off, the VSCS system sounds an alarm at the supervisor's position.)



The heart of the VSCS system—the Magnavox Touchscreen Computer Display

As shown in the photograph of the VSCS computer screen, several VHF/UHF frequency pairs are shown. In most ARTCCs the individual controllers have several pairs of frequencies available to serve a given airspace sector from different remote communications sites. In some ARTCCS, especially in the West and in other areas with mountainous terrain, a given airspace sector will be served with two or more remote sites operating on the same VHF/UHF frequency pair. In the current system the controller uses his knowledge of his sector to select the proper remote site that will give him the best communications with the airplane he is controlling. In VSCS the system automatically selects the best site for transmission and reception.

One important feature of VSCS is its capability of handling more radio frequencies from a controller position (up to 24). For an entire ATC facility, the maximum number of radio channels available for control through VSCS is 350. Another important feature is increased reliability. The specification on VSCS downtime is a maximum of three seconds per year!

What changes can the aircraft monitor expect to hear as VSCS becomes operational later in this decade? For the most part very few differences will be noticeable. More efficient ATC controllers and more reliable communications switching equipment probably will not be immediately apparent. One interesting capability of VSCS could, however, provide some very interesting monitoring: phone patch capability. With a touch of the computer screen a remote air-to-ground site can be interfaced with the public or Government telephone networks.

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ALASKA KNLS started a new program, *Radio Today*, DX tips from listeners, Jan. 1 (KNLS via Gigi Lytle, Kevin Kline, Don Rhodes) No details on scheduling, but if treated like other segments, could be on several days a week for three minutes or so during hour broadcasts at 0800 on 7365, 1300 on 7355; both tentatively changing to 9615 March 28.

ALBANIA Reuters Foundation has shipped technical assistance to R. Tirana, and will train staff in news writing and business journalism (R. Tirana via BBCM) See Jan. *MT*, p. 60

ANDAMAN ISLANDS AIR Port Blair, B. Sekhar Reddy, Asst. Stn. Engineer, verified report, returned dollar bill quoting serial number, no return postage necessary, and gave this schedule: 0025-0215 on 4760, 0230-1015 on 7170, 1030-1630 or 1700 on 4760 (Dave Valko, *FT*)

AUSTRALIA R. Australia revised sked includes 5880 Carnarvon in English at 1800-2100 (via Jerome van der Linden, Fidonet *SW Echo* via Kirk Baxter) New Khmer service weekdays 0530-0600 for lunch/siesta on 17880 Carnarvon, 17670-Darwin, repeated at 1230-1300 on 13755-C, 7150-D, 9770—probably Shepparton; falsely claimed VOA is only other external broadcaster in this language (via *ibid.*, Radio Netherlands *Media Network*, Bob Padula in *Australian DX News*, gh)

AZERBAIJAN New English from Baku to Europe is at 1700-1800 on 6175; sounds like Radio Gazagorgu of the Voice of Azerbaijan (BBCM) Useless, co-channel to France (Eugene, RVI *Radio World*)

BOSNIA-HERCEGOVINA BBCM feel that R. Yugoslavia North American Service is transmitted from Bijeljina, Bosnia, firmly under Serbian control—and that 7200, previously from Stubline, near Beograd, may have switched to Bijeljina due to much better signal (Andy Sennitt, *SW Echo* via Baxter)

CANADA On the darkest winter mornings, CFVP, Calgary, 6030 was weak but clear as late as 1315, IDs as AM-106 (Alan Roberts, PQ, *World of Radio*) Heard as late as 1500 (Bob Rankin, Tonganoxie KS, *FT*)

CHINA Sinkiang PBS made seasonal switch for winter: Chinese on 3960 ex-7385, Uighur on 3990 ex-7195 (ABI via Radio Japan *Media Roundup*)

COLOMBIA Contrary to last month, UTC-4 has continued here since May (Henrik Klemetz, Bogota, *W.O.R.*)

COSTA RICA REE announced much-revised Cariari relay sked, seemed mostly correct at the outset: S. America north, weekdays 1100-1300 & 1900-2200 17890, 0100-0400 15125, weekends to 0500; C. America, weekdays 1200-1400 5970, 2000-2300 9745, 0200-0500 5970, weekends from 0100; N. America, weekdays 1200-1300 11880, 1400-1500 & 2000-2300 17870, 0200-0500 15380, weekends from 0100. Also Sat. 1600-2300, Sun. 1500-2300 on 17890, 9745, 17870 respectively.

Radio for Peace International, first-quarter program schedule is little changed; appears in *Vista* newsletter, received by Friends of RFPI, annual membership $35 to RFPI, Box 10869-MT, Eugene, OR 97440. *World of Radio* times: Sun. 2300, Mon. 0700, Tue. 1900, Wed. 0300, 1100, Fri. 2000, Sat. 0400, 1200, 1800, Sun. 0200, 1000, on 7375, 7385, 13630, 15030. If you haven't heard it well before, try again as the new 30-kW transmitter should be on quite soon.

CROATIA Zagreb was missing from SW for a few days, then back on 6145, 9830, 13830 including English at 2202-2209 (Eugene, RVI *Radio World*) Also at 0703 and 0903 except Sundays when even shorter English news is at 0803-0805, 1003-1006; daily 1303-1310, and UNPROFOR program in English daily 2030-2035; also check 5025 (BBCM)

CUBA More quick changes to Havana's English sked: 2100-2200 on 15165, 0500-0700 on 9510 (*W.O.R.*) RHC director Milagros Fernandez, speaking in Mexico, appealed to international solidarity for teletype paper, typewriter ribbons and paper (BBCM)

CZECHO From Jan., R. Prague name used again.

DOMINICAN REPUBLIC R. Estrella, new on 6205.5, as early as 2215, as late as 0435 but irregular, testing and asking for reports to Apartado 135-2, Sto. Domingo (Alexander, Berg, Valko, *FT*)

ECUADOR HCJB's 21455-USB has become almost-all-English, with additional repeats when all other frequencies including 17490-USB are in other languages. *DX Partyline* found at unannounced times Sat. 2039 and 2209 (John Norfolk, OK) UTC minus 5 may resume in February (*DXPL*) *Ham Radio Today*, Weds., may get extra times too besides 1930, Thu. 0100, 0300, 0530. Each edition includes basic electronics—resistance, capacitance in Feb.; propagation notes—F-layer, magnetosphere, the sun; computer corner; utility roundup—RTTY, bugging, shack improvements, fax problems. *Musical Mailbag* (time not given), Sat. Feb. 13 goes live with hour-long call in, 011-593-2-241-560. *HCJB Today*, UTC Mon. Feb. 22 0200 is a special about transmitter factory in Elkhart, IN (HCJB *Program Notes*) The HCJB block is surrounded by walls, fence and barbed wire, armed guard and tight security (Ed Newbury, *DX Ontario*)

R. Centinela del Sur around 1100 on 4771, but mentioning 4890, 4870, police reports. ERPE, 5010 at 1130 had credit union ad, none such noted before on this religious station (Don Moore, Davenport, IA)

EL SALVADOR R. Venceremos back on SW, 6300.0 at 1056 ID (Nobuyoshi Aoi, Japan, *Radio Nuevo Mundo*)

EQUATORIAL GUINEA R. Africa until 2302* some days on 7190.2, others on 7203.3, with American religion in English (Brian Alexander, PA, *W.O.R.*)

ETHIOPIA (non) Horizon-V. of Ethiopian Patriotism, via Radio Moscow was last heard Nov. 22 (BBCM) V. of the People for Peace, Democracy and Freedom, 6940.1 and 8000 at 0327-0337, flute music, announcements (Dave Valko, PA, *FT*) V. of Broad Masses of Eritrea, 7380, from 0327 with flute, hi-life, 0400 news, heard until 0415 (Andy Wallace, Lake Ossippee, NH, *FT*)

FLANDERS Receiver images are usually a nuisance, but my ATS-800 only tunes up to 21750; I hear R. Vlaanderen International, 21810, by tuning to 20910 (Bob Colyard, NJ, SPEEDX)

FRANCE (?) R. Neige (Snow) heard four days in a row between 1230 and 1600, unsynchronized on three frequencies—25900 mostly AM, strongest 25710 NBFM, weakest 26070 mainly AM with some FM component; in French, mentioned Martinique (Alan Roberts, PQ, *W.O.R.*) 25900 best on USB at 1539, gone at 1602 check (Gerry Bishop, FL,)

GOA AIR testing two 250 kW here, 0430-1200 on 5980, 7200, 9650, 11915, 15145, 17750, continuous music or Hindi service (Flavio Reposo, Goa, RN*MN*)

GREECE Macedonian station now from Perea site, three 35 kW, rhombic 115°, dipole 315°—1000 (Sundays and holidays 0600)-2215 on 9935 and 11595, 1700-2215 on 7430 (Bueschel, DSWCI *SW News*)

HONDURAS Larry Sexton of La Voz de la Mosquitia, 4910, says it's on Tansin Island, diesel fuel is shipped in, 2300 in Spanish, 0000 in Miskito, 0200 in English; new surplus transmitter will raise power from 100 to 500 watts (Hans Johnson, *FT*)

HUNGARY Contrary to widely distributed print schedule, Radio Budapest apparently never used 5975. At 0300 and 2200 still on 11910, 9835, 6110; no 13620 either (via BBCM)

ICELAND Contrary to schedule in the December column, RUV heard until 1453* on 13855 and 15770 (Norman Blakely, Ont.)

INDIA AIR testing many new transmitters, including on 4990: Itanagar at 1030-1130, Thiru'puram at 0130-0230 (Guha, UDXL *OzDX*)

INDONESIA New RRI outlet surprisingly strong on 9735 from

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around 2200 past 0130; ITU shows 100 kW at Merauke. Frequency quite stable unlike other daytime RRIs on 31m (Bob Padula, Victoria, Australia) RPDT2 Berau, Tanjungredab, 5692, fair with ute interference around 1300 (David Martin, Vic., *OzDX*)

IRAN (non) V. of Mojahed announced 12 frequencies for its 1430-2000 broadcast: 7190, 6940, 6730, 6530, 6270, 6005, 5870, 5530, 5230, 5070, 4870, 4470 (BBCM) 7000v at 0400, moving every three minutes by 10 kHz or so whether jammed or not; suspect jammer uses spectrum analyzer to see where new spikes come up as Mojahed moves (Hans Johnson, MD, *FT*)

IRAQ RII schedule published in *Al-Thawrah*, Baghdad: English 2200-2400 15210 Europe, 1400-1700 13680 East Asia; Turkish 1900-2000 7200, Russian 1630-1730 6105; rest Arabic: 1900-2200 15210 Europe; 0015-0315 15180 South America; Maghreb 0700-1000 13680, 15400, 17720, 17740; also 0215-0515 Arabic/English to Chicago 11860; 0700 Arabic only until 0900; 1000-1400 Arabic to "kinfolk" in Saudi Arabia on 11860v; 15180 has irregular English at 0044-0056. Republic of Iraq Radio, domestic service: 0255-0020 on 17720, 9725v, 7420 (varies 7390-7450), 7180; includes Armed Forces program 1230-1300 Tue., 1800-1830 Sat. (non) V. of the Islamic Revolution in Iraq (via Iran), 1430-1630 on 7215 (BBCM)

KASHMIR AZAD AKR, Muzaffarabad resumed 3664v, 0045-0410, 1045-1810. V. of Independent Kashmir one hour at 0230 on 5000, 5860, 6300; 0700 on 5000, 6300, 7390; 1630 on 4080, 5000, 6300 (Sarath Weerakoon, Shri Lanka, RN*MN*)

KIRIBATI R. Kiribati, 17440 heard at additional times: 1930 past 2000 on AM; another day after 2100, better at 2230 (David Clark, Ont.) 0113 to fadeout 0137 (Guy Atkins, WA, both *FT*)

KOREA SOUTH R. K'rea is negotiating for more relay sites besides Sackville (*SW Feedback*)

KURDISTAN (non?) V. of the Struggle of Iranian Kordestan heard at 1500 on 4090; previously at 1510 on 4098 (BBCM) V. of Iranian Kurdistan, 4065 at 0327 in Kurdish, 0422 in Farsi until 0430* jammed. V. of the People of Kurdistan, 4085, ex-3930? 0353 ID, Koran, music, 0400 news (Hans Johnson, MD, *FT*) R. Kurdistan, socialist, 1500-1700, repeated 0400-0600 on 4130 (BBCM)

KYRGYZIA English news from Bishkek again heard at 0010-0015 on 4010 (Eugene, RVI *Radio World*)

LAOS Vientiane home service, 6130 now heard quite well from before 1030, sked 0900-1600, 2130-0230, 0330-0700; not heard on 5980 around 0030, nor 7113 external (Sarath Weerakoon, Shri Lanka, World DX Club *Contact*)

LIBERIA The pro-ECOMOG ELBC, 7275, runs 0650-1900 in English and vernaculars, with news at 0700 (BBCM)

LITHUANIA Vilnius had to reduce usage of 9710 due to energy shortage, 1900-2300 only; thus R. Centras was not broadcast the last Saturday of November at 0700, and may not come back subsequently (Sigitas Zilionis, RVI *Radio World* via BBCM) Centras was on 9710.2, Dec. 26 until 0800 (Brian Alexander, PA) 9710 at Sitkunai has 50 kW, bearing 259°; home service relay via Balashikha, near Moscow on 6010, 9675 at 260° (Noel Green, DSWCI *SW News*)

MADAGASCAR R. Hery Velona (Active Forces Radio) started shortwave Nov. 23, formerly FM only (R. Madagascar via BBCM) R. Feon'ny Vahoaka (Voice of the People) renamed RFV Plus, adds FM stereo, and shortwave Nov. 23 (*Midi Madagaskara* via BBCM) Apparently same station, but no frequency given!

MEXICO R. Educacion, which runs all night on 6185, says will soon broadcast programs especially for SWLs worldwide, covering Mexican affairs, tourist attractions (Luis Ernesto Pi Orozco, Dir. Gen., via Nicholas Vaughan-Baker and Tony Edge, BDXC *Communication*)

NETHERLANDS (non) R. Nederland relays via C.I.S. sites from Jan. 1 were revised almost every week; latest available version: 0030-0127 English on 7305 500 kW Alma Ata, 0130-0325 same on 12025; 0930-1125 English (including alternate-feature hour at new time 1030) on 7260 Petropavlovsk Kamchatsky, 9810 or 9860 Irkutsk; 1130-1325 Indonesian on 17655 Tashkent, 9810? Irkutsk; 1330-1425 Dutch 7260 & 9810?; 1430-1525 Dutch 7115 Chita; 2130-2325 Indonesian on 9855 Tashkent, 2330-2430 Dutch on same; plus special Sunday program in Dutch for soldiers with UN in Cambodia, 0800-0925 on 15210 Chita. Special QSL for these relays (RN *Media Networks*)

NETHERLANDS ANTILLES More on TWR winding down SW from here: Morning English already reduced to 1055-1230 on 15345, 11815—no more free SW airtime to MW clients. Not a publicity stunt, decision irrevocable. However, exploring alternate SW routes to reach rural Latin Americans. A new QSL for Jan.-Feb.-Mar., Bonaire sealife, then overlay in Apr.-May-June. Then special QSL June 27-30 for final days on SW, reproducing initial 1964 card, limited to 800. *Bonaire Wavelengths* will continue until the end, Sats. 1130, Suns. 0330; some personnel such as myself may be reassigned to other TWR stations (Chuck Roswell, *BWLs*) Plan to scrap the 250 kW transmitter, relocate another, keep the 50 kW for standby just in case (Roswell, RN*MN*) That is, usable for proof of performance to a buyer. SW antennas dismantled ASAP, feedlines shipped to other TWRs (Roswell, HCJB *DXPL*)

NEW ZEALAND RNZI suddenly revived 15120 instead of 17770 for the 0400-0700 period (RN*MN*) Never on BBC any more, *The Goon Show* is on RNZI from National Radio Thu. 0705 on 9700 (Tony King, RNZI *Mailbox*) Maybe 0805 after DST. Actually heard from 0707.

NORWAY English continues from R. Norway Int'l but from February back to Sundays only (Edwin Southwell and Bob Thomas) R. Free Burma 1430-1530 moved to 15140; time may change to 1000 (Bob Thomas, CT, *W.O.R.*)

OMAN R. Oman, Domestic Service in Arabic; 0200 on 7270, 7230, 6085; 0359 on 9735, 7270; 0559 on 11890, 9735; 0759 on 15375, 11890; 1159 add 7230; 1359 on 11890, 9735, 7230; 1559-2145 on 9735, 7230, 6085. English service is on FM only (BBCM)

PAKISTAN R. Pakistan, English at 1658-1800 soon shifted from 9430 to 9418.1, also on 11570, both weak (Brian Alexander, PA) Nominally 9420; other English: 0230-0245 on 9515, 17705, 17725, 21485, 21730; 0800-0845 and 1100-1120 on 21520v, 17900v; 1600-1630 on 11570, 13685, 15555, 17558 (BBCM)

PAPUA NEW GUINEA QSL from R. Western Highlands, 3375 says power up from 4 to 10 kW (Michael Rolph, Australia, SW Echo via Thurman)

PERU Documenting the continued upward creep of R. Azangaro—7065 at 1004-1020, great folk music, political station slogan of "la voz del campesino," not name (Don Moore, IA)R. Universal, 6093.31 from *1026, plenty of IDs, huaynos (Chuck Bolland, FL) A few days later on 6090.9, 1033-1049 rustic huaynos, pops, 1038 ID (Tony Orr, VA, *FT*) R. Lider del Norte, Cajamarca, 5338.0, 1042-1108 folk music, 1058 ID (Takeshi Sejimo, Japan, *Radio Nuevo Mundo*) R. Luz de la Vida, 3194.1, 2nd harmonic of 1597 at 1010-1041, campo music, 1032 and 1038 IDs (Dave Valko, PA, *FT*)

QATAR V. of the Iraqi People, 15470, must be from here, delayed compared to 17955, 15603 and 9983; previously on 15190 before opening at 1400, also delayed, I heard a "*Huna Qatar*" ID (Rumen Pankov,

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Bulgaria, DSWCI *SW News*)

RUSSIA **AWR** Dec.-Jan. sked in English: 0430-0500 & 1600-1630 both on 15125 Samara (*AWR Current* via Frank Orcutt) What do they know? At 0550 on 12060 (Nikolai Rudnev, Russia, WDXC *Contact*) unID on 6035.00, *1230-1300 Chinese with Christian music (Chuck Bolland, FL) It's **FEBC Radio**, via Khabarovsk at 1230-1730; at other times same outlet carries Ostankino's **Orbita-1** (S. Aoki & Y. Kato, R. Japan *Media Roundup*) **R. Nadezhda**, women's station, in Russian 0800-1100 on 15460, 6050; 1500-1800 on 17675, 9580, 9490, 7235, 6110; 2000-2300 on 6110, 5905 (BBCM) also 1100-1400 on 7125, 9585, 11665, 11705 (Nikolai Rudnev, Russia, *Australian DX News*) Letter from station says they hope to add English (Jerry Berg, MA, *FT*) **R. Krasnoyarsk**, regional program in Russian on 50 kW 5290: 2320-2400 Mon.-Fri., 0000-0200 and 0410-0530 and 0900-1000 Sat., 1120-1200 Mon.-Fri., 1210-1340 Mon./Tue./Wed./Fri. (Grigory Grigoriev, *DX Moscow* via *Play-DX*)

Golos Rossii (V. of Russia), state-controlled external service but separate from R. Moscow Int'l, 24 hours on 30 to 50 frequencies at once, includes DX Club at 0130-0145 Thu., 0230 and 0530 Mon., 0630 Thu., 0930 Mon., 1230 Sun., 1530 and 1630 and 1930 and 2330 Wed. Mayak domestic service from Ostankino is 24h, including lengthy use of these SSB: 10855-USB, 13820-LSB, 9180-USB, 13365-LSB, 18730-USB. **Russia's Radio**, another state domestic service 24h, includes these SSB: 8040-USB, 18870-USB, 19145-USB, 18195-USB, 12175-USB, 8005-USB; includes AWR, BBC and religious programs. **Ostankino Radio-1**, for European Russia at 0200-2400 includes SSB: 13820-USB, 6790-USB, 13760-USB, with **Radiostation Smena**, for children, 0440-0530 Mon.-Sat., 0530-0700 Sat., 0600-0800 Mon.-Thu., Sat, 0630-0800 Sun., 1215-1400 daily; **Radiostation Novaya Volna** at 0830-0930 and 1530-1630 daily; programs from various CIS radios at 1100-1120 Tue.; US religion—*Family Focus* at 1915-1930 Sat., *Hour of Revelation* at 2000-2100 Tue. **R. Station Yunost** (Youth, Radio 2), 24h, changes frequencies almost every hour among these: 15490, 11915, 11820, 9790, 9765, 9670, 9585, 9570, 9525, 7255, 7200, 7100, 6105, 6095, 6030, 5995, 5985, 5920, 4740. Perm' transmitters with callsigns: RB-1094 with Radio-2 at 0200-1800 on 9670, 1800-2200 on 15420; RB-1095 with R. Rossii 0000-1600 on 5290, 1600-2200 on 11650 (Leonid Strelkov, Perm', *DX Moscow* via *Play-DX*) **RMI** French service announced religious shows: 1345 Tue., 1415 Wed., 1915 Sun. (BBCM)

SA'UDI ARABIA BSKSA feeder with different programs on USB & LSB, 3868.0 at 2010-2035 (Franz Suess, Germany, DSWCI *SWN*)

SHRI LANKA TWR SW did not begin until Nov. 25, testing 6035 12.5 kW at 1300-1530, but a 100 kW is on order (Victor Goonetilleke, S.L., RN*MN*) It's 1330-1500. (Chuck Roswell, TWR *Bonaire Wavelengths*)

SOUTH AFRICA Never shown on printed skeds, but Radio Allegro, classical music service heard on 4810, 2138 until 2300 R. Orion; announcements every quarter hour or so (Sheldon Harvey, PQ, CIDX)

SUDAN The transmitter on 9170 (or 9180 or 9190) is used by three different "stations"—Republic of Sudan Radio at 0300-0530, 0715-1015, 1900-2200 (Ramadan to 2300); R. National Unity of R. Omdurman, 1245-1700 with English at 1500-1530; R. Omdurman external service, French 1700-1800, English 1800-1900. The first is also on 7200 at 0300-0559, 0715-0830, 1200-2200 (or 2300); and on 4994 after 1600 (BBCM) 4494 is 20 kW near Omdurman while the 7 and 9 MHz frequencies are at Khartoum (BBCM & Andy Sennitt, RN*MN*) 9170 from 1430 to 1525 fade had reggae, Zairean soukous, continually interrupted for commentary, agonizing; was this R. SPLA? (Bob Tarte, MI)

SWITZERLAND SRI on 21820 ex-21770 due QRMoscow at 0900-1645; added English 0500-0530 on 3985, 6165 (The Two Bobs, SRI) Another *Name Game*, mystery destination competition, Sun. Jan. 31 (One Bob via Larry Nebron)

SYRIA Damascus domestic on SW: 0500-1100 15095, 12085, 9955; 1100-1300 15095, 12085, 9950; 1300-1730 15095, 12085; 1730-1900 12085; program for Golan Heights Sat.-Thu. 1445-1500; Armed Forces program 1530-1600; *V. of Palestine* 1630-1730 (Ramadan 1715-1800); *Oman Letter*, from R. Oman, Sun. 1745-1800; *Cairo Letter*, from Egypt Fri. 1745-1800 (BBCM)

THAILAND New VOA relay at Udorn may be on by March, using 30 or 300° antennas, 500 kW; 11905 1600-1700, 11855 1700-1800, 11785 1100-1400, 11705 1400-1600, 9760 0100-0130, 9680 1500-1700, 9615 1400-1500, 9560 1130-1400, 6070 2100-2300, 6045 no time given (VOA)

USA **WWCR's** third transmitter should be on in April or May; already lots of demand for time on it. *World of Radio* via WWCR: Fri. 2215 on 15685, Sun. 0405 and 0800 on 7435, Mon. 0000 on 7435, Tue. 1230 on 15685. *Prayerline* back to WJCR only, replaced on WWCR by Bill Cooper's *Hour of the Time*, UTC Tue.-Sat. 0500-0600 on 7435 (Adam Lock, WWCR) W.O.R. also on **WRNO**, see last month, and Costa Rica, see this month (gh) WRNO-FM has been sold by Joe Costello to Thomas R. Galloway for $500,000 (*Broadcasting* via John Carson, OK) WRNO 15420 aired *World in Review*, from UN, Sun. 2030-2043 (gh) Brother "The End is Nigh" Stair on WWCR, WRNO planned to add two hours nightly on WHRI (via Diane Mauer, WI) **KCBI**, Dallas defunct SW was sold by Criswell for $1000 to Two If By Sea Broadcasting (*Broadcasting*, via Jeff Miller, *SW Echo* via Kirk Baxter) New heights of out-of-bandage achieved by KCBI on 15725 replacing 15375 part of the time (gh) Dr. Gene Scott via KCBI monitored: *0330 and 1400* on 9815, 1430-2130* on 15375, *2200-0230* on 15725 (Brian Alexander, PA) **KJES**, NM, finally returned in mid-December, expanded to seven days a week on previous sked (Diane Mauer, WI) Gone again by early Jan. (gh) **WEWN**, AL, began testing in mid-December; regular use of first transmitter got off to a shaky start Dec. 28—continuous crackle, breakdowns, limited sked of 2000-2200 7540, 2200-2400 5825, 0000-0100 17510—Chinese Catholicism an oddity to hear, 0100-0300 9825, 0300-0500 7520, 0500-1000 7465 (via George Thurman) Plans to add next three units about one per month (Thurman) Initially no secular programming whatsoever heard, should quickly become a bore even to Catholics; what a waste of watts (gh) Should have tested longer; quickly blew out two $75,000 power amp tubes due to pressure to meet Dec. 28 deadline; was running only 100 to 300 kW (Thurman) WEWN and Alabama Power Co. sued by neighbors of Vandiver site for tearing up forest, blocking off public road, and RF hazards (Greg Garrison, Birmingham News via SPEEDX) **WRMI**, Miami, 9955, will include English programming from the very first day, in February or March (Jeff White, *Miami en Vivo*) **VOA** added Nepali, Sats. 0115-0130 on 11920, 15210, 17780, 21475 (Dan Ferguson, *SW Echo* via Baxter) And from Dec. 27, Somali at 0245-0300 on 6155, 7265, 9575, 9865 (Diane Mauer, WI) Judging from subsequent usage, sites may be Ascension, Botswana, Bethany, Botswana; only 7265 audible here, a bit early in Somalia, 5:45 am (gh) **WSMN**, Nashua, NH, 1590, puts 3rd harmonic on 4770, including French Sundays 1400-1700 (Charles F. Washburn, ME, *W.O.R.*) WOWO, 1190, Ft. Wayne, IN, puts 2nd harmonic on 2380, heard at 1025-1100 (Alan Roberts, PQ, CIDX) 4th harmonic 4760 at 1130 (ANARC SWL Net via *SW Echo*, Baxter) TV station audio relayed on 26 MHz: 26100, WREG, ch. 3, Memphis at 1810; 26250, KPRC, ch. 2, Houston at 2300; 26350, WDZL, ch. 39, Miami at 2235 (Alan Roberts, PQ, CIDX)

VENEZUELA R. Rumbos including SW 4970, 9660, was knocked off the air during last coup, secret police destroyed mikes (Reuter via *DXPL*) Closed temporarily by government for inciting rebellion and civil disobedience, but allowed back early by Pres. Perez. It had defied order for all stations to relay R. Nacional, and continued with its own news coverage (*Miami en Vivo*)

VIETNAM Kon Tum, still on 5061, expanded hours: *1045 local Viet, 1100 relay VOV, 1130 local language, then buried by Singapore (Isao Ugusa, RJ*MR*) Bac Thai settled around 6652, 1230 choir music (David Martin, Vic., *OzDX*) Previously on 6654 at *1153-1358* (David Foster, *ibid.*) R. Irina, via Russia at 1400-1500 on 9550 ex-9735 (BBCM, RN*MN*)

Until the next, 73 de Glenn.

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Broadcast Loggings

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

0000 UTC on 11725
BULGARIA: Radio Sofia. Poor signal for ten minutes of English. Station ID, regional news and *Pop Music* program. (Richard Jones, Dayton, OH)

0040 UTC on 9022
IRAN: VOIRI. Good signal for news on Serbian war. News quote as, "Serbs used cluster bombs." (Jones, OH)

0040 UTC on 6020
NETHERLANDS: Radio Netherlands. *Happy Station* program interviews Memphis's blues great B.B. King. (Robert Tucker, Savannah, GA)

0108 UTC on 11800
ITALY: RAI. Closing Italian service into English. Program feature *Weekend* on furniture exhibition and covered bridges in northern Italy. Italian music, station ID and 0119 sign-off. (Tucker, GA)

0111 UTC on 6040
ANTIGUA: Deutsche Welle relay. Commentary on problems of ratifying Maastricht Treaty. *Nickelodeon* with Boris Bittner. Music for North American listeners. Tucker, GA)

0215 UTC on 4880
ECUADOR: Radio Nacional Espejo. Spanish. Radio drama to echo-effect "Nacional Espejo" ID. (Ed Rausch, Cedar Grove, NJ) Ecuador's La Voz Del Napo audible on 3279.8 kHz at 1015. Station IDs, news briefs and Spanish vocals. Radio Centro at 1020 on 3289.8 kHz. (GVH)

0235 UTC on 11655
MADAGASCAR: Radio Netherlands relay. Fair signal quality for world news, and program feature, *Newsline.* (Rausch, NJ)

0253 UTC on 3380.7
GUATEMALA: Radio Chortis. Spanish. Latin style vocals to canned station promotional. Marimba music to closing station identification. (Sam Wright, Biloxi, MS) Radio Maya de Barillas heard on 3324.8 kHz at 1135 UTC. Traditional music to station ID at 1200 UTC. (Jerry Witham, Keaau, HI)

0309 UTC on 9655
CUBA: Radio Havana Cuba. World news to national news update. *Dateline Havana* review of the Cuban press. Frequency update report. (Tucker, GA) Cuba's Radio Rebelde heard on 3366 kHz at 0425. Fair signal quality during Cuban salsa program. "Rebelde" ID to phone-in listener chat. (Richard Jackson, Kansas City, MO)

0355 UTC on 4980
VENEZUELA: Ecos Del Torbes. Spanish. Regional music to "aqui Venezuela," and station promotional. Canned ID and frequency quote. Additional ID to choral national anthem and station sign-off at 0400 UTC. (Wright, MS) Venezuela's Radio Rumbos heard on 4970 kHz at 0715. (Patrick J. Barry, Mission Viejo, CA) (Duane Hadley, St. Petersburg, FL) (Jackson, MO)

0406 UTC on 4865
COLOMBIA: La Voz Del Cinaruco. Local commercial with musical jingle. National news to cola ad and time-check. (T.J. Patterson, Mobile, AL) Caracol Colombia heard on 5075 kHz at 0545. Program heard on parallel La Voz Del Cinaruco 4865 kHz. (Barry, CA)

0500 UTC on 9435
ISRAEL: Kol Israel. Fifteen minute world news. National news roundup with weather forecast. Hebrew service at 0515. News and sports report to French service at 1800 on 11587 kHz. (Rausch, NJ) Additional monitoring on 9435 kHz at 2002. *Spotlight* program on current affairs. Station ID at 2025, news briefs and sign-off at 2027 UTC. (Tucker, GA) (Wright, MS) (Hadley, FL)

0530 UTC on 4915
GHANA: Ghana Broadcasting Corp. Announcer's ID as, "this is Radio One." African vocal tunes to additional "GBC" ID and newscast. (Virgil Carlson, Kirkland, WA) (Hadley, FL)

0540 UTC on 4770
NIGERIA: Radio Nigeria. Afro pop music to "Radio Nigeria" ID. (Barry CA) Regional music monitored on this frequency and parallel 4990 kHz at 0545. English newscast at 0600 (Rausch, NJ)

0555 UTC on 5003.3
EQUATORIAL GUINEA: Radio Nacional. Spanish/Vernaculars. Announcer chat to Afro pop music. Time pips at the hour 35 seconds ahead of WWV. Announcer duo in Spanish with IDs at 0601 UTC. Radio Africa 2000 monitored at 2130-2147 on 6910.1 kHz. Good quality signal. (David A. Gasque, Orangeburg, SC)

0600 UTC on 9765
MALTA: Voice of the Mediterranean. Program feature *Economic Panorama* and *Out and About* music program. (Rausch, NJ)

0845 UTC on 9830
PALAU: KHBN. Chinese. Mellow sounding vocal music. Brief program announcement to ID, "High Adventure, the Voice of Hope." English service beginning at 0900 UTC. (Witham, HI)

0956 UTC on 6010
MEXICO: Radio Mil. Spanish. Good signal for 50-60's music show. Canned "Radio Mil" ID at 1003. Frequency quote and station promotional to musical ID. Ballads to time-check at 1010. (Frank Hillton, Charleston, SC)

1015 UTC on 5030
VENEZUELA: Radio Reno Continental. Spanish. Almost continous chat from male announcer duo. Numerous IDs and news briefs on several Venezuelan cities. Excellent signal. (Gasque, SC) *David, this station may be Radio Continente, also logged this frequency. The station is being heard around 0200 and 2250-2325 UTC. (GVH)*

1020 UTC on 3300
GUATEMALA: Radio Cultural. Time check and ID at tune-in. Great guitar ballads. (Thomas Banks, Dallas, TX) Guatemala's Radio Tezulutlan in Spanish, on 3370 at 1058 UTC. Interval signal to 1100 sign-on. (Rausch, NJ)

1025 UTC on 4790
PERU: Radio Atlantida. Spanish. Regional Andean flute tunes. Clear "Atlantida" ID, to local chat, ad announcement. (Banks, TX)

1030 UTC on 6160
CANADA: CKZN/CBN St. John's Newfoundland. Nice morning show with Canadian news and plenty of items on Labrador. Weather report for frigid Canada to time-checks. News topics on Maine, USA, to easy-listening vocals. Continued regional news on Newfoundland to IDs. (GVH)

1100 UTC on 13605
AUSTRALIA: Radio Australia. Music program to frequency quote announcement. Pacific service monitored on 5880 kHz at 1845 UTC. Easy-listening music, sports report, and feature *Radio Australia Communicator* at 1930. Heard to 2030 with good signal. (Rausch, NJ)

1315 UTC on 3900
CHINA: Hulunbei'er PBS. Chinese. National Chinese music dramatic dialogue at 1327, extending past 1330 UTC. (Witham, HI)

1350 UTC on 4081
MONGOLIA: Radio Ulaanbaatar. Mongolian. Discourse over music by announcer. Western style music at 1355, fading down for pause at 1358. Time pips and ID at 1400 to announcer talk. (Witham, HI)

1400 UTC on 17650
FRANCE: Radio France Int'l. Station ID and world news. Interview with French sculptor. (Jones, OH) Radio France's Gabon relay heard on 4890 kHz at 0404 in French. (Hillton, SC) (Patterson, AL)

1400 UTC on 15400
VATICAN STATE: Vatican Radio. Excellent signal for thirty minutes of English programming. Station ID, announcer chat and feature, *Sacrament of Reconciliation.* (Jones, OH) (Patterson, AL)

1425 UTC on 5024.5
BHUTAN: Bhutan BC Service. Main points of the news and announcer's ID as, "this is Bhutan." Special news on Bhutan's monarchy to sign-off at 1459 UTC. (Carlson, WA)

1600 UTC on 4760
ANDAMAN ISLAND: All India Radio-Port Blair. Hindu. Male/female announcer team with program news to vocal music. Parallel frequency 9950 kHz audible at this time. (Carlson, WA)

1610 UTC on 3980
NORTH KOREA: KCBS-Ch'ongjin Regional Station. Korean. Twenty-minutes of haunting regiona music until news at 1630. Dramatic readings over Korean music at 1640. Vocal music at 1645 to time-pips, and ID type announcement at 1700. Faded out by 1740. (Witham, HI) *Nice log, Jerry! (GVH)*

1640 UTC on 11840
POLAND: Polish Radio Warsaw. *Letter From Poland,* about the current economic situation in Poland and hopes for its' recovery. Parallel 9525 kHz buried under Deutsche Welle. (Witham, HI)

1659 UTC on 17635
SWITZERLAND: Swiss Radio Int'l. Interval signal, ID and newscast. *Swiss Week in Review* and *Grapevine.* Programming featured listener's letters and a blindfolded taste-test of various Swiss chocolates. *Swiss Merry-Go-Round* DX news. ID at 1728 to 1729 sign-off. (Tucker, GA)

1810 UTC on 9705
SAUDI ARABIA: BSKSA. English national news to pop music. Time tone signal to ID as, "this at Riyadh" at 1830. Continued news and program features. (Carlson, WA)

1930 UTC on 15400
ASCENSION ISLANDS: BBC relay. Good signal including IDs, easy-listening music and interview with African musicians. (Jones, OH)

1940 UTC on 9535
ALGIERS: RTV-Algerienne. Arabic. Good signal Arabic programming. Occasional interferences from USB. Arabic vocals to Islamic prayers. Program feature resembling a radio drama. (Hillton, SC)

2200 UTC on 9905
BELGIUM: Radio Vlaanderen. Sign-on ID to frequency announcement. International news to *Radio World* and program on national tourism to 2225 UTC sign-off. Parallel frequency 5910 audible. (Rausch, NJ) (Tucker, GA)

2300 UTC on 11795
NORWAY: Radio Norway Int'l. Station sign-on ID into newscast. Program feature *Sounds of Norway* to 2328 sign-off. Interval signal into Radio Denmark relay in Danish. (Rausch, NJ)

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Utility World

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Tracking Time

Tick, Tock, the clock bonged three times. But, is that clock really right? It must be time to tune in the time stations and find out for sure what time it is.

It seems that time stations are getting a lot of attention lately, On the Genie Information Service, time stations have their own topic. There is even a time station listening club (more on that later).

But what is really out there to listen to? A lot of great DX targets, for one thing. Plus, time signal stations are some of the best reception report verifiers around. Jot down some details (full wording of IDs is the best) of what you heard at the various times, give date/time/frequency and mention something about how strong their signals were and ship it off to the station. It is that simple.

So where do go about tuning in these folks? The best place to start is on the standard channels of 2.5, 5.0, 10.0, 15.0, 20.0, and 25.0 MHz. Several stations worldwide operate on these frequencies including our own WWV/WWVH. Listen in your morning hours for long path communications from the Pacific, Africa and Asian time signals on lower frequencies. Late evenings look for the same areas via higher channels. Try different times of day to see what is propagating to your location. You might be surprised to find WWV in the mud and another station taking its place for a short while. Oh yeah, don't forget to set your clock while you're at it.

What other countries operate time stations? Table 1 is Ute World's latest exclusive list of time stations for your listening pleasure. I have used only recent logs to compile this list. If you have heard other time signals recently that are not included, please drop me a line and I will include the report in future updates.

As I mentioned, there is a new time signal listeners club, the ITDXA (International Time DX'ers Association). This club is the brain-child of Myke Weiskopf whom I meet at the '92 MT convention in Atlanta. Myke is the publisher of *The Tick Tock Times*, the official publication of the ITDXA. Two issues have hit the street so far.

You can get more information on this club by writing ITDXA, 1119 Parkwood Ave, Rockford, IL 61107 or call (815) 229-7121.

Restore Hope Update

Longtime *MT* reader, Tim Tyler, has provided an Operation Restore Hope update of AMC (Air Mobility Command) activity associated with the big relief operation in Somalia. The following is a list of ALCC (Theater Airlift Control Center), ALCE (Airlift Control Element) and Tanker Coordination calls and frequencies.

Call Sign	Location	Frequencies
Absolution	Mogadishu	3878 7844 8192 9175
Absolution Alpha	Cairo West	3878 7844 8192 9175 10930 12290 14655 18399
Absolution Bravo	Djibouti	3878 7844 8192 9175
Absolution Charles	Mombassa	3878 7844 8192 9175
Absolution Echo	Mogadishu	3878 7844 8192 9175
Absolution Foxtrot	Baledougle	3878 7844 8192 9175
Absolution Golf	Baidoa	3878 7844 8192 9175
Absolution Hotel	Moron	3878 7844 8192 9175
Absolution Juliet	Jeddah	3878 7844 8192 9175
Absolution Kilo	Addis Ababa	3878 7844 8192 9175
Accuse Alpha (Tanker)	Cairo West	10930 12290 14655
Accuse Bravo (Tanker)	Lajes	3100.5 4702.5 5185.5 5692 6691.5 6701
Accuse Delta (Tanker)	Moron	5895 7713 9987 16191 18240

Table 1: Time Standard Stations

All frequencies are in kHz and time in UTC unless otherwise indicated.

4PB - Colombo, Sri Lanka: 8473 (0553-0600, 1323-1330)
Address: Colombo Radio, OTS 148, 17 Baseline Road, Colombo 09

ATA - New Delhi, India: 5000 (1230-0330) 10000 (24 Hrs) 15000 (0330-1230)
Address: National Physics Laboratory, Time and Frequency Division Hillside Road, New Delhi-110012

BPM - Xian, China: 5000 (14-24) 10000 (24 hrs) 15000 (00-14)
Address: Shaanxi Astronomical Observatory, Academia Sinica, P.O.Box 18, Lintong, Xian, China

BSF - Chung-Li, Taiwan: 5000 15000 (All freqs 24 hrs)
Address: Telecommunication Laboratories, Ministry of Communications, P.O. Box 71, Chung-Li, Taiwan 320 Republic of China.

CHU - Ottawa, Canada: 3330 7335 14670 (All freqs 24 hours)
Address: CHU, National Research Council, Ottawa, Ontario, Canada K1A 0R6

FFH - Paris, France: 2500
Address: Station de Signeaux Horaires-FFH, Centre National d'Etudes des Telecommunications, Department EST/DEF, 38-40 rue de General Lerclerc, F-92131 Issy-les-Moulineaux

HD210A - Guayaquil, Ecuador: 3810 (05-17) 5000 (17-18) 7600 (18-05)
Address: Instituto Oceanografico de la Armada, Estacion de Senal Horaria, El Director, Casilla 5940, Guayaquil, Ecuador

HLA - Taejeon, South Korea: 2500 5000
Address: Korea Standards Institute, Time and Frequency Laboratory, P.O. Box 3, Ch'ungnam 300-31 Republic of Korea

IAM - Rome, Italy: 5000 (0730-0830, 1030-1130 - 1 hr earlier summer)
Address: Instituto Superiore delle Poste e delle Telecommuncazione, Ufficio 8, Reparto 3, Viale Europa, 1-00100, Rome.

JJY - Tokyo, Japan: 2500 5000 8000 10000 15000 (All 24 Hrs)
Address: Frequency Standard Division, Radio Research Laboratories, Ministry of Post and Communications, 2-1 Nukui Kitamachi, 4-chome, Koganei-shi 184, Tokyo, Japan

LOL - Buenos Aires, Argentina: 5000 10000 15000 (11-12 14-15 17-18) (20-21 23-24)
Address: Observatorio Naval de la Armada Argentina, Servicio de Frecuencias, Avenida Espana 2099, 1107 Buenos Aires, Argentina

PKX - Jakarta Radio, Indonesia: 8542 (0045-0100)
Address: Directorate General of Posts and Telecommunications, Chief of Frequency Control and Monitoring, Jalan Kebon Sirh 37, Jakarta

Russian Time Stations
Address: For all stations: Comite d'Etat des Normes, Conseil des Ministeres de l'URSS, Chief of Foreign Relations Department, 9 Leninskij Prospekt, SU-17049 Moscow M-49

RCH - Tashkent, Russia: 2500 5000 (Both 24 Hrs) 10000 (0530-1330)

RID - Irkutsk, Russia: 5004 10004 15004 (24 Hrs)

RTA - Novosibirsk, Russia: 10000 (1330-0530) 15000 (0530-1330)

RWM - Moscow, Russia: 4996 9996 14996 (24 Hrs)

VNG - Llandilo, Australia: 5000 8638 12984 (All 24 hrs) 16000 (22-10)
Address: VNG Users Consortium, GPO Box 1090, Canberra A.C.T. 2601

VPS - Hong Kong Time Signal Station
Address: Royal Observatory, 134A Nathan Road, Kowloon, Hong Kong

500	VPS	Every hour
4232.5	VPS8	Every odd hour 1100-2100
8539.0	VPS35	Every odd hour
13020.4	VPS60	Every odd hour 0100-1500
17096.0	VPS80	Every odd hour 2100-1300
22536.0	VSP22	Every odd hour 0100-0900

VWC - Calcutta, India: 4286 (1625-1630) 12745 (0825-0830)
Address: VWC, Telegraph Check Office, Calcutta Radio, Chief Radio Operator, Calcutta 700001

WWV - Fort Collins, CO USA: 2500 5000 10000 15000 20000 (All 24 hrs)

WWVB - Fort Collins, CO USA: 60 kHz (24 hrs)
Address: WWV/WWVB, 2000 East County Road 58, Fort Collins, CO 80524

WWVH - Kauai, HI USA: 2500 5000 10000 15000 (All 24 hrs)
Address: WWVH, P.O.Box 417, Kekaha, Kauai, HI 96752

YVTO - Caracas, Venezuela: 5000 (24 Hrs)
Address: Ministerio de la Defensa, Comandancia General de la Marina, Direccion de Hidrografia y Navegacion, Observatorio Cagigal, Apartado 6745, Marina 69-DHN, Caracas

ZSC - Capetown, South Africa: 4291 8461 12724 17018 22455 (0755-0800, 1655-1700)
Address: Chief Superintendent, Private Bag, Milnerton 7435

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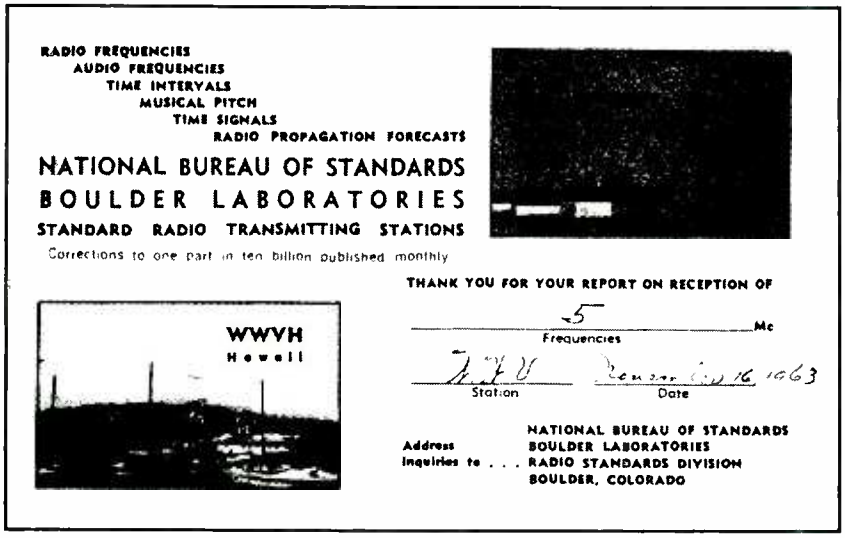

Dave Glow of Townsend, MA, received this WWV QSL back in 1963!

SATCOM		
Voice	23W 295.000 Uplink	261.600 Downlink
Data	23W 317.195 Uplink	244.095 Downlink

Thanks a bunch, Tim, for the info, your contributions are always welcomed at Ute World.

Joerg Klingenfuss reports that U.S. troops in Somalia have been heard on 17449 kHz with 75 bd traffic for those of you with RTTY capability. Mike Agner forwards a report from K3CXB that the Somali Airfield is on 11300, presumably their daytime.

On a somewhat related note, I have received several reports that the USAF is using some more new designators. Yep, now we have a new series of stuff to listen to, the X-200 series. X-210 has been found on 11229 and references on the air indicate that there is a X-206 and X-209. I'm sure there are more out there lurking. More to follow as it becomes available.

Selscan Listening

Ute World regular Thomas McKee writes this month that he is retired and working on a shortwave frequency guide which means he is doing a lot of listening. As a result, he sees an opportunity for the utility monitoring community to use a new method for developing and confirming frequency information on US government radio users.

This new method involves the pulses emitted by the soon-to-be ubiquitous Selscan radios (like those used by the US Custom service and FAA). We are probably going to get inundated with these pulses as other agencies start using these new radios. As Thomas says, "We can't stop their onslaught, but we can take advantage of them to help us find the frequencies used by a given agency."

The idea that Thomas proposes is simple. Listeners should begin reporting the Selscan pulses which they hear but are unable to associate with the known Selscan radio users. Listening to 8912 or 13907 (USCS) for 10 minutes will quickly educate one as to what a Selscan pulse sounds like. The May 1992 *QST* had an article which shows how the pulses are used in the new radio systems. Basically these pulses are used to do Link Quality Analysis (LQA) frequency runs. This helps keep the radio system frequencies open between sites for communication purposes.

Listeners with memory receivers can do a little detective work with these pulses. By putting the Selscan pulse frequencies into the receiver's memory in ascending order, the listener can manually follow the pulses from channel to channel as the Selscan radios move up through the system's frequencies doing these LQA runs. By following the pulses, one can sequence groups of frequencies belonging to a given user. Thomas has done this for one group of USCS frequencies: 7527 8912 10242 11494 13907 15867 18594 20890 23214 23350. Thomas does note that some comments he has heard on Customs channels lead him to believe that there might be a second group of Selscan USCS frequencies.

Thomas has developed the following partial sequences of FAA Selscan channels. "Missing" means that too much time passed between LQA signals from the frequencies below and above. Based on this timing, a frequency should be indicated where the "missing" is inserted, but that channel has not been located yet.

FAA: 6867 7475 8125 Missing 11637 Missing 15851 16348 20852
FAA: 6867 7611 8125 Missing 11637 13457 Missing 15851 19410
FAA?: 6867 7611 8825 11288 13312

The two FAA groups do make sense as there are Eastern and Western FAA nets. Could the third (very tentative) group be FAA flight test frequencies?

Unidentified Selscan activity has been heard on the following frequencies:
4647 5732 5801 6859 6899 7800 8134 10473 10785 13312 14359 18283.

Note that while LQA checks are only 5 to 10 minutes apart on the USCS channels, they may be 20 to 30 minutes apart in other systems.

What frequencies and sequences can others add? Anyone know what agencies are next in line for these new radios? If you have some information to add to this, Thomas and I would like to hear from you. Send your material to the address in the masthead. Many thanks to Thomas McKee for passing along the above information.

Interesting Intercepts

During a recent broadcast of the show *Current Affair*, a member of the Anti-Castro group Alpha 66 (also a Cuban double agent) showed how he got his instructions from Havana using a shortwave portable. Another shot of him on the segment showed him decoding a 5-digit Spanish number broadcast using his portable.

Several readers including Walt Sepaniac and Lee Bowgren caught a very special interview on the Larry King Show on CNN in December. Larry was interviewing the crew on board Reach 60156 (C-141) heading for Somalia and Operation Restore Hope. He also took calls from some viewers for the guys in the cockpit.

For those who had shortwave radio the aircraft could be heard on 11220 from 0220 to 0226 during the interview. There was about a one second delay between the receiver and the CNN broadcast. The phone patch was being conducted through Andrews AFB.

At 0226-0240, after the interview, the pilot was patched to his wife. From 0240-0250, the pilot ran another phone patch to arrange their second aerial refueling at 0915 for 60,000 lbs. of fuel.

Congratulations, fellows, on your unique intercept. I am sure you will all agree with Walt when he says, "This hobby really has its moments."

Speaking of moments, it's time (I checked it with WWV) to see what you have been hearing this month in the Utility World. Then I'll enjoy a hurricane and a Mardi Gras parade or two. See you all next month.

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Utility World

Utility Loggings

Abbreviations used in this column

Aero	Aeronautical	Meteo	Meteorological
AM	Amplitude Modulation	MFA	Ministry of Foreign Affairs
ARQ-E3	Single channel ARQ ITA3 (International Telegraph Alphabet) system	Mossad	Israeli intelligence dept.
		M/V	Motor Vessel
CANFORCE	Canadian Military Forces	QRM	Interference
CCG	Canadian Coast Guard	QSL	Verification card or letter
Comms	Communications	QTH	Location
Comsta	Communications Station	RAF	Royal Air Force
CQ	CW General call for any station	R/T	Radiotelephone
		RTTY	Radioteletype
CW	Continuous Wave (Morse Code)	SCN	System Coordination Network
FACSFAC	USN Fleet Area Control and Surveillance Facility	Selcal	Selective Calling
		SITOR-A	Simplex teleprinting over radio Mode A
FAF	French Air Force		
Fax	Facsimile	SITOR-B	Simplex teleprinting over radio Mode B
GAF	German Air Force		
GHFS	Global High Frequency System	UN	United Nations
		UNHCR	Presumably United Nations agency
HF	High Frequency		
IAF	Italian Air Force	Unid	Unidentified
ID	Identification	USB	Upper Side Band
ISB	Independent Side Band	USAF	United States Air Force
KNCA	Korean Central News Agency (North Korea)	USCG	United States Coast Guard
LDOC	Long Distance Operational Control	USCGC	United States Coast Guard Cutter
LSB	Lower Side Band	USS	United States Ship
MARS	Military Affiliate Radio System	VOA	Voice of America

All frequencies in kilohertz (kHz), all times in UTC. All voice transmissions in English unless otherwise noted.

1704.0 OXZ-Lyngby Radio, Denmark, with USB navigational warnings at 2143. (Ary Boender-Netherlands)

1713.0 PCH-Schevenigen Radio with weather broadcast in USB at 2145. (Boender-Netherlands)

2670.0 USCG Woods Hole, MA, and Charleston working SAR mission at 0705 in USB. (Bill Fernandez-MA)

2749.0 VCO-CCG Sydney with USB weather broadcast at 0525. (Fernandez-MA)

2899.0 Shanwick Aero working Reach 60023 in USB. (Fernandez-MA)

3046.0 Unid stations, KFM de ZBV K in CW at 0919.(Jack Dix-Yonkers, NY)

3413.0 San Francisco/Honolulu aero working various aircraft at 1215 in USB. (Herbert Newberry-Mansfield, GA)

4014.7 5ST-Antananarivo Air, Madagascar, with ARQ-E3 idler at 0248. (Robert Hall-Capetown, RSA)

4022.5 3BZ-Plaisance Air, Mauritius, with ARQ-E3 idler at 0255. (Hall-RSA)

4227.0 IGJ42-Unid Italian Naval with V CW marker at 2300. (Dix-NY)

4373.0 FACSFAC Virginia Capes (Giant Killer) working Q9L and 8KW (Aircraft) at 0546 in USB. (Fernandez-MA)

4426.0 USCGC Alert working NMF-COMSTA Boston about arrival in USB at 0110. Ship on 4134. (*4 MHz SCN channel-Larry*) (Ed Rausch-Cedar Grove, NJ)

4751.5 Crazy Weed Alpha working Romeo, Missionary and Brother 1 concerning a power failure at their QTH. Advised all stations they had only voice comms, no secure comms in USB at 0500. (Rausch-NJ)

4825.0 Navy MARS Region 4 training net in USB at 2335. (Rausch-NJ)

4835.0 Ship yard control working USS Constellation concerning what supplies would be on helo enroute in USB at 0035. (Rausch-NJ) *Interesting Ed, I have no listing for this one; looks like a new Navy channel-Larry.*

4880.0 Mossad number station with 5-letter groups in AM at 0401. (Fernandez-MA)

4890.0 Female working several fishing boats off Nova Scotia with position reports and quantity of fish caught in USB at 1045. (Rausch-NJ)

5000.0 WWV-Time Station Ft. Collins, CO USA heard here in AM at 1429. Also caught WWVH, VNG, BPM and JJY all in here mixing it up. (Tom Roach-San Jose, CA) *Welcome back to the column Tom, glad you are back active-Larry.*

5300.0 Czech female 5-digit number station in AM at 0519. (Fernandez-MA)

5390.0 CGD206-Canadian Bell Bush R/T service with USB traffic in English and French. (Rausch-NJ)

5437.0 Mossad number station with 5-letter groups at 0408 in AM. (Fernandez-MA)

5541.0 RG810, RG811 and RG861 working Varig LDOC in Rio de Janeiro and Manaus at 0522 in USB. (Arsenio Fornaro-Brooklyn, NY)

5550.0 New York radio working unid aircraft in USB at 0617. (Newberry-GA)

5553.0 Varig Belem/Brasilia working this frequency in USB at 0537. (Fornaro-NY)

5643.0 Nandi Aero, Fiji, working aircraft reporting a missile in USB at 1345. Nandi asked pilot to repeat the message concerning a missile going overhead. Not sure if this was a US shot from Vandenberg headed for Kwajalein or what? (Roach-CA) *Great log Tom-Larry.*

5692.0 Mossad SYN2 number station in AM at 2131. (Fernandez-MA)

5700.0 Male and female in German two-way conversation at 2120. (Roger-Cape Cod)

5732.0 German female 3/2-digit number station in AM at 0412.(Fernandez-MA)

5757.0 Army MARS net at 0248 in USB with AAA4TN net control. (Russ Hill-Oak Park, MI)

5807.0 ZXLF-Auckland Meteo, New Zealand, with CW marker at 0921. (Newberry-GA)

5910.0 Scallop fisherman off Long Island with X-rated chit chat in USB at 1230. (Rausch-NJ

6288.0 IGJ43-Unid Italian Naval with V CW marker at 2350. (Dix-NY)

6320.5 VIS63-Sydney Radio, Australia, with CW marker at 1427. (Roach-CA)

6369.0 KLC-Galveston Radio, TX, with CQ CW marker at 1355. (Roach-CA)

6389.6 WNU-Slidell Radio, LA, with CW marker at 1413. (Roach-CA)

6410.7 KLB-Seattle radio, WA, with traffic list in CW at 0632. (Newberry-GA)

6416.0 WLO-Mobile radio, AL, with high seas forecast in CW at 1316. (Newberry-GA)

6462.0 FUM-French Naval Papette, Tahiti, with V CW marker at 1420.(Roach-CA)

6467.0 JCS-Chosi Radio, Japan, with CQ CW marker at 1412. (Roach-CA)

6475.0 4UY23-UNHCR Zagreb with SITOR-A transmissions at 0715. Others noted here with tactical location indicators include: HCYS-UNHCR Sarajevo; HCYT-UNHCR Split; HCYV-UNHCR Vitez?; and HCYZ-UNHCR Zagreb all mentioned frequently. Mostly administrative, directions, and request type messages. (Charly-Europe)

6491.5 JOS-Nagasaki Radio, Japan, with CW marker at 1350. (Roach-CA)

6493.0 VAI-Canadian Coast Guard, Vancouver, BC, Canada, with CQ CW marker at 1356. (Roach-CA)

6496.4 FJP6-Noumea Radio, New Caledonia, with CQ CW marker at 0934. (Roach-CA) *Nice catch, haven't seen that one listed before on that freq-Larry.*

6510.0 WAH-Virgin Island Radio USB weather broadcast at 0220.(Hill-MI)

6673.0 San Francisco Aero working Reach 60021 in USB at 0439. (Jeff Haverlah-Humble, TX)

6693.0 CANFORCE St.John, NF, Canada, with radio check in USB at 0243(Hill-MI)

6738.0 Old Salt Center working Offutt in USB at 0420. (Haverlah-TX)

6828.5 Unid station sending fax weather chart of Africa and Europe at 0258. (Bob Pettengill-Blanchard, OK) *Dunno either, Bob-Larry.*

6853.0 German female 3/2-digit number station 'PB' in AM at 0400. (John and Gabrielle Maky-Grass Valley, CA)

6873.0 VOA feeder Greenville, NC, with USB English transmission at 0644. (Newberry-GA)

7198.0 Mossad number station at 0618 in AM. (Fernandez-MA)

7415.0 English female 5-digit number station in AM at 0510. Numbers QRMing a pirate broadcaster (WKIK I believe).(Tom Mazanec-Maple Heights, OH) Noted same at 0500 to 0530. (Rausch-NJ)

7628.0 Spanish female 5-digit number station in AM 0016. (Dix-NY)

7763.5 3BZ-Plaisance Air, Mauritius, with ARQ-E3 idler at 0350. (Hall-RSA)

7846.0 Spanish female 5-digit number station in AM at 0620. (Fernandez-MA)

7902.0 RFFA-French Forces Paris with ARQ-E3 idling at 0348. (Hall-RSA)

8417.0 WNU-Slidell Radio, LA, with selcal check plus CW at 1340. (Newberry-GA)

8449.0 SAA-Karlskrona Radio, Sweden, with CW traffic list at 2150. (Dix-NY)

8509.0 RFFX-French Forces Versailles with ARQ-E3 idler at 0341. (Hall-RSA)

8512.8 VHI-Naval Radio Darwin, NT, Australia, with CW V marker at 0903. (Newberry-GA)

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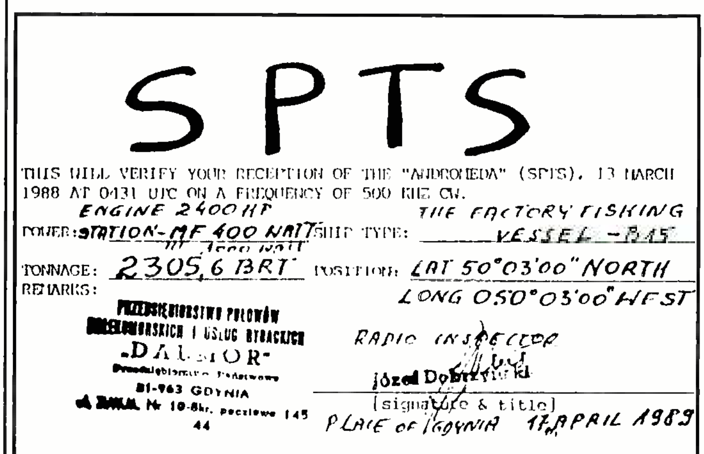
8542.0 Spanish female 5-digit number station in AM at 1041. (Dix-NY)
8558.4 KFS-San Francisco Radio, CA, with CW weather bulletin at 0358. (Newberry-GA)
8606.0 7J working 7Z in USB at 0020. (Dix-NY)
8625.0 FUM-French Naval, Papeete, Tahiti, with V CW Marker at 0906. (Newberry-GA)
8636.0 VNG-Sydney Radio with time signals at 0911 in AM. (Newberry-GA)
8680.0 WSC-Tukerton Radio, NJ, with CQ CW marker at 1406. (Newberry-GA)
8846.0 Various aircraft working New York Radio starting at 2228 in USB. (Boender-Netherlands)
8855.0 Piarco Aero working Paramaribo Aero in USB at 2224. (Robin Hood)
8891.0 Various aircraft working Shanwick and Iceland in USB starting at 1310. (Boender-Netherlands)
8906.0 Various aircraft working Santa Maria and New York in USB starting at 2220. (Boender-Netherlands)
8921.0 British Airways LDOC-London working unid aircraft at 0213. (Fernandez-MA)
8924.0 KLM524 working KLM LDOC Amsterdam at 0205 in USB. RG841/761 working Varig LDOC Rio de Janeiro in USB at 0038. (Fornaro-NY)
8930.0 Delta 83 and Columbus 5568 working Stockholm LDOC at 1420 in USB. (Boender-Netherlands)
8939.0 RG300 working Varig LDOC Belem in USB at 0417. (Fornaro-NY)
9006.0 Nationair 765 working Trenton Military at 0525 in USB.(Haverlah-TX)
9017.0 USAF GHFS MacDill working Livewire at 0258 in USB. (Haverlah-TX)
9040.0 German female 3/2-digit number station 'NU' in AM at 1530.(Maky-CA)
9145.0 RIW-Khiva Naval Radio, Uzbeck, with DE CW marker at 2233. (Dix-NY)
9153.0 Spanish female 5-digit number station in AM at 0536. (Fernandez-MA)
9244.0 Unid military tactical station LV working other in USB at 0200. (Fernandez-MA)
9355.0 Spanish male letter/number could not ID - went into a two way comms - mix of English and Spanish phonetics and numbers in LSB at 0058. (Pettengill-OK)
9387.5 FDC-FAF Metz with CW marker at 1802. (Robin Hood)
9950.0 USS San Diego and Sea Sub Charleston doing equipment checks on USB/LSB/ISB voice (San Diego had one male on each sideband) and RTTY at 1936. Charleston sounded non-military and reporting signals in technical terms while other station comms sounded military in nature. San Diego then instructed to send Quick Brown fox RTTY test. (Fernandez-MA) *Interesting, wonder what this is all about, anybody know-Larry?*
10051.0 New York VOLMET heard at various times in USB. (SH Hosegood-UK)
10066.0 Various aircraft working Calcutta in USB at 1722. (Boender-Netherlands)
10231.6 LYNX-Unid with SITOR idling and CW ID at 0125. (Dix-NY) *MFA Lagos Nigera Jack-Larry.*
11176.0 USAF GHFS Ascension being called by '171'. Ascension questioned ID but aircraft did not respond. Heard a couple minutes later on 11179.0. At 0455 in USB. (Fernandez-MA) Blue Angel #9 with phone patch through USAF GHFS McClellan to Blue Angel Base in USB at 2100. (Paul Roales-Tulsa, OK) *Welcome Paul, congratulations on your Blue Angel QSL-Larry.*
11179.0 Agar 12 working Andrews Global in USB at 1759. (Haverlah-TX)
11209.0 Air Force 2 working Andrews in USB at 1732. (Haverlah-TX)
11218.0 GAF WF70 calling DHM91-GAF Munster at 1040 in USB. (Boender-Netherlands)
11234.0 RAF-Ascension Island (Haven) working Ascot 3578 in USB at 0450. (Fernandez-MA) RAF Corlu, Turkey Flight watch working ALF 6108 (IAF) at 0812 in USB. Also caught GFW-RAF Cyprus Flight watch working 6108. (Boender-Netherlands)
11236.0 Appears to be an IAF frequency with many 'ALF ####' aircraft callsigns at various times in USB working C46. (Boender-Netherlands)
11265.0 CANFORCE 1629 working Trenton Military in USB at 1641. (Haverlah-TX)
11309.0 New York Aero working various aircraft at 1534 in USB. (Hill-MI)
11336.0 Gander aero working U4255 in USB at 1538. (Russ-MI)
11345.0 Various aircraft working Stockholm LDOC at 1325 in USB. (Boender-Netherlands)
12175.0 HMF42-KCNA Pyongyang 50 baud RTTY English news at 2215. (Dix-NY)
12238.0 English female 3/2-digit number station in AM at 1801. (Fernandez-MA)
12632.0 WOO-Ocean Gate Radio, NJ, with SITOR-B weather broadcast at 1026. (Robin Hood)
12693.0 ZRQ-Cape Naval radio, South Africa, with news summary in 75 baud RTTY at 2022. (Robin Hood)
12695.0 VHK12-Canberra Naval Radio, Australia, in CW at 2202 calling VKMY. (Dix-NY)
12718.5 NMN-COMSTA Portsmouth, VA, with CQ CW marker at 1438. (Newberry-GA)
13201.0 USAF GHFS Thule, Greenland, in USB at 1811 passing weather data then Navy 5743 calling McClellan. (Fernandez-MA)
13204.0 Banger working L5Y, Cherrio, Rammer, Jersey, Candle, Altoona, Codfish, Dignity, Gambit (on move with an immediate) in USB at 1945. Tracking net apparently tracking motorized ground targets. (Haverlah-TX)
13207.0 Victor 82 working Uniform 41 in USB at 2122. Also Sentry 63 working Dragnet Uniform in USB at 1649. (Haverlah-TX)
13244.0 USAF/UN-Western Sahara with morale calls to stateside in USB at 2325. (Fernandez-MA) *Interesting, wonder who this was-Larry?* LZ241 calling Mainsail, no response in USB at 2117. (Haverlah-TX)
13248.0 German Navy 6103/GAF 307 calling DHM91 no response so two aircraft talked to each other at 1707 in USB. (Haverlah-TX)
13270.0 New York VOLMET heard at various times in USB. (Hosegood-UK)
13285.0 American Airlines flight 137 with a phone patch to Ft. Worth via Rainbow Radio concerning a female passenger who grabbed some liquor bottles from the flight attendant and went and downed them in the lavoratory. When she came out, she became combative with the crew and passengers. Captain requested permission to divert to Minneapolis to get her off the plane. In USB at 1635. (Maky-CA) *Great log John and Gabrielle-Larry.*
13533.0 Mossad number station in AM at 1818. (Fernandez-MA)
13597.0 IMB56-Rome Meteo, Italy, with fax temperature chart at 2005.(Dix-NY)
14526.0 VOA Feeder Dixon, CA, in ISB at 1822. USB-Russian, LSB-English. (Fernandez-MA)
14585.0 Border Patrol KAK880-El Paso, TX, working KAK780-Blaine, WA and KAK920-Del Rio, TX, at 1229 in USB. (Todd Koch-Bloomington, IL)
14686.0 DEA/Customs/Navy discussing the siezure of a dive boat containing 700 kilos of cocaine in USB at 1450. (Steve Gill-Garberville-CA) *Nice haul; couldn't happen to nicer folks for sure-Larry.*
14945.0 German female 3/2-digit number station 'KW' in AM at 1430. Also on 16414 if not on this one. (Maky-CA)
15015.0 Nighthawk calling Ft. Campbell saying they were D86N aircraft to meet C-130 in USB. (Gill-CA)
15867.0 Omaha 09 calling Big Time at 1545 in USB. (Koch-IL)
16025.0 BAF9-Beijing Meteo, China, with fax chart at 2336. (Dix-NY)
16310.0 Spanish female 4-digit number station in AM at 1839. (Fernandez-MA)
16821.5 OXZ-Lyngby Radio, Denmark, with traffic list and relaying traffic list for Sydney, Perth and Mobile using SITOR-B at 1132. (Robin Hood) *Don't think I have seen that reported before-Larry.*
17013.0 5BA-Cyprus Radio with CQ CW marker at 1454. (Dix-NY)
18594.0 Moray and Salty Dog trying secure key 8, then 7 after 8 was found to be non-functional at 1623 in USB. (Gill-CA)
20005.0 CLP1-MFA Havana with Spanish plain language message using 75 baud RTTY at 1423. (Robin Hood)
22291.0 PCZE-M/V Bakengracht working Schevenigen Radio with SITOR-A at 1121. (Robin Hood)
22422.0 MTO-Royal Navy London with 75 baud RTTY test tape at 1135. (Robin Hood)


SPTS

THIS WILL VERIFY YOUR RECEPTION OF THE "ANDROMEDA" (SPTS). 13 MARCH 1988 AT 0431 UTC ON A FREQUENCY OF 500 KHZ CW.

POWER: STATION-MF 400 WATT / ENGINE 2400 HP SHIP TYPE: THE FACTORY FISHING VESSEL - BAS

TONNAGE: 2305,6 BRT POSITION: LAT 50°03'00" NORTH LONG 050°03'00" WEST

REMARKS:

DALMOR
81-963 GDYNIA

RADIO INSPECTOR
Józef Do...
(signature & title)

PLACE OF GDYNIA 17 APRIL 1989

After logging your utility catches, send your loggings to Utility World c/o Monitoring Times, P.O. Box 98, Brasstown, NC 28902-0098. Be sure to send a reception report to the station heard so you can receive a QSL like Patrick O'Connor of Hinsdale, NH, did from the "Andromeda."

www.americanradiohistory.com

The Scanning Report

Bob Kay
c/o MT, P.O. Box 98
Brasstown, NC 28902

Aircraft Radio

Civilian aircraft communications can be very exciting. Scanner buffs, however, will argue that the civilian air band (118.0 to 136.975 MHz) offers very little in the way of entertainment or excitement. Monitor your local airport frequencies for ten minutes and you'll probably agree that the civilian air band lacks the ability to captivate the listener.

Part of the problem is our inability to actually see the action. Anyone who has taken a scanner radio to an airport, will tell you that it's an exciting adventure. The problem, then, could be solved if we could only see the runway from our listening post.

Sound impossible? It's not. You can build a working scale model of your local airport. You'll need two 12" squares of clear, plexiglass. Use a dry erase marker (available from air supply stores) to draw the runway configuration on one of the squares. The second clear plastic square will be mounted approximately four inches above the first square that contains the runway (Figure #1). To support the upper section, use clear plastic rods or wooden dowel sticks. The top section will represent the sky above the airport. Aircraft that are approaching or departing the airport are displayed on this square.

The bottom square is used to display the aircraft that are on the ground. Miniature replicas of aircraft can be purchased from a local hobby shop or toy store. Position the models to represent the location of the aircraft that are monitored on your scanner radio. As planes land, taxi, depart or enter into a holding pattern, you reflect these changes by moving the planes on your model. Aircraft scanning in this manner is intriguing, interesting and very exciting.

With a little imagination, you can modify your scale model to include working landing lights, compass headings, wind direction and passenger terminal areas. If there's an airport shuttle service operating between the airport and local hotels, you can map out the route and track the shuttle by monitoring its radio transmissions. The amount of fun that you can have is limited only by your imagination.

In addition to building a model of the runway, you should also realize that there's more to airport monitoring than listening to the arrival and departure frequencies. One of the most interesting areas of aircraft monitoring are the "write-up" or repair frequencies: 129.300, 129.700, 130.250, 130.600, 130.650, 130.850, 131.150, 131.425, 132.000. Pilots use the write-up frequencies to report mechanical problems to ground crews. You'll probably be surprised (and dismayed) by the number and type of problems that routinely plague commercial aircraft.

Chit-chat between pilots can usually be heard on 122.850, 122.900, 122.925, and 123.100 MHz. Flight schools operate on 123.500 and helicopters will frequently operate between 122.975 and 123.075. If the Goodyear Blimp is nearby, punch in the following: 123.050, 151.625, 465.9125, 465.9375, 465.9625 MHz.

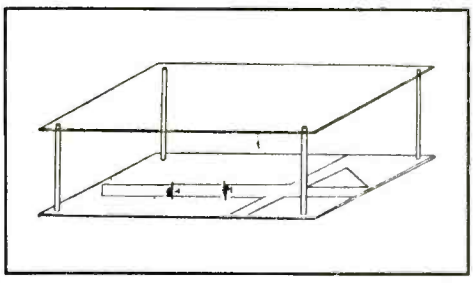
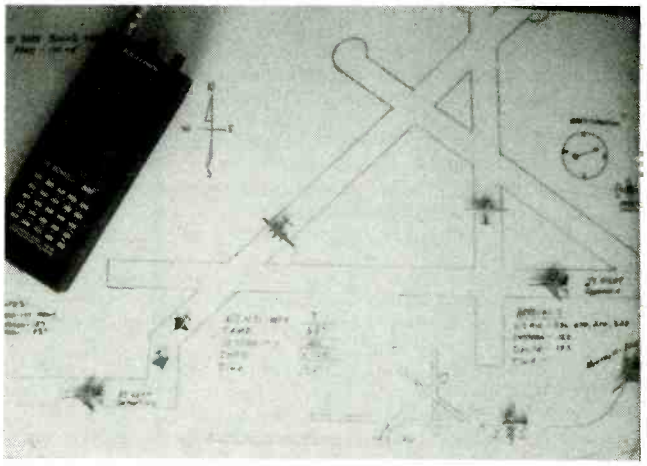


Figure 1

Finally, ground support vehicles can be monitored on 121.600, 121.625, 121.650, 121.675, 121.700, 121.725, 121.750, 121.775, 121.800, 121.825, 121.850, 121.875, 121.900, 460.675, 460.700, 460.725, 460.750, 460.775, 460.800, 460.825, 460.850, 460.875.



Don't expect to hear emergency communications on 121.500 MHz. Although it is the assigned air emergency frequency, you probably won't hear commercial airliners using this frequency. During air emergencies, commercial pilots are more likely to use an assigned airline frequency. To discover the company frequencies that are used in your area, search between 122.00 and 124.00 MHz.

You may also find some other surprises: the Department of Energy has utilized two way communications in the civilian aircraft band; there have been reports of the CIA using FM ground communications near the upper edge of the 225-400 MHz military aircraft band as well. Another interesting inhabitant of the AM aircraft band is the occasional air-to-ground transmission of a federal law enforcement surveillance aircraft. In most situations, the transmissions will be a combination of conventional VHF-FM 162-174 MHz assignments and 118-136 MHz AM traffic. If you're thinking that these types of transmissions violate the U.S. band plan agreement, you're absolutely correct. It does however, help camouflage sensitive communications.

Nearly every moderately priced scanner radio can monitor the civilian air band. If you're within 50 miles of a large airport, you probably already have a scanner radio that can monitor aircraft communications. Best of all, you can build a model of your airport and use your scanner radio to follow the action from within your listening post. Flying, uh, scanning, was never so much fun!

Treasure Hunt

Hurry! This is your last chance to win a brand new 35mm camera from Minolta. The "Maxxum 3xi" takes the guess work out of using a 35mm camera. All you do is load the film, point and shoot. If you're an experienced camera buff, the Maxxum 3xi can be also be manually adjusted to add a touch of creativity.

Need a lens? Minolta has also included a 50mm, 1.7, autofocus lens! The lens contains a micro computer that continuously feeds information to the main computer in the camera. In the autofocus mode, the camera will automatically adjust the lens and select the correct exposure settings. All you do is point the camera, push a button, and enjoy professional quality pictures.

Loading the film couldn't be easier. Open the back, drop in the film and close the case. After your last picture, the camera rewinds the film and the data panel reminds you to install a new roll. Ready to take the best pictures of your life? If so, here are the clues:

www.americanradiohistory.com

1. The weight of the Maximum 3xi (without lens and battery is 420g. How much is that in ounces?
2. The Maximum 3xi uses a "2CR5" lithium battery. How many volts are provided by the 2CR5?
3. A neck strap is included with the Maximum 3xi. True or False?
4. What award winning photographer took the picture on the front cover of the November 1992 edition of *Monitoring Times*?
5. What is a photometer?

You can check out the Maximum 3xi by visiting your local camera shop or department store. In addition to the features that we've already mentioned, the 3xi also contains a built-in flash, a self-timer, and many additional features that will help you to take quality photographs.

Frequency Exchange

Please fasten your seat belts and observe the no smoking sign. As we wait for our departure clearance, here are the frequencies for the ***Detroit, Michigan, Airport.***

118.400	Metro tower	124.550	Metro ATIS info
119.450	Ground Control	125.150	Metro approach
120.000	Willow Run tower	128.750	Metro approach
120.650	Metro approach	134.500	Windsor Ontario Airport info
121.800	Metro ground control		
124.050	Metro approach	135.000	Metro tower
124.250	Metro approach		

As we pull away from the passenger terminal, we can't forget to thank Bill Brown for supplying the above frequencies. Our next stop will be ***Sonoma County, California.*** Barry Anderson lives nearby and here are his favorite frequencies:

42.18	California Hwy Patrol	154.025	Petaluma Fire
42.34	" "	154.145	Santa Rosa Fire
42.66	" " mobile units	154.175	Sonoma Co. fire
42.88	" " base	154.280	Sonoma Co. fire
44.72	State Parks	154.310	Sonoma Co. fire
45.48	Parks Department	453.400	Sonoma Co. Sheriff
45.76	Roads Department	453.550	Sonoma Co. Sheriff
151.310	Forest fire air tankers	453.575	Sonoma Co. Sheriff
151.415	Fish & game	453.725	Sonoma Co. Sheriff
151.460	Forestry	460.050	Santa Rosa Police
151.715	Santa Rosa Jr. College	460.375	Santa Rosa Police

Since we're already in California, let's fly over the home of John Holtz. John has provided several pages of frequencies for ***Southern California.***

126.550	Edwards Air Force Base (EAFB) Advisories	286.800	EAFB Flight test prim.
		314.600	Goldstone tracking
133.650	EAFB Departure	315.900	EAFB Range control
138.250	EAFB high speed photography	318.100	EAFB control tower
		347.100	Vandenberg AFB test range
148.050	EAFB Security police		
148.4750	EAFB Range control	354.400	EAFB Air refuel
148.6750	EAFB Security Police	390.100	EAFB Ground control
148.8425	EAFB Photo lab	417.750	EAFB Command post
165.6125	EAFB Convoy control		

John's complete, three page list contains frequencies between 116.400 and 448.500 megahertz. To receive the entire list, send $2.00 dollars with an SASE to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

As we fly over the coastal areas of ***Vancouver, Washington***, Rick Oppegaard has invited us to monitor a few of his favorite frequencies.

GUIDE TO UTILITY STATIONS 1993

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The completely revised new edition includes a frequency list with 19549 frequencies, and a call sign list with 3590 call signs. Up-to-date schedules of FAX meteo stations and RTTY press services are listed both alphabetically and chronologically. Abbreviations, addresses, codes, definitions, explanations, frequency band plans, international regulations, modulation types, NAVTEX schedules, Q and Z codes, station classes, telex codes, etc. - this reference book lists everything. Thus, it is the ideal addition to the World Radio TV Handbook for the "special" stations on SW!

Further publications available are ***Air and Meteo Code Manual, Guide to Facsimile Stations*** and ***Radioteletype Code Manual*** (12th editions). We have published our international radio books for 23 years. They are in daily use with equipment manufacturers, monitoring services, radio amateurs, shortwave listeners and telecommunication administrations worldwide. Please ask for our free catalogue, including recommendations from all over the world. For recent reviews of our books by Bob Grove see *MT* 2/92, 3/92, and 9/92. All manuals are publisned in the handy 17 × 24 cm format, and of course written in English.

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122.850	Pilot chit-chat	255.400	Flight Service Stations
122.900	Pilot chit-chat	282.800	Search and Rescue
122.925	Pilot chit-chat	340.200	Naval control towers
123.050	Goodyear Blimp	372.200	Pilot to dispatch
123.100	Pilot chit-chat	381.800	Primary air support
123.500	Flight schools	407.850	Air Force One
151.625	Goodyear Blimp	415.700	Air Force One
236.600	Military Control Towers	465.9125	Goodyear Blimp
		465.9375	Goodyear Blimp
237.900	Coast Guard Aircraft	465.9625	Goodyear Blimp

Fasten your belts again. We are about to land in ***Grand Forks, North Dakota***.

118.00	Grand Forks approach	151.010	Grand Forks Hwy repair
118.40	Grand Forks Tower	151.025	State hwy maintenance
120.550	Grand Forks Tower	151.220	Anoka County sheriff
124.900	Red River Tower	151.985	Northwestern Bell
131.925	Federal Express	152.270	Red & White Cab
132.300	Grand Forks Departure	152.420	Vilandre Heating Fuel
138.325	Grand Forks Air Force Base (GFAFB) paging	153.125	Red River Cement
		153.620	Minnkota Power Co.
138.500	GFAB Ace net	155.130	Grand Forks Police
148.075	GFAB Command net	155.565	Grand Forks Police
148.450	GFAB Aircraft maint.	155.685	Grand Forks Police
148.475	GFAB Aircraft maint.	155.790	Grand Forks Police
148.500	GFAB Missile chann. #1	450.3875	Metro Traffic Control
150.350	GFAB Alert Pad Security	450.800	Metro Traffic Control
		463.325	First Bank System Security
150.815	Demers Interstate Amoco		
150.935	AAA Road repair	463.600	Columbia Mall Security
150.995	Grand Forks Hwy repair		

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The Grand Forks frequencies were provided by Greg Putrich. Greg's complete list contains six pages of frequencies. If you want the list, here's the deal. I'll trade Greg's list for a #10 SASE and six pages of your favorite frequencies. If you don't have six pages to trade, send a #10 SASE with $3.00 dollars to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

Are you tired of flying? If so, you'll be glad to know that our final stop is ***New York City***. Gary Symbouras lives in Queens, and here is his list of transit frequencies:

30.90	Manhattan 146th Street Bus Depot	151.34	Manhattan/Bronx Surface Authority-Mobile
31.02	Manhattan 132nd Street Bus Depot	155.925	Hudson Pier Bus Depot
31.06	Jamaica Bus Depot	158.775	54th Street Bus Depot
31.08	Manhattan 100th Street Bus Depot	160.905	54th Street Bus Depot/Base
31.12	Manhattan 126th Street Bus Depot	160.965	Jamaica Bus Depot/Base
44.56	Manhattan/Bronx Surface Authority-Base	161.175	Flushing Bus Depot
151.145	Jamaica Bus Depot/Mobile	470.4125	Queens Village Bus Depot/Voice
		470.4625	Queens Village Bus Depot/Data

To invite the Frequency Exchange to your town, send a list of your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

Air Books

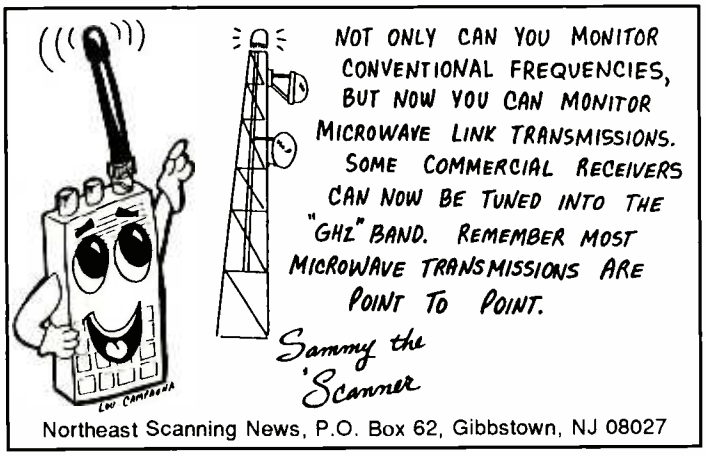
Aircraft monitors will enjoy Bob Bell's new book, *Listening in to Aircraft Communications*. Although the book is primarily written for Australian listeners, it contains a wealth of information that can be utilized on a global scale. There's a comprehensive list of military and civilian frequencies for airports around the world.

Listening in to Aircraft Communications also contains a glossary of air traffic terms, company frequencies, Air Force call signs, transponder and squawk code explanations and a section devoted to aircraft satellite communications.

The book is available from Air Band Communications, P.O. Box 16, George Hall 2198 NSW Australia. The price is $24.95. See the "What's New" column for new editions of more aeronautical reference books.

Tornado Scanning

On November 22, 1992, Robert Randall Jr., of Saluda County, South Carolina, was using his scanner radio to track a tornado. As he monitored the damage reports from his local police and utility company, he suddenly realized that the tornado was heading in his direction.



Northeast Scanning News, P.O. Box 62, Gibbstown, NJ 08027

Robert's home wasn't damaged. But his scanner provided him with ample warning. Robert was also amazed by the amount of information that wasn't covered by his local news stations. According to Robert, the local news only provided about one tenth of the information that was monitored on his scanner radio. Here are the frequencies that Robert monitored:

Saluda County Sheriff	453.30
Edgefield County Sheriff	453.350
Edgefield County Fire	154.415
Saluda Fire Department	45.44
Civil Defense	45.08
Saluda County Ambulance	155.16

Rescue workers using CB channel #9.

Robert has been a subscriber for approximately one year. He credits *Monitoring Times* with helping him to improve his monitoring skills.

The Pink Bandit

A motel clerk helped the Memphis, Tennessee, police to catch a man wanted for armed robbery. The motel clerk was listening to his scanner radio when he heard that the local police were chasing a man wearing a pink sweat shirt and red bandanna. A few minutes later, a man matching the description walked into the hotel room and asked for a room.

When the individual paid for the room with a large wad of cash taken from his pocket, the clerk called police. The armed bandit was arrested in his hotel room without incident. (News clipping from Steve Misemer)

Caller ID

"Help me, I've been stabbed," she cried into the telephone. But the fire department official who took the call thought it was a joke. Five hours later, after replaying the tape to decipher the address, department officials finally responded. But it was too late—Kathleen Dempsey died of a stab wound to the back.

The incident, which occurred in Lexington, Massachusetts, has gained national attention. The official who took the call said the victim gave an address that was garbled and hard to understand. As a result, the taped recording of the call had to be replayed until the address was deciphered.

As you probably can guess, people have been pointing their fingers and accusing a variety of individuals. And while there does seem to be a measure of irresponsibility on behalf of the dispatcher, that's not the only problem.

The town of Lexington does not have a statewide 911 calling system. Nor does the town have "caller ID." As most of you know, caller ID automatically records and prints the caller's address. If the town of Lexington had one or both of these services, Kathleen Dempsey would probably have survived.

Could a statewide 911 system have saved the life of Kathleen Dempsey? And what about Caller ID? Some people claim that caller ID will stop citizens from calling in anonymous tips. What do you think? Send your comments to the Scanning Report, P.O. Box 98, Brasstown, NC 28902.

Scanner Ban

The city of Livonia, Michigan, has adopted a new ordinance that bans police scanners from vehicles. Violators risk up to 90 days in jail and a $500 dollar fine.

The city ordinance does not exempt ham radio operators. And news reporters, who want to scan as they drive, must apply for a permit. Deputy Police Chief Bill Cororan said the law's primary intent was to curb the use of portable scanner radios by fleeing felons. (News clipping from Jerome Ostalecki).

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(* Excludes Cellular)

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BEARCAT BC140	94.99	(7.00)
BEARCAT BC142XL	94.99	(7.00)
BEARCAT BC147XL	99.99	(7.00)
BEARCAT BC200XLT	279.99	(7.00)
BEARCAT BC205XLT	239.99	(8.00)
BEARCAT BC310A	85.99	(7.00)
BEARCAT BC330A	109.99	(7.00)
BEARCAT BC400XLT	99.99	(7.00)
BEARCAT BC560XLT	109.99	(7.00)
BEARCAT BC760XLT	269.99	(7.00)
BEARCAT BC800XLT	249.99	(8.00)
BEARCAT BC855XLT	186.99	(8.00)
BEARCAT BC950XLT	249.99	(7.00)
COBRA SR901	74.99	(6.00)

MIDLAND CB Radios	*In Stock*
COBRA CB Radios	*In Stock*
UNIDEN CB Radios	*In Stock*
Two-Way Radio Batteries	*In Stock*
Scanner Antennas	*In Stock*
Power Supplies	*In Stock*

RELM RH606B	414.99	(9.00)
RELM UC202 (2 or more)	129.99	(6.00)

SCANNER ACCESSORIES

BCAD70	14.99	BP4	24.99
BCAD100	14.99	BP55	16.99
BCAD140	14.99	MA917	24.99
BCAD 580	16.99	MA518	14.99
BC003	7.99	ESP25	16.99
BC002	59.99	GRE8002	79.99
PS001	12.99	GRE-HH	54.99
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GEnie T.AREY1

The "Confirmed" Monitor

Throughout human history, everywhere in the world, people who study other people have learned some basic truths about H. Sapiens. We all like to collect things and we all like to keep score of things. These primal desires are at the very root of the radio monitoring hobby.

Listening to radio signals, whether down the block or around the world, becomes more meaningful when you keep track of what you have heard, and LOGGING the many signals we seek will usually lead to a desire to CONFIRM the loggings. This is most often done by seeking some form of verification from the originating station.

Yes folks, even in the hobby world there is paperwork! But it need not be drudgery. Once you get the hang of things, it can be as much fun as listening.

Setting Up a Log

Your log is a permanent record of your listening experiences and accomplishments. But it serves more functions than simply giving you something to look back over twenty-five years from now. A log book is the repository of all the data you will need to go about the process of seeking confirmation of what you have heard. Consequently, some very specific information needs to hit the pages of your log book. More on this later.

Also, a well kept log gives a monitor a notion of his or her own listening patterns. Very few of us are both rich *and* single. Family responsibilities and the need to go out into the world to make a living make it impossible for us to listen all the time. Even if you were independently wealthy, you have to sleep sometime!

A log, coupled with the information from columns such as "Shortwave Guide" and "Utility World," will help you get a handle on your listening needs. You have to be listening when the stations are transmitting. If your log indicates you do all of your listening on weekends and Radio Freedonia only broadcasts on Tuesdays, you are going to have to rearrange your life a bit if you want to make the catch.

What Does a Log Look Like?

A log book is a matter of personal style. It does not need to be very fancy. I know of one world class amateur radio DXer who has kept his records on common stenographer's tablets for over twenty years. Commercial log books are available from many of the advertisers in the pages of *MT*. My personal preference, over the years, has been to design my own log sheets, making copies via any nearby photocopy machine. As computers continue to permeate the radio hobby world, it is also possible to use any commercial database management program to make a nifty electronic "paperless" log.

What you choose to use as a log book is secondary to the information you collect in it. Whatever you choose, use something that is sturdy enough to stand up over the years. Also, make sure you make your entries LARGE. Your old eyes will thank you when you try to show your log to your great grandchildren.

Assuming I have now convinced you of the need to keep a log, we can take a look at the kind of basic information you will want to keep track of. As you progress in the monitoring hobby, you will probably come up with additional information you will want to keep in your log.

Time and Date

If you are a shortwave listener, you will want to keep track of your loggings based upon UTC (Coordinated Universal Time) time and date. UTC, also known as GMT (Greenwich Mean Time), is the time standard commonly recognized around the radio world. I also log local time and date. If you are a scanner monitor, you may want to track time using a 24-hour format if your local public services use this format over the air. Don't forget to log the time you began listening and stopped listening to a station.

Frequency

This might sound a bit obvious, but it can give you additional insight into a station's patterns. For example, most American pirate broadcasters hang out at 7415 kHz. Hearing a pirate operating 5 kHz lower might just give you something worth sharing with the readers of the "Outer Limits" column.

Callsign - Location

The callsign or station name is important; so is the country, state, city, or transmitter location, depending on your listening habits.

Language

Getting this right is important to seeking a verification. Also, make note of the gender of the announcer.

Signal Report

This is the information that is of interest to the station you are monitoring. Radio hobbyists have adopted a system called SINPO over the years. SINPO stands for a signal's Strength, Interference, atmospheric Noise, Propagation disturbance (fading), and Overall merit. By rating a signal from 1 to 5 (with 5 being excellent), this system should allow you to write a thorough report to a station for verification. Use the SINPO code in your log, but *not* in your report. The person who reads your letter is not likely to be a radio hobbyist and may not have the faintest notion of what SINPO means.

Program Content

Most stations want to know more than how well you enjoyed their programming. A few notes on the program content and how it appealed to you will go a long way in "greasing the wheels" that can lead to a verification.

Equipment

Many hobbyists use more than one receiver or antenna during a monitoring session. Make note of what you used to catch each station. Over the years it is fun to see just how many things you heard with each receiver you have owned.

Verification Tracking

You can use your log to keep track of the verification process. Make note of which stations you sent confirmation letters to, which ones responded and how quickly. This information is useful to your fellow listeners and can be shared in the "QSL Corner" column in *MT*. Also, if your log shows that a station hasn't responded in a reasonable period, you can try to send out another report.

Speaking of Verification

Now it's time to use the information in your log to seek confirmation of what you have heard from the transmitting stations. This is commonly called QSLing, "QSL" being a Morse code operator's abbreviation for "I am acknowledging receipt."

Sending out a verification report is a win-win situation. The station receiving the report gets an idea about its listeners and how well it is being heard. In return, the dedicated listener gets a QSL card or a letter verifying reception. QSL collections are one aspect of the radio hobby that non-hobbyists seem to enjoy. The journey to a vast QSL collection begins with a few simple rules and a little wrestling with the international postal service.

Writing a QSL Report

Always type or print your reports. Cursive writing is confusing even to fellow countryman. Include your name, full address with no abbreviations, zip-code and finish your address with The United States of America (or whatever your home country).

Next put in the date you monitored the station. Always spell out the month's name completely. 2/1/93 will be interpreted as either February first or January second depending on what country is reading your letter.

Include the name and address of the station you heard. This is not simply common letter writing practice; it is also another step in letting the reader know exactly who you heard. Many broadcasters will include their mailing address over the air. If not, addresses can be found in the

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QSL cards can be a record of the changing face of the world.

"QSL Report" column in *MT* or in common hobby books such as *The World Radio TV Handbook* and *Passport to World Band Radio.*

With the top of the letter completed, you can move on to the "meat and potatoes" information. Start with a short paragraph informing the station that you are a radio hobbyist who enjoys listening to stations from all over the world, especially those at some distance away. You can even mention a little bit about yourself (e.g., "I am an 18 year old engineering student"...).

In the second paragraph, restate the date and give the time you began to monitor the station. Always use UTC, as this is commonly respected. If you want to be sure to get the point across, use a world time chart (one can be found in any good world atlas) to include the local time at the broadcaster's location.

In the next few paragraphs, report exactly what you heard with as much detail as possible. Now you can see why you kept all of that information in your log. Pay attention to program content. Was the announcer male or female? Was the broadcast just in English or did you hear another language used? Make note of the time that programs begin and end, making special mention of station identifications, sign-ons and sign-offs.

Tell the station what you thought of their programming. Tell them what you enjoyed. Tell them if you liked the music. If you learned something new about the station or the country, let them know. Nothing can sour the QSL process faster than making the station operators feel that the only reason you listened was to get a QSL card. Also, if you disagree with a station's politics or religious perspective, keep it out of your letter. Arguing politics or religion will work against a favorable reply.

After you have reported what you heard and why you liked it, include a solid paragraph about the conditions. This is where you take into account the signal information you logged using the SINPO code. Stations especially appreciate information about any interfering signals. You may want to include a few lines indicating the receiving equipment and antennas you used as well as your local weather conditions.

Finally, after you have given the station operators information that may be of use to them, include a closing paragraph POLITELY asking for verification of your report. Don't get pushy! No station is under any obligation to write back. State what you have enclosed in terms of return postage and thank the station profusely for their time and kind consideration.

The Mail Must Go Through

Sending a letter around the world is different from sending one across town. There are pitfalls all along the pathway of the international postal system. A few tips will help to see your letter arrives at its destination.

Use common (unfancy) air mail stamps and use plain envelopes that are thick enough that the contents cannot be examined when the letter is held up to a lightbulb. This will prevent your letter from being sidetracked by some unscrupulous postal clerk.

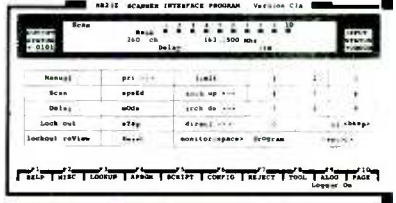
On the outside of the envelope include the complete addresses: yours and the station's. Do not use abbreviations. Spell out the full name of the countries. Avoid using improper country names. Mail sent to The Peoples Republic of China addressed as RED CHINA just gets tossed in the dust bin. Don't be offensive. The people on the other end are just as proud of their homeland as we are of ours.

You can include return postage either by using International Reply Coupons (IRCs), available from large post offices, or by enclosing mint (unused) stamps from the country you are writing to. Mint stamps can be purchased through any store catering to stamp collectors (check your yellow pages) or you can use the DXers Stamp Service, operated by William J. Plum, 12 Glen Road, Flemington, NJ 08822. An SASE will bring you a list of Bill's offerings.

Entire books have been written on the subject of QSLing. These basic hints will get you started down the road to the first fifty or so countries. Remember to be patient, because mail moving around the world can take some time. The longest period I waited for a QSL card was THREE YEARS! However, after a few months, you may want to consider sending another report.

Logging and QSLing will grow on you as you begin to respond to those primal urges to keep score and collect things. Have fun!

The HB-232
SCANNER/COMPUTER INTERFACE



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Navy Relay	260.550	294.150
Navy Relay	260.575	294.175
Navy Relay	260.600	294.200
Air Force	260.625	294.225
Air Force	260.650	294.250
Air Force	260.675	294.275
Air Force	260.700	294.300
Air Force	260.725	294.325
Air Force	260.750	294.350
Air Force	260.775	294.375
Air Force	260.800	275.400
Air Force	260.825	294.425
Air Force	269.850	294.450
BRAVO PACWEST		
Navy	261.450	295.050
Wideband	261.475	295.075
Navy Relay	261.500	295.100
Navy Relay	261.525	295.125
Navy Relay	261.550	295.150
Navy Relay	261.575	295.175
Navy Relay	261.600	295.200
Navy Relay	261.625	295.225
Navy Relay	261.650	295.250
Navy Relay	261.675	295.275
Navy Relay	261.700	295.300
Air Force	261.725	295.325
Air Force	261.750	295.350
Air Force	261.775	295.375
Air Force	261.800	295.400
Air Force	261.825	295.425
Air Force	261.850	295.450
Air Force	261.875	295.475
Air Force	261.900	295.500
Air Force	261.925	296.525
Air Force	261.950	295.550
FLTSATCOM CHARLIE		
Navy	262.050	295.650
Wideband	262.075	295.675
Navy Relay	262.100	295.700
Navy Relay	262.125	295.725
Navy Relay	262.150	295.750
Navy Relay	262.175	295.775
Navy Relay	262.200	295.800
Navy Relay	262.225	295.825
Navy Relay	262.250	295.850
Navy Relay	262.275	295.875
Navy Relay	262.300	295.900
Air Force	262.325	295.925
Air Force	262.350	295.950
Air Force	262.375	295.975
Air Force	262.400	246.000
Air Force	262.425	246.025
Air Force	262.450	246.050
Air Force	262.475	246.075
Air Force	262.500	246.100
Air Force	262.525	246.125
Air Force	262.550	246.150
FLTSATCOM DELTA		
Navy	263.550	297.150
Wideband	263.575	297.175
Navy Relay	263.600	297.200
Navy Relay	263.625	297.225
Navy Relay	263.650	297.250
Navy Relay	263.675	297.275
Navy Relay	263.700	297.300
Navy Relay	263.725	297.325
Navy Relay	263.750	297.350
Navy Relay	263.775	297.375
Navy Relay	263.800	297.400
Air Force	263.825	297.425
Air Force	263.850	297.450
Air Force	263.875	297.475
Air Force	263.900	297.500
Air Force	263.925	297.525
Air Force	263.950	297.550
Air Force	263.975	297.575
Air Force	264.000	297.600
Air Force	264.025	297.625
Air Force	264.050	297.650
FLTSATCOM ALPHA/XRAY		
Navy	250.450	249.450
Wideband (Down)	260.350	260.850
(Up)	293.950	294.450
Navy Relay	251.950	292.950
Navy Relay	253.650	294.650
Navy Relay	255.350	296.350
Navy Relay	256.950	297.950
Navy Relay	258.450	299.450
Navy Relay	265.350	306.350
Navy Relay	266.850	307.850
Navy Relay	268.250	309.250
Navy Relay	269.750	310.750
Air Force	243.945	317.045
Air Force	243.955	317.055
Air Force	243.960	317.050
Air Force	243.965	317.065
Air Force	243.970	317.070
Air Force	243.975	317.075
Air Force	243.980	317.080
Air Force	243.985	317.085
Air Force	243.990	317.090
Air Force	243.995	317.095
Air Force	244.000	317.100
Air Force	244.010	317.110
FLATSCOM BRAVO/YANKEE		
Navy	250.550	296.550
Wideband (Down)	262.450	261.950
(Up)	296.050	295.550
Navy Relay	252.050	293.050
Navy Relay	253.750	294.750
Navy Relay	255.450	296.450
Navy Relay	257.050	298.050
Navy Relay	258.550	299.550
Navy Relay	265.450	306.450
Navy Relay	266.950	307.950
Navy Relay	268.350	309.350
Navy Relay	269.850	310.850
Air Force	244.045	317.145
Air Force	244.055	317.155
Air Force	244.060	317.160
Air Force	244.065	317.165
Air Force	244.070	317.170
Air Force	244.075	317.175
Air Force	244.080	317.180
Air Force	244.085	317.185
Air Force	244.090	371.190
Air Force	244.095	317.195
Air Force	244.100	317.200
Air Force	244.110	317.210
FLTSATCOM CHARLIE/ZULU		
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Wideband (Down)	262.050	262.550
(Up)	295.650	296.150
Navy Relay	252.150	293.075
Navy Relay	253.850	294.850
Navy Relay	255.550	296.550
Navy Relay	257.150	298.150
Navy Relay	258.650	299.650
Navy Relay	265.550	306.550
Navy Relay	267.050	308.050
Navy Relay	268.450	309.450
Navy Relay	269.950	310.950
Air Force	244.145	317.245
Air Force	244.155	317.255
Air Force	244.160	317.260
Air Force	244.165	317.265
Air Force	244.170	317.270
Air Force	244.175	317.275
Air Force	244.180	317.280
Air Force	244.185	317.285
Air Force	244.190	317.290
Air Force	244.195	317.295
Air Force	244.200	317.300
Air Force	244.210	317.310
FLTSATCOM DELTA		
Navy	250.350	296.350
Wideband (Down)	263.550	264.050
(Up)	297.150	297.650
Navy Relay	251.850	292.850
Navy Relay	253.550	294.550
Navy Relay	255.250	296.250
Navy Relay	256.850	297.850
Navy Relay	258.350	299.350
Navy Relay	265.250	306.250
Navy Relay	266.750	307.750
Navy Relay	268.150	309.150
Navy Relay	269.650	310.650
Air Force	243.845	316.945
Air Force	243.855	316.955
Air Force	243.860	316.960
Air Force	243.865	316.965
Air Force	243.870	316.970
Air Force	243.875	316.975
Air Force	243.880	316.980
Air Force	243.885	316.985
Air Force	243.890	316.990
Air Force	243.895	316.995
Air Force	243.900	317.000
Air Force	243.910	317.010

Note: nbfm unless noted

Satellites...they circle above us, beaming down their communications until, in an increasingly high-tech world, it looks as if we can't do without them. What started with Sputnik promises to be an essential part of modern life far into our children's future.

Today, backyard satellite dishes bring the latest news, sports and entertainment into our television sets. Supermarkets and video stores use them to beam the latest specials onto flickering screens that we can watch while we shop. The local car dealer uses a specialized satellite network to hunt for used car parts, and cattlemen use them to buy and sell livestock. Soon, circling rings of cellular phone satellites will enable anyone who can afford the technology to place a call from anywhere in the world.

One of the first pioneers to use satellite technology was the military. Today, armed forces scattered to the far corners of the world are as close as next door through military communications satellites. Orbiting high above our heads are military satellites used for communications, intelligence gathering, weather forecasting, early warning and even entertainment.

High Seas and UHF

The U.S. Navy uses a sophisticated communications network to keep in contact with its aircraft carriers, destroyers, submarines, aircraft and thousands of vessels. Military monitors are familiar with the U.S. Navy's HICOM shortwave communications network and have logged many hours of exciting listening. But if you really want to log some exotic Navy communications then you need to tap into the exciting world of FLTSATCOM.

Monitoring the U.S. Navy's Fleet Satellite Communications System (FLTSATCOM) isn't easy, but with a lot of patience and a little homework it can provide hours of fascinating listening. Unfortunately, many monitors are still reporting limited success in monitoring FLTSATCOM channels, although they are located in the middle of the UHF military aviation band (225 to 400 MHz).

FLTSATCOM communications comprise a large chunk of the UHF military frequencies, ranging from 244 to 317 MHz. If your scanner is capable of monitoring these freqs, then you have a good chance of netting something. The most popular of the receivers with FLTSATCOM capability are the Realistic® PRO-2004/2005/2006, PRO 43, AOR AR-1000/ Fairmate and the ICOM R-1.

FM Mode

Most communications in the UHF military band are conducted in the AM mode. The reason that many monitors report little success in monitoring FLTSATCOM is they are not monitoring those channels in the correct mode. Most FLTSATCOM communications take place in either narrow band FM or wide band FM modes. Make sure that if you enter a FLTSATCOM frequency you do so in the correct mode (See frequency chart).

Antennas

Many monitors wonder if their antenna system might be to blame. If you are using the back-of-the-set antenna that came with the radio, the answer is yes. FLTSATCOM signals are weak, and that little piece of metal will not pull them in unless you are standing on the deck of a Navy carrier next to their transmitting antenna.

Sorry, apartment dwellers, you must have a high quality outside antenna to receive these signals. I suggest trying a Grove Scanner Beam ($59.95 from Grove Enterprises) using it with an inexpensive TV rotator. I use two rotators (one to rotate it through the points on the compass and the other used to aim the antenna through points in the sky). The Scanner Beam is highly directional (meaning it receives signals better from the direction it is pointed) and works well when aimed at an orbiting FLTSATCOM satellite.

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When shopping for or constructing an antenna, keep in mind that a high-gain directional antenna works best when trying to pull in those weak satellite signals. Some experienced monitors have adapted TV antennas by mounting them sideways (vertically) and have reported excellent results. Others have constructed helical antennas, (looking much like a cork screw) or have mounted scanner antennas on their satellite dishes with good results. I am experimenting with a discone antenna mounted on a 4 ft. microwave dish.

Amplification

Even with the use of a high gain antenna, the weak signals used in FLTSATCOM work may not make it all the way down that long coax and into your scanner. Signal loss in coax on the UHF bands is high and a little bit of strengthening is needed. Many of the commercially available in-line signal amplifiers will do a good job of capturing weak signals. I found that a Radio Shack in-line amplifier used for satellite TV purposes works well. A 20 dB model costs only $29.95 and is a champ, amplifying all AM military communications.

Finding The Birds

Once you have your antenna system set up, where do you point it? All satellites placed in geosynchronous orbit hover over the equator. Therefore, point your antenna south. The Navy has several FLTSATCOM birds in orbit and at least one satellite in range of each ocean in the world. They are occasionally moved to supply communications in conjunction with the Navy's special needs during a conflict. The birds are carefully nudged out of their parking orbits and placed over the operations area.

Finding the satellites takes time and patience. An aid in hunting down the birds is provided by the satellites themselves. Each FLTSATCOM transmits an open carrier on three frequencies. The frequencies are 261.400, 262.400 and 263.400 MHz. Carefully aim and slowly turn your antenna through all points of the southern sky while listening for a white noise carrier. This method works best in NBFM mode.

Remember, finding the birds is tricky and may take time. Sometimes you cannot find the carrier due to terrain, interference or intermittent operation. Patience is the key. Even if you do not find the carrier, enter all the FLTSATCOM frequencies in the proper modes and monitor them for a month or so. Make careful notes on what position the antenna is in when you find a Navy bird. Even if you cannot find the FLTSATCOM downlinks from the orbiting satellites, chances are you might hear a Navy aircraft or a ship in your area transmitting on an uplink channel.

An accomplished FLTSATCOM monitor (who prefers to remain anonymous) says that you will find the Navy's communications satellites hovering over the following coordinates, 105° West, 100° West, 93° West, 23° West, 172° East, and 75° East. Using a map you can plot the direction towards these coordinates from your position and aim your antenna accordingly.

It takes a lot of patience and a little luck, but you can find the FLTSATCOM birds if you make a systematic and thorough search of the FLTSACOM frequencies and the heavens. Let the Federal File know what you find and we will pass it on!

Mailbag

Clay Gibbs from Georgia writes he overheard some strange military transmissions on 228.375 MHz—the 75 kHz ending frequency suggesting "discrete" use. Clay says, "I've only heard transmissions on this frequency about five times over the past three to four months. There are only two stations that I have heard on the frequency: Zero-One Charlie (the aircraft) and Star 681 (presumably the ground station.) Some examples of the type of transmissions intercepted were:

1. *"Wings level entering 3 Alpha"*
2. *"Going back to flight level four-two-zero"*
3. *"Wings level, Southbound"*
4. *"Do you want any experiments today?"*
5. *"Wings level, Northbound."*
6. *"Go outside your door and look to the West."*

"The majority of these transmissions took place in the early morning hours.

"Another strange transmission took place on the published AR-625 frequency recently over here in Georgia. The transmissions I copied were between a "Jake 10" (KC-10 out of Kesseler M.S.) and "Stealth 3" on 352.600 MHz. They both refueled for about 20 minutes. Any ideas who they could be?"

Clay, there have been sightings of the enigmatic *"Aurora Project,"* (or as it is known now, the *"Senior Citizen"* aircraft) over Georgia. A large aircraft looking much like the 60s era XB-70 bomber was sighted by Glenn Emery in early 1992. There is also a Lockheed facility located at Marietta, Georgia. Many stealth experts believe that Lockheed may be the prime contractor of the *"Aurora Senior Citizen"* project. Here are some Lockheed frequencies used at Marietta that you might keep an ear on.

Lockheed flight test operations (MHz)
Shortwave: (all USB) 3.281, 3.443, 3.474, 5.469, 5.775, 6.550, 6.590, 6.6710, 6.730, 6.935, 8.822, 8.917, 10.450, 11.306, 11.375, 13.312, 17.965, 18.0035, 21.930,

VHF: 49.950, 123.125, 123.1500, 123.175, 123.200, 123.250, 123.350, 123.400, 123.450, 123.550, 123.575, 138.360, 142.200

UHF: 229.300, 266.300, 275.200, 314.600, 340.000, 345.400, 382.600, 384.800 MT

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plane talk

Jean Baker, KIN9DD

Radar

Welcome aboard! Today we have a lot of ground to cover, so fasten your seatbelts!

The word "radar" is short for RAdio Detection And Ranging. Technically, it's a device which, by measuring the time interval between transmission and reception of radio pulses and correlating the angular orientation of the radiated antenna beam or beams in azimuth and/or elevation, provides information on range, azimuth, and/or elevation of objects in the path of the transmitted pulses. Now, let's translate that into everyday English:

Basically, radar is a method whereby radio waves are transmitted into the air and are then received when they have been reflected back by an object in the path of the beam. Range is determined by measuring the time it takes (at the speed of light) for the radio wave to go out to the object and then return to the receiving antenna. The direction of a detected object from a radar site is determined by the position of the rotating antenna when the reflected portion of the radio wave is received.

There are several factors which affect radar control. The amount of reflective surface of an aircraft will determine the size of the radar return. Therefore, a small light airplane or a sleek jet fighter will be more difficult to see on radar than a large commercial jet or military bomber.

Altitude is reported by the radar beacon only if the aircraft is equipped with an airborne transponder. All Air Route Traffic Control Center radars in the U.S. and many airport surveillance radars have the ability to interrogate MODE C (altitude reporting) and display altitude information to the controller from appropriately equipped aircraft. However, there are a number of airport surveillance radars that are still two dimensional (range and azimuth) only, and altitude information must be obtained from the pilot.

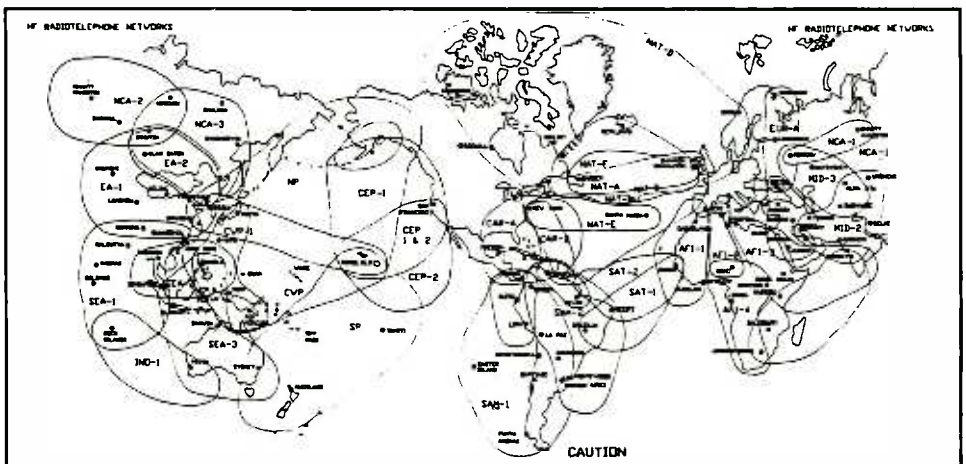
Radar is divided into two categories—primary and secondary. A Primary radar system is the simplest form, in which a minute portion of a radio pulse transmitted from a site is reflected by an object and then received back at that site for processing and display. However, in a Secondary radar system, we are talking about radar systems in which the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder). Radar pulses transmitted from the searching transmitter/receiver (interrogator) site on the ground are received in the cooperative equipment and used to trigger a distinctive transmission from the airborne transponder. The reply transmission, rather than a reflected signal, is then received back at the transmitter/receiver site for processing and display at an air traffic control facility.

Surveillance Radar: There are two general categories of surveillance radar: Airport Surveillance Radar and Air Route (Center) Surveillance Radar. Surveillance radars scan through 360 degrees of azimuth and present target information on a radar display in a tower or center. This information is used independently or in conjunction with other navigational aids in the control of air traffic.

Precision Approach Radar (PAR): This is designed to be used as a landing aid, rather than an aid for sequencing and spacing aircraft. PAR equipment may be used as a primary landing aid, or it may be used to monitor other types of approaches. It is designed to display range, azimuth, and elevation information.

Two antennas are used in the PAR array, one scanning a vertical plane and the other scanning horizontally. Since range is limited to 10 miles, azimuth to 20 degrees, and elevation to 7 degrees, only the final approach area is covered. Each scope is divided into two parts. The upper half presents altitude and distance information, and the lower half presents azimuth and distance.

PAR is utilized mostly by military installations, although many civilian airports have PAR capabilities. Incidentally, those of you who are fortunate to have the simulation RAPCON which is the military version of TRACON, can see a PAR in action as RAPCON has PAR capabilities built in!



★ AERONAUTICAL EN ROUTE RADIO STATION OPERATED BY ARINC.
• AERONAUTICAL EN ROUTE RADIO STATION OPERATED BY OTHERS.
THIS MAP IS NOT SUITABLE FOR NAVIGATIONAL PURPOSES.

CAUTION
- THIS CHART SHOWS THE FREQUENCIES ALLOTED TO AERONAUTICAL GROUND STATIONS WITHIN THE BOUNDARIES SHOWN
- NOT ALL STATIONS ON ALL NETWORKS ARE SHOWN ON THESE DIAGRAMS.
- NOT ALL FREQUENCES ARE IMPLEMENTED AT ALL STATIONS.
- ICAO REGIONAL AIR NAVIGATION PLANS SHOULD BE REFERRED TO FOR ADDITIONAL DETAILS.
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ARINC

FILE LOCATION L3

SCALE	DRAWN BY	DATE	ENGINEER	DRAWING NUMBER
N/A	RJT	10-26-92	RAS	HF-501-1

ALL FREQUENCIES ARE EXPRESSED IN KILOHERTZ

SEA-1 & 3	SEA-1 & EA-2	EA-1	NCA-1	NCA-2	NCA-3	CVP-1 & 2	CEP-1 & 2	SP	NP	SAT-2	CAR-A	CAR-B	NW-SW SAM	NE-SE-C SAM
3470	3485	3016	3019	2851	3004	2998	2869	3467	3667	2854	2287	3455	2944	3479
6556	5649	6571	5646	4678	5664	4666	3413	5643	6665	5565	5550	5520	4669	5526
10066	5655	8897	13315	6592	10039	6532	5547	8867	8915	11291	6577	6586	6549	8855
11396	8942	10042	17958	10096	13303	6562	5574	13273	13339	13315	8918	8846	10024	10096
13318	11396	17958		17958	17958	8903	8843	17904	17946	17955	11396	11387	11360	13297
17907	13309					11384	11282		21925		13297	17907	17907	17907
	17907					13300	13261		2932		17907			
						17904	13354		5628					
						21985	17904		10048					
									13294					
									17904					

EUR-A	AFI & SAT-1	AFI-2	AFI-3 & MID-2	AFI-4	NAT-A	NAT-B	NAT-C	NAT-D	NAT-E	NAT-F	MID-1	MID-3	IND-1
3479	3452	3419	3467	2878	3016	2899	2862	2971	2962	3476	2992	2944	3476
5661	6535	5652	5658	5493	5598	5616	5649	4675	6628	6622	4669	4669	5634
6598	8861	8894	10018	8903	8906	8864	8879	8891	8825	8831	6631	6631	8879
10084	13357	13273	11300	13294	13306	13291	13306	11279	11309		8951	8951	13306
13288	17955	17961	13288	17961	17946	17946	17946	13291	13354		11375	11375	17961
17961			17961					17946			17961	17961	

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Air Traffic Control Radar Beacon System: The ATCRBS, as it is known, is also referred to as secondary surveillance radar in some areas. The ATCRBS has three components:

1. **Interrogator**: This is a ground-based radar beacon transmitter-receiver which scans in synch with the primary radar and transmits discrete radio signals which repetitiously request all transponders to reply. The replies received are then mixed with the primary returns and both are displayed on the same radarscope.
2. **Transponder**: This airborne radar beacon transmitter-receiver automatically receives the signals from the interrogator and selectively replies with a specific pulse group (code) only to those interrogations being received on the mode to which it is set. These replies are independent of, and much stronger than a primary radar return.
3. **Radarscope:** The radarscope used by the controller displays returns from both the primary radar system and the ACTRBS. These returns, called targets, are what the controller refers to in the control and separation of air traffic. The job of identifying and maintaining identification of primary radar targets is a long and tedious task for the controller. Some of the advantages of the ATCRBS over primary radar include reinforcement of radar targets; rapid target identification; and unique display of selected codes.

Next time, we'll look more closely at the various descriptions of approach and enroute radar systems and how they work, with plenty of illustrations included!

Mailbag

Richard Bender (Pittsburgh, PA), a new contributor to the column, sent in the new ARINC HF Major World Air Route Areas (MWARA) chart. Thanks, Richard! We've waited a long time for this new chart to be published—close to 10 years, I believe. The new chart was effective 7 January 1993.

This brings up another subject on which I want to put your minds at rest: Although there's a lot of talk about the use of satellites replacing HF communications for overseas flights, HF comms will be around for a long time to come. For proof, just look at the new frequencies that New York, San Francisco, and Honolulu ARINC have activated in the past year alone! Some time down the road satellites may be used concomitantly with HF voice comms, but don't look for their demise in the near future!

Did anyone notice that New York ARINC has reactivated the old frequency of 11387 kHz on frequency family CAR-B? Gosh, that freq was decommissioned eight or nine years ago! Heavy traffic must have mandated the reactivation of the old as well as incorporation of new frequencies such as 3455, 6586 and 5520 (Car B); and a NAT-F family of frequencies which will include 3476, 6622, and 8831 kHz.

Book Reviews

The Directory of North American Military Communications (HF/VHF/UHF), Second Edition, Hunterdon Aero Publishers), edited by Jack Sullivan, is now available and it's just what the military aero monitor needs for his or her reference shelf!

Published in regional editions (Northeastern, Southeastern, Central, & Western) each book contains cross listings by both frequency and location. Greatly expanded from the first edition, HF frequencies and military satellites have been added.

The extensive HF (248 kHz to 27.920 MHz) is of special interest. Also, I was pleased to see that every FAA enroute air traffic control sector frequencies were included and up-to-date; also VHF/UHF allocated pairings are shown.

In the short time I've had my directories, many new military aero frequencies reside in my scanner and the HF logbook I maintain has new additions galore. If you're interested in military aero monitoring, whether you're an experienced listener or raw beginner, be sure to order your copy(ies) soon! See "What's New" for ordering information.

The Downing of Flight Six Heavy is one of the very few works of aviation fiction whose author (Perry Lafferty) has thoroughly researched the subject! I have rarely found a novel containing factual and technical descriptions of oceanic flight and airliners, but this book is right on the money. Combining mystery, adventure, and a lot of good stuff on flying B747s, it's high adventure (sorry about the pun). First printed in July 1992, it's fairly new so look for it at your favorite bookstore or newsstand ($4.99 paperback), or write to Pinnacle Books, Windsor Publishing Company, 475 Park Avenue, New York, New York 10016. It may also be available in hardback form, so check your public library for a copy.

Now, let's have some fun: The book mentioned above is about a Transatlantic flight. As I said, the author has researched the subject well; however, he inadvertently (I hope!) left out one very important detail concerning Transatlantic flights. I'll give the first person who can tell me what it is a copy of MIRAMAR—a military aero computer simulation (shareware). If the winner doesn't have a computer, I'll come up with a substitute prize for him/her. Here's a hint: It has to do with communications! Send your answers in to Plane Talk in care of *Monitoring Times.*

That's it for now. Next time, we'll look at Airport and Enroute radar; the TCAS System; review Bob Bell's new book (*Listening in to Aircraft Radio*), and give a visual description on how windshear works (no fooling!).

Until then, 73 and out. MT

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Lowfing Around

They're not easy to hear, but once you've tuned one in, you'll be hooked. LOWFERS (short for **Low** Frequency **E**xperimental **R**adio **S**tations), are low power experimental stations operating from 160 to 190 kHz under a little-known provision of the FCC rules.

Part 15, Subpart D of the rules, permits anyone in the U.S. to operate such a transmitter, provided its input power is no more than 1-watt and the antenna length does not exceed 50 feet (15 meters). These restrictions make for tough odds, especially when you consider that a 50 foot antenna on LF is akin to using a paper clip for the shortwaves!

Despite the odds, LOWFERS *are* being heard quite regularly at distances over 300 miles. Most of their communication is done beacon-style, with an ID consisting of the owner's initials or perhaps the suffix of a ham call (if the operator is also a ham). There is some two-way work being done also, but this is less common.

In keeping with the experimental nature of the band, most LOWFERS use home-built gear to send out their signals, although a few commercial transmitters have been available over the years. For the homebrew builder, many suitable designs have appeared from time-to-time in radio monthlies such as *The Lowdown* published by the Longwave Club of America (LWCA), Dept. MT, 45 Wildflower Rd., Levittown, PA 19057.

Receiving Hints

I'm not going to tell you that LOWFERS are easy to hear. In fact, they're probably going to be your most challenging catch. There are a few things you can do to improve your chances, however. When hunting for LOWFERS, try the following:

1) Use the CW/SSB mode of your receiver. Unlike NDBs, LOWFERS use keyed-carrier CW (just like on the ham bands) and you will need the CW BFO to hear them properly.
2) Shut off appliances that cause static. Even a slight amount of noise could be enough to wipe out a weak LOWFER signal.
3) Use headphones. They will block out house hold noise and help you focus on the signals at hand.
4) Use a narrow bandwidth—no wider than 1 kHz. The more adjacent signals you can block out, the better your chances.
5) Listen at night. By far, the bulk of LOWFER loggings I receive are made after 10 pm during the winter months. Not only is propagation enhanced at night, but there are fewer neighborhood static sources to com pete with.
6) Choose a good antenna. It is entirely possible to hear LOWFERS with a simple "longwire" antenna, but you can usually improve your chances with a directional antenna—especially in noisy areas. A homebrew antenna that works well for this purpose was described in the September '92 column. If you need a reprint, drop me an SASE here at *MT*.
7) Tune slowly! In the narrow 160 to 190 kHz LOWFER band, it's easy to spin right past a weak signal.

Even if you don't hear a LOWFER right away (it took me several tries), you might want to tune into one of the ham radio nets that are geared toward LF experimenting. Eastern LOWFERS meet Sunday evenings on 1983 kHz (LSB) at 8 pm Eastern Time. West coast experimenters gather on 3927 kHz (LSB) at 8 pm Pacific Time. Just by listening, you can find out who's active, and gain a wealth of information about the radio equipment and antennas being used by LOWFERS.

Table 1 lists some LOWFER stations reported to be active at this writing. Many operate 24 hours a day, but some only operate on weekends, or keep somewhat irregular schedules. The list is based on information contained in *The Lowdown*.

If you hear a LOWFER station and would like to verify your catch, drop me a line here at *MT* with details of your reception. I'll try to supply you with a current mailing address for the station.

Table 1: LOWFER Stations

Freq.	Call	Location
175.000	D	Des Moines,IA
175.388	KRY	Chardon, OH
180.000	FL	Silver Spring, MD
184.500	JDH	Warner-Robins, GA
184.900	XTAR	Tarentum, PA
185.300	W	Watauga, TN
185.800	3SCO	Scarborough, ONT
186.375	BA	Lancaster, IL
186.800	MS	Scottsburg, IN
187.260	CAT	Cincinnati, OH
188.480	9HDQ	Daleville, IN
188.500	ART	Columbia, MN
188.812	1SUN	Durant, OK
188.840	GSR	Frederick, MD
189.100	CLI	Cincinnati, OH
189.200	GIR	New Eagle, PA
189.360	TH	Colt's Neck, NJ
189.500	CRL	White Bear LK, MN
189.500	ABC	Hilton Head Is, NC
189.730	8LXJ	Cincinnati, OH
183.540	PRK	Saratoga, CA
183.544	MEL	San Jose, CA
179.000	MPM	Morrow Bay, CA
187.200	MM	Westmoreland, CA
187.650	C	Maritime Mobile, CA
184.020	EK	Sunnyvale, CA
181.170	IZJ	San Gabriel, CA
184.520	PLI	Burbank, CA
182.880	H2	Descanso, CA

Mailbag

• First-time contributor Anthony McCormick of Kettering, Ohio, wrote to say that he built the Homespun Loop described in the September '92 column and is having excellent results. Using an Icom R-71, Anthony logged several new stations with the antenna, including ZBB (Bimini, Bahamas).

The biggest challenge he encountered was finding the necessary variable capacitor from an old AM broadcast radio. This is a common problem when building longwave gear. Radio companies stopped using air-variable tuning capacitors in the seventies and ever since they've been getting harder to find. I suggest looking at flea markets for old "junker" radios that can be scrapped, or at hamfests where the capacitors can often be had for less than $1.00.

• Keith Hadley, of Kanata, Ontario, also tried his hand at building the Homespun Loop and had this to say: "My only gateway to shortwave broadcasts is my Sony ICF7600DS radio. It tunes the LW band, but all I've ever heard there was one faint beacon and the lamp dimmers in my living room. As such, I've always ignored the basement band. I thought I would only be wasting my time building an antenna to capture signals that experience had taught me do not exist."

Well, curiosity prevailed, and Keith built one anyway. It took a bit of rummaging in his junk box, but he came up with the necessary parts and had a working antenna in short order. In little time, Keith had pulled in eight new beacon signals!

Keith also offers a helpful tip for anyone needing enameled wire, like the kind used for the Homespun Loop. Check the Yellow Pages under "Electric Motors - Sales & Service." You may be able to find a company willing to sell a small quantity of wire at a very reasonable price.

That's about all the room left for this month. Do you have a penchant for longwave trivia? If so, be sure to check in next month. Besides sharing more reader mail, I'll have some basement band teasers that will get you really thinking. For the correct answers, two readers will get a free copy of the *Utility Guide for the 0-900 kHz Spectrum*. See you next month.

MT

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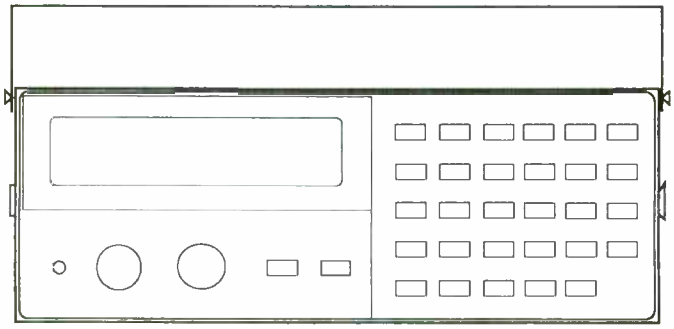

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Karl Zuk

Nashville Calling DXers!

"*I heard your station. It was great. Please send me a QSL.* You can't do that!!" If you want to verify hearing WSM, you've got to convince Tom Bryant. "We are pretty finicky about getting enough information for a QSL. Music isn't acceptable proof; neither is network stuff. We need details that are locally oriented: local phone numbers, local commercials, newscaster's names, stuff like that. If somebody is rejected, they always get a letter saying 'please try again.'"

As chief verifier for the 50,000 watt giant, Tom processes over 100 requests a year for WSM QSL cards. "I took over as verifier about 7 or 8 years ago. We had a chief engineer who didn't do a thing with the verie requests that came in for about three years. When he left, someone found a drawer full of letters. I sent out verifications to all I could verify and apologies to those I couldn't and asked them to try again. I think there were three or four hundred of them!"

Suddenly, Tom had become the DX ambassador for the station. Mail continues to arrive from all over the world daily. "Most of the real far ones are from DXpeditions like the ones up in Lapland. I get about ten requests a year from them. There's a British group that has DXpeditions up in Northern Scotland. We hear from Australia, New Zealand, and a few come in from South America. I suspect we'd probably get some from Asia, if there were more English speaking DXers there."

Tom likes DXers because he's a DXer too! Tom writes a monthly column for *VHF-UHF Digest*, the monthly publication of the Worldwide TV-FM DX Association. It's called "TV Time Tunnel," a look into television's past including fascinating station histories and pictures of old facilities, logos and test patterns. He also belongs to America's two medium wave DX clubs: The International Radio Club of America and The National Radio Club.

"Combo" studio at KFYR (Bismarck). Photo circa 1958.

Newcomers to the hobby are encouraged to hone their skills when they write to Radio 650 WSM. Tom coaches people who mail in rough reports by sending them sample QSL letters to use in the future, and a list of addresses of DX clubs where they can obtain more information about the AM DX hobby.

Along with his duties as chief verifier of America's favorite country music radio station, Tom also serves as their Production Manager. For 22 years, he's been responsible for all the commercials, jingles, and bumpers you'll hear on WSM. When a commercial needs to be produced on site, Tom arranges the music and finds the voices to be recorded on the spot. WSM announcers often combine their skills with the sounds of secretaries and passersby—even the janitor! Sometimes a session guitarist will enter Tom's studios, but most of the music is prerecorded. He meets the demands of his Program Director and WSM's Sales and Traffic Departments day after day, which is no easy feat!

Tom was a seasoned broadcaster long before he hit the road toward Nashville. He started AM and TV DXing at age 10, and got his ham license (WN0KLP) the next year. At age 15, a lifetime of broadcasting began at KFYR in Bismarck, North Dakota, while he was still in high school. "The broadcast industry was more or less an extension of my hobby. To a certain extent, that has continued to be the case over my entire 35 year career."

During his first ten years in radio, Tom worked all across the Midwest as an on-air announcer at a variety of local stations. Winnipeg, Manitoba became his address in the early sixties. Winnipeg's CJOB AM and FM represented big time radio. "I'm really glad I got to go to Winnipeg because it was probably one of the best experiences I ever had. The Winnipeg stations were always really good stations. I was not only working in a major market, but in another country. The perspective you get of the U.S. when you're living outside and looking back is pretty interesting. So, it was a good learning experience all around."

Serving as a staff announcer with an overnight board shift at CJOB, Tom also got his feet wet as a production whiz, and was introduced to the world of Country music. "I did the all night shift, and between five and six in the morning there was a Country and Western show. I knew absolutely nothing about Country and Western music, so I just would grab some things I thought were appropriate and heard other guys play and slapped those on, and managed to get away with it!" Tom later became morning man on CJOB-FM, and moved to CJQM when they first went on the air. Bad management and poor finances forced CJQM to reorganize, and Tom lost his job.

After a short six month stint at KXGO, Fargo, North Dakota, Tom went to Nashville to join the staff of WWGM "The Wide World of Great Music," but he didn't plan on staying.

WSM production director/manager. Photo taken in October '90 by visiting DXer Bill Burrows of Gloucester City, NJ.

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WDAY in Fargo was about to launch an FM outlet, and Tom was promised the Program Director position. This caused problems!

"My Dad used to run a small town weekly newspaper. He had written in his personal column, on the front page, about my moving back to North Dakota very soon. Well, there was a copy of it laying around the station and the Program Director saw it. 'We didn't hire you to come down here and cool your heels for a couple of months before you go back to Fargo! I'll give you a week to figure out what you are going to do,'" he said in anger.

Tom knew another former WWGM staffer who worked at WSM, and he eventually was hired there instead. "I was at a point in my career where I felt I needed a stable employer, and WSM was about as rock-solid as they came."

Hard work has filled Tom's years at WSM, but there is time for fun once in awhile. "Wheel of Fortune" TV star Pat Sajak used to host the afternoon drive show on WSM years ago and fell prey to Tom's sense of humor one April Fool's Day. "We took all the carts he was going to use on his show, like jingles, openers, and even a few spots, and reloaded them with a polka. So, every time he'd punch a button, he'd get the same polka! Later, at his 4:05 reintro we loaded a WLS jingle into his opener. He got so paranoid, he was afraid to push any more buttons!"

Radio engineering has come a long way since Tom started in radio. "If you stop and think about it, the studio end used to be based entirely on magnetic principles: phono pickups and audio tape. Now virtually nothing is magnetic anymore except for the microphones."

One thing that hasn't changed is the WSM tower just off I-65 South. "It's a very unusual tower. Bell Laboratories designed it, and it was put up in 1938. It's 794 feet high, and has just been registered as an historical site. There are only two left in the country. It's self supporting from the mid point up. The bottom half of the tower is exactly like the top except it's inverted and sits on the base insulator."

WSM in Nashville, Tennessee, is heard almost everywhere east of the Rockies at night, and is the most famous country music radio station in the world. Their most popular show is "The Grand Ole Opry," a live concert broadcast that has been heard every Saturday night since 1925. You haven't made the big time in Country music until you've performed on the Opry's stage.

Tom Bryant has met many Country music legends at WSM, and has worked with their famous disk jockeys, too. For ten years, Tom engineered Ralph Emery's radio show on WSM. Ralph has since moved on to his own daily show on the Nashville Network on cable TV. If you would like to receive a WSM QSL card, send details of a WSM broadcast you've heard to: Tom Bryant, WSM Radio, 2644 McGavock Pike, Nashville, TN 37214.

Bits 'N' Pieces

The industry calls it "beautiful music." You've heard it in dentist's offices and on elevators; and during the 1970's it was the most popular music format on the air. One of the last strongholds of the sounds of Ray Coniff and Mantovani is trading in their Muzak-like sounds for the softer side of rock. WPAT 930 AM and 93.1 FM, serving New York City, has moved to a more "soft 'n easy" sound.

"After doing audience research, we came to the conclusion that listeners would spend more time with us if we made it a more interesting place to come to," Gene Hobicorn, General Manager of WPAT told the *New York Times*. "We're calling it bringing easy listening into the nineties." Now you'll hear Gloria Estefan, Paul Simon, and Natalie Cole mixed in with standards by 101 Strings. WPAT hopes to lower the average age of their listeners to attract more advertising dollars.

Mailbag

If you enjoy learning about the history of radio, you'll love a new book written by *MT* reader John Russell Ghrist. The product of six years of painstaking research, *Valley Voices* chronicles radio broadcasting in Northern Illinois and Northwest Indiana since 1910. John scoured local libraries, interviewed the people involved, or their surviving relatives, and searched for old photographs of stations wherever he could find them. He has created a 464 page treasury of fascinating accounts and pictures for anyone interested in radio.

"I wanted to write one big book that contained virtually everything on area radio. Since the business keeps changing, the historical facts collected about former stations will be at last printed and preserved for study," says John. Copies are available for $33.50 from JRG Communications, P.O. Box 1073, Dundee, IL 60118-1073.

International Bandscan

• The Chinese have invaded Central California! Radio Beijing is now being broadcast live to the Modesto-Stockton area. KPLA, transmitting from nearby Riverbank, relays news, features, and music in English from the Chinese capital every afternoon at 5 pm on 770 kHz. Thanks to Radio Beijing Technical Monitor George Poppin for this tip.

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• Ron Carruthers in Edinburgh, reports that BBC Radio Scotland is preparing to dramatically cut the amount of hours produced locally by its stations, forcing them to broadcast nationwide programming almost exclusively. Network head James Boyle wants to cut back local news bulletins to four five minute broadcasts a day, and drop all other current affairs and music productions. Sports would become limited to nationwide coverage only.

Public outrage has been swift, and has caught the eye of Prince Charles. According to his private secretary, Belinda Harley, "The proposed cuts are indeed of great concern to His Royal Highness. Reports on the plan, and the outrage they have caused, have now been forwarded to him for his earliest attention." Many listeners, especially in farming areas, claim the move will deprive them of a much needed community service. Stay tuned! Until next month, happy trails!

MT

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Direct Broadcast Satellite Update

Slower than a speeding glacier! More expensive than an S & L bailout! Able to bankrupt corporate giants with a single launch! Look! Up in the Air! No, on the launch pad! No, on the drawing table! It's: Direct Broadcast Satellite!

The only thing that has generated more advanced publicity than the imminent arrival of DBS is the imminent end of the world. Experts have a more accurate count of the number of pinheads who can dance with an angel, than they do of when we'll finally be watching 266 channels of fabulous entertainment on tiny 12" dishes.

What's the mystery? Why is it that after 10 years of research and development, untold FCC hearings, lawsuits and counter lawsuits, billions of dollars in contracts signed, countless press conferences and unnumbered amounts of trees sacrificed to press releases, are we still no closer to this most elusive of broadcast dreams?

Well, there's your answer. It's all about hype, wrangling, legal bushwhacking, contractual hog-tying and verbal obfuscation. After all the electronic dust has settled, here in 1993 the sum total of tangible DBS lies with a company called Primestar Partners. And it is a pale ghost of the much ballyhooed DBS promise.

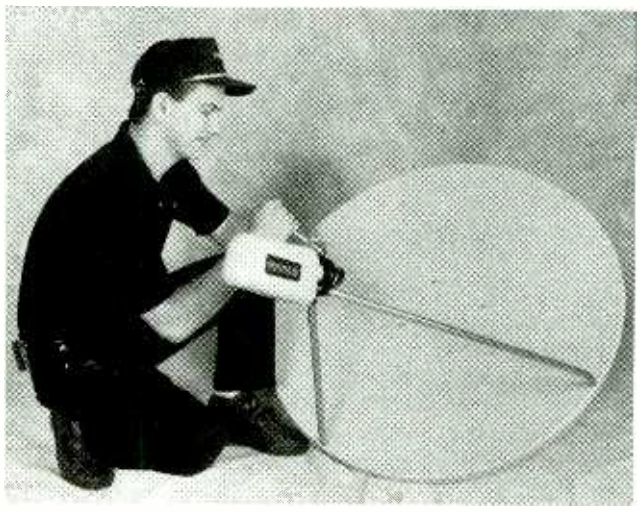
PrimeStar IRD with remote control belongs to the company and will be swapped with new receiver as technology changes.

The Promise

Nearly fifty years ago it was observed that microwaves—frequencies much higher than those previously used—could travel great distances undisturbed by atmospheric or manmade interference. All modes of transmissions—FM, AM, data, video, digital or analog—could be transmitted from point-to-point on fairly low power with very little loss. In theory, if one built a really tall antenna tower, say, tens of thousands of feet tall, carriers could be relayed great distances without signal loss.

Of course, construction of such towers would be impractical, but, Arthur C. Clarke observed, satellites placed in a geosynchronous orbit above the Earth could be used to relay such microwave signals from one point on Earth to a very large area of the planet below it. This area, generally oblong in shape, is known as a satellite "footprint." Any properly tuned receiving antenna within the footprint may receive the signals with virtually no loss in signal strength.

It didn't take a card carrying Mensa to figure that if such a satellite had enough power and capacity, hundreds of channels of video and audio could be transmitted to small antennas on the ground. The more powerful the satellite, the smaller the receiving dish could be. What went wrong?



PrimeStar's 3 foot off-set fed antenna mounts inobtrusively just about anywhere. Feedhorn and LNB are in a weather-proof case supported by a tripod for rigid stability. The installation has no moving parts and is virtually maintenance free.

The Technical Reality

The technical stumbling blocks encountered on the road to DBS were numerous. The first problem was the limited capability of the satellite. Original satellites were of very low power and were unable to carry much of a load. The current generation of retiring satellites, which were launched ten years ago and are reaching the end of their scheduled usefulness, typically had 24 channels at about seven to eight watts output per channel. This amount of power at C band frequencies (3 to 4 GHz range) enabled reception by ten foot diameter parabolic reflectors which became the standard for the 1980's.

Ku band satellites of the same period typically featured 16 watts output per channel and were often on-board C band satellites. This meant that Ku may only take up six of the 24 channels on the satellite. The Spacenet I and II satellites are a good example. Reception of these Ku signals are receivable on systems as small as three feet in diameter with a fairly low noise figure (1.0 dB or better) LNB.

These results were not because designers weren't trying. This is really the best that could be done given the progress in the development of solid state electronics, solar cell technology and vehicle launch capability.

Early DBS Efforts

Many years ago the International Telecommunications Union (ITU) allowed that each ITU region would have so many orbital slots which were designated for direct broadcast technology. This technology was originally seen as high powered (100 watts and up) satellites operating in the Ku band frequency range. Business interests were simply drooling at the chance to set up a DBS system.

The trouble was that such a satellite didn't exist. The only Ku band birds around with any

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power were Canadian. So it was that in 1963 an American company called USCI leased five Ku band channels on a Canadian satellite, retrained their spot beam to the Mid-Atlantic states and retransmitted five basic cable services. The hardware was sold through local Radio Shack stores and manufactured by a number of major suppliers including General Instrument.

One marketing problem with the service was that it was unencrypted as, indeed, all the C band services were. They simply couldn't compete with C band's 160 plus channels, and standard encryption technology was still three years away. After losing millions of dollars, the service folded, leaving many thousand dedicated Ku installations dotting the landscape rusting away.

The interim ten years have left DBS to the paper speculators. There has been a lot of big talk from some slick operators, most of which has ended up in bankruptcy court. The most spectacular of these was a company called SkyPix. As of this writing the participants of this venture were awaiting the harsh words of a bankruptcy judge who has not been amused by the antics of SkyPix hucksters.

Back To PrimeStar

Operating out of what's called a medium powered (47 watts) Ku band satellite (Satcom K1 85 degrees W.), PrimeStar Partners (comprised of GE Americom, cable giant Tele-Communications, Inc. and Viacom among others) launched its service in November of 1990.

PrimeStar offers 11 channels of analog video including "superstations" and three channels of pay-per-view and TV-Japan. In addition, they offer nine audio channels which include those carried by the Jones Intercable audio services on G5.21 C band. They also offer both the Electra Teletext data service and X*Press Information Services, both of which have their C band homes on G5,6.

After one year of testing the system and another year of regional marketing, PrimeStar is poised to seek wide penetration across the country. Before it can do so and gain wide acceptance it will be necessary to increase the number of channels carried. To do this, without expanding their own presence on K1, will require a system of video compression. This is a transmission method by which several signals (typically four or five) are compressed to one and fed on a single channel. Some type of proprietary decompression information is carried on the signal so that properly equipped receivers will be able to view the programming.

Compression technology is far from complete. In the first place there are numerous players who seek acceptance of their compression system as a standard. Standard?! Didn't we hear standardization arguments back in the early days of VCII encryption? Yes, and they are still far from settled. More than a few court cases around the country involving a couple of heavy hitters will testify to that. So, it's reasonable to argue that it could be more than a few years before compression details are ironed out. But, that's the least of DBS' problems.

Where Are The Satellites?

That brings us to the nub of the whole DBS issue. Just where are these high powered Ku satellites? That's easy; they don't exist, except in the press releases of the nearly one dozen would-be DBS pavers. Sure, contractual agreements have been made and specs have been drawn up but here's the optimistic schedule of DBS activities as reported in several satellite industry journals: Hughes Communications' DirecTv service is slated for launch 10 to 12 months from now as is Stanley Hubbard's USSB service. After that it's another two years before the next two, Advanced Communications and EchoStar satellite Corp. launch.

But, remember, these are the "best guess" scenarios from their most vocal promoters. If the past is to be anything to judge by I'd add another 6 to 12 months to the above schedule at least.

Advantage PrimeStar

This foot-dragging process is bound to help the only functioning ersatz DBS operator. With tens of thousands of installations in the ground, and an aggressive sales operation attracting many more, Primestar is positioned to capture the early and easy sales. These are the customers whose rural or suburban location remains unserved by cable or where large dishes are a legal problem.

They also offer an attractive pricing scheme compared to traditional TVRO installations. A call to your local TVRO dealer will bring a price tag of $2,000 to $3,500 for a complete installation. PrimeStar will do a site survey, install the three foot dish in your yard or on your roof, run the wires, hook up the receiver and plug you in for $250 plus $30 a month for the programming. (If you merely want to lease the hardware, the installation fee goes down to around $100 and the per month up to $35).

Regardless of the terms, the receiver remains the property of PrimeStar. The reason for this is that in the future they may add features, change encryption or compression systems which would render your receiver obsolete. A simple swap out of receivers makes such changeovers painless for the consumer.

But to be really competitive some would argue that PrimeStar should ditch its superstation line-up in favor of a more traditional basic cable service combination. It's true that this would probably sell like crazy, but it would become a direct threat to the livelihood of the cable companies now owned by the PrimeStar Partners.

And finally, in case you were wondering, the seven superstations are: TBS Superstation Atlanta, WGN Chicago, WPIX New York, WWOR NJ, KTLA Los Angeles, KTVU San Francisco, WSBK Boston, WHYY Philadelphia (part time). Their PrimeCinema offers three channels of Pay Per View movies before they get to the video stores in addition to other types of events such as concerts or sporting events. For information on a PrimeStar dealer in your area call: 800-966-9615.

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PLA/NET

PLA/NET

If you live on the planet Earth, here is something you should be interested in. Bob Wilderman, K3SRO, has founded and organized a net called PLA/NET. The problems of our environment and the search for solutions are the topics addressed in this net.

I first mentioned the net in my October 1992 column. At that time I did not have a great deal of information on the net and requested input from anyone with knowledge of PLA/NET. Well, I received a lot of mail on this one; it seems that a lot of you are interested and have some knowledge of it. Bob Wilderman, K3SRO, also wrote me and included a complete information package. Here, then, is the story of PLA/NET.

K3SRO is a concerned inhabitant of planet Earth. Being involved in several environmental groups and a ham radio operator, he decided to use the ham bands to seek others interested in improving Earth's environment. Consequently, a little over one year ago he formed PLA/NET (or Planet). Currently there are about 130 active members of Planet—and growing!

Planet's aims are to establish a global communications network utilizing ham radio and computers to facilitate efficient transfer of information concerning the environment and environmental crisis situations. The network will include voice, APlink, AMTOR, RTTY and packet amateur radio nets. Information will be provided to individuals and groups to find solutions to environmental problems. An environmental monitoring system is also in the works. This system would be active 24 hours a day to speed reliable reports to a central headquarters.

Net Discussions

Relevant topics include matters relating to the atmosphere, marine environment, agriculture, forestry, population and industry. Toxic waste, recycling, alternate energy and consumer information are topics that have already been addressed during net meetings.

An educational program has also been started to involve students at all levels. The program will allow students and educators to discuss environmental concerns with environmentalists and scientists around the globe. Several programs linking high schools have already been implemented.

There are several PLA/NETs operating at present. The USA net meets every Saturday on 14330 kHz at 1830 UTC. The European/Africa/Middle East net meets on the same frequency at 1630 UTC each Saturday and a Pacific net meets at 1300 UTC on the first and third Saturdays of the month. In addition, a new ten meter net (USA) meets Sunday at 1900 UTC on 28330 kHz (conditions permitting).

Help Wanted

Planet needs help in the form of net control operators, newsletter writers, editors, publishers, attorneys with knowledge of environmental law, and regular net members as well. If you can help, please contact PLA/NET USA and Pacific at 19 Glen Road, Lansdale, PA 19446-1405 and PLA/NET Europe, Patrijzenlaan 2, 1560 Belgium.

Everyone is invited to participate, SWL's can comment to the above addresses.

Toxic Radio

Being concerned with the environment myself, one issue I feel is important to raise at this time is the damage done to the environment by electronics! The hobby we enjoy is responsible for large amounts of toxic waste, minesite pollution and depletion of valuable resources. It is something we should be aware of and which I hope PLANET will address.

It can be minimized in several ways. One approach is to ask ourselves if we really need the latest and greatest (why do you need a 486 computer or new rig with bells and whistles that seldom are used?). While I enjoy new technology, it brings with it various problems. For example, what do we do with our old gear when we make the change? There are tons of outdated but perfectly usable electronics equipment sitting in storage. There must be some way of recycling it (comments please).

Ham Radio Environment Day?

One radio club recently instituted an activity that other clubs and individuals might like to duplicate. This particular club travels to a wilderness area and operates with battery operated equipment. Part of their purpose is to make others aware of the beauty of nature.

Upon reading their newsletter describing this wilderness day, I could envision a given day or a weekend (say the first weekend of summer) when as many hams as possible would operate from some natural site using low powered gear and giving photos of the site as QSL cards (not a contest, just fun hamming). In this manner more of us can see and learn about the beautiful places of the world and this in turn might encourage us to use the earth in a more careful manner.

Of course, such a thing should be repeated twice a year, since summer in the North is winter in the Southern hemisphere. This Ham Radio Environment Day (or Wilderness Weekend) could be a fun idea. Any support for such an activity?

That's all gang, take care.

Ike, N3IK

K3SRO

Robert N. Wilderman
19 Glen Road
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Rob Leonard's Ham DX Tips

Although this *is* the shortest month of the year, with the following DX tips you can still log plenty of DX.

BOSNIA-HERCEGOVINA Loggings of 4N4 or YU4 prefixes made on 15 October 1991 or later now count for this new DXCC country for many amateur awards. If you have not logged this one, you can try: 4N4XA at 1330 UTC on 21335 kHz SSB or 4N4ANT on 14240 kHz SSB. Both use the services of QSL manager: KA9WON, Lonnie W. Miller, 12031 Blue Spruce Dr., Roscoe, IL 61073. ***CENTRAL AFRICAN REP*** TL8NG has been on 21083 kHz RTTY most days at 1700 UTC. QSLs go to TL8NG's QSL manager: Frank J. Dlugokinski, P.O. Box 772, Litchfield, CT 06759. CROATIA The prefix here is 9A. Prior to that it was YU2, and it is also a new DXCC country. If you logged a station using either of those two prefixes on or after 26 June 1991, you have a new country to count. If not, look for 9A3NU who appears on 14240 kHz SSB at 1500 UTC most days. His address is: P.O. Box 439, Split, 58000, Croatia. Keep in mind that is a war zone and people here have more important things to do than to answer QSL requests, so be patient while waiting for a reply; it might take a while. ***DX NETS*** A new DX net to check is the European/African 12 meter DX net on 24945 kHz SSB at 1500 UTC daily. ***EAST KIRIBATI*** T32BE has been on 10105 kHz CW most days at 1400 UTC. Send reports to his QSL manager: WC5P, Paul Lange, 705 North Bend Rd., Weatherford, TX 76086. ***ESTONIA*** ES7QF, the wife of ES7FQ (Hellar Uik, P.O. Box 103, Viljandi 202900, Estonia), has been a regular on 14085 kHz RTTY starting at 1200 UTC. ***GREECE*** Check 28265 kHz for a new Greek (SV prefix) 10 meter propagation beacon sending its callsign (which is not known at the time of this writing) in CW. ***KINGMAN REEF*** Sometime between 20 and 28 February look for stations on CW, RTTY, and SSB using the KH5K prefix for eight to nine days. It is expected that the operators will use their own callsigns and use either /KH5K at the end or KH5K/ at the start. This will be a BIG DX-pedition with 12 operators. QSL routes will be announced by the operators. ***MAURITIUS*** 3B8CF (Seewoosankar Mandary, Shastri Rd., Candos, Quatre, Bornes, Mauritius) operates RTTY on or near 14086 kHz most days starting at 0300 UTC. ***NAMIBIA*** V51ED can be found weekends on 21227 kHz SSB at 1930 UTC, and moving to 24490 kHz at 1500 to 1700 UTC. V51ED uses QSL manager Merlin D. Anderson, 4300 S. Cochran, Charlotte, MI 48813. ***NAURU*** C21NR (Brain Rous, P.O. Box 478, Nauru, Central, Pacific) can be found on the Heard Island DX Assoc. DX net which meets daily (except Sundays) at 0400 UTC on 14222 kHz. There is a considerable amount of other DX on this net as well. ***NIGER*** RTTY DXers can log this African country on 28080 kHz at 1220 UTC most days. The operator is a Japanese professional working in the country and asks that you send your QSL requests via the Japanese Amateur Radio League, 1-14-2 Sugamo, Toshima, Tokyo, 170 Japan. ***PALMYRA*** The same group of DX'ers who plan to operate from Kingman Reef also plan to send a team to operate all bands RTTY, CW, and SSB from here as well in late February. The prefix here is KH5. ***SAN ANDRES ISLAND*** 27 February to 7 March look for HK0/KB5L, Silvano Ameata, active from here on 20, 17, 15, 12 and 10 meter RTTY and SSB frequencies. QSLs will be handled by QSL manager KA6V, Joanie Branson, 93787 Doresey Ln., Junction City, OR 97448. Or, you can try for HK0/AA5AU (Donald A. Hill, P.O. Box 625, Belle Chasse, LA 70037) who will be operating from here at the same time on 40, 30, 20, 15, 12, and 10 meters CW and RTTY only. ***ST LUCIA ISLAND*** *MT* received a news release from the Lambda Amateur Radio Club that they will be sponsoring their second Oscar 13 satellite DX-pedition from here 9 to 14 March. The group all signing J6/ and their callsigns (KK3K, WB6LYI, KA1MQX, N6ZSU, KC3XC and WD4LJV) will be placing this country on Oscar 13 Satellite for the first time. Their news release says, "The club will automatically mail an engraved certificate signed by all the operators to every station who successfully works all their operators during the DX-pedition." Or you may send for individual QSLs via the callbook addresses of the operators. ***SLOVINIA*** Loggings of amateurs using the prefixes S5 or YU3 on or after 26 June 1991, now count as this new DXCC country. ***ZIMBABWE*** Z21JE (Molly E. Henderson, Box 460, Harare, Zimbabwe) is in the Family Hour DX Net on 21345 kHz SSB at 1800 UTC.

In this short month there are plenty of celebratory events (Lincoln's Birthday, Washington's Birthday, Black History month, and of course, Valentine's Day) which may prompt Special Events amateur operations on weekends. Be sure to check for these between 1400 and 2200 UTC Saturdays and Sundays around (+/- 10 kHz) the frequencies of 7250, 14250, 21300 and 28300-28350 kHz SSB. Also, be sure to take time out from the radios to spend some time with that special valentine. After all, they are worth it. 73 de Rob.

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Russian Pirate Uses USA Relay

Romantic Space Radio, one of the leading pirate stations in Russia, has established a relay relationship with North American pirate station **Radio USA.** So far there have been no North American loggings of RSR's primary Russian transmitter. But, the station now produces programming for relay by United States pirates, similar to widespread overseas relay transmitter arrangements used by many licensed international broadcasters.

Regular *MT* reporter Pat Murphy of Chesapeake, VA, snagged the first example of this relay on November 21 between 2310 and 2339 UTC on 7417 kHz. The frequency was slightly variable as the Radio USA upper sideband transmitter slowly drifted upward. I fortunately also picked up this very unusual broadcast. RSR signs on with announcements in Russian, but most of their program consists of local Russian rock music hosted by an English language DJ named Arty.

As we previously reported in the August *MT*, Romantic Space Radio uses a maildrop address of P. 0. Box 29, Moscow, Russia 109444. Arty solicits reception reports, and he promises QSL's. DXers should be aware that there have been continued reports of organized postal theft rings in Russia. Arty therefore advises that reception report envelopes should be sealed securely. It would be a good idea to make your envelope appear as inconspicuous as possible.

Other Europirates have been using the relay technique in recent months. For instance, Pat Murphy also heard a forty minute North American relay of programming from the British pirate **Radio Gemini** in late 1992 on 7415 kHz at 0320 UTC. Pat reports that they announced a British maildrop for correspondence, but this station is easier for us to contact via P.O. Box 293, Merlin, Ontario N0P 1W0.

Somalia Clandestines?

Following the deployment of United States troops to Somalia, our attention has been closely focused on this part of northeastern Africa. Political hot spots like this almost always generate clandestine radio activity. Several clandestines have been active in Somalia over the years, including the **Voice of the Western Somalia, Radio Halgan,** and **Radio SNM.** Halgan was an Ethiopian operation that has been silent since diplomatic relations were established between Ethiopia and Somalia in 1988. The other stations have not been reported in recent years, either.

The only Somali clandestine that has been noted during the last twelve months is a station that stole the name of Somalia's longtime government broadcaster, **Radio Mogadishu.** It allegedly supports a political faction headed by Ali Mahdi Mohammed. BBCMS monitored a schedule for them several months ago. Last year their one hour programs nominally were transmitted on 6958 kHz at 0400 and 1600, and on 9467 kHz at 1000 UTC. Gerry Dexter's *Clandestine Confidential* newsletter also carried a report that they allegedly use an upper sideband transmitter on 9495 kHz. Unfortunately, DXers' loggings of this one have been extremely rare.

It is theoretically possible that we could have a slim shot at hearing the 0400 broadcast during months of winter propagation to Africa. It would not be suprising if other clandestine activity emerges in Somalia this year, so keep your ears pealed, and watch this space.

Korean Clandestine Newsletter

MT reporter Scott Edwards of Los Alamitos, CA, has discovered that the National Salvation Front publishes a biweekly newsletter in English. This political group operates the anti-South Korea clandestine **The Voice of National Salvation.** It's obvious that North Korea is behind this one. The station has sometimes been reported around local sunrise on 4400 and 4450 kHz. If you would like a copy of this newsletter, write to the Mission of the National Democratic Front of South Korea in Japan, Amatsu Building, 2-1 Hirakawa, Chiyoda-Ku, Tokyo, Japan. If you would prefer to call them, their listed telephone number is (03) 3264-6567.

31 Meter Clandestine Tip

I had the pleasure of hosting well attended seminars on pirate and clandestine DXing at the October *Monitoring Times* Convention in Atlanta. I asked those in attendance if pirate and/or clandestine listening was a major priority in their hobby activities. Several strong pirate enthusiasts were at the pirate seminar, but in the clandestine seminar, not one person raised their hand in response to my question!

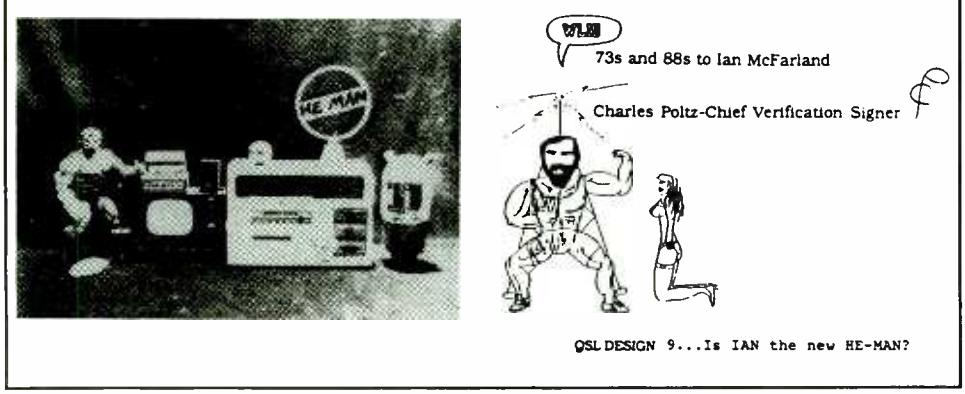
It is clear from our mail that many of us would like to hear some clandestines, but we don't know where to begin. A good place to look is at the top end of the 31 meter band. Three easily heard clandestines operate here on a daily basis. You can start on 9980 kHz in the afternoon, where the **Voice of the Iraqi People** is heard continuously. It usually suffers from easily audible bubble jamming, but the jamming transmitter does not modulate its carrier's lower sideband. Hence, you can hear the clandestine in your receiver's lower sideband mode.

After it gets dark, two longtime anti-Castro clandestines should be easy loggings, even on inexpensive portable receivers. Try **La Voz del CID** on 9941.6 kHz and **Radio Caiman** on 9965 kHz. Both stations are very well produced, and they put out excellent signals on a worldwide basis.

Digital Pirates

Last month we featured a neat pirate FAX logging on 27503 kHz from Ron Bruckman of Hempstead, MD. Ron's log motivated me to tune around this range, which is active with pirate stations in various digital modes on a daily basis. For years we have heard scores of European stations on a 27537.5 kHz pirate packet net, and it's still quite active. I also heard a pirate RTTY station (45/200) with foxes on 27553 kHz from Roby in North Italy. On 27527.6 kHz I found several French pirates active in SITOR-A mode.

This activity peaks between 1400 and 1500 at my home in Ohio. If you have digital signal



Dueling logos from He-Man and WLIS.

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decoding capabilities, this frequency range is an excellent place to scan for pirate activity.

He Man vs. WLIS

Both **He Man Radio** and **WLIS** submitted pictures directly to *MT* this month. As you see on these pages, one of WLIS' new QSL cards parodies He Man, who acquires the head of **Radio Japan's** Ian McFarland, formerly a well-known personality at **Radio Canada International.** (Ian's face adorns all WLIS QSL cards). Meanwhile, He Man's own graphics are becoming more elaborate, as shown here.

Both pirates have been active on 41 meters in recent months. He Man combines rock and bagpipe music with sexist male advocacy discussions, usually on 7415 kHz. The unique WLIS format always features renditions of actual interval station music used by international shortwave broadcasting stations.

Correction

A correction that didn't make it into the January text is as follows: Vanguard Radio is broadcast on KMTL-760 at 1600 on Saturdays, not 1500 Sundays as printed; also, the producer of American Dissident Voices is Kevin Alfred Strom, not Strong.

What We Are Hearing

Pirate station activity continues at record levels, and we have literally dozens of loggings again. The Wolf Run (droperator) reports direct that his box is now permanently closed. But, eight active maildrops are used by stations listed this month, including P.O. Box 452, Wellsville, NY 14895; P.O. Box 109, Blue Ridge Summit, PA 17214; 770 Sycamore Avenue, #J193, Vista CA 92083; P.O. Box 25302, Pittsburgh, PA 15242; P.O. Box 17534, Atlanta GA 30316; P.O. Box 493, Boys Town, NE 68010; P.O. Box 605, Huntsville, AL 35804; and P.O. Box 146, Stoneham, MA 02180. Frequencies are in kHz, with times in UTC.

Action Radio- 7415 at 2245. A. J. Michaels increasingly weaves comedy sketches in with his normal rock music fare. Addr: Boys Town. (Seth Zirin, Basking Ridge, NJ)
Anarchy One- 7417 at 0330. They claim to be a clandestine, featuring leftist political analyses and eclectic music. Addr: Vista. (Skip Harwood, Beale AFB, CA)
Christian Rock Radio- 7416 at 2230. A new station that features hard Christian rock, including interviews with musicians. Addr: none announced yet. (George Zeller, Cleveland, OH)
CSIC- 7425 at 2300. Pirate Rambo mixes Canadian rock and comedy shows with relays of other pirates, always with his signature "Psycho Chicken" song at sign-on and sign-off. Addr: Blue Ridge Summit. (Murphy)
DC Radio- 7416 at 2000. Their heavily political focus attacks Republicans with gusto, sometimes using Morse code modulation. But, they object to past *MT* characterizations of them as "leftist." Addr: none, but they verify logging reports printed in *ACE*. (Murphy and direct from the station)
East Coast Beer Drinker- 7415 at 0430. This fellow urges everybody to stimulate their livers with alcohol. Addr: Blue Ridge Summit. (Jeff Voges, Memphis, TN)
EBO Radio- A call from the station revealed that their transmitter has temporarily been out of order, but repairs are anticipated. (Gigi Lytle, Lubbock, TX)
Hope Radio International- 7381 at 0015. A couple of years ago they were the most active North American pirate, but they now transmit sporadically, sometimes with political analyses. Addr: Blue Ridge Summit. (Don Schneider, Pittsburgh, PA)
Plan Nine- 7415 at 0215. A new one that baffled everybody in November with science fiction movie audio, a powerful signal, ID's by a woman in German, and an extremely elaborate but confusing production. Addr: none, unfortunately. (Voges)
Radio Freedom- 7417 at 0200. This new rock station has been primarily heard so far in western North America. Addr: none. (Harwood)
Radio Esoterica- 7412 at 1400. Our reporters indicate that this new station announces an "exotic" format of international music. Addr: Stoneham. (Schneider, Murphy)
Radio Philadelphia Superpower- 3885 at 0200. Operations like this one within amateur radio band frequencies are 'exceptionally unwise' tactics. Stations take note! Addr: none. (Mike Fanderys, Parma, OH)
Radio Scottish Montreal- 7425 at 2300. As their name implies, this station features Scottish music and promotions for Scottish ethnic activities in Quebec. Addr: Blue Ridge Summit. (Murphy)

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Radio USA- 7419 at 2330. Despite an FCC bust in 1992, this station's punk rock and comedy is still heard. George's first pirate! The station should not be confused with a bogus and obscene Radio USA that inaccurately announces a Pennsylvania maildrop. Addr: Wellsville. (George Archibald, Paoli, PA; Alan Masyga. Winona, MN; Harwood; Murphy; and direct from the station)
RBCN- 7415 at 0230. When not relaying the Voice of Shakerag, Radio Bob programs his own clever shows with variable music formats. Addr: Atlanta. (Bill Hennessy, Marble Falls, TX, Murphy)
Voice of Anarchy- 7416 at 0030. Leonard Longwire's Heathkit DX-60B transmitter often generates good reception; the musical format varies on every show. Addr: Blue Ridge Summit. (Lytie, Masyga)
Voice of Shakerag- 7415 at 0200. The side-splitting southern humor on the Radio Bob network is well produced and highly entertaining. Addr: Atlanta. (Mark Seiden, Miami, FL)
Voice of the Night- 7420 at 0045. Lad's erratic mayhem is still heard, but his QSL policy is increasingly questionable. Addr: Pittsburgh. (Masyga, Voges)
WARI- 7415 at 0230. Dr. Lobotomy programs rock music, regularly relays other pirates, and uses an "Alternative Radio International" slogan. Addr: Wellsville. (Harwood, Archibald, Murphy)
WEED- 7415 at 0300. They feature a well produced mix of fast paced rock, drug humor, and political parodies. Addr: none, solicits reports via a computer BBS at (708) 238-1901. (Seiden, Hennessy, Murphy, Harwood, Voges)
WHO- 7415 at 0045. This station's theme music from the Dr. Who television series makes it easy to spot. Addr: Wellsville. (Masyga)
WKIK- 7412 at 0345. This rock station, allegedly from Jacksonville, has been plagued lately by a badly drifting upper sideband transmitter that makes its music sound horrible. Happily, they have acquired a maildrop. Addr: Wellsville. (Murphy, Schneider, Voges)
WRAR- QSL's from this station certify that the Alabama maildrop is good. Addr: Huntsville. (Scott Krauss, Cleveland, OH)
WSKY- 7416 at 7550 at 0200. Mike Richards and Doug Barley recently supplemented their traditional slick rock oldies format with long anti-abortion discussions. Addr: Wellsville. (Schneider, Seiden, Murphy, Harwood)
WVOL- 7418 at 2330. The Voice of the Loon features rock music and comedy, obviously a staple pirate format. Addr: Wellsville. (Masyga)

We'd like to see **YOUR** loggings; send them to Brasstown for next month!

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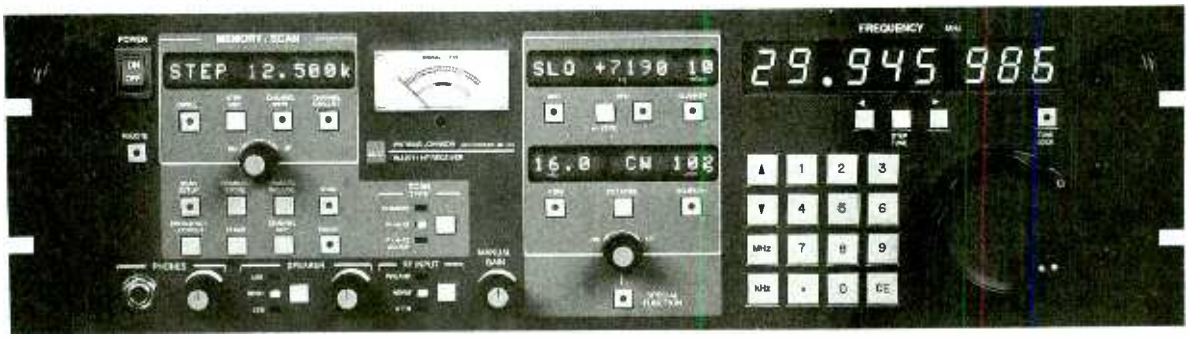

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reading rtty

Jack Albert

Richard Crisp reports intercepting North Korean communications on 11476 kHz, 50 baud, 225 Hz shift. In spite of the changes in the Soviet Union and the shutdown of the TASS wire services on HF last year, it appears that Korea is still going strong with their propaganda. They are the only hard-liners on the radio anymore that I am aware of, so be sure to tune them in. Richard's catch was made at 2145 UTC from Cupertino, California.

Here's a news snippet from the North Korean's RTTY broadcast on Thanksgiving Day:

POOL-05 NUCLEAR DESIGN CANNOT BE CONCENN RK~

PYONGYANG NOVEMBER 26 (KCNA) —

RODONG SINMUN TODAY COMMENTS ON JAPAN'S DESIGN TO BECOME A NUCLEAR POWER. RECALLING THAT JAPAN HAS A PLAN TO IMPORT 30 TONS OF PLUTONIUM FROM EUROPE IN THE FUTURE AND THAT THE JAPANESE AUTHORITIES INCLUDING THE CHIEF CABINET SECRETARY ARE NOW AT PAINS TO JUSTIFY IT, THE NEWS ANALYST SAYS: THIS OPENLY REVEALED THE INTENTION TO REALISE THE DESIGN TO BECOME A NUCLEAR POWER IN THE GUISE OF +PEACE+ AND IT IS A CHALLENGE TO THE DESIRE OF THE WORLD PROGRESSIVE PEOPLE FOR PEACE.

JAPAN HAS LONG HARBOURED THE NUCLEAR DESIGN AND MADE A NUCLEAR-WARHEAD-LAUNCHING SYSMEM ALREADY IN THE 1967-71 PERIOD.

ITS PLAN TO SHIP FROM OTHER COUNTRIES AND STOCKPILE PLUTONIUM MORE THAN NECESSARY WAS MOTIVATED BY ITS INTENTION TO MANUFACTURE NUCLEAR WEAPONS ANY TIME.

JAPAN IS TRYING TO BECOME A POLITICAL POWER COMMENSURATE WITH AN ECONOMIC POWER AND, FURTHER, BECOME A MILITARY POWER TO SEEK WORLD SUPREMACY IN THE MILITARY FIELD, TOO. THE TRANSPORT OF LARGE QUANTITIES OF PLUTONIUM IS TO SERVE THIS CRIMINAL PURPOSE.

FOR THE SAKE OF WORLD PEACE AND SECURITY JAPAN'S CRIMINAL TRANSPORT OF PLUTONIUM SHOULD NOT BE ALLOWED, THE ANALYST STRESSES. -0-

2711920715
NNNN

Richard Crisp also says, "Not only do they transmit Baudot at 50 baud and 225 Hz shift on 11476, you can also try 13580 as they are up to the same 'hardliner' propaganda there, too. I even find press fax on these same frequencies. The RTTY starts in the early afternoon around 2130 UTC and they seem to transmit on and off RTTY and fax until around 0300 UTC or so. It varies daily depending, perhaps on the news load?"

"I always get a kick out of the way they refer to the US as 'Imperialists' and the South Korean government as 'puppets.'"

I'd like to to thank Richard for another great intercept. He has an advantage living in California because he probably hears Korea coming in like "gang busters" from across the Pacific. When I was stationed at Osan AFB in the late 60's I remember working California on the ham bands. I operated the ham rig that was located at the Air Force Mars station.

More Strange Stuff!

While tuning around 6329 kHz I copied what I believe was the 6028 FDM modem. 6028 FDM is a multi-channel RTTY signal that uses time and frequency diversity to improve reception. Sometimes you can catch them sending "Foxes" or RY's by using a narrow filter and by tuning in one of the FDM channels.

After tuning up about 50 kHz, I was still hearing the signal! Because the 6028 FDM only utilizes about 6 kHz of spectrum I knew that something was wrong. I also noticed that the signal was very distorted.

I came to the conclusion that it must be 6028 FDM but that there's something wrong with the equipment. They must be over modulating the transmitter and causing a great deal of splatter, like a CB operator talking with a "power mike" which will usually cover several CB channels.

I have heard other signals that cover a great deal of spectrum and produce other strange whistling sounds. If you've experienced similar phenomena, drop us a line here at *Monitoring Times* Central.

But I Thought it was ARQ!

Sometimes I have a good ear when it comes to tuning in a RTTY signal. I can tell by beeps or the cadence of the toodily-doo sound that it's normal RTTY or an ARQ-E3 running 48 baud.

On a few occasions, however, I tried to tune in what I thought was an ARQ-E running 96 baud and 450 Hz shift on 11019.5 and 9421 kHz. When using the M7000 or the M8000 you can usually tell if it's an ARQ because the Idle or Sync LED is lit after the signal is properly tuned. But on these occasions, I had no such luck. I tried every combination and every ARQ mode that the M8000 can handle. But no idle or no text. Whatever these signals are, they aren't ARQ.

The second night I tried 11019.5 again and bingo! There was an ARQ-E 96/425 with no text for several hours. But I will, sooner or later, copy something.

I guess this proves that even the veteran RTTY hackers have problems. The first signal requires further analysis. Maybe it'll be a new mode in the M9000!

Loggings

One night of tuning for about an hour.

Freq kHz	Call	Bd/Shift	Mode	Notes
10340	?	?	NSK	Fast data like buzzing went off at 0310 UTC and then encrypted RTTY
10534	CFH	75/850	RTTY & FAX	
10796				
10799	RFLI	100/850	ARQ-E3	
10873		100/425	ARQ-E3	Went off at 0350 UTC
10916		48/425	ARQ-E3	
11434	?			Same as 10340
14871	RFLI	96/450	ARQ-E	Sending French text
16325	RFLI	48/450	ARQ-E3	Controle de Voie

Tuning FSK

Most RTTY hobbyists don't realize that FSK is similar to FM. The only difference is that the FSK signal swings from the mark to the space frequency at a digital rate. With FM, the frequency swings at an audio rate.

One thing that is missing in a RTTY setup is a special circuit that is used in FM reception, called a limiter. If you're familiar with the VHF narrow band FM that ham radio operators use, or if you own an ICOM R7000 receiver, you probably know that it's difficult to tune in an AM signal with the receiver set to FM. The AM distorts because the limiter tries to remove the amplitude variations in the signal. The limiter also removes electrical interference like static and popping.

Well, if RTTY is like FM, why aren't HF receivers equipped with limiters? That's a good question! Whatever the reason, the fact that they aren't can cause problems.

One major problem is the popping and electrical noise that you encounter below 7 MHz. In an HF receiver the AGC (Automatic Gain Control) circuit tends to overshoot when a loud noise burst is received. This causes the receiver to momentarily reduce its sensitivity. If the RTTY signal is weak, it will drop out until the slow AGC recovers and restores the receiver's sensitivity. By the time the AGC recovers, two, three or even five characters will be lost.

When I copy RTTY I always turn off the AGC. With it off, the sensitivity of the receiver is forced to a maximum level. When popping or static is encountered, it will be limited in the same way as an FM receiver. The RTTY signal may sound distorted or unpleasant to the ear, but don't worry! The filters in most RTTY decoders will clean up the sound before it reaches the important circuits. The distortion is a small price to pay for improved copy.

If you don't have an AGC on/off switch on your receiver and you're a qualified engineer or technician then modify your receiver and let us know how you did it. I'm sure Doug Demaw or Bill Cheek would like to hear from you.

NNN

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The Second Time Around

Ever heard, "Things are better the second time around?"

That's certainly true of the new and updated book, *Secrets of Successful QSLing* by Gerry Dexter!

Gerry has outdone himself again, and weaves us through the many avenues of QSLing. From the beginnings of Reception Reporting, Putting It Together, and the proven methods from DXers, Gerry proves there's no such thing as giving up!

I guarantee your QSL totals will increase—mine did !

Send your order to Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147—and tell them *MT* sent ya !

ALGERIA

Algiers Aeradio, 8894 kHz. Full data prepared QSL card, verified by Hocine Larfaoui. Received in 5 months for an English utility report and a stamped-self-addressed-envelope. Station address: ENESA/DENA, Boite Postal 118, Route De Sidi Moussa, Baraki, Algeria. (Ed Rausch, Cedar Grove, NJ)

ARGENTINA

Radiodiffusion Argentina Al Exterior, 11710 kHz. Full data RAE card, verified by G. Barrera. Received in 27 days for an English report and one U.S. dollar. Station address: Casilla 555, 1000 Buenos Aires, Argentina. (Raymond King, Kelowna, BC Canada)

BAHRAIN

Radio Bahrain, 9746 kHz. Partial data map card, without veri signer. Received in 19 days for an English report and one IRC. Station address: P.O. Box 702, Manama, Bahrain. (Steve Leite, Fall River, MA)

CANADA

CFRB Toronto, 6070 kHz. Full data card, verified by Stephen Canney. Received in 12 days for an English report. QSL address: Ontario DX Association, P.O. Box 161, Station A, Willowdale, Ontario, Canada, M2N5S8. (Richard A. Jones, Dayton, OH)

CHINA

Radio Beijing, 17790 kHz. Full data scenery card, without veri signer. Received in 19 days for an English report. Station address: English Department, Beijing, People's Rep. of China. (Paul Sullivan, Albany, CA) (Frank Hillton, Charleston, SC)

CLANDESTINE

Voice of the National Army of Democratic Kampuchea, 5408 kHz. Non specific letter confirming reception, verified by Phobel Cheng-First Secretary. Letter stated station ceased broadcasting this year. Letter received for several English follow-ups. QSL address: Permanent Mission of Cambodia to the United Nations, 820 Second Ave., Suite 1500, New York, NY 10017. Logged while stationed on Okinawa. (Mike Hardester, Jacksonville, NC)

COSTA RICA

Adventist World Radio, 9725 kHz. Full data logo card, with illegible veri signature. Station souvenirs included. Received in 312 days for English follow-up reports. Station address: Apartado 1177, 4050 Alajuela, Costa Rica. (Hardester, NC)

GABON

Africa No. 1, 15475 kHz. Full data letter of confirmation signed and stamped by Le Directeur Technique, and station logo card. Received in a year-and-a-half after an English follow-up report and several IRCs. Station address: Boite Postal 1, Libreville, Republique Gabonaise. (Paul Mundt, Lombard, IL)

INDONESIA

Timor-RRI Dili, 3305 kHz. No data QSL card, verified by Harry A. Silalahi. Received for two Indonesian follow-up reports, mint Indo stamps, and address label (not used). Station address: RRI Stasiun Regional I Dili, Jln. Kaikoli, P.O. Box 103, Dili 88000, Timor-Timur, Indonesia. (Hardester, NC)

NIGERIA

Voice of Nigeria, 7255 kHz. No data QSL, without veri signer. Received in 201 days for an English report and two IRCs. Station address: Broadcasting House, Ikoyi, Lagos, Nigeria. Additional address: P.M.B. 4003 Falomo, Ikoyi, Lagos, Nigeria. (Sullivan, CA)

SAIPAN

KFBS, 11650 kHz. Full data "antenna" card, without veri signer. Program schedule included. Received in 31 days for an English report. Station address: P.O. Box 209, Saipan, CM (Leite, MA)

SENEGAL

ORTS, 4890 kHz. Partial data globe/tower card, without veri signer. Received in 23 days for a French report, cassette audio tape, and two U.S. dollars. Station address: Boite Postal 1765, /or 58, Boulevard de la Republique, Dakar, Senegal. (Charlie Washburn, North Perry, ME)

SHIP TRAFFIC

AKADEMIK IOEFE-KB3NA, 14300 kHz (Russian Scientific Research Vessel). Full data prepared QSL card confirmed, with fact sheet and picture of vessel. Received in 13 days for an English utility report and U.S. mint stamps. Ship address: Martin Bassin, 16 Mountain Rd., Linthicum, MD 21090. (Hank Holbrook, Dunkirk, MD)

MARIE MAERSK-OULL2, 156.65 MHz (Containerized Motor Vessel). Full data letter, confirmed by D. Kristensen-Master. Received in 44 days for an English utility report and one U.S. dollar. Ship address: A.P. Moller, Esplanaden 50, DK-1098 Copenhagen K, Denmark. (Holbrook, MD)

MATHILDE MAERSK-OUUU2, 156.65 MHz (Container). Full data prepared QSL card verified by Radio Officer. Received in 52 days for an English utility report and one U.S. dollar. Ship address: Same as Marie Maersk. (Holbrook, MD)

EXPORT FREEDOM-WCJS, 12359 kHz (Container). Full data prepared QSL card, verified by Roshan Verma (WA2RIF)-Radio Electronics Officer. Received in 55 days for an English utility report and a stamped self-addressed envelope. Ship address: c/o Farrell Lines, 1 Whitehall St., New York, NY 10004. (Russ Hill, Oak Park, MI)

LIBERTY SKY-3ESW3, 156.600 MHz (Bulk Carrier). Full data prepared QSL card, verified by ship's stamp. Received in 65 days for an English utility report, one IRC, mint U.S. stamps, and a self-addressed envelope. Ship address: c/o Shinwa Marine, Fokuku Seimei Bldg., 2-2 Uchisaiwai, 2 Chome, Chiyoda-ku, Tokyo 100, Japan. (Hill, MI)

UNITED STATES

U.S. Antarctic Development Squadron Six (VXE-6), 261.600 MHz. Confirmation letter signed by R.D. Brown LTJG USNR-Public Affairs Officer. Confirmation was for communications of detachment in New Zealand with 62nd Air Wing, Travis AFB. Received in 35 days for an English utility report. QSL address: Dept. of the Navy, Public Affairs Office, Antarctic Development Squadron Six, FPO San Francisco, CA 96601. (Brian Webb, Thousand Oaks, CA)

KMI, 8743 kHz. Full data "antenna" card, verified by G. Sparacio. Station information packet included. Received in 17 days for an English utility report. Station address: P.O. Box 9, Inverness, CA 94937. (King, Canada)

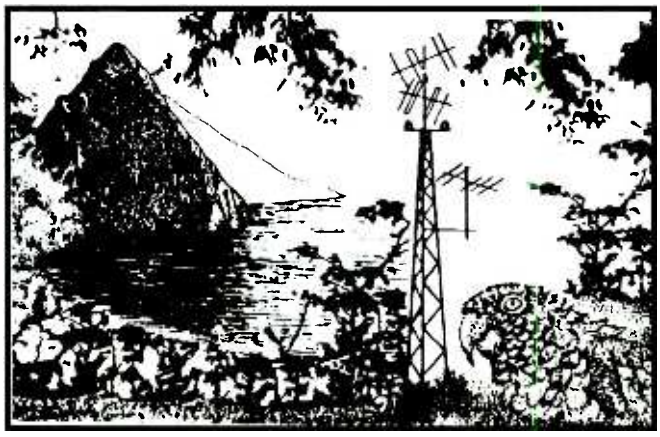
VATICAN STATE

Vatican Radio 11620 kHz. Full data QSL, without veri signer. Received in 58 days for an English report. Station address: I-00120, Vatican City, Vatican City State. (Doug Merkel, St. Louis, MO)

VIRGIN ISLANDS

WAH-High Seas Telephone, 6510 kHz. Full data prepared QSL card, verified by Peter Church-Station Engineer. Received in 10 days for an English utility report and a stamped-self-addressed-envelope Station address: Global Comm. Corp., P.O. Box 7009, St. Thomas, U.S. Virgin Islands 00801. (Rausch, NJ)

It took Paul Mundt of Lombard, IL, five months to receive this QSL card from St. Lucia.



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English language

shortwave guide

How to Use the Shortwave Guide

1: Convert your time to UTC.

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

Note that all dates, as well as times, are in UTC: for example, the BBC's "Ken Bruce Show" (0030 UTC Sunday) will be heard on Saturday evening (7:30 PM Eastern, 4:30 PM Pacific) in North America, not on Sunday.

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. If it's news you're interested in, check out the complete "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 re-run, 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	W: Wednesday	S: Saturday
M: Monday	H: THursday	
T: Tuesday	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	me:	Middle East
na:	North America	as:	Asia
ca:	Central America	au:	Australia
sa:	South America	pa:	Pacific
eu:	Europe	va:	various
af:	Africa	do:	domestic broadcast
me:	Middle East	om:	omnidirectional

Consult the propagation charts. To further help you find the right frequency, we've included propagation 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.

Programs for Shortwave Listeners: This section, published quarterly, lists programs with news and information about shortwave radio for listeners. (RR) denotes reruns of programs broadcast earlier in the week. For brevity, only programs at certain peak listening times are included.

Sundays

0018 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round
0035 Radio Vlaanderen Int'l: Radio World
0039 HCJB: DX Party Line
0106 Radio Czechoslovakia: DX Special
0110 Voice of America (am, ca): Communications World
0117 Deutsche Welle: Technical Tips For DX'ers (monthly: Sun after last Sat.)
0140 Radio Havana Cuba: DX'ers Unlimited
0200 Radio For Peace Int'l: World Of Radio
0215 KSDA, Guam: DX Asiawaves
0218 Swiss Radio Int'l: Swiss SW Merry-Go-Round (RR)
0230 Radio Romania Int'l: DX Mailbag
0239 HCJB: DX Party Line (RR)
0300 WRNO: World Of Radio
0317 Deutsche Welle: Technical Tips For DX'ers (monthly) (RR)
0330 Radio Japan: Media Roundup
0330 TWR, Bonaire: Bonaire Wavelengths
0340 Radio Havana Cuba: DX'ers Unlimited (RR)
0350 Radio Budapest: DX World
0405 WWCR: World Of Radio
0406 Radio Czechoslovakia: DX Special (RR)
0418 Swiss Radio Int'l: Swiss SW Merry-Go-Round (RR)
0430 Voice of Turkey: DX Corner (biweekly)
0509 HCJB: DX Party Line (RR)
0517 Deutsche Welle: Technical Tips For DX'ers (monthly) (RR)
0540 Radio Havana Cuba: DX'ers Unlimited (RR)
0635 Radio Korea: Shortwave Feedback
1135 Radio Korea: Shortwave Feedback (RR)
1230 Radio Austria Int'l: Austrian Shortwave Panorama
1250 Radio Korea: Shortwave Feedback (RR)
1330 Radio Austria Int'l: Austrian Shortwave Panorama (RR)
1435 Radio Korea: Shortwave Feedback (RR)
1440 FEBC Radio Int'l, Philippines: DX Report
1530 Radio Japan: Media Roundup (RR)
1615 KSDA, Guam: DX Asiawaves (RR)
1630 Polish Radio, Warsaw: DX Program
1630 Radio Austria Int'l: Austrian SW Panorama (RR)
1635 Radio Korea: Shortwave Feedback (RR)
2300 Radio For Peace Int'l: World Of Radio (RR)
2330 Radio Austria Int'l: Austrian SW Panorama (RR)
2330 Radio Japan: Media Roundup (RR)

Mondays

0000 WWCR: World Of Radio (RR)
0013 Spanish National Radio: DX Spot
0105 Radio Korea: Shortwave Feedback (RR)
0110 Radio Tashkent: DX Program (monthly)
0113 Spanish National Radio: DX Spot (RR)
0145 FEBC Radio Int'l, Philippines: DX Dial
0330 Radio Austria Int'l: Austrian SW Panorama (RR)
0430 Radio New Zealand Int'l: Mailbox (biweekly)
0513 Spanish National Radio: DX Spot (RR)
1330 Polish Radio, Warsaw: DX Program (RR)
1330 WWCR: World Of Radio (RR)
1400 Voice of the Mediterranean: DX Program
1407 Radio Vlaanderen Int'l: Radio World (RR)
1435 All India Radio: DX'ers Corner (biweekly)
1500 Radio For Peace Int'l: World Of Radio (RR)

Tuesdays

0020 Radio Vilnius: Feature For DX'ers
0040 All India Radio: DX'ers Corner (biweekly) (RR)
0600 Voice of the Mediterranean: DX Program (RR)
1130 Radio Australia: Communicator
1343 Radio Sweden: MediaScan (biweekly)
1530 Radio Australia: Communicator (RR)
1610 Polish Radio, Warsaw: DX Program (RR)
1613 Radio Sweden: MediaScan (biweekly) (RR)

Wednesdays

0040 Radio Havana Cuba: DX'ers Unlimited (RR)
0113 Radio Sweden: MediaScan (biweekly) (RR)
0213 Radio Sweden: MediaScan (biweekly) (RR)
0240 Radio Havana Cuba: DX'ers Unlimited (RR)
0300 Radio For Peace Int'l: World Of Radio (RR)
0340 Radio Budapest: DX News
0415 BBC: Waveguide
0440 Radio Havana Cuba: DX'ers Unlimited (RR)
0640 Radio Havana Cuba: DX'ers Unlimited (RR)
1100 Radio For Peace Int'l: World Of Radio (RR)
1310 Polish Radio, Warsaw: DX Program (RR)
1315 FEBC Radio Int'l, Philippines: DX Spot

Thursdays

0014 Radio Czechoslovakia: DX Special (RR)
0100 HCJB: Ham Radio Today
0130 BBC: Waveguide (RR)
0150 Radio Netherlands: Media Network
0300 HCJB: Ham Radio Today (RR)
0314 Radio Czechoslovakia: DX Special (RR)
0315 RAE, Buenos Aires: DX Actuality
0350 Radio Budapest: DX World (RR)
0440 Radio Sofia: Calling Amateurs And DX'ers
0530 HCJB: Ham Radio Today (RR)
1150 Radio Netherlands: Media Network (RR)
1350 Radio Netherlands: Media Network (RR)
1415 FEBC Radio Int'l, Philippines: DX Dial (RR)
1550 Radio Netherlands: Media Network (RR)

Fridays

0050 Radio Netherlands: Media Network (RR)
0250 Radio Netherlands: Media Network (RR)
0350 Radio Netherlands: Media Network (RR)
1140 Radio Sofia: Radio Sofia Calling
1511 Radio Portugal: DX Progarm (monthly)

Saturdays

0115 FEBC Radio Int'l, Philippines: DX Report (RR)
0130 Radio Sofia: Radio Sofia Calling (RR)
0241 Radio Portugal: Feature (RR)
0340 Radio Budapest: DX News (RR)
0400 Radio For Peace Int'l: World Of Radio (RR)
0440 Radio Sofia: Radio Sofia Calling (RR)
0618 Swiss Radio Int'l: Swiss SW Merry-Go-Round (RR)
1118 Swiss Radio Int'l: Swiss SW Merry-Go-Round (RR)
1130 TWR, Bonaire: Bonaire Wavelengths (RR)
1200 Radio For Peace Int'l: World Of Radio (RR)
1210 Voice of America: Communications World (RR)
1318 Swiss Radio Int'l: Swiss SW Merry-Go-Round (RR)
1340 Radio Tashkent: DX Program (monthly)
1405 Radio Vlaanderen Int'l: Radio World (RR)
1500 Radio Romania Int'l: DX Mailbag (RR)
1518 Swiss Radio Int'l: Swiss SW Merry-Go-Round (RR)
1615 KSDA, Guam: DX Asiawaves (RR)
2300 WRNO: World of Radio
2315 KSDA, Guam: DX Asiawaves (RR)
2350 Radio Nacional, Bogota: Colombia DX

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English language

shortwave guide

MT Monitoring Team

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Frequency Manager
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Kansas

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B.W. Battin
New Mexico

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Jim Frimmel
Texas

Thanks to Gayle Van Horn for her help on the database this month.

March Deadline: January 27

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
(7:00 PM EST, 4:00 PM PST)
BBC
CBC, Northern Quebec [S]
China Radio Int'l
Christian Science Monitor
Radio Australia
Radio Canada Int'l [T-A]
Radio Czechoslovakia
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-A]
Radio Thailand
Radio Vilnius
SBC Radio 1, Singapore
Spanish National Radio
Swiss Radio Int'l
Voice of America
0005
Radio Pyongyang
0010
China Radio Int'l*
0030
All India Radio
Christian Science Monitor (SE Asia) [M]
Christian Science Monitor [T-F]
FEBC Radio Int'l, Philippines
HCJB
Radio Havana Cuba [T-S]
Radio Korea
Radio Netherlands
Radio Vlaanderen Int'l
Voice of America (Americas, East Asia) (Spec English) [T-S]
Voice of America (East Asia) (Special English) [M]
0035
All India Radio (News Service)
0045
Radio Korea (News Service)
0055
WRNO [H, A]

0100 UTC
(8:00 PM EST, 5:00 PM PST)
BBC
CBC, Northern Quebec
Christian Science Monitor
Croatian Radio, Zagreb [M-A]
Deutsche Welle
Radio Australia
Radio Belize
Radio Canada Int'l [S-M]
Radio Czechoslovakia
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [M-A]
Radio Sofia
Radio Tashkent
Radio Thailand
Radio Ukraine Int'l
Radiotelevisione Italiana
SBC Radio 1, Singapore
Spanish National Radio
Voice of America
Voice of Indonesia
WWCR [T-A]
0115
Radio Havana Cuba* [T-S]
0125
Radio Korea [T-A]
0130
Christian Science Monitor (SE Asia) [M]
Christian Science Monitor [T-F]
FEBC Radio Int'l, Philippines
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Netherlands
Radio Tirana
Radio Yugoslavia
Voice of Greece
0155
Voice of Indonesia
WRNO [W, A]

0200 UTC
(9:00 PM EST, 6:00 PM PST)
BBC
CBC, Northern Quebec [S-M]
Channel Africa, Johannesburg
Christian Science Monitor
Croatian Radio, Zagreb [S]
Deutsche Welle
Radio Australia
Radio Canada Int'l [T-A]
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Romania Int'l
Radio Thailand
RAE, Buenos Aires [T-A]
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
Voice of Free China
Voice of Myanmar
WWCR [T-A]
0215
Radio Cairo
Radio Nepal
0230
Christian Science Monitor (Africa, Middle East) [M]
Christian Science Monitor [T-F]
HCJB
Radio Havana Cuba [T-S]
Radio Moscow
Radio Netherlands
Radio Pakistan (Special English)
Radio Portugal [T-A]
Radio Tirana
Radio Yugoslavia
SLBC, Sri Lanka
0245
All India Radio (News Service)
Radio Finland [T-S]

0300 UTC
(10:00 PM EST, 7:00 PM PST)
BBC
CBC, Northern Quebec [T-S]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Bahrain
Radio Belize
Radio Budapest
Radio Czechoslovakia
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [M-F]
SBC Radio 1, Singapore
Voice of America
Voice of Free China
WWCR [T-A]
0309
BBC*
0310
China Radio Int'l*
0315
Radio Cairo
Radio Havana Cuba* [T-S]
0330
BBC (Africa)*
Christian Science Monitor (Africa, Middle East) [M]
Christian Science Monitor [T-F]
Radio Austria Int'l [T-A]
Radio Bahrain
Radio Havana Cuba [T-S]
Radio Netherlands
UAE Radio, Dubai
Voice of Greece
0350
Radio Yerevan
0355
Radio Japan [M-F]

0400 UTC
(11:00 PM EST, 8:00 PM PST)
BBC
CBC, Northern Quebec
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Bahrain
Radio Canada Int'l
Radio Czechoslovakia
Radio Havana Cuba [T-S]
Radio Moscow
Radio Romania Int'l
Radio Sofia
Radio Tanzania
Radio Thailand
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
Voice of Turkey
WRNO [F]
WWCR [T-A]
ZNBC Radio 2, Lusaka
0405
Radio Pyongyang
0410
China Radio Int'l*
0425
Radiotelevisione Italiana
0430
BBC (Africa)* [M-A]
Christian Science Monitor (Africa, Asia) [M]
Christian Science Monitor [T-F]
Radio Bahrain
Radio Botswana
Radio Havana Cuba [T-S]
0450
Channel Africa, Johannesburg
0455
WYFR (Network) [T-A]

0500 UTC
(12:00 AM EST, 9:00 PM PST)
BBC ("Newshour")
CBC, Northern Quebec [T-S]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
HCJB
Kol Israel
Radio Australia
Radio Bahrain
Radio Havana Cuba [T-S]
Radio Japan
Radio Lesotho
Radio Moscow
Radio New Zealand Int'l [A-S]
Radio Thailand
SBC Radio 1, Singapore
Spanish National Radio
Voice of America
ZNBC Radio, Lusaka
0510
China Radio Int'l*
Radio Botswana
0515
Radio Havana Cuba* [T-S]
0520
Radio For Peace Int'l [T-A]
0530
Christian Science Monitor (Africa, Asia) [M]
Christian Science Monitor [T-F]
Radio Austria Int'l
Radio Finland [M-A]
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Romania Int'l
Radio Thailand
RTM, Malaysia
UAE Radio, Dubai
Voice of Nigeria
0545
Voice of Nigeria*

0600 UTC
(1:00 AM EST, 10:00 PM PST)
BBC
CBC, Northern Quebec
Channel Africa, Johannesburg
Christian Science Monitor
Deutsche Welle
GBC Radio, Accra*
Radio Australia
Radio Bahrain

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newsline

Radio Havana Cuba [T-S]
Radio Korea
Radio Moscow
Radio New Zealand Int'l [M-F]
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
Voice of Malaysia
ZNBC Radio, Lusaka [M-A]
0605
Radio Pyongyang
0609
BBC*
0615
Radio Canada Int'l [M-F]
0630
BBC (Africa)*
Christian Science Monitor [M-F]
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Romania Int'l
RTV Congolaise, Brazzaville [M-F]
Voice of Nigeria
0645
Radio Romania Int'l
Voice of Nigeria*
0655
Radio Korea [M-F]

0700 UTC
(2:00 AM EST, 11:00 PM PST)
BBC
Christian Science Monitor
ELBC, Liberia
GBC Radio, Accra
MBC, Blantyre [M-A]
Radio Australia
Radio Czechoslovakia
Radio Japan
Radio Moscow
Radio New Zealand Int'l [S-F]
SBC Radio 1, Singapore
SLBS, Freetown
Voice of Free China
Voice of Myanmar
0703
Croatian Radio, Zagreb [M-A]
0705
Radio Pyongyang
0730
All India Radio (News Service)
BBC (Africa)* [M-A]
Christian Science Monitor [M-F]
HCJB
Radio Czechoslovakia
Radio Ghana
Radio Moscow (World Service)
Radio Netherlands
Radio Vlaanderen Int'l
0745
Radio Finland [M-A]
0750
Radio For Peace Int'l [T-A]
0755
Radio Japan [M-F]

0800 UTC
(3:00 AM EST, 12:00 AM PST)
BBC
Christian Science Monitor
GBC Radio 1, Accra [S]
GBC Radio 2, Accra
MBC, Blantyre [S]
Radio Australia
Radio Bahrain
Radio Korea
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Pakistan
SBC Radio 1, Singapore
SLBS, Freetown
Voice of Indonesia
Voice of Malaysia
ZNBC Radio 2, Lusaka [M-A]
0803
Croatian Radio, Zagreb [S]
0805
Radio Pyongyang
0830
All India Radio (News Service)
Christian Science Monitor [M-F]
Radio Austria Int'l
Radio Moscow (World Service)
Radio Netherlands
0840
Voice of Greece [M-A]
0850
All India Radio (News Service) (Special English)
Radio Pacific Ocean [A]
0855
Radio Korea [M-F]
Voice of Indonesia

0900 UTC
(4:00 AM EST, 1:00 AM PST)
BBC
China Radio Int'l
Christian Science Monitor
Deutsche Welle
ELBC, Liberia
GBC Radio 1, Accra [M-F]
GBC Radio 2, Accra
MBC, Blantyre M-A]
Radio Australia
Radio Bahrain
Radio Japan
Radio Moscow
Radio New Zealand Int'l [S]
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of Nigeria
0903
Croatian Radio, Zagreb [M-A]
0910
China Radio Int'l*
0915
Radio Korea (News Service)
0930
All India Radio (News Service)
Christian Science Monitor [M-F]
Deutsche Welle (Africa)* [M-F]
FEBC Radio Int'l, Philippines
Radio Afghanistan
Radio Moscow
Radio Netherlands
0940
Radio Togo
0955
Radio Japan [M-F]

1000 UTC
(5:00 AM EST, 2:00 AM PST)
All India Radio
BBC
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
GBC Radio 2, Accra [A]
HCJB
MBC, Blantyre [S]
Radio Australia
Radio Bahrain
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Tanzania
Radio Vlaanderen Int'l [M-A]
SBC Radio 1, Singapore
Voice of America
ZNBC Radio 2, Lusaka [M-A]
1003
Croatian Radio, Zagreb [S]
1010
China Radio Int'l*
1030
Christian Science Monitor [M-F]
MBC, Blantyre [M-F]
Radio Austria Int'l [M-F]
Radio Korea
Radio Moscow
RTM, Malaysia
UAE Radio, Dubai
Voice of Nigeria
1040
Voice of Greece [M-A]
1055
All India Radio

1100 UTC
(6:00 AM EST, 3:00 AM PST)
BBC
Channel Africa, Johannesburg
Christian Science Monitor
Deutsche Welle
GBC Radio, Accra [A-S]
Kol Israel
MBC, Blantyre [A-S]
Radio Australia
Radio Bahrain
Radio Japan
Radio Korea
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Pakistan
SBC Radio 1, Singapore
Swiss Radio Int'l
TWR, Bonaire [M-F]
Voice of America
WWCR [M-F]
WYFR (Network) [M-F]
ZNBC Radio, Lusaka
1105
Radio Pakistan (Special English)
Radio Pyongyang
1110
Radio Belize [T-A]
Radio Botswana [M-F]
1115
Radio Korea (News Service)
Radio Nepal
1125
Radio Belize [M]
Radio Botswana [A-S]
1130
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
Radio Czechoslovakia
Radio Lesotho
Radio Moscow
Radio Netherlands
Radio Thailand
RTM, Malaysia*
1135
All India Radio (News Service)
1150
Channel Africa, Johannesburg
1155
Radio Japan [M-F]
Radio Korea [M-F]

1200 UTC
(7:00 AM EST, 4:00 AM PST)
BBC
CBC, Northern Quebec [A-S]
China Radio Int'l
Christian Science Monitor
MBC, Blantyre [M-F]
Radio Australia
Radio Bahrain
Radio Jordan
Radio Moscow
Radio Nacional do Brasil [M-A]
Radio New Zealand Int'l [S-F]
Radio Sofia
Radio Tashkent
Radio Thailand
RTM, Malaysia
SBC Radio 1, Singapore
SLBC, Sri Lanka
Voice of America
WWCR [M-A]
1210
China Radio Int'l*
1215
HCJB [M-F]
Radio Korea
1225
WYFR (Network) [M-F]
1230
All India Radio (News Service)
Christian Science Monitor [M-F]
Radio Austria Int'l [M-F]
Radio Cairo
Radio Finland [M-F]
Radio France Int'l
Radio Moscow
Radio Netherlands
Radio Vlaanderen Int'l [S]
Radio Yugoslavia
SLBC, Sri Lanka
TWR, Bonaire [A-S]
1235
Voice of Greece
1245
SLBC, Sri Lanka
1255
WYFR (Network) [M-F]
1257
HCJB [M-F]
1258
Africa Number One, Libreville

1300 UTC
(8:00 AM EST, 5:00 AM PST)
BBC ("Newshour")
CBC, Northern Quebec [A-S]
China Radio Int'l
Christian Science Monitor
GBC Radio, Accra
Polish Radio, Warsaw
Radio Australia
Radio Bahrain
Radio Belize
Radio Canada Int'l (North America) [M-F]
Radio Moscow
Radio Romania Int'l
Radio Tanzania [A-S]
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
1303
Croatian Radio, Zagreb
1305
Radio Pyongyang
1310
China Radio Int'l*
Radio Korea [M-F]
1320
Radio For Peace Int'l [T-A]
SLBC, Sri Lanka
1325
HCJB [M-F]
1328
Radio Cairo
1330
All India Radio
Christian Science Monitor [M-F]
FEBC Radio Int'l, Philippines
Radio Austria Int'l [M-F]
Radio Canada Int'l (Asia)
Radio Finland [M-F]
Radio Moscow
Radio Netherlands
Radio Tashkent
RTM, Malaysia
UAE Radio, Dubai
Voice of America (Spec English)
Voice of Turkey
1346
All India Radio [A]
1355
WYFR (Network) [M-F]

1400 UTC
(9:00 AM EST, 6:00 AM PST)
BBC
CBC, Northern Quebec
China Radio Int'l
Christian Science Monitor
ELBC, Liberia
GBC Radio, Accra
Kol Israel [S-H]
MBC, Blantyre [M-F]
Radio Australia
Radio Bahrain
Radio Belize [M-F]
Radio Canada Int'l [S]
Radio France Int'l
Radio Iraq Int'l
Radio Japan
Radio Jordan
Radio Korea
Radio Moscow
Radio Vlaanderen Int'l [M-A]
RTM, Malaysia*
SBC Radio 1, Singapore
Voice of America
ZNBC Radio 2, Lusaka [M-F]
1410
China Radio Int'l*
1415
Radio Korea (News Service)
Radio Nepal
1425
HCJB [M-F]
1430
All India Radio (News Service)
Christian Science Monitor [M-F]
FEBC Radio Int'l, Philippines
Radio Finland [M-A]
Radio Moscow
Radio Netherlands
Radio Romania Int'l
1440
FEBC Radio Int'l, Philippines* [M-F]
1445
BBC (East Asia) (Spec English) [M-F]
Voice of Myanmar
1455
All India Radio
Radio Korea [M-F]

1500 UTC
(10:00 AM EST, 7:00 AM PST)
BBC
CBC, Northern Quebec [A-S]
China Radio Int'l
Christian Science Monitor
Deutsche Welle
GBC Radio 2, Accra
National Unity Radio, Omdurman
Radio Australia
Radio Bahrain

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- The Datametrics Communications Manager provides computer control over the Radio Shack PRO2006 receiver.
- Powerful menu driven software includes full monitoring display, digital spectrum analyzer and system editor.
- Uses innovative Machine State Virtualizer technology (patent pending) hardware interface by Datametrics.
- Comprehensive manual includes step by step instructions, screen displays, and reference information.
- Extends receiver capabilities including autolog recording facilities, 1000 channel capacity per file, and much more.
- Simple 4 step installation - no soldering or modification to normal receiver operations.

Datametrics, Inc

- Computer Aided Scanning system $ 349
- PRO2006 receiver w/interface installed and CAS system $ 749
- Manual and demo disk $15

Requires Radio Shack PRO 2006 receiver and IBM PC with 360K memory (640K for full channel capacity) and parallel (printer) port.

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  - ✯ Prefixes
  - ✯ Q Signals
  - ✯ Morse Code
  - ✯ Phonetic Alphabet
  - ✯ Many More...
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  - ✯ Propagation Graph
  - ✯ Grayline (night is shaded)
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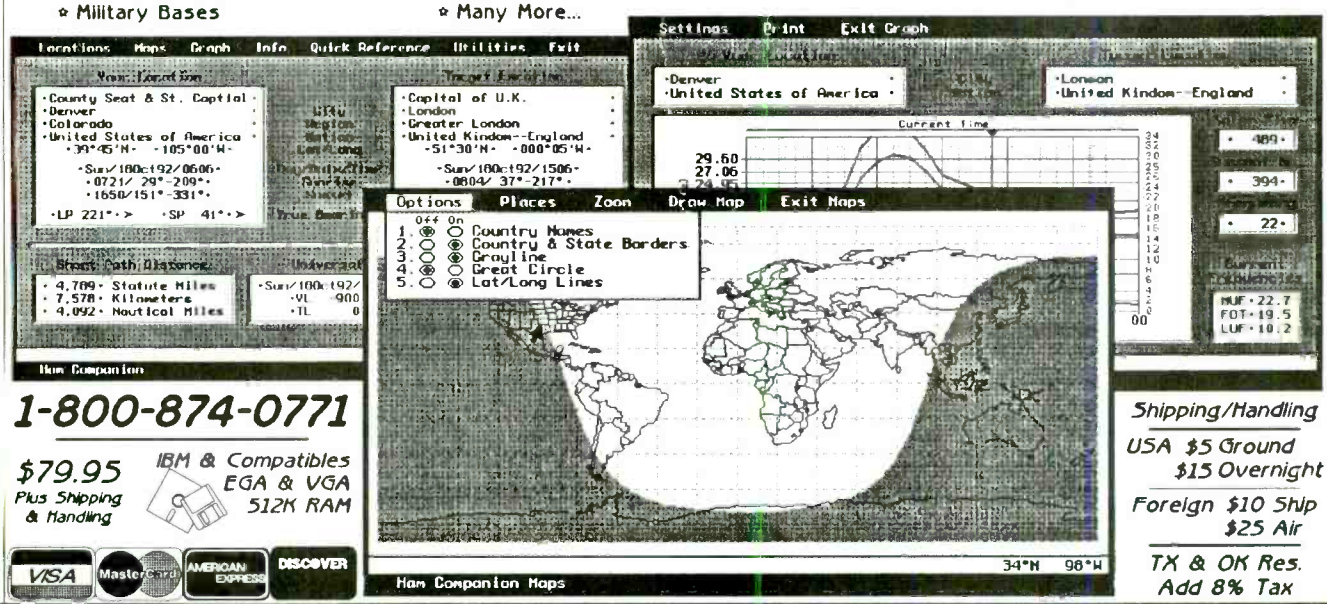
- ☆ Sunrise and Sunset Times
- ☆ Quick Reference for your most frequent calls
  - ✯ Checks if band is open to Quick Reference Cities



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newsline

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Radio Canada Int'l (na) [S]
Radio Japan
Radio Moscow
Radio Portugal [M-F]
RTM, Malaysia
SBC Radio 1, Singapore
SLBC, Sri Lanka
Swiss Radio Int'l
Voice of America
Voice of Ethiopia
WWCR [M-F]
1502
Radio Finland [M-A]
1505
Radio Pyongyang
1510
China Radio Int'l*
1515
Radio Canada Int'l (Europe)
1520
Voice of Greece
1525
Radio Veritas Asia [T-F]
1530
All India Radio (News Service)
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
FEBA, Seychelles
FEBC Radio Int'l, Philippines
Radio Austria Int'l
Radio Moscow
Radio Netherlands
Radio Tirana
Voice of Ethiopia
Voice of Nigeria
1540
Radio Veritas Asia [A-M]
Voice of Nigeria*
1545
Radio Korea (News Service)
1550
Radio For Peace Int'l [T-A]

1600 UTC
(11:00 AM EST, 8:00 AM PST)
BBC
CBC, Northern Quebec [A-S]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
ELBC, Liberia
GBC Radio 2, Accra
MBC, Blantyre
Polish Radio, Warsaw
Radio Australia
Radio Bahrain
Radio Canada Int'l (North America) [S]
Radio France Int'l
Radio Jordan
Radio Korea
Radio Lesotho
Radio Moscow
Radio Pakistan
Radio Tanzania
SBC Radio 1, Singapore
Voice of America
Yemen Radio
ZNBC Radio 2, Lusaka [M-A]
1609
BBC*
1610
China Radio Int'l*
Radio Botswana [M-F]
1615
Radio Pakistan (Special English)
1620
Radio Tallinn [M-F]
1630
Christian Science Monitor [M-F]
HCJB [M-F]
Radio Austria Int'l [M-F]
Radio Canada Int'l (Asia)
Radio Moscow
UAE Radio, Dubai
Voice of America (Europe) (Special English)
1655
Radio Korea [M-F]

1700 UTC
(12:00 PM EST, 9:00 AM PST)
BBC
CBC, Northern Quebec [A]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
GBC Radio 2, Accra
Radio Australia
Radio Bahrain
Radio Belize [M-F]
Radio Canada Int'l
Radio Japan
Radio Jordan
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Pakistan
SLBC, Sri Lanka
Swiss Radio Int'l
Voice of America
1705
Radio Pyongyang
1710
China Radio Int'l*
1715
Radio Korea (News Service)
1725
Radio Surinam Int'l [M-F]
1730
All India Radio (News Service)
Christian Science Monitor [M-F]
Radio Moscow
Radio Netherlands
Radio Romania Int'l
1740
BBC (Africa)*
1750
Channel Africa, Johannesburg

1800 UTC
(1:00 PM EST, 10:00 AM PST)
All India Radio
BBC
CBC, Northern Quebec [A]
Christian Science Monitor
GBC Radio, Accra
Kol Israel
KVOH
MBC, Blantyre
Polish Radio, Warsaw
Radio Afghanistan
Radio Australia
Radio Bahrain
Radio Belize [M-F]
Radio Canada Int'l
Radio Czechoslovakia
Radio Moscow
Radio Nacional do Brasil [M-A]
Radio New Zealand Int'l [S-F]
Radio Tanzania
Voice of America
ZNBC Radio, Lusaka
1805
Radio New Zealand Int'l* [M-F]
1815
ZNBC Radio 2, Lusaka*
1830
BSKSA, Riyadh
Christian Science Monitor [M-F]
Radio Belize
Radio Kuwait
Radio Mogadishu
Radio Moscow
Radio Netherlands
Radio Sofia
Voice of America (Spec English)
1840
Voice of Greece
1845
BSKSA, Riyadh*
Radio Cote d' Ivoire
Radio Guinea, Conakry
1855
BBC (Africa)* [M-F]

1900 UTC
(2:00 PM EST, 11:00 AM PST)
All India Radio
BBC
CBC, Northern Quebec [M-H]
China Radio Int'l
Christian Science Monitor [M-A]
Deutsche Welle
ELBC, Liberia
GBC Radio 2, Accra*
HCJB
KVOH
Radio Australia
Radio Canada Int'l [M-F]
Radio Japan
Radio Korea
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Portugal [M-F]
Radio Romania Int'l
Radio Vlaanderen Int'l
RAE, Buenos Aires [M-F]
SLBS, Freetown
Spanish National Radio
Voice of America
1903
Voice of Greece
1910
China Radio Int'l*
Radio Botswana
1930
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
Polish Radio, Warsaw
Radio Austria Int'l
Radio Czechoslovakia
Radio Finland [S-F]
Radio Ghana
Radio Moscow
Radio Netherlands
Radio Yugoslavia
Voice of Nigeria
1935
Radiotelevisione Italiana
1945
Radio Togo
1955
BBC (Africa)* [M-F]
Radio Korea [M-F]

2000 UTC
(3:00 PM EST, 12:00 PM PST)
BBC
China Radio Int'l
Christian Science Monitor
GBC Radio, Accra
Kol Israel
KVOH
MBC, Blantyre
Radio Australia
Radio Bahrain
Radio Belize [M-F]
Radio Canada Int'l
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Portugal [M-F]
SLBS, Freetown
Swiss Radio Int'l
Voice of America
Voice of Indonesia
Voice of Nigeria
ZNBC Radio 2, Lusaka
2005
Radio Pyongyang
2010
China Radio Int'l*
Radio New Zealand Int'l* [S-H]
2025
Radiotelevisione Italiana
2030
Christian Science Monitor [M-F]
Polish Radio, Warsaw
Radio Moscow
Radio Nacional de Angola
2045
BSKSA, Riyadh
Radio Korea (News Service)
Radio Sofia
2055
Voice of Indonesia

2100 UTC
(4:00 PM EST, 1:00 PM PST)
All India Radio
BBC ("Newshour")
CBC, Northern Quebec [S-F]
China Radio Int'l
Christian Science Monitor [M-A]
Deutsche Welle
ELBC, Liberia
GBC Radio 2, Accra*
KVOH
MBC, Blantyre
Radio Australia
Radio Bahrain
Radio Belize [M-F]
Radio Czechoslovakia
Radio Havana Cuba [M-A]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [A-H]
Radio Romania Int'l
SLBS, Freetown
Spanish National Radio
Voice of America
Voice of Turkey
ZNBC Radio 2, Lusaka
2110
China Radio Int'l*
Radio New Zealand Int'l* [S-H]
2120
Radio For Peace Int'l [M-F]
2125
Radio Havana Cuba* [M-A]
2130
Christian Science Monitor [M-F]
Radio Cairo
Radio Havana Cuba [M-A]
Radio Moscow
2145
Radio Korea

2200 UTC
(5:00 PM EST, 2:00 PM PST)
All India Radio
BBC
CBC, Northern Quebec [S-F]
China Radio Int'l
Christian Science Monitor
CIQX, Montreal [M-F]
GBC Radio 2, Accra
MBC, Blantyre
Radio Australia
Radio Budapest
Radio Canada Int'l
Radio Czechoslovakia
Radio Havana Cuba [M-A]
Radio Iraq Int'l
Radio Moscow
Radio New Zealand Int'l [A-H]
Radio Tirana
Radio Ukraine Int'l
Radio Vlaanderen Int'l
Radio Yugoslavia
Radiotelevisione Italiana
SBC Radio 1, Singapore
SLBS, Freetown
Swiss Radio Int'l
Voice of America
Voice of Free China
2203
Croatian Radio, Zagreb
2209
BBC*
2210
China Radio Int'l*
2215
Radio Finland [S-F]
2225
Radio Havana Cuba* [M-A]
2230
Christian Science Monitor [M-F]
Kol Israel
Radio Havana Cuba [M-A]
Radio Moscow
Radio Vilnius
Voice of America (Spec English)
2240
Radio Korea [M-F]
Voice of Greece
2245
GBC Radio, Accra
Radio Sofia
Radio Yerevan

2300 UTC
(6:00 PM EST, 3:00 PM PST)
All India Radio
BBC
CBC, Northern Quebec [M-F]
Christian Science Monitor [M-A]
ELBC, Liberia
Radio Australia
Radio Belize [M-F]
Radio Canada Int'l
Radio Japan
Radio Moscow
Radio New Zealand Int'l
RTM, Malaysia
SBC Radio 1, Singapore
Voice of America
Voice of Turkey
2305
Radio Pyongyang
2330
Christian Science Monitor [M-F]
Radio Austria Int'l [M-F]
Radio Moscow
Radio Nacional, Bogota [A]
Radio Netherlands
Radio New Zealand Int'l [S-H]
RTM, Malaysia*
2335
Voice of Greece
2340
Radio Yerevan
2345
SLBC, Sri Lanka [M]
2350
Radio For Peace Int'l [M-F]
2355
Radio Japan [M-F]

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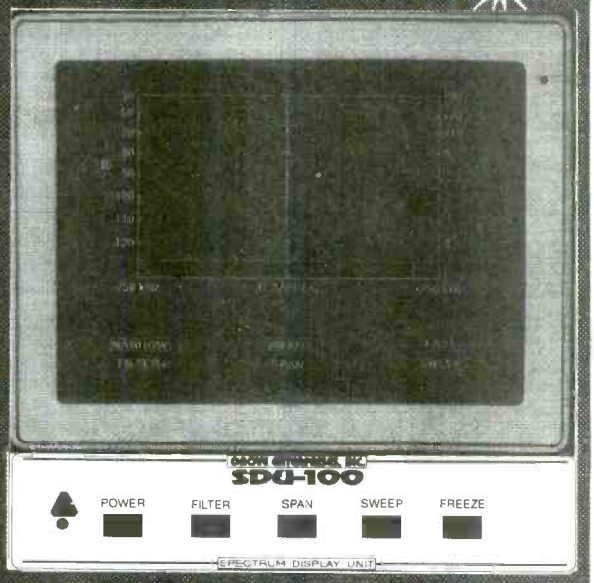
The SDU-100 is configured to operate with a variety of receiver intermediate frequencies (IFs), including 8.8, 10.7, 21.4, 45 and 70 MHz (specify at time of order).



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English language

shortwave guide

0000 UTC [7:00 PM EST/4:00 PM PST]

FREQUENCIES

0000-0025	Netherlands, Radio	6020na	6165na		
0000-0027	Czechoslovakia, Radio	7345na	9580na	11990na	
0000-0030	Australia, Radio	13605pa	15320va	15365pa	17630pa
		17750as			
0000-0030	Canada, RCI Montreal	5960am	9755am	13670am	
0000-0030 a	Croatian Radio via WHRI	7315na			
0000-0030	Lithuania, Radio Vilnius	7150na	7440na	17605na	17690na
0000-0030 sm	Norway, Radio Norway Intl	9645am			
0000-0030	Switzerland, Swiss R Intl	6135na	9650na	9885na	12035na
		17730na			
0000-0030	United Kingdom,BBC London	5975na	6005af	6175na	6195as
		7180as	7325na	7415as	9580as
		9590na	9915na	11750sa	11750sa
		11945as	11955as	12095na	15070na
		15260sa	15280va	15360pa	17830as
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100	Australia, ABC Brisbane	4920do	9660do		
0000-0100	Australia, ABC Perth	9610do			
0000-0100	Bulgaria, R Sofia	9700na	11720na		
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, CKZU Vancouver	6160do			
0000-0100	Canada, RCI Montreal	5940am	9535am	9755am	11845am
		13720am			
0000-0100	China, China Radio Intl	9770na	11715na		
0000-0100	Costa Rica, AWR	9725ca	11870ca	13750ca	
0000-0100	Costa Rica, RFPI	7375na	7385na	13630na	15030na
0000-0100	Cuba, Radio Havana Cuba	6010na	9815na		
0000-0100	Guam, KSDA	15610as			
0000-0100	New Zealand, R NZ Intl	17770pa			
0000-0100	Palau, KHBN	9830va			
0000-0100	Philippines, FEBC Manila	15450as			
0000-0100	Russia, Radio Moscow	6000na	7115na	7150na	7170va
		7220va	7295va	9685va	9725va
		9750va	9870na	9890va	12050na
		15425va	15455va	17570va	17655na
		17890va	21480na		
0000-0100	S Africa, Radio Orion	4810do			
0000-0100	Singapore, SBC1	5010do	5052do	11940do	
0000-0100	South Korea, Radio Korea	15575am			
0000-0100	Spain, Spanish Natl Radio	9530na			
0000-0100	Thailand, Radio	9655as	11905as		
0000-0100	USA, CSMonitor Boston MA	5980na	9850af	13760sa	17555as
0000-0100 sa	USA, CSMonitor Boston MA	17865as			
0000-0100	USA, KCBI Dallas TX	15725va			
0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	USA, KVOH Los Angeles CA	17775am			
0000-0100	USA, VOA Washington DC	5995am	6130as	7120as	7405am
		9455am	9770as	9775am	11580am
		11695am	11760as	15120am	15185as
		15205am	15290as	17735as	17820as
0000-0100	USA, WHRI Noblesville IN	7315na			
0000-0100	USA, WINB Red Lion PA	15145eu			
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100	USA, WRNO New Orleans LA		7355am		
0000-0100	USA, WWCR Nashville TN	7435na	13845na		
0000-0100	USA, WYFR Okeechobee FL	5985am	6065na		
0010-0020 irreg	USA, WEWN Birmingham AL	17725na			
0030-0100	Australia, Radio	15240pa	15320va	15365pa	17630as
		17715pa	17750as	17795pa	17880as
		21740pa	21775as		
0030-0100	Belgium, R Vlaanderen	9930na	13655sa		
0030-0100	Canada, RCI Montreal	5960am	9755am		
0030-0100	Ecuador, HCJB Quito	9745am	15155am	21455am	
0030-0100	Iran, VOIRI Tehran	9022am	11790am	15260am	
0030-0100	Netherlands, Radio	6020na	6165na	9860as	11655as
		11835na	15560na		
0030-0100	South Korea, Radio Korea	15575am			
0030-0100	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0030-0100	United Kingdom,BBC London	5965as	5975na	6005sa	6175na
		7135as	7325na	9580as	9590na
		9915na	11750sa	11955as	12095na
		15260sa	15280va	15360pa	17830va
0030-0100	Yugoslavia, Radio	9580am			
0035-0040	India, All India Radio	4860do	5120as	11920as	

SELECTED PROGRAMS

Sundays

0010 Voice of America (am,ca): On The Line. No details available.
0010 Voice of America (as): VOA Morning. Variety.
0011 Radio Havana Cuba: Spotlight On Latin America. Analysis.
0015 Radio Havana Cuba: Headliners. Views behind the stories.
0030 BBC: The Ken Bruce Show. Ken Bruce plays pop music.
0030 Voice of America (ca): Weekend Magazine. Music, conversations with correspondents, and talks about the arts.
0035 Radio Havana Cuba: World Of Sports. The latest sports news.
0040 Radio Havana Cuba: World Of Stamps. New releases etc.
0040 V. of America (am,as): Words And Their Stories (Spec Eng).
0045 V. of America (am): American Stories (Spec Eng). Fiction.
0045 Voice of America (as): VOA Morning. See S 0010.

Mondays

0000 Radio Havana Cuba: Sunday Review. The week in Cuba.
0000 Radio Norway Int'l: Norway Today. See S 1200.
0010 Radio Havana Cuba: The Mailbag Show. Listener letters.
0010 Voice of America (am,ca): Encounter. See S 1210.
0010 Voice of America (as): Newsline. See S 2310.
0020 Radio Havana Cuba: The Jazz Place. Langston Wright.
0030 BBC: In Praise Of God. Christian religious services.
0030 Voice of America (am,ca): Spotlight. Reports and interviews of interest to listeners in the Caribbean and Latin America.
0040 Voice of America (as): Science Report (Special English). Developments in the world of science and technology.
0045 Voice of America (as): VOA Morning. See S 0010.

Tuesdays

0010 Voice of America (am,as): Newsline. See S 2310.
0010 Voice of America (ca): Caribbean Report. The latest news, sports, financial news, and weather reports for the Caribbean.
0011 Radio Havana Cuba: Spotlight On The Americas. Analysis.
0030 BBC: Panel Game. Jazz is the subject, Green is the host.
0030 Voice of America (ca): Music, UA. (Standards). See M 1130.
0035 Radio Havana Cuba: Sports In Cuba. An in-depth look.
0040 Radio Havana Cuba: Let's Talk Law. A top jurist answers questions on Cuban justice.
0040 V. of America (am,as): Science Report (Spec Eng). M 0040.
0045 V. of America (am): This Is America (Spec Eng). M 1115.
0045 Voice of America (as): VOA Morning. See S 0010.

Wednesdays

0010 Voice of America (am,as): Newsline. See S 2310.
0010 Voice of America (ca): Caribbean Report. See T 0010.
0011 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0015 Radio Havana Cuba: Headliners. See S 0015.
0030 BBC: Omnibus. Topical features from Dracula to drugs.
0030 Voice of America (ca): Now Music, UA. See T 1130.
0040 Radio Havana Cuba: DX'ers Unlimited. See S 0140.
0040 V. of America (am,as): Science Report (Spec Eng). M 0040.
0045 V. of America (am): Science In The News (Spec Eng). T 1115.
0045 Voice of America (as): VOA Morning. See S 0010.

Thursdays

0010 Voice of America (am,as): Newsline. See S 2310.
0010 Voice of America (ca): Caribbean Report. See T 0010.
0011 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0015 Radio Havana Cuba: Headliners. See S 0015.
0030 BBC: Comedy/Quiz. See W 1530.
0030 Voice of America (ca): Now Music, UA. See T 1130.
0035 Radio Havana Cuba: The Way We See It. Staff commentary.
0040 Radio Havana Cuba: Cuba Today. A magazine program.
0040 V. of America (am,as): Science Report (Spec Eng). M 0040.
0045 V. of America (am): Space And Man (Spec Eng). W 1115.
0045 Voice of America (as): VOA Morning. See S 0010.

Fridays

0010 Voice of America (am,as): Newsline. See S 2310.
0010 Voice of America (ca): Caribbean Report. See T 0010.
0011 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0015 Radio Havana Cuba: Headliners. See S 0015.
0030 BBC: Music Feature. "Unraveling Ravel" looks at the short life of the French master (5th, 12th).
0030 Voice of America (ca): Now Music, UA. See T 1130.
0035 Radio Havana Cuba: Feature Report. News interviews
0040 V. of America (am,as): Science Report (Spec Eng). M 0040.
0045 V. of America (am): The Making Of A Nation (Spec Eng). H 0045.
0045 Voice of America (as): VOA Morning. See S 0010.

Saturdays

0010 Voice of America: Newsline. See S 2310.
0011 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0015 Radio Havana Cuba: Cuba Today. See H 0040.
0030 BBC: From The Weeklies. The international weekly press.
0030 Voice of America (ca): Country Music, UA. See F 1130.
0035 Radio Havana Cuba: The Way We See It. See H 0035.
0040 Radio Havana Cuba: Kaleidoscope. Cuban artists talking about their own contributions to Cuba's culture and arts.
0040 V. of America (am): Science Report (Spec Eng). M 0040.
0040 V. of America (as): Words And Their Stories (Spec Eng). S 0040.
0045 BBC: Recording Of The Week. See M 0615.
0045 V. of America (am): American Mosaic (Spec Eng). F 1115.
0045 Voice of America (as): VOA Morning. See S 0010.

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English language **shortwave guide**

0100 UTC [8:00 PM EST/5:00 PM PST]

FREQUENCIES

0100-0120	Italy, RAI Rome	9575am	11800am		
0100-0125	Netherlands, Radio	6020na	6165na	9860as	11655as
		11835na			
0100-0127	Czechoslovakia, Radio	5930na	7345na	9580na	
0100-0130 twhfa	Canada, RCI Montreal	5960am	9755am		
0100-0130	Iran, VOIRI Tehran	9022am	11790am	15260am	
0100-0130 sm	Norway, Radio Norway Intl	9565am			
0100-0130	South Korea, Radio Korea	9770na	11865na	15575am	
0100-0130	Sweden, Radio	9695as	11820as		
0100-0130	United Kingdom,BBC London	5965as	5975na	6005sa	6175na
		7135as	7325na	9580as	9590na
		9915na	11750sa	11955as	12095na
		15260sa	15280as	15360pa	17790va
0100-0130	Uzbekhistan, R Tashkent	5995as	7325as	7335as	9740as
		9755as	11975as		
0100-0150	Germany, Deutsche Welle	6040na	6055na	6085na	6120na
		6145na	9515na	9565na	9610na
		9770na	11865na		
0100-0159 sm	Canada, RCI Montreal	9535am	9755am	11845am	11940am
		13720am			
0100-0200 twhf	Argentina,RAE BuenosAires	11710am			
0100-0200	Australia, ABC Brisbane	920do	9660do		
0100-0200	Australia, ABC Perth	9610do			
0100-0200	Australia, Radio	13605pa	15240pa	15320va	15365pa
		17630as	17715pa	17750as	17795pa
		17880as	21590as	21740pa	21775as
0100-0200	Bulgaria, Radio Sofia	7225na	9700na	11720na	
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, CKZU Vancouver	6160do			
0100-0200	Costa Rica, RFPI	7375am	7385na	13630am	15030am
0100-0200	Cuba, Radio Havana Cuba	6010na	9815na		
0100-0200	Ecuador, HCJB Quito	9745am	15155am	21455am	
0100-0200	Japan, Radio	11840me	15195as	17810as	17835as
		17845as			
0100-0200	Namibia, Namibia BC Corp	3290af			
0100-0200	New Zealand, R NZ Intl	17770pa			
0100-0200	Philippines, FEBC Manila	15450as			
0100-0200	Russia, Radio Moscow	6000va	6045va	7115na	7150va
		7295va	9725va	9750va	9870va
		11655va	12015va	12050na	15425na
		17655va	17890va	21530va	21770va
		21790va			
0100-0200 vl	S Africa, Radio Orion	4810af			
0100-0200	Singapore, SBC1	5010do	5052do	11940do	
0100-0200	Spain, Spanish Natl Radio	9530na			
0100-0200	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0100-0200	Thailand, Radio	9655as	11905as		
0100-0200	Ukraine, R Ukraine Intl	6080eu	7180eu	7195eu	7240eu
		9640eu	9710eu	9860eu	10344eu
		17605na	17690na		
0100-0200	USA, CSMonitor Boston MA	5850na	9850af	13760na	17555as
0100-0200 sa	USA, CSMonitor Boston MA	17865as			
0100-0200	USA, KCBI Dallas TX	15725am			
0100-0200	USA, KTBN Salt Lk City UT	7510na			
0100-0200	USA, KVOH Los Angeles CA	17775am			
0100-0200	USA, VOA Washington DC	5995am	6130am	7205as	7405am
		9455am	9740as	9775am	11580am
		11705am	15120am	15205am	15250as
		17740as	21550as		
0100-0200	USA, WHRI Noblesville IN	7315am			
0100-0200	USA, WINB Red Lion PA	15145na			
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0200	USA, WRNO New Orleans LA		7355na		
0100-0200	USA, WWCR Nashville TN	5935na	7435na		
0100-0200	USA, WYFR Okeechobee FL	5985am	9505am	15440am	
0130-0150 mtwhfa	Greece, Voice of	9395na	9420na	11645na	
0130-0200	Austria, R Austria Intl	9870sa	9875na	13730na	
0130-0200	Netherlands, Radio	9860as	11655as		
0130-0200	United Kingdom,BBC London	5965as	5975na	6005na	6175na
		9580na	9915na	11955va	15280va
		15360va	17790va		
0145-0200	Vatican State, Vatican R	9650as	11935as		

SELECTED PROGRAMS

Sundays

0101 BBC: Play Of The Week. Hour-long productions from the BBC's crack drama team.
0110 Voice of America (am,ca): Communications World. A look at modern telecommunications.
0110 Voice of America (as): VOA Morning. See S 0010.
0111 Radio Havana Cuba: Sports Report. The latest sports news.
0130 Voice of America (am,ca): Press Conference, UA. Correspondents ask questions of newsmakers.
0140 Radio Havana Cuba: DX'ers Unlimited. Arnie Coro presents shortwave radio news.

Mondays

0100 Radio Havana Cuba: From Havana. Culture and the arts in Cuba.
0100 Radio Norway Int'l: Norway Today. See S 1200.
0101 BBC: Feature/Drama. Sarah Ward presents current affairs for young people in "What's News" (through March 1st).
0110 Voice of America (am,ca): New Horizons. See S 1110.
0110 Voice of America (as): Newsline. See S 2310.
0115 BBC: Feature. "East Meets West" examines how Eastern Europe views the West (1st).
0130 Radio Havana Cuba: Feature. Topical programming on various subjects.
0130 Voice of America (am,ca): Issues In The News. See S 1130.
0130 Voice of America (as): VOA Morning. See S 0010.
0145 BBC (as): South Asia Report. See S 0315.
0145 BBC: Musical Feature. Andrew Green looks at unusual instruments in "Musical Mavericks" (1st, 8th).

Tuesdays

0105 BBC: Outlook. See M 1405.
0110 Voice of America (am,ca): Report To The Americas. News, correspondent reports, interviews, and opinion.
0110 Voice of America (as): Newsline. See S 2310.
0111 Radio Havana Cuba: Sports Report. See S 0111.
0130 BBC: Folk Routes. Ian Anderson presents a selection of folk music.
0130 Voice of America (as): VOA Morning. See S 0010.
0135 Radio Havana Cuba: Feature. See M 0130.
0145 BBC (as): South Asia Report. See S 0315.
0145 BBC: Health Matters. New medical developments and methods of keeping fit.
0155 Voice of America (am,ca): Editorial. See S 1455.

Wednesdays

0105 BBC: Outlook. See M 1405.
0110 Voice of America (am,ca): Report To The Americas. See T 0110.
0110 Voice of America (as): Newsline. See S 2310.
0111 Radio Havana Cuba: Sports Report. See S 0111.
0130 BBC: Talks. Short stories from Scotland feature in "Traveling Tales" (3rd, 10th).
0130 Voice of America (as): VOA Morning. See S 0010.
0135 Radio Havana Cuba: Feature. See M 0130.
0145 BBC (as): South Asia Report. See S 0315.
0145 BBC: Country Style. David Allan profiles the country music scene on both sides of the pond.
0155 Voice of America (am,ca): Editorial. See S 1455.

Thursdays

0105 BBC: Outlook. See M 1405.
0110 Voice of America (as): Newsline. See S 2310.
0110 Voice of America (as,ca): Report To The Americas. See T 0110.
0111 Radio Havana Cuba: Sports Report. See S 0111.
0130 BBC: Waveguide. See W 0415.
0130 Voice of America (as): VOA Morning. See S 0010.
0135 Radio Havana Cuba: Feature. See M 0130.
0140 BBC: Book Choice. See W 0425.
0145 BBC (as): South Asia Report. See S 0315.
0145 BBC: The Farming World. An examination of issues that affect food production worldwide.
0155 Voice of America (am,ca): Editorial. See S 1455.

Fridays

0105 BBC: Outlook. See M 1405.
0110 Voice of America (am,ca): Report To The Americas. See T 0110.
0110 Voice of America (as): Newsline. See S 2310.
0111 Radio Havana Cuba: Sports Report. See S 0111.
0130 BBC: Seven Seas. Malcolm Billings presents news about ships and the sea.
0130 Voice of America (as): VOA Morning. See S 0010.
0135 Radio Havana Cuba: Feature. See M 0130.
0145 BBC (as): South Asia Report. See S 0315.
0145 BBC: Global Concerns. An update on environmental issues.
0155 Voice of America (am,ca): Editorial. See S 1455.

Saturdays

0105 BBC: Outlook. See M 1405.
0110 Voice of America (am,ca): Report To The Americas. See T 0110.
0110 Voice of America (as): VOA Morning. See S 0010.
0111 Radio Havana Cuba: Sports Report. See S 0111.
0130 BBC: Short Story (except 6th: Seeing Stars). See S 0430.
0135 Radio Havana Cuba: Feature. See M 0130.
0145 BBC (as): South Asia Report. See S 0315.
0145 BBC: Jazz Now And Then. George Reid presents a weekly mix of new releases, old tracks, and interviews.
0155 Voice of America (am,ca): Editorial. See S 1455.

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0200 UTC [9:00 PM EST/6:00 PM PST]

FREQUENCIES

0200-0225	Netherlands, Radio	9860as	11655as		
0200-0230 mtwhfa	Kenya, Voice of	4935do			
0200-0230 sm	Norway, Radio Norway Intl	9565na			
0200-0230	Philippines, FEBC Manila	15450as			
0200-0230	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0200-0230	Sweden, Radio	9695na	11705na		
0200-0230	Switzerland, Swiss R Intl	6135am	9650am	9885am	12035am
0200-0230	United Kingdom,BBC London	5975na	6005sa	6175na	6195eu
		7135as	7325na	9410eu	9580as
		9590na	9670me	9915na	11750sa
		11955as	12095va	15260sa	15280as
		15360pa	15380as	17790as	21715as
0200-0230	USA, KCBI Dallas TX	15725va			
0200-0230 twhfa	USA, VOA Washington DC	5995am	7405am	9775am	11580am
		15120am	15205am		
0200-0230	Yugoslavia, Radio	9580na	11870na		
0200-0250	Germany, Deutsche Welle	6035as	7285as	9615as	9690as
		9815as	11945as	12065as	
0200-0259 twhfa	Canada, RCI Montreal	9535sa	9755sa	11845sa	11940sa
		13720sa			
0200-0300	Australia, ABC Brisbane	4920do	9660do		
0200-0300	Australia, ABC Perth	6070do	9610do		
0200-0300	Australia, Radio	15240pa	15320va	15365pa	17630as
		17715pa	17750pa	17795pa	17880as
		21525as	21590as	21740pa	21775as
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, CKZU Vancouver	6160do			
0200-0300	Canada, RCI Montreal	9535am	9650am	11845am	11940am
		13720am			
0200-0300	Costa Rica, RFPI	7375na	7385na	13630na	15030na
0200-0300	Cuba, Radio Havana Cuba	5965na	6010na	9655na	
0200-0300	Ecuador, HCJB Quito	9745am	15155am	21455am	
0200-0300	Egypt, Radio Cairo	9475na	11865na		
0200-0300 as	Guam, KSDA	13720as			
0200-0300 smtwh	Malaysia, RTM Radio 4	7295do			
0200-0300	Namibia, Namibia BC Corp	3290af			
0200-0300	New Zealand, R NZ Intl	17770pa			
0200-0300	Romania, R Romania Intl	5990am	6155am	9510am	9570am
		11830am	11940am		
0200-0300	Russia, Radio Moscow	7115na	7150va	9775va	9830va
		9870va	9890va	11775va	12015va
		12050va	15425va	17655va	17890va
		21790va			
0200-0300	S Africa, Channel Africa	11745af			
0200-0300 vl	S Africa, Radio Orion	4810do			
0200-0300	Singapore, SBC1	5010do	5052do	11940do	
0200-0300	Taiwan, VO Free China	5950na	9680na	9765pa	11740ca
		11860as	15345as		
0200-0300	Thailand, Radio	9655as	11905as		
0200-0300	USA, CSMonitor Boston MA	5850na	9350af	13760sa	
0200-0300 sa	USA, CSMonitor Boston MA	17555as	17865as		
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	USA, KVOH Los Angeles CA	17775am			
0200-0300	USA, VOA Washington DC	7205as	9740as	11705as	15120am
		15205am	15250as	17735as	17740as
		21550as			
0200-0300	USA, WHRI Noblesville IN	7315na			
0200-0300	USA, WINB Red Lion PA	15145eu			
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300 vl	USA, WRNO New Orleans LA		7355am		
0200-0300	USA, WWCR Nashville TN	5935va	7435am		
0200-0300	USA, WYFR Okeechobee FL	5985am	6065am	9505am	15440am
0205-0238	Honduras,La Voz Mosquitia	4911do			
0215-0300	Iraq, Radio Iraq Intl	11860am			
0230-0245	Pakistan, Radio	9515as	17705as	17725as	21485as
		21730as			
0230-0300	Albania, R Tirana Intl	9580na	11840na		
0230-0300 s	Kenya, Voice of	4935do			
0230-0300	Netherlands, Radio	9860as	11655as		
0230-0300	Philippines, FEBC Manila	17760as	17840as	21580as	
0230-0300 twhfa	Portugal, Radio	9570am	9600am	9705am	11840am
0230-0300	Sri Lanka, SLBC Colombo	9720as	15425as		
0230-0300	United Kingdom,BBC London	5975na	6005sa	6175na	6195eu
		7135me	7325na	9670me	9915na
		11750sa	11955me	12095va	15260sa
		15280as	15360pa	15390va	17790va
		21715as			
0245-0300	India, All India Radio	3945as	7110as	11830as	15120as
		15220as			
0245-0310 smtwthf	Finland, Radio	9560na	11755na		
0250-0300	Vatican State, Vatican R	7305na	9605na		
0255-0300	Neth Antilles,TWR Bonaire	11930am			

SELECTED PROGRAMS

Sundays

0210 Voice of America: VOA Morning. See S 0010.
0211 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0215 Radio Havana Cuba: Headliners. See S 0015.
0230 BBC: Feature. A recent Royal Navy cruise is the subject of "Task Force Orient" (7th).
0235 Radio Havana Cuba: World Of Sports. See S 0035.
0240 Radio Havana Cuba: World Of Stamps. See S 0040.

Mondays

0200 Radio Havana Cuba: Sunday Review. See M 0000.
0200 Radio Norway Int'l: Norway Today. See S 1200.
0210 Radio Havana Cuba: The Mailbag Show. See M 0010.
0210 Voice of America: Newsline. See S 2310.
0220 Radio Havana Cuba: The Jazz Place. See M 0020.
0230 BBC: Composer Of The Month. Profiles of famous classical-music composers.
0230 Voice of America: VOA Morning. See S 0010.

Tuesdays

0210 Voice of America (am,ca): Focus. See M 1110.
0210 Voice of America (as): Newsline. See S 2310.
0211 Radio Havana Cuba: Spotlight On The Americas. See T 0011.
0230 BBC: Quiz. See M 1215.
0230 Voice of America (as): VOA Morning. See S 0010.
0235 Radio Havana Cuba: Sports In Cuba. See T 0035.
0240 Radio Havana Cuba: Let's Talk Law. See T 0040.

Wednesdays

0210 Voice of America (am,ca): Focus. See M 1110.
0210 Voice of America (as): Newsline. See S 2310.
0211 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0215 Radio Havana Cuba: Headliners. See S 0015.
0230 BBC: Development '93. Aid and development issues for developing nations.
0230 Voice of America (as): VOA Morning. See S 0010.
0240 Radio Havana Cuba: DX'ers Unlimited. See S 0140.

Thursdays

0210 Voice of America (am,ca): Focus. See M 1110.
0210 Voice of America (as): Newsline. See S 2310.
0211 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0215 Radio Havana Cuba: Headliners. See S 0015.
0230 BBC: Sports International. Live play-by-play, interviews, features, and discussions from the sports world.
0230 Voice of America (as): VOA Morning. See S 0010.
0235 Radio Havana Cuba: The Way We See It. See H 0035.
0240 Radio Havana Cuba: Cuba Today. See H 0040.

Fridays

0210 Voice of America (am,ca): Focus. See M 1110.
0210 Voice of America (as): Newsline. See S 2310.
0211 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0215 Radio Havana Cuba: Headliners. See S 0015.
0230 BBC: Drama. See H 1130.
0230 Voice of America (as): VOA Morning. See S 0010.
0235 Radio Havana Cuba: Feature Report. See F 0035.

Saturdays

0210 Voice of America (am,ca): Focus. See M 1110.
0210 Voice of America (as): VOA Morning. See S 0010.
0211 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0215 Radio Havana Cuba: Cuba Today. See H 0040.
0230 BBC: People And Politics. Background to the British political scene.
0235 Radio Havana Cuba: The Way We See It. See H 0035.
0240 Radio Havana Cuba: Kaleidoscope. See A 0040.

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0300 UTC [10:00 PM EST/7:00 PM PST]

FREQUENCIES

0300-0310 smtwthf	Finland, Radio	9560na	11755na		
0300-0315	Vatican State, Vatican R	7305na	9605na		
0300-0325	Netherlands, Radio	9860as	11655as		
0300-0330	Czechoslovakia, Radio	5930na	7345na	9810na	
0300-0330	Egypt, Radio Cairo	9475na	11865na		
0300-0330	Japan, Radio	5960am	15230va	15325am	17810am
		17825am	21610am		
0300-0330	Philippines, FEBC Manila	17760as	17840as	21580as	
0300-0330	United Kingdom,BBC London	5975na	6005va	6175na	6180eu
		7325na	9410eu	9600af	9915na
		11730af	11750va	11760me	15260sa
		15310as	21715va		
0300-0330	USA, VOA Washington DC	5965eu	11905me	15160me	17810eu
		17895me			
0300-0350	Germany, Deutsche Welle	6045na	6055na	6085na	6120na
		9535na	9545na	9640na	9705na
		9770na			
0300-0400	Australia, ABC Brisbane	4920do	9660do		
0300-0400	Australia, ABC Perth	9610do			
0300-0400	Australia, Radio	15240pa	15320va	15365pa	17630as
		17670as	17715pa	17750as	17795pa
		17880as	21525as	21590as	21740pa
		21775as			
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, CKZU Vancouver	6160do			
0300-0400	China, China Radio Intl	9690na	9770na	11715na	
0300-0400	Costa Rica, RFPI	7375na	7385na	13630na	15030na
0300-0400	Costa Rica, TIFC	5055ca			
0300-0400	Cuba, Radio Havana Cuba	6010na	9655na		
0300-0400	Ecuador, HCJB Quito	9745am	15155am	21455am	
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400 sm	Honduras, R Luz y Vida	3250ca			
0300-0400	Iraq, Radio Iraq Intl	11860am			
0300-0400	Kenya, Voice of	4935do			
0300-0400 smtwh	Malaysia, RTM Radio 4	7295do			
0300-0400	Neth Antilles,TWR Bonaire	9535am	11930am		
0300-0400	New Zealand, R NZ Intl	17770pa			
0300-0400	Russia, Radio Moscow	7115na	7150na	9480na	9685va
		9715na	9775va	9830va	11895va
		12015va	12050va	15425va	17890va
0300-0400	S Africa, Channel Africa	7270af	11745af		
0300-0400	Singapore, SBC1	5010do	5052do	11940do	
0300-0400	Sri Lanka, SLBC Colombo	9720as	15425as		
0300-0400	Taiwan, VO Free China	5950na	9680na	9765as	11745as
		15345na			
0300-0400	Tanzania, Radio	5985af	9685af	11765af	
0300-0400	Thailand, Radio	9655as	11905as		
0300-0400	USA, CSMonitor Boston MA	5850na	9350af	13760sa	
0300-0400 sa	USA, CSMonitor Boston MA	17555as	17865as		
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9785sa			
0300-0400	USA, VOA Washington DC	6035af	7265af	7280af	7405af
		9575af	9885af	11835af	11850af
		11890af	15115af		
0300-0400	USA, WHRI Noblesville IN	7315na			
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400 vl	USA, WRNO New Orleans LA		7395am		
0300-0400	USA, WWCR Nashville TN	5935na	7435na		
0300-0400	USA, WYFR Okeechobee FL	5985am	6065am	9505am	
0330-0355 vl	India, All India Radio	7110as	15120as	15220as	
0330-0400	Albania, R Tirana Intl	9580na	11825na		
0330-0400	Austria, R Austria Intl	9870ca	13730na		
0330-0400	Japan, Radio	5960na	11870na	17810as	
0330-0400	Netherlands, Radio	9590na	11720na		
0330-0400	UAE, UAE Radio Dubai	11795na	13695eu	15320eu	15435na
0330-0400	United Kingdom,BBC London	3255af	5975na	6005af	6175va
		6180eu	6190af	6195eu	9410eu
		9600af	9915af	11740af	11760me
		11955me	12095eu	15280as	15310as
		15420af	17885af	21715as	
0330-0400 irreg	USA, WEWN Birmingham AL	7540na			
0340-0350 mtwhfa	Greece, Voice of	9395na	9420na	11645na	
0345-0359 varies	Armenia, Radio Yerevan	11675na	*1790na	13645am	15580na

SELECTED PROGRAMS

Sundays

0310 Voice of America: VOA Morning. See S 0010.
0311 Radio Havana Cuba: Sports Report. See S 0111.
0315 BBC (as): South Asia Report. In-depth analysis of political, economic, and social developments in the subcontinent.
0315 BBC: Sports Roundup. News from the world of sports.
0330 BBC: From Our Own Correspondent. Reporters comment on the background to the news.
0335 BBC (af): Postmark Africa. Answers to any question under the sun.
0340 Radio Havana Cuba: DX'ers Unlimited. See S 0140.
0350 BBC: Write On... Listener letters, opinions, and questions.

Mondays

0300 Radio Havana Cuba: From Havana. See M 0100.
0310 Voice of America: aybreak Africa. Correspondent reports, news features, and background reports.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Anything Goes. See S 1430.
0330 Radio Havana Cuba: Feature. See M 0130.
0333 BBC (af). Network Africa. Hilton Fyle and the team present information, personalities, and music.

Tuesdays

0310 Voice of America: Daybreak Africa. See M 0310.
0311 Radio Havana Cuba: Sports Report. See S 0111.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: John Peel. Newly released albums and singles from the contemporary music scene.
0333 BBC (af): Network Africa. See M 0333.
0335 Radio Havana Cuba: Feature. See M 0130.

Wednesdays

0310 Voice of America: Daybreak Africa. See M 0310.
0311 Radio Havana Cuba: Sports Report. See S 0111.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Discovery. An in-depth look at scientific research.
0333 BBC (af): Network Africa. See M 0333.
0335 Radio Havana Cuba: Feature. See M 0130.

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Thursdays

0310 Voice of America: Daybreak Africa. See M 0310.
0311 Radio Havana Cuba: Sports Report. See S 0111.
0315 BBC: Sports Roundup. See 0315.
0330 BBC: Assignment. A weekly examination of topical issues, from Batman to bandits.
0333 BBC (af): Network Africa. See M 0333.
0335 Radio Havana Cuba: Feature. See M 0130.

Fridays

0310 Voice of America: Daybreak Africa. See M 0310.
0311 Radio Havana Cuba: Sports Report. See S 0111.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Focus On Faith. Comment and discussion on major issues in the worlds of religion.
0333 BBC (af): Network Africa. See M 0333.
0335 Radio Havana Cuba: Feature. See M 0130.

Saturdays

0310 Voice of America: VOA Morning. See S 0010.
0311 Radio Havana Cuba: Sports Report. See S 0111.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: The Vintage Chart Show. Paul Burnett with classic Top 20 hits.
0335 BBC (af): Quiz Of The Week. The Saturday edition of "Focus On Africa," with a radio game show.
0335 Radio Havana Cuba: Feature. See M 0130.

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English language

shortwave guide

0400 UTC [11:00 PM EST/8:00 PM PST]

FREQUENCIES

0400-0425	Netherlands, Radio	9590na	11720na		
0400-0427	Czechoslovakia, Radio	5930na	7345na	9810na	11985va
		13715va			
0400-0430	Canada, RCI Montreal	9505me	9650eu	9670me	
0400-0430 varies	Croatian Radio via WHRI	7315na	9495na		
0400-0430	Cuba, Radio Havana Cuba	5965na	6010na	6180am	9655na
		9815na			
0400-0430	Ecuador, HCJB Quito	9745am	15155am	21455am	
0400-0430	Guatemala, Radio Cultural	3300do			
0400-0430	Neth Antilles,TWR Bonaire	9535am	11930am		
0400-0430 sm	Norway, Radio Norway Intl	9560na	9650na		
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11830na	11940na		
0400-0430	Sri Lanka, SLBC Colombo	9720as	15425as		
0400-0430	Switzerland, Swiss R Intl	6135na	9860na	12035na	13635na
0400-0430	Tanzania, Radio	5985af	9685af	11765af	
0400-0430	Thailand, Radio	9655as	11905as		
0400-0430	United Kingdom,BBC London	3255va	5975na	6005af	6175am
		6180eu	6195eu	7325na	9410eu
		9750eu	9915af	11750va	11955me
		15070va	15280as	15310va	15575va
		15590eu			
0400-0430	USA, VOA Washington DC	7265af	7280af	7405af	9575af
		9885af	11835af	11850af	15115af
0400-0450	Germany, Deutsche Welle	6065af	6130af	7150af	7225af
		7275af	9665am	9765af	11765af
		13770af			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0500	Australia, ABC Brisbane	4920do	9660do		
0400-0500	Australia, ABC Perth	9610do			
0400-0500	Australia, Radio	15240pa	15365pa	17630as	17715pa
		17750as	17795pa	17880as	21525as
		21740pa	21775as		
0400-0500	Bulgaria, Radio Sofia	7290eu	9700na	11720na	
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, CKZU Vancouver	6160do			
0400-0500	China, China Radio Intl	11680na			
0400-0500	Costa Rica, RFPI	7375na	7385na	13630na	15030om
0400-0500	Iraq, Radio Iraq Intl	11860am			
0400-0500	Kenya, Voice of	4935do			
0400-0500 smtwh	Malaysia, RTM Radio 4	7295do			
0400-0500 mtwhf	Namibia, Namibia BC Corp	3270af	3290af		
0400-0500	New Zealand, R NZ Intl	15120pa			
0400-0500	Russia, Radio Moscow	7150va	7295va	9665va	9735va
		9870va	11675va	11895va	12055va
		15425na	17765va	17870va	17890va
0400-0500	S Africa, Channel Africa	7270af	15345af		
0400-0500 vl	S Africa, Radio Oranje	3230do			
0400-0500	Singapore, SBC1	5010do	5052do	11940do	
0400-0500	Turkey, Voice of	9445na			
0400-0500	USA, CSMonitor Boston MA	5850na	9840af	9870na	13760na
		17780as			
0400-0500 sa	USA, CSMonitor Boston MA	17555as			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9785am	9815am		
0400-0500	USA, VOA Washington DC	5995me	6035me	6040me	6140me
		6155me	6873me	7170me	7405me
0400-0500	USA, WHRI Noblesville IN	7315na	9495sa		
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	5935va	7435na		
0400-0500	USA, WYFR Okeechobee FL	5985am	6065am	9505am	
0425-0440	Italy, RAI Rome	5990eu	7275me		
0430-0500	Cuba, Radio Havana Cuba	6010na	6180na	9815na	
0430-0500	Nigeria, Radio	3326do	4770do		
0430-0500	Russia, AWR Russia	15125eu			
0430-0500	Swaziland, TWR	5055af	5965af	7215af	9655af
		11750af			
0430-0500	United Kingdom,BBC London	5975na	6005af	6175eu	6180eu
		6195eu	9410eu	9600af	9770va
		12095va	15280as	15310va	15400af
		15575va	17885va	21470as	
0445-0500 t	Sri Lanka, SLBC Colombo	9720na	15425na		
0455-0500	Nigeria, Voice of	7255af			

SELECTED PROGRAMS

Sundays

0410 Voice of America: VOA Morning. See S 0010.
0411 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0415 BBC (af): African Perspective. A look at a major issue affecting Africa.
0415 BBC: Feature. "Inside The Photograph Album" looks at — you guessed it — other people's photo albums (through March 7th).
0415 Radio Havana Cuba: Headliners. See S 0015.
0430 BBC: Short Story. Dramas written by BBC listeners (except 7th: Seeing Stars, a monthly look at astronomy).
0435 Radio Havana Cuba: World Of Sports. See S 0035.
0440 Radio Havana Cuba: World Of Stamps. See S 0040.
0445 BBC: Talks. Julia Arrowsmith travels in search of "Music From The Med" (7th, 14th, 21st).

Mondays

0400 Radio Havana Cuba: Sunday Review. See M 0000.
0400 Radio Norway Int'l: Norway Today. See S 1200.
0410 Radio Havana Cuba: The Mailbag Show. See M 0010.
0410 Voice of America: Newsline. See S 2310.
0415 BBC (af): Network Africa. See M 0333.
0415 BBC: Talks. Poets from various parts of England are the subject of "Poets And Places" (1st, 8th, 15th).
0420 Radio Havana Cuba: The Jazz Place. See M 0020.
0430 BBC: Off The Shelf. Serialized readings from famous books.
0430 Voice of America: VOA Morning. See S 0010.
0445 BBC: Andy Kershaw's World Of Music. New and unusual music from the world over.

Tuesdays

0410 Voice of America: Newsline. See S 2310.
0411 Radio Havana Cuba: Spotlight On The Americas. See T 0011.
0415 BBC (af): Network Africa. See M 0333.
0415 BBC: Health Matters. See T 0145.
0430 BBC: Off The Shelf. See M 0430.
0430 Voice of America: VOA Morning. See S 0010.
0435 Radio Havana Cuba: Sports In Cuba. See T 0035.
0440 Radio Havana Cuba: Let's Talk Law. See T 0040.
0445 BBC: Talks. See M 2315.

Wednesdays

0410 Voice of America: Newsline. See S 2310.
0411 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0415 BBC (af): Network Africa. See M 0333.
0415 BBC: Waveguide. Tips on how to hear the BBC better.
0415 Radio Havana Cuba: Headliners. See S 0015.
0425 BBC: Book Choice. A short review of a recently released book.
0430 BBC: Off The Shelf. See M 0430.
0430 Voice of America: VOA Morning. See S 0010.
0440 Radio Havana Cuba: DX'ers Unlimited. See S 0140.
0445 BBC: Country Style. See W 0145.

Thursdays

0410 Voice of America: Newsline. See S 2310.
0411 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0415 BBC (af): Network Africa. See M 0333.
0415 BBC: The Farming World. See H 0145.
0415 Radio Havana Cuba: Headliners. See S 0015.
0430 BBC: Off The Shelf. See M 0430.
0430 Voice of America: VOA Morning. See S 0010.
0435 Radio Havana Cuba: The Way We See It. See H 0035.
0440 Radio Havana Cuba: Cuba Today. See H 0040.
0445 BBC: From Our Own Correspondent. See S 0330.

Fridays

0410 Voice of America: Newsline. See S 2310.
0411 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0415 BBC (af): Network Africa. See M 0333.
0415 BBC: Musical Feature. See M 0145.
0415 Radio Havana Cuba: Headliners. See S 0015.
0430 BBC: Off The Shelf. See M 0430.
0430 Voice of America: VOA Morning. See S 0010.
0435 Radio Havana Cuba: Feature Report. See F 0035.
0445 BBC: Folk Routes. See T 0130.

Saturdays

0410 Voice of America: VOA Morning. See S 0010.
0411 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0415 BBC (af): TalkAbout Africa. Discussion of events from the week just past.
0415 BBC: Good Books. See W 1445.
0415 Radio Havana Cuba: Cuba Today. See H 0040.
0430 BBC: Jazz Now And Then. See A 0145.
0435 Radio Havana Cuba: The Way We See It. See H 0035.
0440 Radio Havana Cuba: Kaleidoscope. See A 0040.
0445 BBC: Worldbrief. See F 2315.

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0500 UTC [12:00 AM EST/9:00 PM PST]

FREQUENCIES

0500-0515	Iraq, Radio Iraq Intl	11860am			
0500-0515	Israel, KOL Israel	9435na			
0500-0515 t	Sri Lanka, SLBC Colombo	9720na	15425na		
0500-0530	Swaziland, TWR	9655af			
0500-0530	United Kingdom,BBC London	5975na	6005af	6180eu	6195eu
		9410eu	9600af	9640na	9750va
		12095va	15280as	15310va 1	5400af
		15575as	17830va	17885va	
0500-0530	Vatican State, Vatican R	11625af	15090af	17730af	
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na 6	130na
		9535na	9670na	9690na	
0500-0600	Australia, ABC Brisbane	4920do	9660do		
0500-0600	Australia, ABC Perth	9610do			
0500-0600	Australia, Radio	15240pa	15320pa	15365pa	17630as
		17715pa	17750as	17795pa	17880as
		21525as	21740pa	21775as	
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	11840am			
0500-0600	Costa Rica, RFPI	7375na	7385na	13630na	15030na
0500-0600	Cuba, Radio Havana Cuba	9510na			
0500-0600	Ecuador, HCJB Quito	9745am	11925am	21455am	
0500-0600 sa	Eq Guinea, R East Africa	9585af			
0500-0600 irreg	Italy, IRRS Milan	7125eu			
0500-0600	Japan, Radio	6085me	7230eu	15230na	17765na
		17810na	17825na	17860as	21610na
0500-0600	Kenya, Voice of	4935do			
0500-0600	Malaysia, RTM Radio 4	7295do			
0500-0600 mtwhf	Namibia, Namibia BC Corp	3270af	3290af		
0500-0600	New Zealand, R NZ Intl	15120pa			
0500-0600	Nigeria, Radio	3326do	4770do	4990do	
0500-0600	Nigeria, Voice of	7255af			
0500-0600	Russia, Radio Moscow	5950eu	6165eu	7150na	7165na
		7170va	7180na	7255af	7270va
		7390eu	9870na	9890eu	12050va
		15455va	17570va	17890va	
0500-0600	S Africa, Channel Africa	15430af			
0500-0600	Singapore, SBC1	5052do	11940do		
0500-0600	Spain, Spanish Natl Radio	9530na			
0500-0600	Thailand, Radio	9655as	11905as		
0500-0600	USA, CSMonitor Boston MA	5850na	9840af	9870na	13760na
		17780as			
0500-0600 sa	USA, CSMonitor Boston MA	17555as			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9785am	9815am		
0500-0600	USA, VOA Washington DC	5995me	6035af	6040me	6140me
		7170me	7405af	9530me	9575af
		9635me	9700me	9885af	11825me
		11850af	12080me	15115af	15205me
		15600af			
0500-0600	USA, WHRI Noblesville IN	7315na	9495na		
0500-0600	USA, WINB Red Lion PA	15145eu			
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA		7395am		
0500-0600	USA, WWCR Nashville TN	5935na	7435na		
0500-0600	USA, WYFR Okeechobee FL	5985am	9880eu	11915eu	13695eu
0510-0515	Botswana, Radio	7255af			
0510-0600 vl	S Africa, Radio Oranje	9630do			
0524-0600 f	Ghana, GBC Radio 2	3366do			
0525-0600	Ghana, GBC Radio 1	4915do			
0530-0600	Austria, R Austria Intl	6015na	6155eu	13730eu	15410eu
		21490me			
0530-0600	Romania, R Romania Intl	11840af	15380af	17720af	17745af
		17790af	21665af		
0530-0600	Russia, AWR Russia	15125as			
0530-0600	Swaziland, TWR	5965af	11750af		
0530-0600	UAE, UAE Radio Dubai	15435as	17830as	21700as	
0530-0600	United Kingdom,BBC London	5975na	6085va	6180as	6190af
		6195eu	9410eu	9640na	9740eu
		15310va	15360va	15400af	15400va
		17885va	21470eu		

SELECTED PROGRAMS

Sundays
0510 Voice of America: VOA Morning. See S 0010.
0511 Radio Havana Cuba: Sports Report. See S 0111.
0530 BBC (eu): Europe This Weekend. News and features, pro files, and trends for Europe.
0540 Radio Havana Cuba: DX'ers Unlimited. See S 0140.

Mondays
0500 Radio Havana Cuba: From Havana. See M 0100.
0510 Voice of America: Newsline. See S 2310.
0530 BBC (eu): Europe Today. The latest news, analysis, and comment for the new Europe.
0530 Radio Havana Cuba: Feature. See M 0130.
0530 Voice of America: VOA Morning. See S 0010.

Tuesdays
0510 Voice of America: Newsline. See S 2310.
0511 Radio Havana Cuba: Sports Report. See S 0111.
0530 BBC (eu): Europe Today. See M 0530.
0530 Voice of America: VOA Morning. See S 0010.
0535 Radio Havana Cuba: Feature. See M 0130.

Wednesdays
0510 Voice of America: Newsline. See S 2310.
0511 Radio Havana Cuba: Sports Report. See S 0111.
0530 BBC (eu): Europe Today. See M 0530.
0530 Voice of America: VOA Morning. See S 0010.
0535 Radio Havana Cuba: Feature. See M 0130.

Thursdays
0510 Voice of America: Newsline. See S 2310.
0511 Radio Havana Cuba: Sports Report. See S 0111.
0530 BBC (eu): Europe Today. See M 0530.
0530 Voice of America: VOA Morning. See S 0010.
0535 Radio Havana Cuba: Feature. See M 0130.

Fridays
0510 Voice of America: Newsline. See S 2310.
0511 Radio Havana Cuba: Sports Report. See S 0111.
0530 BBC (eu): Europe Today. See M 0530.
0530 Voice of America: VOA Morning. See S 0010.
0535 Radio Havana Cuba: Feature. See M 0130.

Saturdays
0510 Voice of America: VOA Morning. See S 0010
0511 Radio Havana Cuba: Sports Report. See S 0111.
0530 BBC (eu): Europe Today. See M 0530.
0535 Radio Havana Cuba: Feature. See M 0130.

Special from the Program Manager:

Although in our frequency listings you may find frequencies directed toward Africa, the Middle East and North America all compiled under one broadcast listing, these services may not necessarily carry the same programming. Please note that we have added target areas to the selected programming to clarify which program is carried on which frequencies.

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English language

shortwave guide

0600 UTC [1:00 AM EST/10:00 PM PST]

FREQUENCIES

0600-0615	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu	
0600-0620	Vatican State, Vatican R	6245eu	7250eu		
0600-0625	Kenya, Voice of	4935do			
0600-0630 s	Latvia, Radio Riga	5935eu			
0600-0630	Switzerland, Swiss R Intl	9860af	13635af	17565af	
0600-0630	United Kingdom,BBC London	5975na	6180eu	6195eu	7150pa
		9410eu	9590na	9750eu	11940af
		15280va	15360as	15400va	15420af
		17790sa	17830va		
0600-0640 last a	Lithuania, Radiocentras	9710eu			
0600-0645	Romania, R Romania Intl	7225eu	9510eu	9570eu	11775eu
0600-0650	Germany, Deutsche Welle	11765af	13610af	13790af	15185af
		15435af	17875af		
0600-0650	North Korea, R Pyongyang	15180as	15230as		
0600-0658	New Zealand, R NZ Intl	15120pa			
0600-0700	Australia, Radio	6020pa	11670va	11720pa	11880pa
		15240pa	15320pa	15365pa	17715pa
		21740pa			
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			
0600-0700	Costa Rica, RFPI	7375na	7385na	13630am	15030na
0600-0700	Cuba, Radio Havana Cuba	6000na	9510na		
0600-0700	Ecuador, HCJB Quito	11925am	15155am	21455am	
0600-0700 sa	Eq Guinea, R East Africa	9585af			
0600-0700	Ghana, GBC Radio 1	4915do			
0600-0700 f	Ghana, GBC Radio 2	3366do			
0600-0700 irreg	Italy, IRRS Milan	7125eu			
0600-0700	Kiribati, Radio	17440do			
0600-0700	Lebanon, King of Hope	6280me			
0600-0700 smtwha	Malaysia, RTM Radio 4	7295do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295as	
0600-0700	Malta, VO the Mediterean	9765eu			
0600-0700 s	New Zealand, ZLXA	3935do			
0600-0700	Nigeria, Radio	3326do	4770do	4990do	
0600-0700	Nigeria, Voice of	7255af			
0600-0700	Russia, Radio Moscow	5905va	7150eu	7165va	7170va
		7175va	7180eu	7270na	9860va
		9870va	9890eu	17570va	
0600-0700	S Africa, Channel Africa	15430af			
0600-0700 vl	S Africa, Radio Oranje	9630do			
0600-0700	Singapore, SBC1	5010do	5052do	11940do	
0600-0700	South Korea, Radio Korea	7275na	11945na	15155na	
0600-0700	Swaziland, TWR	5965af	7200af	11740af	
0600-0700 sa	Thailand, Radio	9655as	11905as		
0600-0700	USA, CSMonitor Boston MA	5850na	7395eu	17555as	17780as
0600-0700	USA, KTBN Salt Lk City UT	7510na			
0600-0700	USA, KVOH Los Angeles CA	9785na			
0600-0700	USA, VOA Washington DC	3980eu	5995eu	6035af	6040eu
		6060me	6873eu	7325me	7405af
		9530af	9575af	9885af	11850af
		11925af	15115af	15600af	
0600-0700	USA, WHRI Noblesville IN	7315eu	9495am		
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WWCR Nashville TN	5935na	7435na		
0600-0700	USA, WYFR Okeechobee FL	5985am	7355eu	11915af	13695af
0603-0610 tent	Croatia, Croatian Radio	6210eu	9830eu	13830eu	
0615-0700 mtwhf	Canada, RCI Montreal	6150eu	7155eu	9740af	9760eu
		11935af			
0625-0700	Kenya, Voice of	4935do			
0630-0700	Austria, R Austria Intl	6015na			
0630-0700 smtwhf	New Zealand, ZLXA	3935do			
0630-0700	United Kingdom,BBC London	5975na	6180eu	6195eu	7150pa
		9410eu	9640va	9750eu	11760me
		11940af	11955as	12095eu 1	5280as
		15400af	17790as	17885va	
0630-0700	Vatican State, Vatican R	11625af	15090af	17730af	
0635-0700	Monaco, TWR Monte Carlo	9480eu			
0645-0700	Ghana, GBC	6130af			
0645-0700	Romania, R Romania Intl	11810pa	11940pa	15335pa	17720pa
		17805pa	21665pa		
0655-0700	Neth Antilles,TWR Bonaire	11815am	15345am		

SELECTED PROGRAMS

Sundays

0605 BBC (af): Postmark Africa. See S 0335.
0610 Voice of America: VOA Morning. See S 0010.
0611 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0615 BBC: Letter From America. Alistair Cooke shares his inimi table view of American life.
0615 Radio Havana Cuba: Headliners. See S 0015.
0630 BBC (af): African Perspective. See S 0415.
0630 BBC: Jazz For The Asking. Digby Fairweather plays listener requests.
0635 Radio Havana Cuba: World Of Sports. See S 0035.
0640 Radio Havana Cuba: World Of Stamps. See S 0040.

Mondays

0600 Radio Havana Cuba: Sunday Review. See M 0000.
0610 Radio Havana Cuba: The Mailbag Show. See M 0010.
0610 Voice of America (af): Daybreak Africa. See M 0310.
0610 Voice of America (eu): Newsline. See S 2310.
0615 BBC: Recording Of The Week. A personal choice of new classical music releases.
0620 Radio Havana Cuba: The Jazz Place. See M 0020.
0630 BBC: Feature. See S 1401.
0630 Voice of America (eu): VOA Morning. See S 0010.
0633 BBC (af): Network Africa. See M 0333.

Tuesdays

0610 Voice of America (af): Daybreak Africa. See M 0310.
0610 Voice of America (eu): Newsline. See S 2310.
0611 Radio Havana Cuba: Spotlight On The Americas. See T 0011.
0615 BBC: The World Today. See M 1645.
0630 BBC: Rock/Pop Music. Hear the latest in reggae, soul, and rap on "World Ranking" (2nd).
0630 Voice of America (eu): VOA Morning. See S 0010.
0633 BBC (af): Network Africa. See M 0333.
0635 Radio Havana Cuba: Sports In Cuba. See T 0035.
0640 Radio Havana Cuba: Let's Talk Law. See T 0040.

Wednesdays

0610 Voice of America (af): Daybreak Africa. See M 0310.
0610 Voice of America (eu): Newsline. See S 2310.
0611 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0615 BBC: The World Today. See M 1645.
0615 Radio Havana Cuba: Headliners. See S 0015.
0630 BBC: Meridian. Events in the world of the arts.
0630 Voice of America (eu): VOA Morning. See S 0010.
0633 BBC (af): Network Africa. See M 0333.
0640 Radio Havana Cuba: DX'ers Unlimited. See S 0140.

Thursdays

0610 Voice of America (af): Daybreak Africa. See M 0310.
0610 Voice of America (eu): Newsline. See S 2310.
0611 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0615 BBC: The World Today. See M 1645.
0615 Radio Havana Cuba: Headliners. See S 0015.
0630 BBC: Sports International. See H 0230.
0630 Voice of America (eu): VOA Morning. See S 0010.
0633 BBC (af): Network Africa. See M 0333.
0635 Radio Havana Cuba: The Way We See It. See H 0035.
0640 Radio Havana Cuba: Cuba Today. See H 0040.

Fridays

0610 Voice of America (af): Daybreak Africa. See M 0310.
0610 Voice of America (eu): Newsline. See S 2310.
0611 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0615 BBC: The World Today. See M 1645.
0615 Radio Havana Cuba: Headliners. See S 0015.
0630 BBC: Meridian. See W 0630.
0630 Voice of America (eu): VOA Morning. See S 0010.
0633 BBC (af): Network Africa. See M 0333.
0635 Radio Havana Cuba: Feature Report. See F 0035.

Saturdays

0605 BBC (af): Quiz Of The Week. See A 0335.
0610 Voice of America: VOA Morning. See S 0010.
0611 Radio Havana Cuba: Spotlight On Latin America. See S 0011.
0615 BBC: The World Today. See M 1645.
0615 Radio Havana Cuba: Cuba Today. See H 0040.
0630 BBC (af): Spice Taxi. A look at African culture, from presidential style to cult films.
0630 BBC: Meridian. See W 0630.
0635 Radio Havana Cuba: The Way We See It. See H 0035.
0640 Radio Havana Cuba: Kaleidoscope. See A 0040.

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0700 UTC [2:00 AM EST/11:00 PM PST]

0700-0715	Romania, R Romania Intl	11810pa	11940pa	15335pa	17720pa
		17805pa	21665pa		
0700-0715	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu	
0700-0730	Australia, Radio	6020pa	11720va	11880pa	15240pa
		15320va	15365pa	17695as	17750as
		21740pa			
0700-0730	Czechoslovakia, Radio	6055eu	7345eu	9505eu	11990eu
0700-0730	United Kingdom,BBC London	3955na	5970eu	5975na	6025eu
		6195eu	7150pa	7325af	9410eu
		9640va	9750eu	11940af 1	5325eu
		15360pa	17885va	21470va	
0700-0750	North Korea, R Pyongyang	15350as	17765as		
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, RFPI	7375na	7385na	13630na	15030na
0700-0800	Ecuador, HCJB Quito	6205eu	9745eu	11835eu	21455eu
0700-0800	Ghana, GBC	6130af			
0700-0800	Ghana, GBC Radio 1	4915do			
0700-0800 f	Ghana, GBC Radio 2	3366do			
0700-0800 irreg	Italy, IRRS Milan	7125eu			
0700-0800	Japan, Radio	5970eu	6025eu	15405pa	17765eu
		17810as	17860as	21575as	
0700-0800	Kenya, Voice of	4935do			
0700-0800	Lebanon, King of Hope	6280me			
0700-0800 smtwha	Malaysia, RTM Radio 4	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as	
0700-0800	Monaco, TWR Monte Carlo	9480eu			
0700-0800	Neth Antilles,TWR Bonaire	11815am	15345am		
0700-0800	New Zealand, R NZ Intl	9700pa			
0700-0800 smtwhf	New Zealand, ZXLA	3935do			
0700-0800	Nigeria, Radio	3326do	4990do		
0700-0800	Russia, Radio Moscow	5905va	9490eu	9890va	12010af
		12055af	13650va	13705va	15190va
		15280af	15345af	15440eu	15465af
		15470af	15520af	15540va	15550af
		17580eu	17655af	17675af	17860eu
0700-0800 vl	S Africa, Radio Oranje	9630do			
0700-0800	Singapore, SBC1	5010do	5052do	11940do	
0700-0800	Taiwan, VO Free China	5950na			
0700-0800 sa	Thailand, Radio	9655as	11905as		
0700-0800	USA, CSMonitor Boston MA	5850eu	7395am	9445na	9870am
		17555as	17780as		
0700-0800	USA, KTBN Salt Lk City UT	7510na			
0700-0800	USA, KVOH Los Angeles CA	9785na			
0700-0800	USA, WHRI Noblesville IN	7315eu			
0700-0800	USA, WJCR Upton KY	7490na	9495na	13595na	
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	5935va	7435am		
0700-0800	USA, WYFR Okeechobee FL	5985va	7355va	9680va	11915af
		13695eu			
0703-0715 s	Croatia, Croatian Radio	6210eu	9830eu	13830eu	
0730-0735	India, All India Radio	15250as	17850as		
0730-0745 mtwhf	iceland, Natl BC Service	9265om			
0730-0745 mtwhfa	Vatican State, Vatican R	6245do	7250do	9645na	15210na
0730-0755	Belgium, R Vlaanderen	5910eu	9905va	11695pa	
0730-0800	Australia, Radio	6020pa	11720pa	11880pa	15240pa
		15365pa	17630as	17750as	21525as
		21590as			
0730-0800	Czechoslovakia, Radio	17725pa	21705as		
0730-0800	Italy, AWR Europe	7210eu			
0730-0800	Netherlands, Radio	9630pa	11895pa		
0730-0800	United Kingdom,BBC London	5970eu	6195na	7150pa	7325eu
		9410eu	9640va	9660va	9750eu
		9760eu	9915af	15310va	15420va
		17790va	17830va	17885va	
0745-0800	Finland, Radio	6120af	9560me	11755eu	

0800 UTC [3:00 AM EST/12:00 AM PST]

0800-0825	Malaysia, Voice of	6175as	9750as	15295as	
0800-0825	Netherlands, Radio	9630pa	11895pa		
0800-0830	Australia, Radio	5995pa	6020pa	9580pa	9710pa
		15240pa	17630as	21590as	25750as
0800-0830	Ecuador, HCJB Quito	6205eu 1	1835eu	11925eu	21455eu
0800-0830	Neth Antilles,TWR Bonaire	11815am	15345am		
0800-0830	United Kingdom,BBC London	6190na	7150pa	9750eu	11940af
		15280as	15360pa	15400na	15420va
		17640va	17790va	17830va	17885va
0800-0835	Monaco, TWR Monte Carlo	9480eu			
0800-0845	Pakistan, Radio	17900eu	21520eu		
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0900	Australia, ABC Brisbane	9660do			
0800-0900	Australia, ABC Perth	15425va			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica, RFPI	13630am	15030na		
0800-0900	Ghana, GBC Radio 1	4915do			
0800-0900 f	Ghana, GBC Radio 2	3366do			
0800-0900 asmtwh	Guam, KTWR	15200as			
0800-0900 irreg	Italy, IRRS Milan	7125eu			
0800-0900	Kenya, Voice of	4935do			
0800-0900	Lebanon, King of Hope	6280me			
0800-0900 smtwha	Malaysia, RTM Radio 4	7295do			
0800-0900	New Zealand, R NZ Intl	9700pa			
0800-0900 smtwhf	New Zealand, ZXLA	3935do			
0800-0900	Nigeria, Radio	3326do	4990do		
0800-0900	Nigeria, Voice of	7255af			
0800-0900	Papua New Guinea, NBC	4890do			
0800-0900	Russia, Radio Moscow	4940af	4975af	6110af	7130af
		9580va	11765af	12010va	*2020va
		12055af	12070eu	13650va	13705va
		15190eu	15210va	15345va	15440va
		17675af	17805af	17860va	21655af
0800-0900 vl	S Africa, Radio Oranje	9630do			
0800-0900	Singapore, SBC1	5010do	5052do	11940do	
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, Radio Korea	7550eu	13670eu		
0800-0900	USA, CSMonitor Boston MA	9445am	9840am	11705eu	13615as
		15665pa			
0800-0900	USA, KNLS Anchor Point AK	7365as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, VOA Washington DC	11735eu	15160eu	15195me	21455me
		21570me			
0800-0900	USA, WHRI Noblesville IN	7315eu			
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5935va	7435am		
0830-0845	Vatican State, Vatican R	6245eu	7250eu	9645eu	15210eu
0830-0900	Australia, Radio	5995na	6020pa	6080pa	9580pa
		9710pa	15240pa	17630as	17750as
		21590as			
0830-0900	Austria, R Austria Intl	6155eu	13730eu	15450au	21490as
0830-0900	Ecuador, HCJB Quito	9745au	11925au	15270eu	21455au
0830-0900	Finland, Radio	17800as	21550as		
0830-0900	India, All India Radio	7250as	9610as	11970as	15250as
		17850as			
0830-0900	Netherlands, Radio	9630pa	11895pa		
0830-0900	United Kingdom,BBC London	6190va	6195eu	7325va	9750eu
		11940eu	15280as	15360pa	15360pa
		15400va	15420va	15575va	17640va
		17790as	17830va	17885va	
0835-0850 smtwhf	Monaco, TWR Monte Carlo	9480eu			
0850-0900 s	Monaco, TWR Monte Carlo	9480eu			

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0900 UTC [4:00 AM EST/1:00 AM PST]

0900-0905	Ghana, GBC Radio 1	4915do			
0900-0905 f	Ghana, GBC Radio 2	3366do			
0900-0910	India, All India Radio	9610as	11970as	15250as	17850as
0900-0915 s	Monaco, TWR Monte Carlo	9480eu			
0900-0925	Netherlands, Radio	9630pa	11895pa		
0900-0930	Costa Rica, RFPI	7375na	13630am	15030na	
0900-0930 mtwhf	New Zealand, ZLXA	3935do			
0900-0930	Switzerland, Swiss R Intl	9560pa	13685pa	17670pa	21770pa
0900-0930	United Kingdom,BBC London	6190as	6195eu	7180eu	9410eu
		9740eu	9750eu	11765as	15190am
		15575va	17640va	17705va	17790va
		17830va	17885va	21470va	
0900-0950	Germany, Deutsche Welle	6160as	11715as	11915as	15410af
		17780pa	17820as	21465as	21600af
		21650as	21680as		
0900-1000	Australia, ABC Brisbane	4920do	9660do		
0900-1000	Australia, Radio	5995pa	6020pa	9510pa	9580pa
		13605as	15170as	21725as	
0900-1000 s	Bhutan, BC Service	6035do			
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	11755au	15440au	17710au	
0900-1000	Ecuador, HCJB Quito	9745au	11925au	21455au	
0900-1000	Finland, Radio	17800as	21550as		
0900-1000	Guam, KTWR	11805pa			
0900-1000 s	Italy, AWR Europe	7230eu			
0900-1000 irreg	Italy, IRRS Milan	7125eu			
0900-1000	Japan, Radio	11815eu	11840eu	15270au	17860as
		21610as			
0900-1000	Kenya, Voice of	4935do			
0900-1000	Lebanon, King of Hope	6280me			
0900-1000	Malaysia, RTM Radio 4	7295do			
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-1000	Nigeria, Radio	3326do	4990do		
0900-1000	Nigeria, Voice of	7255af			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Philippines, FEBC Manila	9800as	11685as		
0900-1000	Russia, Radio Moscow	4940af	6110af	7130af	9755af
		11765af	12010va	12020va	12055af
		12070va	13650va	15175va	15210va
		15435va	15440va	15540va	17565va
		17860va	21755va	21825af	21845af
0900-1000 vl	S Africa, Radio Oranje	9630do			
0900-1000	Singapore, SBC1	5010do	5052do	11940do	
0900-1000	USA, CSMonitor Boston MA	9445am	9840eu	11705eu	13615pa
		15665pa			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, VOA Washington DC	11735eu	15160eu	15195me	17770eu
		21455me	21570eu		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000	USA, WWCR Nashville TN	5935va	7435am		
0905-1000 sa	Ghana, GBC Radio 1	4915do			
0905-1000 mtwhf	Ghana, GBC Radio 2	3366do	7295do		
0905-1000 sa	Ghana, GBC Radio 2	3366do			
0910-0940 smwha	Mongolia, R Ulaanbaatar	11850pa	12015pa		
0915-0930 smtwh	Guam, KTWR	15200as			
0930-0945	India, All India Radio	9610as	11970as	15250as	17850as
0930-1000	Netherlands, Radio	9630pa	9720pa	11895pa	
0930-1000	United Kingdom,BBC London	5975eu	6190na	6195na	7180as
		9410as	9740eu	9750eu	9760eu
		11765as	15575va	17640va	17705va
		21470va			
0940-0950	Greece, Voice of	17525eu			

1000 UTC [5:00 AM EST/2:00 AM PST]

1000-1025 mtwhf	Belgium, R Vlaanderen	5910eu	9905eu		
1000-1025	Netherlands, Radio	9630pa	11895pa		
1000-1030	United Kingdom,BBC London	5975eu	6190eu	6195eu	9410as
		9740eu	9750eu	15190am	
1000-1030	Vietnam, Voice of	9840as	12020as	15010as	
1000-1100	Australia, Radio	5995pa	9580pa	21725as	
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, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755au	15440au	17710au	
1000-1100	Costa Rica, AWR	9725ca			
1000-1100	Costa Rica, RFPI	7375na	13630na	15030na	
1000-1100	Ecuador, HCJB Quito	9745au	11925au	21455au	
1000-1100 sa	Ghana, GBC Radio 1	4915do			
1000-1100 mtwhf	Ghana, GBC Radio 2	7295do			
1000-1100 sa	Ghana, GBC Radio 2	3366do			
1000-1100	Italy, AWR Europe	7230eu			
1000-1100 irreg	Italy, IRRS Milan	7125eu			
1000-1100	Kenya, Voice of	4935do			
1000-1100	Malaysia, RTM Kuching	7160do			
1000-1100 mtwh	Malaysia, RTM Radio 4	7295do			
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1100	Nigeria, Radio	4990do	7285do		
1000-1100	Nigeria, Voice of	7255af			
1000-1100	Philippines, FEBC Manila	9800as	11685as		
1000-1100	Russia, Radio Moscow	4975af	6110af	7130af	11765af
		12010eu	12020eu	12070va	13650va
		15175va	15210va	15345eu	15440va
		15465va	15475va	15550af	17565va
		17600eu	17805eu	21550eu	21755va
1000-1100	S Africa, Channel Africa	11900af			
1000-1100 vl	S Africa, Radio Oranje	9630do			
1000-1100	Singapore, SBC1	5010do	5052do	11940do	
1000-1100	USA, CSMonitor Boston MA	9455am	9495na	13625as	17555as
1000-1100 sa	USA, CSMonitor Boston MA	13770eu			
1000-1100	USA, VOA Washington DC	5985as	11720au	15425au	
1000-1100	USA, WHRI Noblesville IN	9850sa			
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5935va	15685va		
1000-1100	USA, WYFR Okeechobee FL	5950am			
1030-1100	Austria, R Austria Intl	6155eu	13730as	15450as	21490pa
1030-1100	Iran, VOIRI Tehran	9525as	11715af	11790as	11910as
		11930me			
1030-1100	South Korea, Radio Korea	11715na			
1030-1100	Sri Lanka, LBC Colombo	11835as	15120as	17850as	
1030-1100	UAE, UAE Radio Dubai	13675eu	15320eu	15435eu	21605eu
1030-1100	United Kingdom,BBC London	5975eu	6190eu	6195eu	9410as
		9740as	9750as	9760as	15190am
		15310va	15420va	15575va	17640va
		17705va	17885va	21470va	
1040-1050	Greece, Voice of	15650as	17525as		
1055-1100	Neth Antilles,TWR Bonaire	11815am	15345am		

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1100 UTC [6:00 AM EST/3:00 AM PST]

FREQUENCIES

1100-1110 mtwhf	Ghana, GBC Radio 2	7295do			
1100-1120	Pakistan, Radio	17900eu	21520eu		
1100-1130	Ecuador, HCJB Quito	9745au	11925au	15155au	21455au
1100-1130	Iran, VOIRI Tehran	9525af	11515af	11790as	11910as
		11930me			
1100-1130	Israel, KOL Israel	17545eu			
1100-1130	Sri Lanka, SLBC Colombo	11835as	15120as	17850as	
1100-1130	Switzerland, Swiss R Intl	6165eu	9535eu	13635as	15505as
		17670as			
1100-1130	United Kingdom,BBC London	5965na	6190na	6195eu	9410as
		9700eu	9740as	9750eu	9760eu
		15310na	15420va	15575va	17640va
		17705va	17790va	17885va	21470va
1100-1130	Vietnam, Voice of	7416as	19732as		
1100-1150	Germany, Deutsche Welle	15410af	17765af	17800af	17860af
		21465af	21600af		
1100-1150	North Korea, R Pyongyang	6576na	9977na	11335na	
1100-1200	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa			
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, CKZU Vancouver	6160do			
1100-1200	Costa Rica, AWR	9725ca	11870ca		
1100-1200	Costa Rica, RFPI	7375na	13630na	15030na	
1100-1200	Ghana, GBC Radio 1	4915do			
1100-1200 sa	Ghana, GBC Radio 2	3366do			
1100-1200 irreg	Italy, IRRS Milan	7125eu			
1100-1200	Japan, Radio	6120na	11815sa	11840na	
1100-1200	Malaysia, RTM Radio 4	7295do			
1100-1200	Neth Antilles,TWR Bonaire	11815am	15345am		
1100-1200	New Zealand, R NZ Intl	9700as			
1100-1200	Russia, Radio Moscow	9705va	9780va	9855va	11675va
		11710va	12020na	12070va	13650va
		15435va	15470va	15475va	15530va
		15550va	15585va	17570va	17600va
		17755va	21515va	21755va	21785va
1100-1200	S Africa, Channel Africa	11900af			
1100-1200 vl	S Africa, Radio Oranje	9630do			
1100-1200	Singapore, SBC1	5010do	5052do	11940do	
1100-1200	South Korea, Radio Korea	15575af			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	USA, CSMonitor Boston MA	9455am	9495na	13625as	17555as
1100-1200 sa	USA, CSMonitor Boston MA	13770eu			
1100-1200	USA, KTBN Salt Lk City UT	7510na			
1100-1200	USA, VOA Washington DC	5985as	9590as	9760as	11915au
		15120au			
1100-1200	USA, WHRI Noblesville IN	7315na	9850sa	11790sa	
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	USA, WWCR Nashville TN	5935va	15685va		
1100-1200	USA, WYFR Okeechobee FL	5950am	7355am		
1115-1145	Nepal, Radio	3230as	5005as	7165as	
1120-1130 mtwhf	Vatican State, Vatican R	6245eu	7250eu	11740eu	15210eu
		21670eu			
1125-1130 sa	Botswana, Radio	5955af	7255af		
1130-1157	Czechoslovakia, Radio	6055eu	7345eu	9505eu	11990eu
		15355eu			
1130-1200	Austria, R Austria Intl	6155eu	11780as	13730va	15450as
1130-1200	Bulgaria, Radio Sofia	11630eu	11720eu	13670eu	17780eu
		17825eu			
1130-1200	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
1130-1200	Netherlands, Radio	5955eu			
1130-1200	South Korea, Radio Korea	9650na			
1130-1200	Thailand, Radio	4830as	9655as	11905as	
1130-1200	United Kingdom,BBC London	5965na	6190eu	6195eu	9410eu
		9740eu	9750eu	15220na	15420va
		17705va	17885va	21470va	21660af
1135-1140	India, All India Radio	9675as	11770as	11970as	17705as
		17815as			

SELECTED PROGRAMS

Sundays

1110 Voice of America (as): New Horizons. The world of science, medicine, and technology.
1110 Voice of America (ca): Critic's Choice. News from the world of the arts.
1130 BBC: The Ken Bruce Show. See S 0030.
1130 Voice of America (as): Issues In The News. Members of the Washington press corps discuss current topics.
1130 Voice of America (ca): Studio One. Dramatized and narrative documentaries.

Mondays

1110 Voice of America (as): This Is America (Special English). A look at various unique aspects of American culture.
1110 Voice of America (ca): Focus. A look at the major figures and issues that shape contemporary life.
1130 BBC: Composer Of The Month. See M 0230.
1130 Voice of America (as): Music, UA. (Standards). Classics of American popular music.
1130 Voice of America (ca): VOA Morning. See S 0010.

Tuesdays

1110 Voice of America (as) (Special English): Agriculture Report. Developments in agriculture.
1110 Voice of America (ca): Focus. See M 1110.
1115 Voice of America (as) (Special English): Science In The News. The role of science in everyday life.
1130 BBC: Megamix. Music, sports, fashion, health, travel, news, and opinion for young people.
1130 Voice of America (as): Now Music, UA. Rock and soul music from old favorites to the latest hits, and profiles of the stars.
1130 Voice of America (ca): VOA Morning. See S 0010.

Wednesdays

1110 Voice of America (as): Science Report (Special English). See M 0040.
1110 Voice of America (ca): Focus. See M 1110.
1115 Voice of America (as): Space And Man (Special English). Various aspects of life in space.
1130 BBC: Meridian. See W 0630.
1130 Voice of America (as): Now Music, UA. See T 1130.
1130 Voice of America (ca): VOA Morning. See S 0010.

Thursdays

1110 Voice of America (as): Science Report (Special English). See M 0040.
1110 Voice of America (ca): Focus. See M 1110.
1115 Voice of America (as): The Making Of A Nation (Special English). See H 0045.
1130 BBC: Drama. A production from the BBC's crack drama team.
1130 Voice of America (as): Now Music, UA. See T 1130.
1130 Voice of America (ca): VOA Morning. See S 0010.

Fridays

1110 Voice of America (as): Science Report (Special English). See M 0040.
1110 Voice of America (ca): Focus. See M 1110.
1115 Voice of America as): American Mosaic (Special English). A feature program in s-l-o-w English.
1130 BBC: Meridian. See W 0630.
1130 Voice of America (as): Country Music, UA. Current popular country music tunes with a sprinkling of old favorites.
1130 Voice of America (ca): VOA Morning. See S 0010.

Saturdays

1110 Voice of America: Agriculture Today. Developments in agri culture.
1130 BBC: Meridian. See W 0630.
1130 Voice of America (as): Press Conference, UA. See S 0130.
1130 Voice of America (ca): Music, UA. (Standards). See M 1130.

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English language

shortwave guide

1200UTC [7:00 AM EST/4:00 AM PST]

FREQUENCIES

1200-1205	New Zealand, R NZ Intl	9700as			
1200-1225 sa	Ghana, GBC Radio 2	3366do			
1200-1225	Netherlands, Radio	5955eu			
1200-1230 smwha	Mongolia, R Ulaanbaatar	11850as	12015as		
1200-1230 as	Norway, Radio Norway Intl	17860as	21705as		
1200-1230	Thailand, Radio	9655as	11905as		
1200-1230	United Kingdom,BBC London	5965eu	6190na	6195na	9740na
		13660eu	15220va	15310pa	15420va
		15520na	17640va	17790va	17885va
		21470va			
1200-1230	Uzbekhistan, R Tashkent	5945as	9540as	15470as	17745as
1200-1300	Australia, ABC Brisbane	4920au			
1200-1300	Australia, ABC Katherine	2485do			
1200-1300	Australia, ABC Perth	6140do	9610do		
1200-1300	Australia, Radio	5995pa	7240pa	9580pa	21725as
1200-1300	Brazil, Radiobras	15445am			
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, CKZU Vancouver	6160do			
1200-1300	China, China Radio Intl	9655na	9715as	11660as	11795pa
		15210na	15440pa		
1200-1300	Costa Rica, AWR	9725ca	11870ca		
1200-1300	Costa Rica, RFPI	13630na	15030na		
1200-1300	Ecuador, HCJB Quito	11925am	15115am	17890am	21455om
1200-1300	Ghana, GBC Radio 1	4915do			
1200-1300 irreg	Italy, IRRS Milan	7125eu			
1200-1300	Kenya, Voice of	4935do			
1200-1300	Malaysia, RTM Radio 4	7295do			
1200-1300	Neth Antilles,TWR Bonaire	11815am	15345am		
1200-1300	Nigeria, Radio	4990do	7285do		
1200-1300	Nigeria, Voice of	7255af			
1200-1300	Palau, KHBN	9830va			
1200-1300	Russia, Radio Moscow	7370va	9705va	9745va	9780va
		9855va	11710va	11980va	12020va
		13650va	15175va	15210va	15280na
		15435va	15465va	15475va	15510va
		15585va	17570va	17735va	21755va
1200-1300 vl	S Africa, Radio Oranje	9630do			
1200-1300	Singapore, SBC1	5010do	5052do	11940do	
1200-1300	USA, CSMonitor Boston MA	9425au	9495am	13625as	13760na
1200-1300 as	USA, CSMonitor Boston MA	15665eu			
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, VOA Washington DC	6110as	9760au	11715as	15155au
		15425as			
1200-1300	USA, WHRI Noblesville IN	7315na	9850sa	11790sa	
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300	USA, WWCR Nashville TN	5935va	15685va		
1200-1300	USA, WYFR Okeechobee FL	5950am	6015am	11830am	17760am
1208-1300	New Zealand, R NZ Intl	9510as			
1215-1300	Egypt, Radio Cairo	17595as			
1215-1300	South Korea, Radio Korea	9750am			
1226-1300	Ghana, GBC Radio 2	7295do			
1230-1235	India, All India Radio	3925do	4860do	11770as	15145as
		17850as			
1230-1250 mtwhf	Finland, Radio	11735na	15400na		
1230-1255	Belgium, R Vlaanderen	17555as	21810na		
1230-1255	France, Radio France Intl	9805eu	11670eu	15155eu	15195eu
		15365na	21645na		
1230-1300	Austria, R Austria Intl	6155eu	13730na	15450va	17730as
1230-1300	Bangladesh, Radio	15200eu	17750eu		
1230-1300	Netherlands, Radio	5955eu			
1230-1300	Sri Lanka, SLBC Colombo	6075as	9720as		
1230-1300	United Kingdom,BBC London	5965ca	6045eu	6195ca	9410eu
		9560eu	9600eu	9635eu	9740na
		11680eu	11710na	11845na	12095eu
		15115eu	15220na	21715eu	
1230-1300	Vietnam, Voice of	9840as	12020as	15010as	
1230-1300	Yugoslavia, Radio	17740na	21605na		
1235-1245	Greece, Voice of	15635na	15650na	17515na	

SELECTED PROGRAMS

Sundays

1200 Radio Norway Int'l: Norway Today. A magazine program on issues and people affecting modern-day Norway.
1201 BBC: Play Of The Week. See S 0101.
1210 Voice of America: Encounter. A discussion program presenting opinions on world issues.
1230 Voice of America: Studio One. See S 1130.

Mondays

1209 BBC: Words Of Faith. Speakers from various faiths discuss scripture and their beliefs.
1210 Voice of America: Newsline. See S 2310.
1215 BBC: Quiz. This month, contestants attempt to speak for "Just A Minute" without repetition, deviation, or hesitation.
1230 Voice of America: Magazine Show. Features about culture, science, sports, medicine, and the arts in America.
1245 BBC: Sports Roundup. See S 0315.

Tuesdays

1209 BBC: Words Of Faith. See M 1209.
1210 Voice of America: Newsline. See S 2310.
1215 BBC: Multitrack 1. See M 2330.
1230 Voice of America: Magazine Show. See M 1230.
1245 BBC: Sports Roundup. See S 0315.

Wednesdays

1209 BBC: Words Of Faith. See M 1209.
1210 Voice of America: Newsline. See S 2310.
1215 BBC: New Ideas. See M 1615.

This Radio Japan QSL card was received by J. R. Mason of Worcester, England.

1230 Voice of America: Magazine Show. See M 1230.
1235 BBC: Talks. See M 1635.
1245 BBC: Sports Roundup. See S 0315.

Thursdays

1209 BBC: Words Of Faith. See M 1209.
1210 Voice of America: Newsline. See S 2310.
1215 BBC: Multitrack 2. See W 2330.
1230 Voice of America: Magazine Show. See M 1230.
1245 BBC: Sports Roundup. See S 0315.

Fridays

1209 BBC: Words Of Faith. See M 1209.
1210 Voice of America: Newsline. See S 2310.
1215 BBC: Feature. This month, "Taking Issue Around The World" features roundtable discussions from worldwide venues.
1230 Voice of America: Magazine Show. See M 1230.
1245 BBC: Sports Roundup. See S 0315.

Saturdays

1209 BBC: Words Of Faith. See M 1209.
1210 Voice of America: Communications World. See S 0110.
1215 BBC: Multitrack 3. See F 2330.
1230 Voice of America: Weekend Magazine. See S 0030.
1245 BBC: Sports Roundup. See S 0315.

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English language

shortwave guide

1300 UTC [8:00 AM EST/5:00 AM PST]

FREQUENCIES

1300-1315	South Korea, Radio Korea	9750na			
1300-1320	Brazil, Radiobras	15445am			
1300-1325	Kenya, Voice of	4935do			
1300-1325	Netherlands, Radio	5955eu			
1300-1330	Egypt, Radio Cairo	17595as			
1300-1330	Neth Antilles,TWR Bonaire	11815am	15345am		
1300-1330 as	Norway, Radio Norway Intl	9590eu	25730af		
1300-1330	Switzerland, Swiss R Intl	7480as	11690as	13635as	15505as
		17670as	21820as		
1300-1330	United Kingdom,BBC London	5965am	6190eu	6195eu	7180as
		9410eu	9515eu	9750eu	15220am
		15575va	17640va	17705va	17790va
		21470va			
1300-1330	USA, VOA Washington DC	6110as	9760au	11715as	15155au
		15425au			
1300-1350	North Korea, R Pyongyang	9345eu	9640as	13760am	15230as
1300-1355	Poland, Polish R Warsaw	6135eu	7145eu	9525eu	11815eu
1300-1400	Australia, ABC Alice Sprg	2310do			
1300-1400	Australia, ABC Brisbane	4920do			
1300-1400	Australia, ABC Katherine	2485do			
1300-1400	Australia, ABC Perth	9610do			
1300-1400	Australia, ABC Tennant Cr	2325do			
1300-1400	Australia, Radio	5995pa	7240pa	9580pa	11800pa
		11855as	13755as		
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, CKZU Vancouver	6160do			
1300-1400 mtwthf	Canada, RCI Montreal	9635na	11855na	17820am	
1300-1400	China, China Radio Intl	7405na	9715as	11660va	15440pa
1300-1400	Costa Rica, RFPI	7375am	13630na	15030na	
1300-1400	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
1300-1400	Lebanon, Wings of Hope	11530me			
1300-1400	Malaysia, RTM Radio 4	7295do			
1300-1400	New Zealand, R NZ Intl	9510as			
1300-1400	Nigeria, Radio	4990do	7285do		
1300-1400	Nigeria, Voice of	7255af			
1300-1400	Palau, KHBN	9830va			
1300-1400	Philippines, FEBC Manila	11995as			
1300-1400	Romania, R Romania Intl	11940eu	15365eu	17720eu	17850eu
1300-1400	Russia, AWR Russia	11855as			
1300-1400	Russia, Radio Moscow	7330va	7370va	7380va	9705va
		9715va	9755va	9890va	11710va
		15480va	15510va	15520va	15540va
		15550va	17570va	17600va	17735va
		17840va	17860va	21610va	21785va
1300-1400 vl	S Africa, Radio Oranje	9630do			
1300-1400	Singapore, SBC1	5010do	5052do	11940do	
1300-1400	Sri Lanka, SLBC Colombo	6075as	9720as		
1300-1400	Sweden, Radio	15240as	21625pa		
1300-1400	USA, CSMonitor Boston MA	9425au	9495am	13625as	13760na
1300-1400 as	USA, CSMonitor Boston MA	15665eu			
1300-1400	USA, KNLS Anchor Point AK	7355as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, WHRI Noblesville IN	9465na	11790na		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400	USA, WWCR Nashville TN	5935va	15685va		
1300-1400	USA, WYFR Okeechobee FL	5950am	9705na	11830am	13695na
		17760am			
1320-1400	Jordan, Radio	9560eu			
1325-1400 mtwhf	Kenya, Voice of	4935do			
1330-1357	Canada, RCI Montreal	6150as	9535as		
1330-1400	Austria, R Austria Intl	15450as	17730as		
1330-1400	Finland, Radio	15400na	21550na		
1330-1400	Netherlands, Radio	13770as	17610as		
1330-1400	Turkey, Voice of	9675as			
1330-1400	UAE, UAE Radio Dubai	13675eu	15320eu	15435as	21605as
1330-1400	United Kingdom,BBC London	5965am	6190na	6195am	7180af
		9410na	9515na	9740as	15070va
		15220na	15310va	15575me	21660af
1330-1400	USA, VOA Washington DC	6110as	9760as	15155au	15425au
1330-1400	Uzbekhistan, R Tashkent	7325as	9750as	15460as	17815as
1330-1400	Vietnam, Voice of	9840as	12020as	15010as	
1345-1400	Vatican State, Vatican R	15090au	17525au	21515au	

SELECTED PROGRAMS

Sundays

1300 Radio Norway Int'l: Norway Today. See S 1200.
1310 Voice of America: Critic's Choice. News from the world of the arts.
1340 Voice of America: Words And Their Stories (Special English). See S 0040.
1345 Voice of America: Tuning In The USA (Special English). A feature program in s-l-o-w English.

Mondays

1310 Voice of America: Focus. See M 1110.
1340 Voice of America: Development Report (Special English). No details available.
1345 Voice of America: This Is America (Special English). See M 1115.

Tuesdays

1310 Voice of America: Focus. See M 1110.
1340 Voice of America (Special English): Agriculture Report. See T 1110.
1345 Voice of America (Special English): Science In The News. See T 1115.

Wednesdays

1310 Voice of America: Focus. See M 1110.
1340 Voice of America: Science Report (Special English). See M 0040.
1345 Voice of America: Space And Man (Special English). See W 1115.

Thursdays

1310 Voice of America: Focus. See M 1110.
1340 Voice of America: Science Report (Special English). See M 0040.
1345 Voice of America: The Making Of A Nation (Special English). See H 0045.

Fridays

1310 Voice of America: Focus. See M 1110.
1340 Voice of America: Science Report (Special English). See M 0040.
1345 Voice of America: American Mosaic (Special English). See F 1115.

Saturdays

1310 Voice of America: On The Line. See S 0010.
1340 Voice of America: Words And Their Stories (Special English). See S 0040.
1345 Voice of America: American Stories (Special English). See S 0045.

"I want to thank you for sending me my missed copy of MT.Not only did you send the missed copy no questions asked, but you sent it first class mail! What service!"
Bob Billa, San Antonio, TX

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English language

shortwave guide

1400 UTC [9:00 AM EST/6:00 AM PST]

FREQUENCIES

1400-1415	Vatican State, Vatican R	15090au	17525au	21515au	
1400-1425 smtwh	Israel, KOL Israel	11587am	11603na	15640na	15650as
		17575eu	17590eu		
1400-1425	Netherlands, Radio	13770as	17610as		
1400-1430 mtwtfs	Belgium, R Vlaanderen	17550as	21810eu		
1400-1430	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
1400-1430	Finland, Radio	15400na	21550na		
1400-1430	United Kingdom,BBC London	6195as	7180as	9515na	9660eu
		9740as	9740as	9750eu	11820as
		11860af	15260na	21490am	
1400-1500	Australia, ABC Brisbane	4920do			
1400-1500	Australia, Radio	5995pa	7240pa	9540pa	9580pa
		9770va	11800pa	11855pa	
1400-1500	Australia, VLW6 Wanneroo	6140do			
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, CKZU Vancouver	6160do			
1400-1500 s	Canada, RCI Montreal	11955am	17820am		
1400-1500	China, China Radio Intl	7405na	11815as	15165as	
1400-1500	Costa Rica, RFPI	7375na	13630na	15030am	
1400-1500 sas	Finland, Radio	15400na	21550na		
1400-1500	France, Radio France Intl	11910as	15405as	17650me	
1400-1500	Ghana, GBC Radio 1	4915do			
1400-1500	Ghana, GBC Radio 2	7295do			
1400-1500	Iraq, Radio Iraq Intl	13680as			
1400-1500 irreg	Italy, IRRS Milan	7125eu			
1400-1500	Japan, Radio	9535va	11815na		
1400-1500	Jordan, Radio	9560eu			
1400-1500 mtwhf	Kenya, Voice of	4935do			
1400-1500	Lebanon, King of Hope	6280me			
1400-1500	Malaysia, RTM Kuching	4950do			
1400-1500	Malaysia, RTM Radio 4	4950do	7295do		
1400-1500	Malta, VO the Mediterean	11925eu			
1400-1500	New Zealand, R NZ Intl	9510as			
1400-1500	Nigeria, Radio	4990do	7285do		
1400-1500	Nigeria, Voice of	7255af			
1400-1500	Philippines, FEBC Manila	11995as			
1400-1500	Russia, Radio Moscow	6065as	7170as	7260as	7330as
		7345as	7370va	7380as	9715va
		9755na	9855va	9890va	11675va
		11710va	11980va	15480va	15550va
		17730va	21610va	21755va	21785va
1400-1500 vl	S Africa, Radio Oranje	9630do			
1400-1500	Singapore, SBC1	5010do	5052do	11940do	
1400-1500	South Korea, Radio Korea	9570as			
1400-1500	Sri Lanka, SLBC Colombo	6075as	9720as		
1400-1500	USA, CSMonitor Boston MA	9530as	13625as	13760am	15665eu
		17510eu	17555am		
1400-1500 sa	USA, CSMonitor Boston MA	13710na			
1400-1500	USA, KCBI Dallas TX	15375va			
1400-1500	USA, KTBN Salt Lk City UT	7510na			
1400-1500	USA, VOA Washington DC	6110as	9645au	9760as	15160au
		15425au			
1400-1500	USA, WHRI Noblesville IN	9465na	15105na		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WWCR Nashville TN	13845na	15685va		
1400-1500	USA, WYFR Okeechobee FL	6015am	9705na	11550as	11830am
		17760am			
1415-1425	Nepal, Radio	3230do	5005do	7165do	
1415-1500	Bhutan, BC Service	5025do			
1430-1435	India, All India Radio	7290do	9950do	10330do	
1430-1500	Ecuador, HCJB Quito	11925am	17890am	21455am	
1430-1500 mtwthf	Finland, Radio	15400na	21550na		
1430-1500	Myanmar, VO Myanmar	5990do			
1430-1500	Netherlands, Radio	9895as	13770as	15150as	17610as
1430-1500	United Kingdom,BBC London	6195as	7180as	9515na	9660eu
		9740as	9750eu	11820as	12095eu
		15070va	15260na	15575me	17840af
		21660af			
1430-1500 irreg	USA, KJES Albuqeurque NM	11715na			
1435-1440	India, All India Radio	7290do	10330do		
1445-1500 smwha	Mongolia, R Ulaanbaatar	7260as	13780as		

SELECTED PROGRAMS

Sundays

1401 BBC: Feature. Topical programming.
1410 Voice of America: The Concert Hall. Classical music and interviews with America's great artists and conductors.
1430 BBC: Anything Goes. Bob Holness presents a variety of musical requests.
1455 Voice of America: Editorial. American opinion.

Mondays

1400 BBC (as): Dateline East Asia. The political and economic affairs of the Pacific rim.
1405 BBC: Outlook. Conversation, controversy, and color from the UK and the world.
1410 Voice of America: Asia Report. News, correspondent reports, interviews, and opinion.
1430 BBC: Off The Shelf. See M 0430.
1445 BBC: Talks. See S 0445.
1455 Voice of America: Editorial. See S 1455.

Tuesdays

1400 BBC (as): Dateline East Asia. See M 1400.
1405 BBC: Outlook. See M 1405.
1410 Voice of America: Asia Report. See M 1410.
1430 BBC: Off The Shelf. See M 0430.
1445 BBC: Musical Feature. See M 0145.
1455 Voice of America: Editorial. See S 1455.

Wednesdays

1400 BBC (as): Dateline East Asia. See M 1400.
1405 BBC: Outlook. See M 1405.
1410 Voice of America: Asia Report. See M 1410.

BBC's "Taking Issue" presenter Christopher Cook.

1430 BBC: Off The Shelf. See M 0430.
1445 BBC: Gooc Books. Recommendations of books to read.
1455 Voice of America: Editorial. See S 1455.

Thursdays

1400 BBC (as): Dateline East Asia. See M 1400.
1405 BBC: Outlook. See M 1405.
1410 Voice of America: Asia Report. See M 1410.
1430 BBC: Off The Shelf. See M 0430.
1445 BBC: Recording Of The Week. See M 0615.
1455 Voice of America: Editorial. See S 1455.

Fridays

1400 BBC (as): Dateline East Asia. See M 1400.
1405 BBC: Outlook. See M 1405.
1410 Voice of America: Asia Report. See M 1410
1430 BBC: Off The Shelf. See M 0430.
1445 BBC: Global Concerns. See F 0145.
1455 Voice of America: Editorial. See S 1455.

Saturdays

1401 BBC: John Peel. See T 0330.
1410 Voice of America: Music, UA. (Jazz). Willis Conover looks at jazz of yesterday and today, in the UA. and abroad.
1430 BBC: Sportsworld. Extensive coverage and results of all the weekend's sports.
1455 Voice of America: Editorial. See S 1455.

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English language

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1500 UTC [10:00 AM EST/7:00 AM PST]

FREQUENCIES

1500-1515 smwha	Mongolia, R Ulaanbaatar	7260as	13780as		
1500-1525	Netherlands, Radio	9895as	13770as	15150as	17610as
1500-1530	Switzerland, Swiss R Intl	13635af	15505af	17670af	21820me
1500-1530	United Kingdom,BBC London	6195as	7180as	9515na	9660as
		9740na	9750eu	12095eu	15070va
		15260na	15310va	15420va	17790va
		17860va	21470am	21660af	
1500-1550	Germany, Deutsche Welle	9735af	11965af	13610af	15145af
		17735af	17765af		
1500-1550	North Korea, R Pyongyang	9325eu	9640af	9977af	13785eu
1500-1555	Neth Antilles,TWR Bonaire	11815am	15345am		
1500-1555	Seychelles, FEBA	9810as	11710as	15330as	
1500-1600	Australia, ABC Brisbane	6140do			
1500-1600	Australia, Radio	5995pa	6060pa	7260pa	9580pa
		9770pa	11800pa		
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, CKZU Vancouver	6160do			
1500-1600 s	Canada, RCI Montreal	11955am	17820am		
1500-1600	China, China Radio Intl	7405na	11815as	15165as	
1500-1600	Costa Rica, RFPI	7375am	13630am	15030am	
1500-1600	Ecuador, HCJB Quito	11925am	17890am	21455am	
1500-1600	Guam, KTWR	15610as			
1500-1600	Iraq, Radio Iraq Intl	13680as			
1500-1600	Japan, Radio	9535na	15355na		
1500-1600	Jordan, Radio	9560eu			
1500-1600	Malaysia, RTM Radio 4	7295do			
1500-1600	Malta, VO the Meditterean	11925eu			
1500-1600	Myanmar, VO Myanmar	5990do			
1500-1600	New Zealand, R NZ Intl	9510as			
1500-1600	Nigeria, Radio	4990do	7285do		
1500-1600	Nigeria, Voice of	7255af			
1500-1600	Philippines, FEBC Manila	11995as			
1500-1600	Russia, Radio Moscow	6065na	7170na	7260na	7330va
		7345na	7370va	7380na	9745va
		9755na	9780va	9855va	9890va
		12065va	15465va	15480va	15540va
		15550va	21610va	21755va	
1500-1600 vl	S Africa, Radio Oranje	9630do			
1500-1600	Singapore, SBC1	5010do	5052do	11940do	
1500-1600	Sri Lanka, SLBC Colombo	6075as	9720as		
1500-1600	USA, CSMonitor Boston MA	9530as	13760pa	17510am	
1500-1600 sa	USA, CSMonitor Boston MA	13710na			
1500-1600	USA, KCBI Dallas TX	15375va			
1500-1600	USA, KTBN Salt Lk City UT	15590na			
1500-1600	USA, VOA Washington DC	6110as	7125as	9645as	9700eu
		9760as	15205me	15395as	
1500-1600	USA, WHRI Noblesville IN	9465sa	15105na		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WWCR Nashville TN	13845na	15685va		
1500-1600	USA, WYFR Okeechobee FL	11830am	15215am	17760am	
1515-1530	Canada, RCI Montreal	9555am	11915am	15315am	15325am
		17820am			
1530-1540 mtwhfa	Greece, Voice of	15630na	15650na	17525na	
1530-1545	India, All India Radio	3945do	6140do	7290do	7412do
		9950do	10330do		
1530-1600	Austria, R Austria Intl	6155eu	11780as	13730eu	21490va
1530-1600	Netherlands, Radio	9895as	13770as	15150as	17610as
1530-1600 mtwhf	Portugal, Radio	21515me			
1530-1600	Sudan, National BC Corp	9540do	9550do	11635do	
1530-1600	United Kingdom,BBC London	7180as	7180as	9515va	9740na
		9750na	11750as	12095eu	15070va
		15260as	15420va	17840na	17860va
		21660af			
1545-1600	Vatican State, Vatican R	15090au	17865as		

SELECTED PROGRAMS

Sundays

1500 BBC (af): Postmark Africa. See S 0335.
1510 Voice of America: New Horizons. See S 1110.
1515 BBC: Concert Hall. Classical music from the world's great concert halls.
1530 Voice of America: Studio One. See S 1130.

Mondays

1510 Voice of America: Newsline. See S 2310.
1515 BBC (af): Focus On Africa. African politics, sports, economics, medicine, and media.
1515 BBC: Feature/Drama. See M 0101.
1530 BBC: Feature. See M 0115.
1530 Voice of America: Magazine Show. See M 1230.

Tuesdays

1510 Voice of America: Newsline. See S 2310.
1515 BBC (af): Focus On Africa. See M 1515.
1515 BBC: A Jolly Good Show. Dave Lee Travis presents listener rock music requests.
1530 Voice of America: Magazine Show. See M 1230.

Wednesdays

1510 Voice of America: Newsline. See S 2310.
1515 BBC (af): Focus On Africa. See M 1515.
1515 BBC: Talks. See M 0415.
1530 BBC: Comedy/Quiz. Teams guess the origin of curious expressions in "Back To Square One" (3rd, 10th, 17th).
1530 Voice of America: Magazine Show. See M 1230.

Thursdays

1510 Voice of America: Newsline. See S 2310.
1515 BBC (af): Focus On Africa. See M 1515.
1515 BBC: Classics With Kay. See S 2315.
1530 Voice of America: Magazine Show. See M 1230.

Fridays

1510 Voice of America: Newsline. See S 2310.
1515 BBC (af): Focus On Africa. See M 1515.
1515 BBC: Music Review. See H 2315.
1530 Voice of America: Magazine Show. See M 1230.

Saturdays

1500 BBC (af): Spice Taxi. See A 0630.
1510 Voice of America: Close-Up. No details available.
1515 BBC: Sportsworld. See A 1430.
1530 Voice of America: Press Conference, UA. See S 0130.

Scott Krauss, Cleveland, OH, shares this Bayerischer Rundfunk QSL from Munich, Germany.

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English language

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1600 UTC [11:00 AM EST/8:00 AM PST]

FREQUENCIES

1600-1605	Singapore, SBC1	5010do	5052do	11940do	
1600-1625	Netherlands, Radio	9895as	13770as	15150as	17610as
1600-1630 as	Norway, Radio Norway Intl	11875as	15230af		
1600-1630	Pakistan, Radio	11570me	13685af	15555af	17558af
1600-1630	Sweden, Radio	15270me	17870na	21500me	
1600-1630	United Kingdom,BBC London	7215na	9740me	12095eu	15070eu
		15260na	15310va	15400af	17705va
		17860va	17880af	21470am	21660af
1600-1630	Vietnam, Voice of	12020eu	15010eu		
1600-1640 vl	S Africa, Radio Oranje	9630do			
1600-1640	Vatican State, Vatican R	15090au	17865au		
1600-1645	Guam, KTWR	15610as			
1600-1645	UAE, UAE Radio Dubai	11795af	13675eu	15320eu	21605eu
1600-1649	New Zealand, R NZ Intl	9510as			
1600-1650	Germany, Deutsche Welle	7225as	7305as	9585as	11785as
		15105as	15595as		
1600-1655	Poland, Polish R Warsaw	7285eu	9525eu	11840eu	
1600-1700	Australia, Radio	5995pa	6060pa	9510pa	9580pa
		11800pa	11855pa	11880pa	13755as
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, CKZU Vancouver	6160do			
1600-1700	China, China Radio Intl	11575af	15110af	15130af	
1600-1700	Costa Rica, RFPI	7375na	13630na	15030na	
1600-1700	Ecuador, HCJB Quito	17790me	21455am	21480me	
1600-1700	France, Radio France Intl	11705af	12015af	15530me	17620af
		17795af	17850af		
1600-1700	Ghana, GBC Radio 1	4915do			
1600-1700	Ghana, GBC Radio 2	7295do			
1600-1700	Guam, KSDA	11980as			
1600-1700	Iraq, Radio Iraq Intl	13680as			
1600-1700	Nigeria, Radio	4990do			
1600-1700	Nigeria, Voice of	7255af			
1600-1700	Russia, Radio Moscow	7170va	7250va	7260na	7345va
		9540va	9590va	9660va	9705va
		9715va	9755na	9860va	9890va
		9895va	11655va	11840va	15465va
		15480va	15540va	15550va	21755va
1600-1700	S Africa, Channel Africa	15430af			
1600-1700	Saudi Arabia, BSKSA	9705eu	9720eu		
1600-1700	South Korea, Radio Korea	5975om	9870af		
1600-1700	Sri Lanka, SLBC Colombo	6075as	9720as		
1600-1700	USA, CSMonitor Boston MA	11580as	13625as	17510na	21640af
1600-1700 sa	USA, CSMonitor Boston MA	13710na	17555am		
1600-1700	USA, KCBI Dallas TX	15375va			
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, VOA Washington DC	9575af	11920af	11995af	15225af
		15445af	15495af	15580af	17800af
		19261af			
1600-1700	USA, WHRI Noblesville IN	9465am	15105am		
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WWCR Nashville TN	13645am	15685va		
1600-1700	USA, WYFR Okeechobee FL	11830am	15215na	15355am	17760eu
		21525af	21615af		
1630-1657	Canada, RCI Montreal	7150as	9555as		
1630-1700	Ecuador, HCJB Quito	17790me	21455me	21480me	
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700 mtwhf	Portugal, Radio	21515me			
1630-1700	United Kingdom,BBC London	6195va	9515na	9630va	9740me
		12095eu	15070eu	15260na	15310va
		15420va	17880af	21470af	21660af
1630-1700	USA, VOA Washington DC	6180eu	9700eu	9760me	11855me
1645-1700 s	Guam, KTWR	15610as			
1650-1700 smtwhf	New Zealand, R NZ Intl	9675pa			

SELECTED PROGRAMS

Sundays

1600 Radio Norway Int'l: Norway Today. See S 1200.
1610 Voice of America (af): Nightline Africa. News and reports on world and African issues.
1610 Voice of America (eu): Encounter. See S 1210.
1615 BBC: Feature. See S 0230.
1640 Voice of America (eu): Words And Their Stories (Special English). See S 0040.
1645 BBC: Letter From America. See S 0615.
1645 Voice of America (eu): People In America (Special English). A feature program about America's diverse people.

Mondays

1610 Voice of America (af): Nightline Africa (until 1700). See S 1610.
1610 Voice of America (eu): Focus. See M 1110.
1615 BBC: New Ideas. A window on the world of technology, innovations, and new products.
1635 BBC: Talks. This month, hear Cliff Notes on famous 20th-century authors in "Writers In A Nutshell."
1640 Voice of America (eu): Development Report (Special English). See T 1340.
1645 BBC: The World Today. A look at a topical aspect of the international scene.
1645 Voice of America (eu): This Is America (Special English). See M 1115.

Tuesdays

1610 Voice of America (af): Nightline Africa. See S 1610.
1610 Voice of America (eu): Focus. See M 1110.
1615 BBC: Megamix. See T 1130.
1640 Voice of America (eu) (Special English): Agriculture Report. See T 1110.
1645 BBC: The World Today. See M 1645.
1645 Voice of America (eu) (Special English): Science In The News. See T 1115.

Wednesdays

1610 Voice of America (af): Nightline Africa. See S 1610.
1610 Voice of America (eu): Focus. See M 1110.
1615 BBC: Rock/Pop Music. See T 0630.
1640 Voice of America (eu): Science Report (Special English). See M 0040.
1645 BBC: The World Today. See M 1645.
1645 Voice of America (eu): Space And Man (Special English). See W 1115.

Thursdays

1610 Voice of America (af): Nightline Africa. See S 1610.
1610 Voice of America (eu): Focus. See M 1110.
1615 BBC: Network UK. Issues and events affecting people across the UK.
1640 Voice of America (eu): Science Report (Special English). See M 0040.
1645 BBC: The World Today. See M 1645.
1645 Voice of America (eu): The Making Of A Nation (Special English). See H 0045.

Fridays

1610 Voice of America (af): Nightline Africa. See S 1610.
1610 Voice of America (eu): Focus. See M 1110.
1615 BBC: Science In Action. The latest in science and technology.
1640 Voice of America (eu): Environment Report (Special English). A feature program in s-l-o-w English.
1645 BBC: The World Today. See M 1645.
1645 Voice of America (eu): American Mosaic (Special English). See F 1115.

Saturdays

1610 Voice of America (af): Nightline Africa. See S 1610.
1610 Voice of America (eu): On The Line. See S 0010.
1615 BBC: Sportsworld. See A 1430.
1640 Voice of America (eu): In The News (Special English). A feature program in s-l-o-w English.
1645 Voice of America (eu): American Stories (Special English). See S 0045.

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1700 UTC [12:00 PM EST/9:00 AM PDT]

1700-1715	Switzerland, Swiss R Intl	9885af	13635af	15430af	17635af
1700-1730 mtwhf	Canada, RCI Montreal	5995eu	7235eu	13650eu	15325eu
		17820eu	21545eu		
1700-1730 as	Norway, Radio Norway Intl	9655eu			
1700-1730	Sri Lanka, SLBC Colombo	6075as	9720as		
1700-1730	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu	
1700-1730	United Kingdom,BBC London	5975na	6190na	9410va	9515na
		12095eu	15070eu	15260na	15310va
		15400af	15420af	17880af	
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9977af	11705eu
1700-1750	Pakistan, Radio	9420eu	11570eu		
1700-1800	Algeria, Radio Algiers	9535me	17745af		
1700-1800	Australia, Radio	5995pa	6060pa	6080pa	7240pa
		7260pa	9580pa	11880pa	11910pa
		13755as			
1700-1800	Azerbaijan, Azerbaijani R	6175as			
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, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	9570as	11575as	15345as	
1700-1800	Costa Rica, RFPI	7375na	13630na	15030na	
1700-1800	Ecuador, HCJB Quito	15270me	17790me	21455me	21480na
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Ghana, GBC Radio 1	4915do			
1700-1800 sa	Guam, KSDA	13720af			
1700-1800 irreg	Italy, IRRS Milan	7125eu			
1700-1800	Japan, Radio	7140as	9535na	11815af	17775af
1700-1800 smtwhf	New Zealand, R NZ Intl	9675pa			
1700-1800	Russia, Radio Moscow	7170as	7260as	7345as	7370as
		9540va	9685va	9705va	9755va
		9860va	9890va	12060va	
1700-1800	S Africa, Channel Africa	11900af	15430af		
1700-1800	Saudi Arabia, BSKSA	9705eu	9720eu		
1700-1800	USA, CSMonitor Boston MA	11580as	13625as	17510na	21640af
1700-1800 sa	USA, CSMonitor Boston MA	13710na	17555am		
1700-1800	USA, KCBI Dallas TX	15375va			
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, VOA Washington DC	6040me	6110as	7125as	9645as
		9700va	9760me	11920af	11995af
		13710af	15205me	15320af	15395as
		15445af	19261am		
1700-1800	USA, WHRI Noblesville IN	13760am	15105am		
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, WWCR Nashville TN	13845va	15685va		
1700-1800	USA, WYFR Okeechobee FL	21500va			
1715-1730	Vatican State, Vatican R	6245eu	7250af	9645me	
1715-1745	United Kingdom,BBC London	9515ca	9560ca	15260ca	21660ca
1730-1800	Netherlands, Radio	6020af	9605af	21515af	21590af
1730-1800	Romania, R Romania Intl	15340af	15365af	17720af	17745af
1730-1800	United Kingdom,BBC London	3955va	5975va	6010va	9740me
		15260na	15310va	15400va	17780va
1730-1800	Vatican State, Vatican R	11625af	15090af	17730af	

1800 UTC [1:00 PM EST/10:00 AM PDT]

1800-1815	Israel, KOL Israel	7465na	11587eu	11675na	17465na
		17575af			
1800-1825	Netherlands, Radio	6020af	9605af	21515af	21590af
1800-1827	Czechoslovakia, Radio	5930eu	6055eu	7345eu	9605eu
1800-1830	Canada, RCI Montreal	13670af	15260af	17820af	
1800-1830	Egypt, Radio Cairo	15255af			
1800-1830	United Kingdom,BBC London	5975va	9410eu	15070eu	15310va
		15400af	15420af	17880af	
1800-1830	Vietnam, Voice of	9840eu	12020eu	15010eu	
1800-1850 smtwhf	New Zealand, R NZ Intl	9675pa			
1800-1855	Poland, Polish R Warsaw	7270eu	9525eu		
1800-1900 twhfs	Argentina,RAE BuenosAires	15345eu			
1800-1900	Australia, Radio	5995pa	6010pa	6060pa	6080pa
		7240pa	9580pa	11880pa	11910pa
		12000pa			
1800-1900	Brazil, Radiobras	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, CKZU Vancouver	6160do			
1800-1900	Costa Rica, RFPI	7375am	13630am	15030am	
1800-1900	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
1800-1900	Ghana, GBC Radio 1	4915do			
1800-1900	Ghana, GBC Radio 2	7295do			
1800-1900	Guam, KSDA	13720af			
1800-1900 irreg	Italy, IRRS Milan	7125eu			
1800-1900	Kuwait, Radio	13620na			
1800-1900	Russia, Radio Moscow	7260va	9685as	9785va	9860va
		9890va	11770va	11840va	12050va
		13670va	15425va	15485va	17605va
1800-1900	Saudi Arabia, BSKSA	9705eu	9720eu		
1800-1900	South Korea, Radio Korea	15575eu			
1800-1900	USA, CSMonitor Boston MA	9535pa	13840na	15565eu	21640af
1800-1900 sa	USA, CSMonitor Boston MA	17555am			
1800-1900	USA, KCBI Dallas TX	15375va			
1800-1900 irreg	USA, KJES Albuquerque NM	9510na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, VOA Washington DC	6040eu	9575af	9700eu	9760me
		11920af	11995af	13710af	15205me
		15410af	15445af	15580af	17650af
		17800af	21625af		
1800-1900	USA, WHRI Noblesville IN	13760na	17835sa		
1800-1900	USA, WINB Red Lion PA	15295eu			
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900	USA, WWCR Nashville TN	13845am	15685na		
1800-1900	USA, WYFR Okeechobee FL	21500va			
1815-1900	Bangladesh, Radio	9570me	12030eu		
1830-1900	Bulgaria, Radio Sofia	6235eu	9560eu	9700na	11720na
1830-1900 as	Canada, RCI Montreal	13670me	15260me	17820me	
1830-1900	Netherlands, Radio	6020af	9605af	21515af	21590af
1830-1900	Sri Lanka, SLBC Colombo	9720eu	15120eu		
1830-1900	United Kingdom,BBC London	3255va	6190va	6195va	9410eu
		15070eu	15400af	17880va	
1840-1850 mtwhfa	Greece, Voice of	15630af	17525af		
1850-1900 smtwhf	New Zealand, R NZ Intl	15120pa			

1900 UTC [2:00 PM EST/11:00 AM PST]

1900-1925	Netherlands, Radio	6020af	9605af	21515af	21590af
1900-1930	Belgium, R Vlaanderen	5900af	15440eu		
1900-1930	Canada, RCI Montreal	13670af	15260af	17820af	
1900-1930	Japan, Radio	9535am	9640va	11850va	19535am
1900-1930 s	Lebanon, King of Hope	6280me			
1900-1930 as	Norway, Radio Norway Intl	15220va	17730va		
1900-1930	United Kingdom,BBC London	6005va	7160va	9410eu	12095eu
		15070eu	15400af	17880va	
1900-1930	Vietnam, Voice of	9840eu	12020eu	15010eu	
1900-1950	Germany, Deutsche Welle	9765af	11765af	11785af	11905af
		13790af	15350af	17810af	
1900-2000	Australia, Radio	5995pa	6060pa	6080pa	7240pa
		7260pa	9580pa	11720pa	11855pa
		11910pa			
1900-2000	Bulgaria, Radio Sofia	15330na			
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			

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1900 UTC cont'd

1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	6955af	9440af		
1900-2000	Costa Rica, RFPI	7375am	13630am	15030am	
1900-2000	Ecuador, HCJB Quito	17790eu	21455eu	21480eu	
1900-2000	Kuwait, Radio	13620na			
1900-2000 s	Morocco, RTV Marocaine	11920as			
1900-2000	Nigeria, Radio	3326do	4990do		
1900-2000	Nigeria, Voice of	7255af			
1900-2000	Romania, R Romania Intl	6105eu	7195eu	7225eu	
1900-2000	Russia, Radio Moscow	7170va	7260va	9685va	9725va
		9785va	9860va	9890va	11770va
		11840va	11920va	12050va	13670va
		15425va	15485va	17605va	
1900-2000	Saudi Arabia, BSKSA	9705eu	9720eu		
1900-2000	Spain, Spanish Natl Radio	9675af	9685eu		
1900-2000	Sri Lanka, SLBC Colombo	9720eu	15120eu		
1900-2000	USA, CSMonitor Boston MA	9425pa	13840na	15665eu 2	1640af
1900-2000 sa	USA, CSMonitor Boston MA	17555am			
1900-2000	USA, KCBI Dallas TX	15375va			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, VOA Washington DC	3990af	9525as	9700eu	13710af
		15320af	15410af	15580eu	17800af
		19261am			

1900-2000	USA, WHRI Noblesville IN	13760na 17835na
1900-2000	USA, WINB Red Lion PA	15295eu
1900-2000	USA, WJCR Upton KY	7490na 13595na
1900-2000	USA, WMLK Bethel PA	9465eu
1900-2000	USA, WWCR Nashville TN	13845na 15685va
1900-2000	USA, WYFR Okeechobee FL	15355eu 21615af
1930-1955	Finland, Radio	6120eu 9730eu 11755eu
1930-2000	Austria, R Austria Intl	5945eu 6155eu 12010me 13730af
1930-2000	Bulgaria, Radio Sofia	15330na
1930-2000	Iran, VOIRI Tehran	9022va 15260va
1930-2000 fa	Kazakhstan, R Alma Ata	3955do 5035do 5260do 5960eu
	5970eu 7115eu 9505eu 9690eu	
	11825eu 15215eu 15250eu 15270eu	
	15285eu 15315au 15360eu 15385eu	
	17605eu 17730eu 17765eu 21490eu	
1930-2000	Netherlands, Radio	17605af 21590af
1930-2000	Poland, Polish R Warsaw	7145eu 9525eu
1930-2000	United Kingdom, BBC London	6190va 6195va 7160va 9410eu
	9410va 9630va 12095eu 17880af	
1930-2000	Yugoslavia, Radio	6100eu 7200af
1935-1955	Italy, RAI Rome	7275eu 9710eu 11800eu
1940-2000 smwha	Mongolia, R Ulaanbaatar	11790eu 11850eu
1950-2000	Vatican State, Vatican R	5885eu 7250eu

Keeping an Ear on the U.S.-Iraqi Standoff

Compiled by Gayle and Larry Van Horn

The on-again, off-again aggressive stance by Sadaam Hussein gives monitors good cause to keep their eyes and ears upon this ever-volatile area of the Middle East. These are the best bets for potential activity should open hostilities break out. See what you can hear, and let us know what you log.

Satellite Communications

Military communications to the Middle East utilize the same degrees West FLTSATCOM satellite. Check frequencies between 261.025 to 262.975 MHz every 25 Hz on narrowband FM. This month's "Federal File" (p. 42) also gives good advice on how to hear the comsats.

VHF-Skip

As pointed out in the feature article on VHF skip (Parts I and II), this is the time of year for 30-50 MHz skip. Air-to-air combat frequencies were heard in this range during Desert Storm at that time. Russell Wright reported hearing air to air transmissions on 32.250, 32.350, 32.450, 32.550, and 33.300.

Shortwave Broadcasting

Certain shortwave stations in the Middle East and stations beaming to the Middle East offer news and varying points of view.

Radio Iraq International - Baghdad
0215-0515 11860 am
1400-1700 13680 as
2200-2300 15210 eu

Voice of the Islamic Rep of Iran - Tehran
0030-0130 9022 11790 15260 (na)
1030-1130 9525 11515 11715 11790 11910 11930 (va)
1930-2000 9022 15260 (va)

Kol Israel - Jerusalem
0500-0515 9435 (na)
1400-1425 11587 11603 15640 (na) 15650 17575 17590 (va)
1800-1815 7465 17465 (na) 11587 11675 17575 (va)
2000-2030 7465 9435 11603 11675 (na) 11587 17575 (va)
2230-2300 7465 9435 11567 (na) 11603 11675 17575 (va)

Radio Jordan - Amman
1320-1600 9560 (eu)

Radio Kuwait - Kuwait City
1800-2100 13620 (na)

Voice of America (English to me)
0400-0500 5995 6040 6140 7170 (6873 LSB)
0500-0530 5995 6040 6140 7170 9530 9700 11825 15205 (6873 LSB)
0530-0600 3980 5995 6040 6060 6140 7170 9530 9700 11825 15205 (6873 (LSB)
0600-0630 3980 5995 6005 6040 6060 6140 7170 7325 11805 11825 15205 (6873 LSB)
0630-0700 3980 5995 6005 6040 6060 7170 7325 11805 11825 15205 (6873 LSB)
0800-1000 11735 15160 15195 17770 21455 21570
1000-1100 11735 15160 15195 17770 21455
1400-1500 15205
1500-1630 9700 15205 (19379 LSB)
1630-1700 6180 9700 9760 11855 15205 15245 (19379 LSB)
1700-1800 6040 9700 9760 15205 (19379 LSB)

Utility Channels to Watch

US Navy HICOM channels

Area	Control Station	Freq/Time
West Pacific	NAVCAMS Pacific, Guam	4040 24 hours
		4813.5 24 hours
		12761 2200-1000 UTC
East/No Atlantic	NAVCOMMSTA, UK	6720 2200-0600 UTC
	Thurso, Scotland	11255 0600-2200 UTC
Western Atlantic/ Caribbean	Various	6697 24 hours
		11267 24 hours
		23287 24 hours
Caribbean	COMNAVFORCARIB	7535 24 hours
	NAVSTA Gitmo Bay, Cuba	15522 24 hours

Continued on p. 85

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English language

shortwave guide

2000 UTC [3:00 PM EST/12:00 PM PST]

2000-2010 mtwhf	Kenya, Voice of	4935do			
2000-2010 smwha	Mongolia, R Ulaanbaatar	11850eu	12015eu		
2000-2015	Canada, RCI Montreal	11945eu	13650eu	13670eu	15325eu
		17820eu	17875eu		
2000-2015 mtwhfa	Greece, Voice of	7450eu	9395eu		
2000-2025	Netherlands, Radio	17605af	21590af		
2000-2025	Poland, Polish R Warsaw	7145eu	9525eu		
2000-2030	Israel, KOL Israel	7465na	9435na	11587eu	11603am
		11675na	17575af		
2000-2030	Nigeria, Voice of	7255af			
2000-2030 mtwhf	Portugal, Radio	11740eu			
2000-2030	Switzerland, Swiss R Intl	9885af	12035af	13635af	15505af
2000-2030	United Kingdom,BBC London	9410eu	11945eu	11955va	12095eu
		13650eu	15070eu	15260sa	15325eu
		17875eu	17880af		
2000-2030	Vatican State, Vatican R	9645af	11625af	15090af	
2000-2050	North Korea, R Pyongyang	6576eu	9345eu	9640af	9977af
2000-2100	Australia, Radio	5995pa	6060pa	6080pa	7240pa
		9580pa	9860pa	11720as	11910pa
		12000pa			
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, CKZU Vancouver	6160do			
2000-2100	China, China Radio Intl	9440af	9920eu	11500eu	11715af
		15110af			
2000-2100	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
2000-2100	Ghana, GBC Radio 1	4915do			
2000-2100	Ghana, GBC Radio 2	7295do			
2000-2100	Kuwait, Radio	13620na			
2000-2100	Lebanon, King of Hope	6280me			
2000-2100	Nigeria, Radio	3326do	4990do		
2000-2100	Russia, Radio Galaxy	11880eu			
2000-2100	Russia, Radio Moscow	4795va	4825va	7170va	7180va
		7205va	9685va	9725va	9785va
		9870va	9890va	15425na	17605na
		21480va			
2000-2100	Saudi Arabia, BSKSA	9705eu	9720eu		
2000-2100	USA, CSMonitor Boston MA	7510eu	9455as	13625pa	13770am
		17510am	17555sa		
2000-2100	USA, KCBI Dallas TX	15375va			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100	USA, VOA Washington DC	6040eu	9700eu	9760eu	11710eu
		13710af	15160eu	15205eu	15410af
		15445af	15495af	15580af	17650af
		17800af	17895af	21485a	f 21625af
2000-2100	USA, WHRI Noblesville IN	13760af	17835va		
2000-2100	USA, WJCR Upton KY	7490na	13595na		
2000-2100	USA, WMLK Bethel PA	9465eu			
2000-2100	USA, WRNO New Orleans LA		15420na		
2000-2100	USA, WWCR Nashville TN	13845va	15685va		
2000-2100	USA, WYFR Okeechobee FL	7355eu	15355na	15566eu	15585eu
		17610na	17750af	21525eu	21615na
2005-2100	Syria, Radio Damascus	12085na	15095na		
2010-2100 sa	Kenya, Voice of	4935do			
2025-2045	Italy, RAI Rome	7235me	9575me	11800me	
2030-2035	Latvia, Radio Riga	5935do			
2030-2100	Canada, RCI Montreal	5995eu	7230eu	11945eu	13650eu
		15140eu	15325eu	17875eu	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	South Korea, Radio Korea	6480af	7550me	15575eu	
2030-2100	United Kingdom,BBC London	9410eu	12095eu	15260sa	15400af
		15495as	15580as		
2030-2100	USA, WHRI Noblesville IN	17835va			
2030-2100	Vietnam, Voice of	9840eu	12020eu	15010eu	
2045-2100	Bulgaria, Radio Sofia	6235eu			
2055-2100	Neth Antilles,TWR Bonaire	11930am			

2100 UTC [4:00 PM EST/1:00 PM PST]

2100-2105	Syria, Radio Damascus	12085na	15095na		
2100-2110	Vatican State, Vatican R	5885eu	7250eu		
2100-2115	Bulgaria, Radio Sofia	6235eu	9560na		
2100-2130	China, China Radio Intl	9920eu	11715af	15110af	15170af
2100-2130	Czechoslovakia, Radio	5960eu	7345eu	9605eu	
2100-2130	Lebanon, King of Hope	6280me			
2100-2130 as	Norway, Radio Norway Intl	15180va			
2100-2130 mtwhf	Portugal, Radio	15250af			
2100-2130	South Korea, Radio Korea	6480af	7550me	15575eu	
2100-2130	Sweden, Radio	6065va	9655va	17730as	
2100-2130	United Kingdom,BBC London	6005va	6180va	7180as	9410eu
		9590na	15260sa	15340eu	15400af
2100-2150	Germany, Deutsche Welle	6185as	9670as	9690as	9765as
		11785as			
2100-2200	Australia, Radio	5995pa	6060pa	6080pa	11720pa
		11880pa	13705pa	15365as	
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, CKZU Vancouver	6160do			
2100-2200	China, China Radio Intl	9920eu	11500eu	15170eu	
2100-2200	Costa Rica, RFPI	7375na	13630na	15030na	
2100-2200	Cuba, Radio Havana Cuba	15165na	17705eu		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Ghana, GBC Radio 1	4915do			
2100-2200	Ghana, GBC Radio 2	7295do			
2100-2200	Hungary, Radio Budapest	6110eu	9835eu	11910eu	
2100-2200	Japan, Radio	11815me	11840eu	15430eu	17810as
		17890as			
2100-2200	Neth Antilles,TWR Bonaire	11930am			
2100-2200	Nigeria, Radio	3326do	4990do		
2100-2200	Romania, R Romania Intl	5955eu	6105eu	7145eu	7225eu
		9690eu			
2100-2200	Russia, Radio Moscow	4795va	4825va	7115va	7150va
		7180va	7205va	9725va	9750va
		9785va	9860va	9870va	9890va
		12050na	13670va	15425na	17605na
		17665va	17690va	21480na	
2100-2200	Spain, Spanish Natl Radio	6130eu			
2100-2200	Sri Lanka, SLBC Colombo	15120as			
2100-2200	Turkey, Voice of	9445eu			
2100-2200	Ukraine, R Ukraine Intl	5960eu	7250eu	7340eu	9600eu
		9635eu	9865eu	15135na	15570eu
2100-2200	USA, CSMonitor Boston MA	9455as	13625pa	13770na	15665eu
		17510na	17555sa		
2100-2200	USA, KCBI Dallas TX	15375va			
2100-2200	USA, KTBN Salt Lk City UT	15590na			
2100-2200	USA, VOA Washington DC	13710va	15290af	15410af	15495af
		15580af	17800af	19261af	
2100-2200	USA, WHRI Noblesville IN	13760am	17835na		
2100-2200	USA, WJCR Upton KY	7490na	13595va		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200	USA, WRNO New Orleans LA		15420na		
2100-2200	USA, WWCR Nashville TN	13845va	15685va		
2100-2200	USA, WYFR Okeechobee FL	7355eu	15566eu	17750af	21525eu
2110-2200	Syria, Radio Damascus	12085na	15095na		
2115-2130 mtwhf	United Kingdom,BBC Carib	15390ca	17715ca		
2115-2200	Egypt, Radio Cairo	9900eu			
2125-2200	Belgium, R Vlaanderen	5910eu	9905eu		
2130-2200	Austria, R Austria Intl	5945eu	6155eu	9870af	
2130-2200	Canada, RCI Montreal	11880af	15150af	17820af	
2130-2200	Ecuador, HCJB Quito	17790eu	21455eu	21480eu	
2130-2200	Kazakhstan, R Alma Ata	3955do	5035do	5260do	5960eu
		5970eu	7115eu	9505eu	9690eu
		11825eu	15215eu	15250eu	15270eu
		15285eu	15315eu	15360eu	15385eu
		17605eu	17730eu	17765eu	21490eu
2130-2200 smtwhf	Lebanon, King of Hope	6280me			
2130-2200	Lithuania, Radio Vilnius	9530na	17605na	17690na	
2130-2200	New Zealand, R NZ Intl	17770pa			
2130-2200	Sweden, Radio	6055eu	9655pa	11955as	
2130-2200	United Kingdom,BBC Flk Is	13660sa			
2130-2200	United Kingdom,BBC London	5975ca	6125eu	6180va	6195eu
		7125va	9410eu	9590na	15260sa
		15340va	15400va		

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shortwave guide

2200 UTC [5:00 PM EST/2:00 PM PST]

2200-2210	Syria, Radio Damascus	12085na	15095na		
2200-2225	Italy, RAI Rome	5990as	9710as	11800as	
2200-2229	Yugoslavia, Radio	6100eu	7200eu	9505na	
2200-2230	Albania, R Tirana Intl	9760eu	11825eu		
2200-2230	China, China Radio Intl	3985eu	7170eu		
2200-2230	Czechoslovakia, Radio	5930eu	6055eu	7345eu	9605eu
2200-2230	Switzerland, Swiss R Intl	9810sa	9885sa	12035sa	15570sa
2200-2230	USA, VOA Washington DC	6030sa	7120as	9770as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2200-2230 s	USA,KGEI San Francisco CA	15280sa			
2200-2245	USA, WINB Red Lion PA	15185eu	15195eu		
2200-2300	Australia, Radio	9645as	11720pa	11880pa	13705as
		15240pa	15320pa	15365as	17795pa
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, CKZU Vancouver	6160do			
2200-2300	Canada, RCI Montreal	9760eu	11945eu		
2200-2300	Costa Rica, RFPI	13630ca	15030ca		
2200-2300	Cuba, Radio Havana Cuba	6180va			
2200-2300	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
2200-2300	Ghana, GBC Radio 1	4915do			
2200-2300	Ghana, GBC Radio 2	7295do			
2200-2300	Iraq, Radio Iraq Intl	15210eu			
2200-2300 smtwha	Malaysia, RTM Radio 4	7295do			
2200-2300	New Zealand, R NZ Intl	17770pa			
2200-2300	Nigeria, Radio	3326do	4990do		
2200-2300	Russia, Radio Moscow	7170va	7180va	7300va	9520va
		9685va	9715va	9725va	9735va
		9750va	9785va	9795va	9860va
		9870va	9890va	12050va	15425na
		17570va	17605va	17655va	21480va
2200-2300	Sierra Leone, SLBS	3316do			
2200-2300	Singapore, SBC1	5010do	5052do	11940do	
2200-2300	Taiwan, VO Free China	9850eu	11915eu		
2200-2300	Turkey, Voice of	9445na			
2200-2300	UAE, Radio Abu Dhabi	9605na	11710na	11815na	
2200-2300	Ukraine, R Ukraine Intl	4795eu	6010eu	6020eu	7195eu
		7240eu	9710eu		
2200-2300	United Kingdom,BBC London	5975na	6195as	7325am	9590na
		11750sa	15260sa	15340af	15400af
		17325am	17830as		
2200-2300	USA, CSMonitor Boston MA	7510va	9465na	13625as	15405as
		15665eu	17555am		
2200-2300	USA, KCBI Dallas TX	15725va			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, VOA Washington DC	7120as	9770as	11760as	15185au
		15290au	15305au	17735au	17820au
2200-2300	USA, WHRI Noblesville IN	13760na			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA		15420na		
2200-2300	USA, WWCR Nashville TN	13845na	15685na		
2200-2300	USA, WYFR Okeechobee FL	17610na	17750eu	21525eu	
2203-2209	Croatia, Croatian Radio	6210eu	9830eu	13830eu	
2215-2245	Egypt, Radio Cairo	9900eu			
2215-2300	Finland, Radio	9730eu	11740eu	11810eu	
2230-2300 mtwhf	Congo, RTV Congolaise	4765do			
2230-2300	Israel, KOL Israel	7465eu	9435na	11567na	11603eu
		11675eu	17575eu		
2230-2300	Lithuania, Radio Vilnius	9710eu			
2230-2300	Sweden, Radio	9655eu	11955as		
2230-2300	USA, VOA Washington DC	9530eu	11905me	11960me	17885me
2235-2300 irreg	USA, WEWN Birmingham AL	7540na			
2240-2250 smtwhf	Greece, Voice of	11645au			
2245-2300	Armenia, Radio Yerevan	7440eu	11980eu	12060eu	
2245-2300	Bulgaria, Radio Sofia	9700na	11720na		
2245-2300	USA, WINB Red Lion PA	15145eu			
2245-2300	Vatican State, Vatican R	9600au	11830au	15090au	
2255-2300	Neth Antilles,TWR Bonaire	11930am			

U.S.-Iraqi cont'd

Indian Ocean	NAVCAMS Pacific, Guam	7535 0200-1300 UTC 12213.5 1300-0200

UTC

Navy HICOM Nets (24 hour guard)

	Eastern/MidPac (COM3rdFlt)	WestPac (COM7thFlt)	Indian Ocean
Primary	4416	6720	12215
Secondary	8776	12255	23315
Tertiary	13181	18009	

US Air Force Global HF System
4725 6738 8967 8993 11176 11243 13201 15015 17975

Major World Air Route Areas (MWARAs)

These civilian frequencies are good for hearing military and civilian aircraft both in the crisis area and from those regions whose aircraft may be mobilized.

Middle East (MID-1)
2992 3404 5603 5658 5667 8847 8918 10018 13312 13288 13336

Middle East (MID-2)
2923 2992 3446 3467 5601 5658 5667 6556 6624 8879 8918 10066 10009 10018 13288 13312 13336

Africa (AFI-3)
3467 5505 5658 6574 6624 8847 8870 8888 8918 8959 11300 13288 13294 13306 13336 17961

Indian Ocean (INO-1)
3476 5634 6559 8879 10018 13306 17961

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English language **shortwave guide**

2300 UTC [6:00 PM EST/3:00 PM PST]

FREQUENCIES

2300-2305	Ghana, GBC Radio 1	4915do			
2300-2305	Ghana, GBC Radio 2	7295do			
2300-2310	Sierra Leone, SLBS	3316do			
2300-2315	Bulgaria, Radio Sofia	9700na	11720na		
2300-2315 irreg	USA, WEWN Birmingham AL	7540na			
2300-2330 as	Canada, RCI Montreal	11940sa	15235sa		
2300-2330	Canada, RCI Montreal	9535na	9755na	11730na	11940na
2300-2330 as	Norway, Radio Norway Intl	11795am			
2300-2330	United Kingdom,BBC London	5975na	6175na	6195as	7180as
		7325as	9410va	9590va	11740sa
		15260sa	15400va		
2300-2345	Finland, Radio	9730eu	11740eu	11810eu	
2300-2350	North Korea, R Pyongyang	11700am	13650am		
2300-2350	Turkey, Voice of	7185me	9445na	11895eu	
2300-0000	Australia, Radio	11720pa	11880pa	15240pa	15320pa
		15365as	17795pa		
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, CKZU Vancouver	6160do			
2300-0000	Costa Rica, AWR	9725ca	11870ca		
2300-0000	Costa Rica, RFPI	7375na	7385na	13630na	15030na
2300-0000	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
2300-0000	Guam, KSDA	15610as			
2300-0000	Japan, Radio	11815am	15195as	15430as	17810pa
2300-0000 smtwha	Malaysia, RTM Radio 4	7295do			
2300-0000	Neth Antilles,TWR Bonaire	11930am			
2300-0000	New Zealand, R NZ Intl	17770pa			
2300-0000	Russia, Radio Moscow	4795va	4825va	4860va	7115va
		7150va	7170va	7180va	7300va
		9520va	9685va	9725va	9750va
		9860va	9870va	9890va	12050na
		17655na	21480na	21690na	
2300-0000	S Africa, Channel Africa	4810af			
2300-0000 vl	S Africa, Radio Orion	4810do			
2300-0000	Singapore, SBC1	5010do	5052do	11940do	
2300-0000	Thailand, Radio	9655as	11905as		
2300-0000	UAE, Radio Abu Dhabi	9605na	11710na	11815na	
2300-0000	USA, CSMonitor Boston MA	7510af	9465na	13625as	13770na
		15405af	15665eu	17555af	
2300-0000	USA, KCBI Dallas TX	15725va			
2300-0000	USA, KTBN Salt Lk City UT	15590na			
2300-0000	USA, KVOH Los Angeles CA	9725am			
2300-0000	USA, VOA Washington DC	7120as	9530me	9770as	11760au
		11905me	11960eu	15185au	15290au
		15305as	17735as	17820as	17885me
2300-0000	USA, WHRI Noblesville IN	13760sa			
2300-0000	USA, WINB Red Lion PA	15145eu			
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000	USA, WRNO New Orleans LA		7355na		
2300-0000	USA, WWCR Nashville TN	13845na	15685va		
2330-0000	Australia, Radio	17795pa	21740pa		
2330-0000	Austria, R Austria Intl	9870sa	13730sa		
2330-0000 as	Canada, RCI Montreal	11940sa	15235sa		
2330-0000	Canada, RCI Montreal	9755am	11730am	13670am	
2330-0000 a	Colombia, Radio Nacional	11822.5	17865am		
2330-0000	Netherlands, Radio	6020na	6165na		
2330-0000	Palau, KHBN	9830va			
2330-0000 m	Sri Lanka, SLBC Colombo	15425am			
2330-0000	Sweden, Radio	6065eu			
2330-0000	United Kingdom,BBC London	5975na	6175na	6195as	7180va
		7325na	9570na	9590na	9915na
		11945va	15260sa	15280va	
2330-0000	Vietnam, Voice of	12020as	15010as		
2335-2345 smtwhf	Greece, Voice of	7450eu	9425sa	11645sa	
2345-0000	Croatia, Croatian Radio	5085eu	6210eu	9830eu	13830eu

SELECTED PROGRAMS

Sundays

2300 Radio Norway Int'l: Norway Today. See S 1200.
2305 BBC: World Business Review. The previous week's news and upcoming events.
2310 Voice of America: Newsline. News, correspondent reports, interviews, and opinion.
2315 BBC: Classics With Kay. Brian Kay with his choice of classical music.
2330 Voice of America: VOA Morning. See S 0010.

Mondays

2305 BBC: World Business Report. The latest news from the markets worldwide.
2310 Voice of America: Newsline. See S 2310.
2315 BBC: Talks. This month, foreign correspondents based in the UK present their "Images Of Britain."
2330 BBC: Multitrack 1. Tim Smith presents the smash singles on the UK pop-music charts.
2330 Voice of America: VOA Morning. See S 0010.

Tuesdays

2305 BBC: World Business Report..See M 2305.
2310 Voice of America: Newsline. See S 2310.
2315 BBC: Concert Hall. See S 1515.
2330 Voice of America: VOA Morning. See S 0010.

Wednesdays

2305 BBC: World Business Report. See M 2305.
2310 Voice of America: Newsline. See S 2310.
2315 BBC: From Our Own Correspondent. See S 0330.
2330 BBC: Multitrack 2. Graham Bannerman presents new pop records, interviews, news, and competitions.
2330 Voice of America: VOA Morning. See S 0010.

Thursdays

2305 BBC: World Business Report. See M 2305.
2310 Voice of America: Newsline. See S 2310.
2315 BBC: Music Review. News and features on the world of classical music.
2330 Voice of America: VOA Morning. See S 0010.

Fridays

2305 BBC: World Business Report. See M 2305.
2310 Voice of America: VOA Morning. See S 0010.
2315 BBC: Worldbrief. A roundup of the week's news headlines and developments.
2330 BBC: Multitrack 3. Sarah Ward presents the latest from the alternative pop scene.

Saturdays

2305 BBC: Words Of Faith. See M 1209.
2310 BBC: Book Choice. See W 0425.
2310 Voice of America: VOA Morning. See S 0010.
2315 BBC: A Jolly Good Show. See T 1515.

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Danny Thomas, Founder

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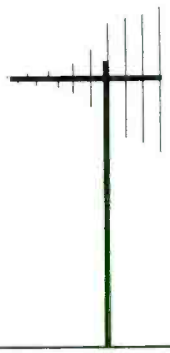
IT'S NEVER TOO EARLY TO GET READY FOR SPRING!

GROVE'S SPRING ANTENNA SPECIAL!



Grove's Outdoor Scanner Antenna System

Start with our Scantenna or Scanner Beam then add our PRE-4 Wideband Preamplifier

PRE-4

The PRE-4 Power Ant has taken all the best from its successful predecessors and combined them into one powerful signal booster for scanners, TV and FM stereos!

Equipped with a high gain, low noise, solid state amplifier stage, the PRE-4's front panel control allows custom selection of up to 20 dB of amplification!

Two output connectors are provided allowing you to use two scanners on one antenna at the same time! All connectors are type F for maximum signal transfer. 120VAC/12VDC wall adaptor included.

SCANTENNA:

This new, full-frequency, omnidirectional scanner antenna will equal or outperform any competitor on the market. Its dipole-cluster design utilizes broadband techniques to provide continuous frequency coverage from 25-1300 MHz, offering superb reception of public safety, civilian and military aircraft, hams, personal communication devices, maritime, CB--anything in its frequency range! Requires TV type F connector on your coax.

SCANNER BEAM:

Our world-renowned antenna has been improved to provide unexcelled 30-50 MHz low band reception, 108-136 MHz aircraft, 136-174 MHz high band, 225-400 MHz military aircraft and satellites, 406-512 MHz UHF, and 806-960 MHz microwave mobile.

HAMS NOTE--can be used for transmitting up to 25 watts on 144, 220 and 420 bands. 50/75 ohms nominal impedance.

Balun transformer, offset pipe and all mounting hardware included (requires TV type F connector on your coax.

WHAT YOU NEED TO ORDER:
ANT 7 Scantenna: $39.95
or
ANT 1 Scanner Beam: $59.95
plus
PRE 4 Preamplifier: $59.95 (plus $3.75 shipping)
CK-SC Scanner Interconnect Kit: $12.95
Shipping for system ordered together: $10 UPS

Grove's Outdoor Shortwave Antenna System

A high performance, low cost shortwave/longwave dipole designed for total 100 kHz-30MHz coverage without the gaps found in more expensive trap antennas.

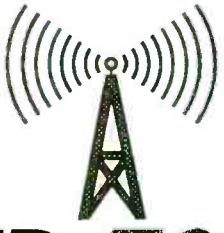
SKYWIRE:

Modeled after the famous Grove all-band transmitting dipole, the 66-foot SKYWIRE is off-center fed, designed specifically for serious SWL's... Includes pre-measured stranded copper antenna wire, porcelain end insulators, custom center insulator for your PL-259 coax connection, and full instructions.

TUN-3:

Then adding the Grove Minituner to your outdoor shortwave antenna will allow signal peaking to perfection as well as eliminate intermodulation on your general coverage receiver. Comes equipped with standard UHF (PL-259) connectors.

WHAT YOU NEED TO ORDER:
TUN-3 Minituner: $49.95 plus $4 shipping
ANT-2 Skywire antenna: $29.95 plus $3.75 shipping
CB-50: $19.95 or CB-100: $29.95 coax cable
CKSW Accessory Kit: $12.95 (includes 20' antenna wire, banana plug, 3 adaptors for all portable and multiband tabletop radios equipped for external antenna connections): plus $3 UPS shipping
Shipping charges for system ordered together: $8 UPS



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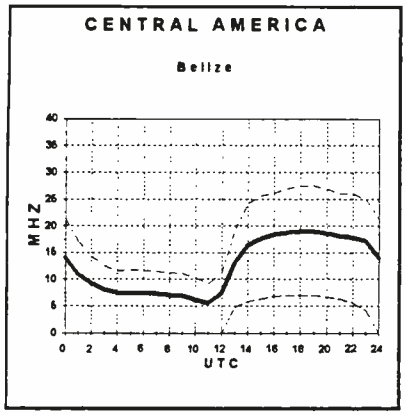
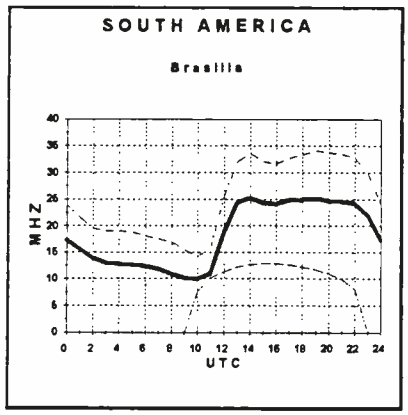
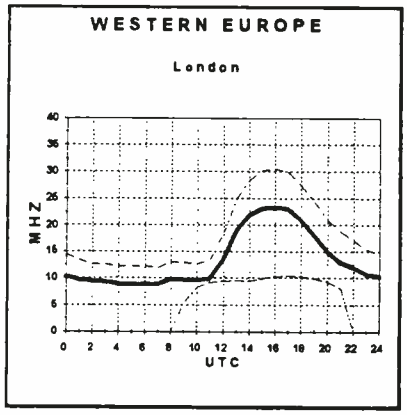
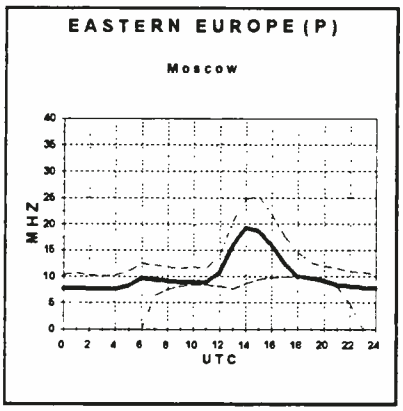
Propagation conditions: Eastern United States

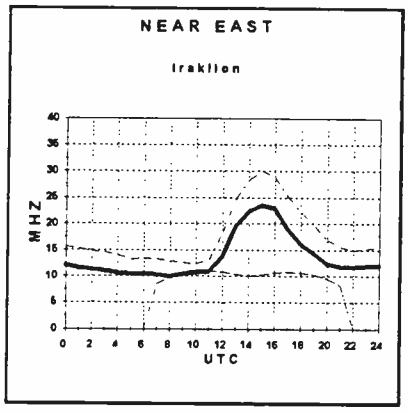
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear.

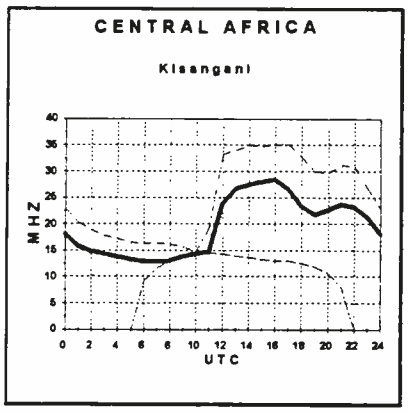


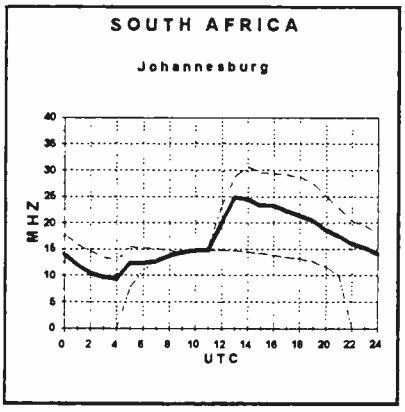


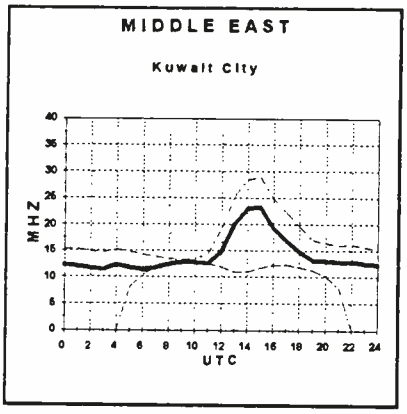


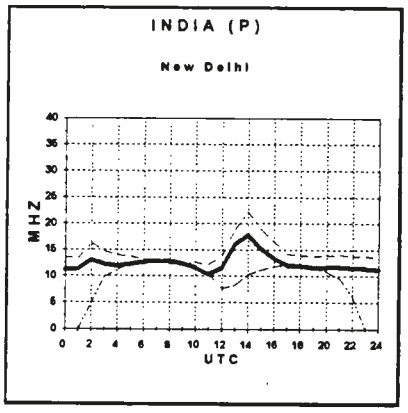


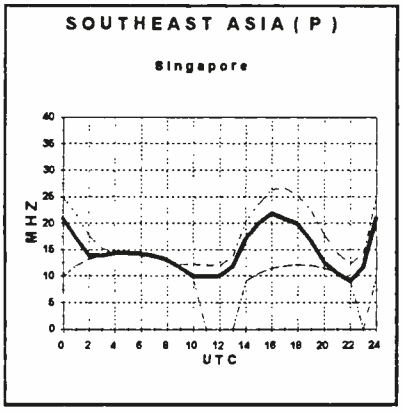


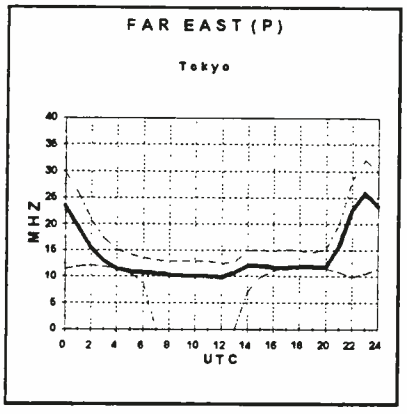


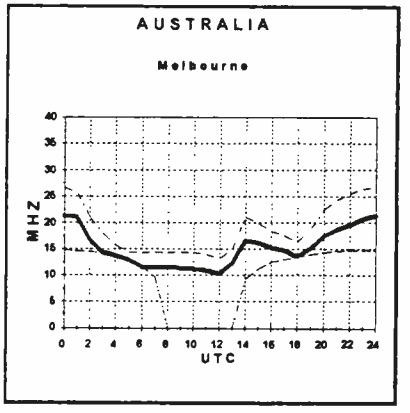












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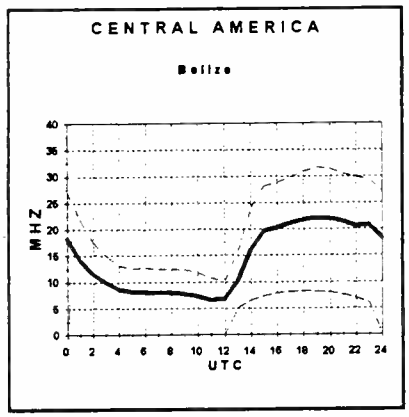
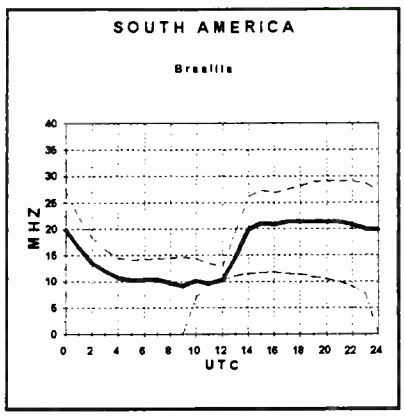
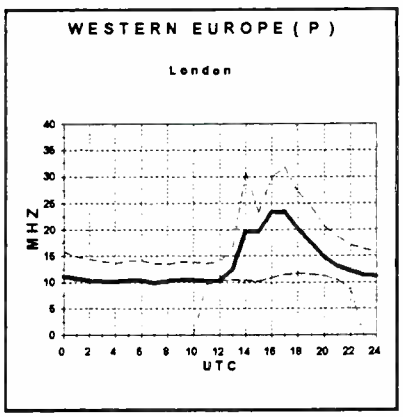
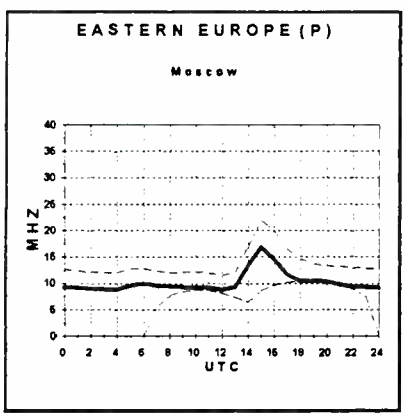
Propagation Conditions: Western United States

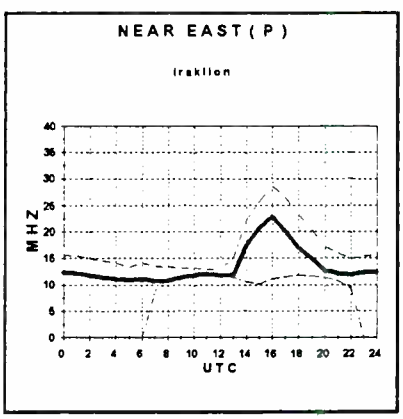
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom 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.

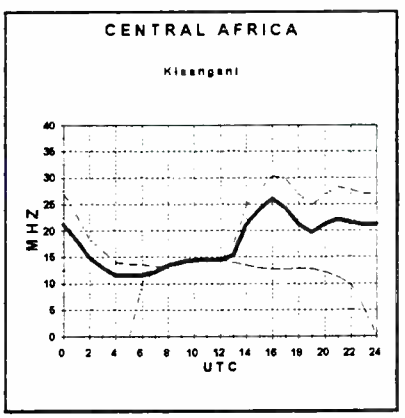


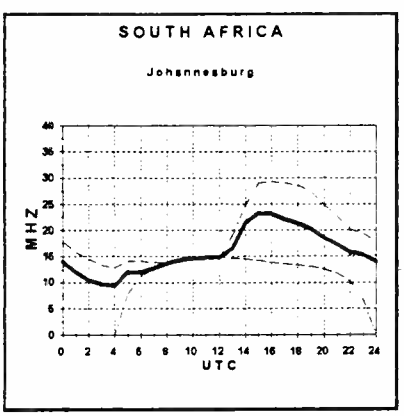


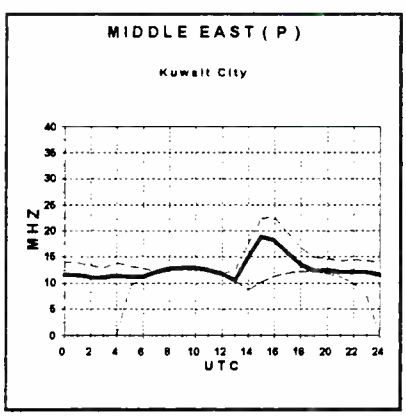


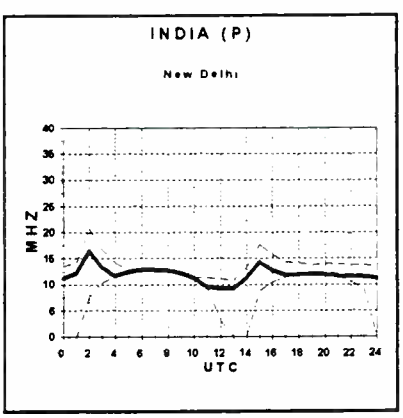


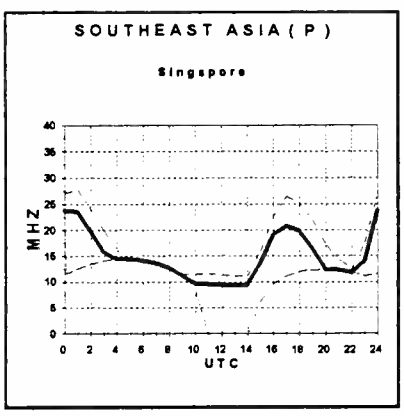


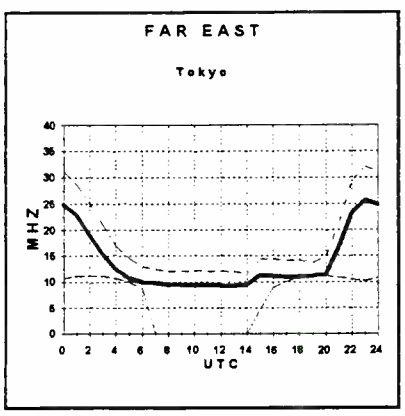


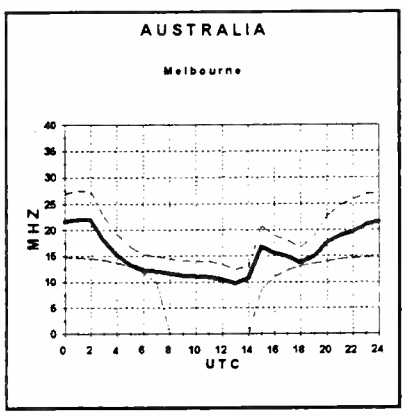












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what's new?

Larry Miller

New Uniden Scanners

February marks the release of Uniden's new Bearcat BC 350A and BC 700A scanners. The two new radios (actually, the only difference between the two is 800 MHz coverage and price) are described as "innovative new products...for the first-time [scanner] buyer."

Both models have preprogrammed frequencies that are activated by buttons such as "FIRE/EMG," "POLICE," "AIR," "MRN" (marine) and "WX" (weather).

The radio also has a search function that allows you to scan the bands for new frequencies and, when found, program them into one of the unit's 50 memory channels. But this is the only way that new frequencies can be entered—there is no keypad.

The BC 350A and the BC 700A are mobile/base units and come with AC adapter, DC cord, mobile mounting bracket and telescopic antenna. Suggested retail price for the '350A will be $199.95 and the '700A will be $379.95.

Tune in on Telephone Calls

Although the hobby is slow to admit it, more than one of us has, at least on occasion, shown a

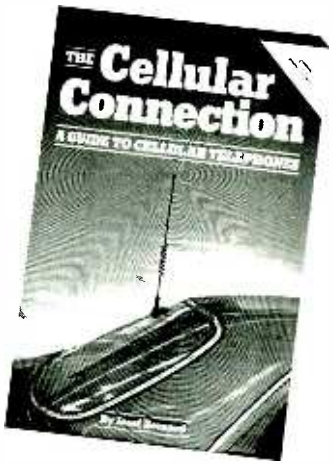
passing interest in monitoring phone conversations. The proof is, in part, provided by the success of Tom Kneitel's perennial favorite, *Tune In On Telephone Calls*, which is now in its second edition.

The second edition of *TIOTC* contains updated information on the revised high seas telephone service, includes information on the new 900 MHz phones and has frequencies for the new 46/49 MHz cordless models. As is his trademark style, Kneitel also dives into such subjects as telephone services for offshore oil rig workers, remote area phones and more.

Tune In On Telephone Calls, published by CRB Research Books, is available for $12.95 plus shipping from virtually all *MT* advertisers.

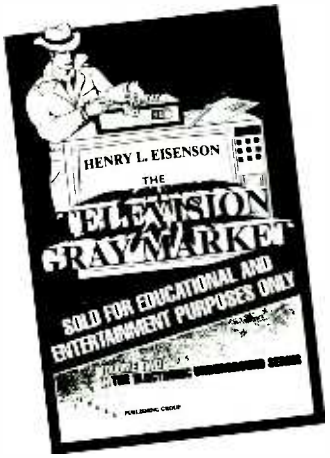
The Cellular Connection

If you are considering the purchase of a cellular telephone—and more and more Americans are—you would do well to read *The Cellular Connection—A Guide to Cellular Telephones*. It is an excellent, comprehensive new book from Quantum, a leading publisher in the field of wireless communications.



Topics include choosing a phone and antenna, billing procedures, roaming, accessories, safety and security (privacy), placing and receiving calls, maintenance and repair, and other aspects as well.

The Cellular Connection by Josef Bernard is $9.95 plus $3 shipping from Quantum Publishing, PO Box 310-MT, Mendocino, CA 95460.



The Mummy Lives!

The cover is like a poster for a low-budget horror film. A man with a face like "The Mummy," who is dressed in a costume that's a cross between a 1920s gangster and John Travolta in the movie, *Saturday Night Fever*, holds a soldering iron to a cable TV box. Below, a banner screams, "The Theft of Satellite, Cable, and Videotape Programming... Sold for educational and Entertainment Purposes Only."

It's all hype; a letdown if you're hoping to get the "how to" and a disservice to a literate and informative book. *The Television Gray Market* is a basic look at the satellite and cable TV industry and the problems they face in trying to keep some very clever and persistent people from ripping them off. It's an entertaining, innocuous book that retails for $23.75 postpaid from Index Publishing Group, 6755 Mission Gorge Road, #6-MT, San Diego, California 92120.

Pirates Live!

Pirate radio is one of those puzzling aspects of the radio hobby. At times, it looks as if there are hundreds of active pirate broadcasters, and from the loggings section of George Zeller's "Outer Limits" column, it seems as if they're as easy to hear as HCJB. They aren't, of course.

Two firms are hoping to give you a helping hand by selling tapes of pirate radio stations.

Jabco Electronics calls its recording, "The Pirate Zone." There's a total of 28 pirates on the tape, many of which the publisher admits are extremely weak and distorted. The tape retails for $9.95 plus $2.00 shipping from 15961 W. Bethel Ave., Alexandria, Indiana 46001. Ask for a copy of Jabco's catalog, too. Anyone who includes pictures of his wife and kids in the catalog can't be all bad.

Panaxis Productions, P.O. Box 130, Paradise, California 95967-0130, is also offering pirate air checks. Theirs are two-pirates-to-a-tape and retail for 2-for-$4.00 plus $1.00 postage. Ask for an assortment or write for their list.

Predicting the Big One

Ray Cole is a radio enthusiast who received a lot of attention because of his unorthodox ideas

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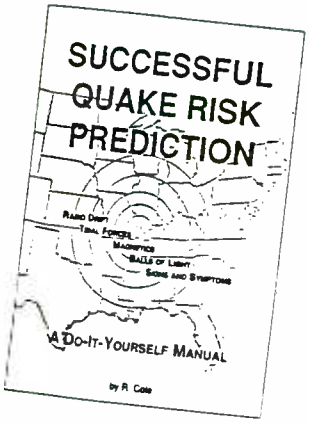
on earthquake prediction, the most interesting of which is that radio hobbyists can predict 'quakes by watching radio signal drift.



Cole has produced a report—it's 48 pages of text in one of those plastic high school report covers—that discusses this phenomenon as well as a number of others. Much, if not all, of this material has been covered in National Radio Club bulletins over the years.

The book is written in easy-to-read style; graphics are scratchy and amateurish but usable.

You can get your copy of *Successful Quake Risk Prediction* (a misnomer—the book makes no promises), from Dajja Enterprises, P.O. Box 24, Cambridge, Wisconsin 53523-0024. The book, which the author describes as "written assuming there will be no profit," is $3.00 postpaid. Please tell them that *Monitoring Times* sent you.

Aeronautical Resource Books

Listening in to Aircraft Radio is an attractive book that takes readers on a soup-to-nuts look at aero monitoring. Bob Bell, a well-known Aussie whose work appears regularly stateside, does an excellent job with the 60+ page book, all the more interesting because it gives readers a look at the subject from the "Down Under" side. Of course, there's plenty of HF and ACARS

and satellite info that guarantees the book a worldwide appeal.

We recommend *Listening in to Aircraft Radio* to all aeronautical monitoring enthusiasts. Regrettably, the price of the book was not stated; however, more information will surely be forthcoming if you drop Mr. Bell a card at P.O. Box 16, Georges Hall, 2198 NSW, Australia. Tell him that his friends at *Monitoring Times* sent you.

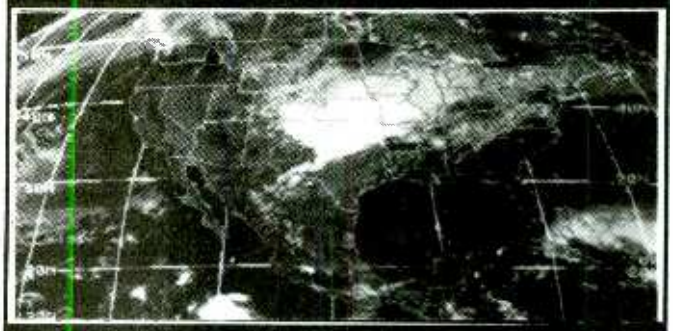
Two other books, already established as authoritative resources for the aeronautical buff, are now in expanded second editions.

Probably no other single volume has as much information for the civilian aircraft listener as the *Aeronautical Frequency Directory* by Robert Coburn. This 400 page reference covers frequencies for HF-SSB, VHF/UHF and 450/800 MHz airphone. FCC frequency bandplans, Air Traffic Control Centers, ARINC communications, aircraft radiotelephones, even a list of enroute Air Force and Civil Air Patrol frequencies is also included.

The primary girth of the book is a state-by-state listing, alphabetized by city, of frequencies, licensee names, callsigns, and uses of aircraft radio across the country.

The *Aeronautical Frequency Directory* is published by Official Scanner Guide (P.O. Box 712, Londonderry, NH 03053) and is available for $24.95 plus $2 book rate shipping from Grove Enterprises or from other *MT* advertisers.

PC HF FACSIMILE 6.0 $99



NOW EVEN BETTER!

Version 6.0 has just been released. It is the most comprehensive fax image reception system for the IBM PC and compatibles. It includes an FSK demodulator, advanced signal processing software, tutorial cassette, and complete 250 page reference manual. The software includes the following advanced features:

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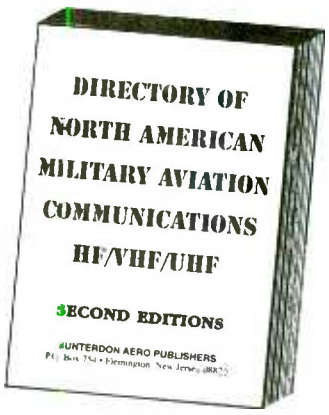
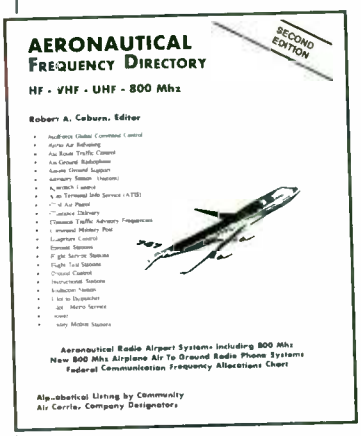
The *Directory of North American Military Aviation Communications* is THE ultimate reference for military aero monitors—up-to-date, comprehensive and accurate. Containing entries from HF-SSB, VHF and UHF, Jack Sullivan's new *Directory* is composed of volumes for northeast, southeast, central and western U.S.; Puerto Rico, Hawaii and Alaska are included.

Introductory chapters explain how military frequency allocations are assigned and used, with common active frequency lists provided to help "jump start" the new listener.

Several maps orient the aero monitor as to radar weather facilities and air refueling tracks with related frequencies.

The main body of the directory set is cross-referenced by frequency order and location (state, city), with identification of





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military branch, and use for the frequencies.

The *Directory of North American Military Aviation Communications* is published by Hunterdon Aero Publishers (P.O. Box 754-MT, Flemington, New Jersey 08822) and is also available from Grove Enterprises and other *MT* advertisers. Each volume is $24.95 plus $2 book rate shipping from Grove.

AM FM TV DXing Guide

If you've ever even thought about getting involved in AM, FM, or TV DXing, this is the perfect introductory book for you. Easy-to-read and easy-to-understand, *Discovering DX* is perfect for beginners. Each area of DX is broken down and explained, as are topics like receivers, propagation record keeping, verifications, and references (which curiously fails to mention *Monitoring Times*!). Especially fun is the author's "best bets" for hearing all 50 states. Enjoy!

The 49-page, 8.5 x 5.5 inch book, it retails for $4.95 plus $1.00 shipping from Universal Radio, 6830 Americana Pkwy, Reynoldsburg, Ohio 43068. Tell 'em that the unmentioned magazine sent you.

Electronic Media Law and Regulation

The media is an intimidating realm of law and regulation that few mortals can understand. The fact is that the electronic media —TV, radio and cable—are dynamic, influential and among the most highly regulated.

Electronic Media Law and Regulation emphasizes principles, using case law and original regulatory text. It's not going to be like reading *Reader's Digest* but for those who face these situations, the book will help them be prepared.

Included are First Amendment privacy and access issues, broadcast station licensing, programming and commercial practice regulation, copyright and intellectual property laws, defamation and libel.

Electronic Media Law and Regulation is by Kenneth Creech and is available from Focal Press for $34.00. Their phone number is 1-800-366-2665. Try to work in a mention of *MT* when you place your order.

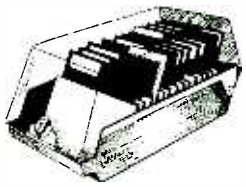
The Software Sleuth

DataFile, Inc., producer of ProScan, has released a new product called "Sherlock." Sherlock is designed to work exclusively with the Commtronics HB-232 Computer-to-Scanner Interface System. According to DataFile personnel, Sherlock is an "intelligent frequency finder" capable of building a virtually unlimited file of up to (gulp!) 1 billion active frequencies, disk space permitting.

"With Sherlock," says company president Perry Joseph, there's "no more taking notes, no more pressing buttons, and no more time limitations. Search for new frequency activity unattended for unlimited periods of time."

Sherlock requires a Radio Shack PRO2004, 2005 or 2006 scanner, a Commtronics HB-232 Scanner-to-Computer Interface System (both hardware and software), IBM/IBM compatible computer using MS/PC-DOS version 2.0 or higher, 640K RAM memory, hard disk, serial port and optional IBM/Epson compatible printer.

The price is $39.95 from DataFile, P.O. Box 20111-MT, St. Louis, Missouri 63123.



DesignCAD

American Small Business is shipping new DesignCAD 2D version 6.0. The complete, easy-to-use system, with unlimited free technical support and a customer base of hundreds of thousands worldwide, rivals high-priced, high-end systems.

Version 6.0 offers 54 new commands, 79 new options, and a host of other changes, including more colors, layers, curve types, dimensioning features as well as improved grouping and programming functions.

For more information on DesignCAD, contact Keith Campbell at One American Way, Pryor, Oklahoma 74361 or call 918-825-4985.

2010 Clearance Sale

Steve Whitt is offering a "clearance sale" on his excellent booklets, "Getting the Best from Your Sony 2001D (2010)" and "Get Even More from Your Sony ICF2001D (2010)." The books cover all aspects of operation, modification and repair of the ICF2010, addressing in detail its weaknesses and offering tried and true improvements.

You can get both books for US$10.00 from S. Whitt, Hunts Cottage, Kiln Lane, Buxhall, Suffolk IP14 3DU, England. Mr. Whitt accepts cash but no checks or money orders unless they are in pounds Sterling.

Ham it up in '93

With eleven months yet to go in 1993, the Ham Photo Calendar we were just sent for review is still a good buy. This oversized, full color calendar measures 11" x 22" when opened. Photos range from globe-hopping DXpeditions and significant occasions in 1992 to representative photos of the various aspects of ham radio. Tom Lewis, author of *Empire of the Air*, provides the historical notes for the 1993 calendar.

The calendar shows dates and times for over 100 amateur events, plus radio history dates, conventions, code proficiency runs, lunar, solar and meteor shower data, and US and Canadian holidays.

The Ham Photo Calendar is $12.95, or $11.95 for three or more (Shipping in US or Canada, $2.50 for one, $0.50 each additional). Inquire about club discounts for packs of ten to KB1T Radio Specialties, Box 1015-YGT, Amherst, NH 03031 (603)-673-4100.

New Books/ Equipment?

Send new books to "What's New?" for review, along with a photo or line art of the cover if possible. Books are generally not returned.

"What's New?" will publish announcements of new equipment and products of interest to *Monitoring Times* readers. For a hands-on review, send a sample of the product and a photo if possible; equipment will be returned if requested.

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Review

JPS NIR-10 Noise/Interference Reduction Unit

Digital signal processing (DSP) has made remarkable inroads into the analog communications world. This latest accessory from JPS Communications is an example. We first saw it being demonstrated at the 1992 Dayton Hamvention.

Designed to connect between a receiver, transceiver or scanner audio output and an external speaker or headphones, the NIR-10 digitizes the audio into bits which may be custom processed to pass desirable intelligence and reject unwanted interference.

The NIR-10 audio processer is intended primarily for CW and voice recovery; music applications are not recommended. Three controls allow custom adjustment of volume, noise reduction level and bandpass filtering.

The notch filter is automatic; any persistent tone—even multiple tones—will be automatically removed in a fraction of a second. While this is impressive, even more impressive is the automatic noise reduction system which samples the speech pattern, then removes all signals not part of that pattern.

The bandpass filter allows three different bandwidths to be varied by the user to fit the signal. For our test unit we selected 1.8, 2.4 and 3 kHz bandwidths. Others are available on special order.

Our Test Results

With the NIR-10 connected between our Kenwood test receiver and an external speaker, we tuned in an international broadcaster that was experiencing fading and its attendant background hiss. The volume level was adjusted to a comfortable point and the noise control was set like a squelch—just enough to quiet the interference without distorting the desired audio.

In the noise reduction mode, the background hiss virtually disappeared, permitting the recovered voice audio to project transparently from the speaker.

The noise sources best handled by the NIR-10 are repetitive, like background hiss, heterodyne tones and ignition pulses; single static discharge like lightning noise crashes are not. Music—and musically-modulated voices—are a real challenge for the NIR-10, best handled by the bandpass filter rather than the DSP circuitry.

The skirt selectivity of the adjustable bandpass filters is remarkable; a slight change in the control setting can slice an interfering CW tone right out of the audio passband.

An excellent user's manual is included with the versatile filter which is powered by an optional 12 VDC, 1 A wall adaptor. Although the NIR-10 represents a sizable investment, its performance is vastly superior to any other accessory filter we have ever tested.

The NIR-10 noise/interference reduction unit is $349.95; AC wall adaptor, $12; from JPS Communications, Box 97757-MT, Raleigh, NC 27624-7757.

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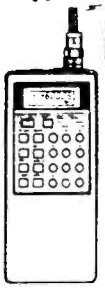

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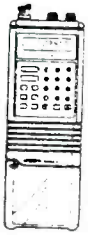

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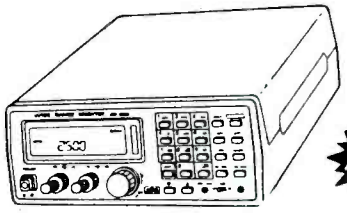

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SONY-2010 150KHZ-30MHZ, + Air, Digital	349.00
ICOM R-72A 100KHZ-30MHZ, 99 Memorys	809.00
ICOM R-7100 – CALL – CALL – CALL – CALL	
NRO-535 90KHZ-30MH, 200 Memorys	1689.00
DRAKE R8 100KHZ-30MHZ, 100 Memorys	975.00
FRG-8800 150KHZ-30MHZ, 12 Memorys	689.00

POLICE/FIRE SCANNERS

BC-200XLT, 200ch, 29-54, 118-174, 406-512, 806-952	259.00
BC-760XLT, 100ch, 29-54, 118-174,406-512, 806-950	289.00
BC-855XLT, 50ch, 29-54, 108-174,406-512, 806-956	209.00
AR-1000XLT, 500KHZ-1,300MHZ, 1000ch, Cellular	395.00
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Bob Grove, WA4PYQ

Uniden Bear Tracker BCT2

From time to time Uniden and its prior Regency division have released specialty scanners for the mobile market; this is one of them.

As the name implies, the "Bear Tracker" is primarily designed to receive highway patrol communications in order to alert the driver that traffic radar or other speed surveillance may be operating nearby.

The BCT2 is not a radar detector; it is a normal scanner with factory-loaded law enforcement frequencies sorted by state. There is no user-enterable frequency capability. An audible/visual alarm signals the driver when one of the highway patrol frequencies comes alive.

The alarm is hard to miss: a succession of loud beeps accompanied by a flashing red light bar lets you know a highway patrol frequency just became active within about three miles (according to the Bearcat manual). The audible alert is defeatable by a mute switch to protect the faint hearted.

Measuring the size of a typical, underdash, compact CB radio (5-3/16"W x 1-5/8"H x 6-7/8"D), and weighing 1 lb. 11 oz., the BCT2 is extremely simple to operate. The normal volume and squelch knobs are present, but there is no keyboard or enter function since all operations are performed utilizing only the preloaded memory channels.

The unit is supplied with a mounting bracket and DC power cord; a Motorola jack allows interconnect with an external antenna. Uniden also includes a Y adaptor to permit the vehicle's AM/FM antenna to be shared between the BCT2 and the car radio. This is not the best arrangement, but it is acceptable for the shorter listening ranges anticipated by the Bear Tracker.

Operating the Bear Tracker

After switching on the unit and selecting the appropriate volume and squelch levels, the user holds the STATE button, watching the two-letter abbreviations scroll by rapidly in alphabetical order. Once he selects his state, the automatic scanning sequence begins.

Simultaneously with the highway patrol, the user can also elect to scan police or Department of Transportation frequencies for each state. All eight National Weather Service channels may be sampled as well.

Frequencies do not appear on the display window, only abbreviations like HP, PO, WX, corresponding to the chosen modes (highway patrol, police, weather, etc.).

The preprogrammed frequency memory bank selects from FCC-allocated public safety channels in the 30, 150 and 450 MHz bands; there is no 800 MHz reception. Average sensitivity is better than 0.5 microvolts.

As with any preprogrammed data bank, there will be some frequencies that are unwanted (data channels, birdies, distant signals, etc.); these can be deleted at the press of a button.

The internal speaker port is on the bottom of the all-metal scanner case, suitable for the vast majority of under-dash mounting configurations. A full 3 watts of audio (4 ohms nom.) is available, loud enough for virtually any conceivable driver's compartment.

Even at full volume, audio remains crisp and clear with minimal distortion. Just in case, an external speaker jack (1/8" miniplug) is provided.

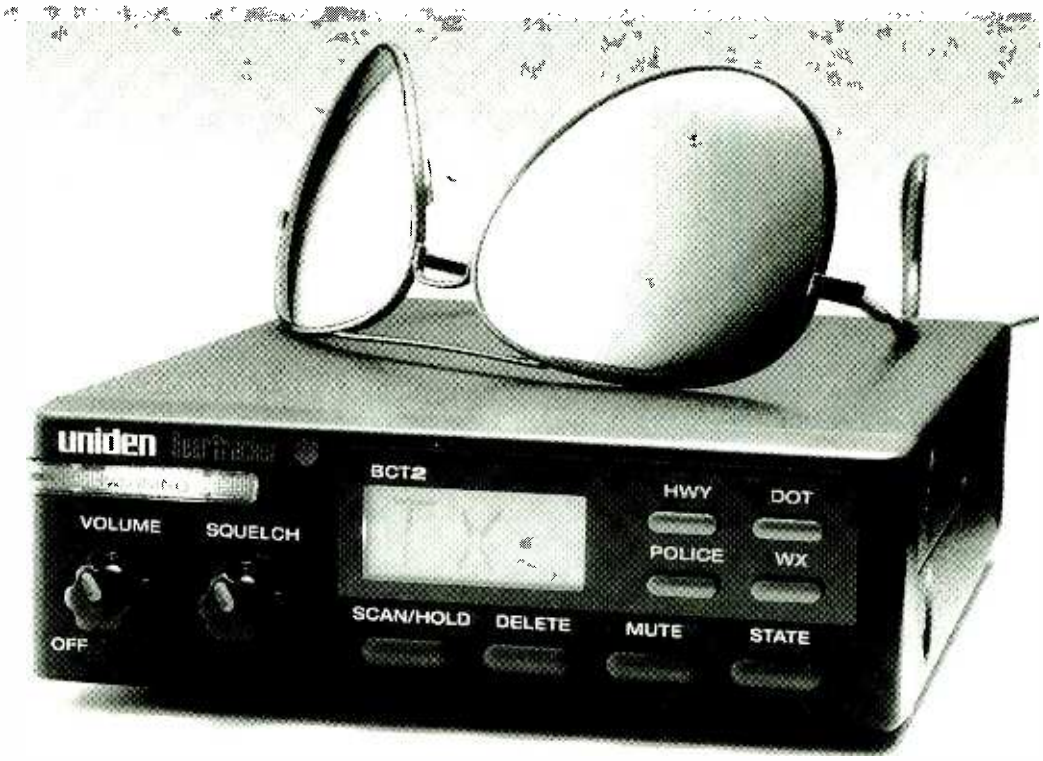
The Bottom Line

This is a specialized scanner, targeted for the interstate driver who wishes to be alerted to roving law enforcement units much as he would use a radar detector.

It is unlikely that such a scanner would be used in a home or desktop environment, but an optional Uniden AD-580U AC wall adaptor and AT-156 plug-in telescoping whip are available from some Uniden dealers for such applications.

The Uniden BCT2 Bear Tracker retails for under $200 from Uniden dealers and *MT* advertisers.

MT



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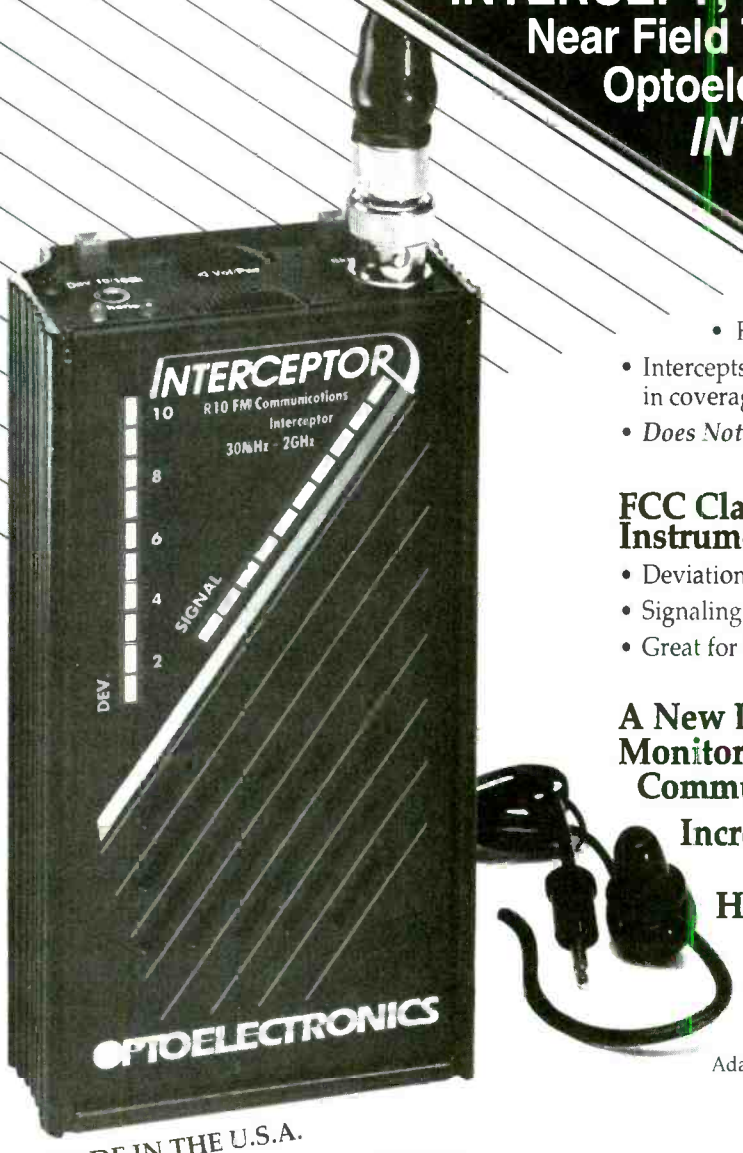

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magne tests

Lawrence Magne
Editor-in-Chief
Passport to World Band Radio

- Casio Debuts with PR100 Portable
- Giros' New R918 Portable

The Gulf War let the cat out of the bag: World band radio is becoming increasingly mainstream, a source for international news that other media can't equal day-in-and-day-out. That's the good news.

The bad news, as *MT* readers know all too well, is that all manner of weird and nigh-useless radios have come onto the market since then. Some firms, well-meaning in their attempt to participate in a growing market, genuinely don't seem to understand enough about shortwave to know what to offer. Others do, but don't care. In moments of candor, some in this latter category will lay it on the line: They offer what they do because they expect people to use these radios only for AM and FM "once the novelty of shortwave has worn off."

By offering radios that hardly perform, that prediction often becomes self-fulfilling. Research done at *Passport to World Band Radio* some time back showed that if a radio isn't reasonably straightforward to use, doesn't perform adequately, and/or lacks a good guide as to what's to be heard — or at least tells where to get accurate schedule information — most newcomers to world band radio do, in fact, drop out during the first year.

Two Labels, One Manufacturer

Enter two more in this recent parade of el cheapos: the $49.00 Casio PR100 (from Heartland America, 800/229-2901) and the CAN$64.50 Giros R918 (from Metragen, 3701 Chesswood Drive #309, Downsview, Ontario, M3J 2P6 Canada), both variations of the same basic Chinese-made compact OEM radio. Whatever else can be said about the Casio version, it's hardly likely that this firm, which has a venerable reputation in digital timepieces, chose to enter the field on a novelty basis. It's equally clear that whatever else Casio may know about standard timepieces, it knows far less about world band radio — and even less, yet, about World Time.

Casio Clock in Wrong Format

Yes, World Time. These radios both come with digital clocks, which on the Giros incorporates the 24-hour standard required for world band radio. That's the Giros. However, the Casio, made by one of the world's leading manufacturers of timepieces, uses the *"AM/PM" 12-hour format!*

How can a respected timepiece firm do anything so far off the mark? We weren't privy to their decision-making process, so we'll probably never know. But there's one real-life scenario from another company that shows how this can take place.

Recall how firms entering world band on the fly consider it to be a novelty market? One of these, a major mail-order retailer, was recently looking to order several thousand world band radios to be promoted in Sunday newspaper supplements and the like. They were considering a decent portable from an established manufacturer, but turned it down because its clock uses "military time." They were explicit: 24-hour time would "confuse" the public, which they felt would tire of world band after a couple of weeks, anyway, and thus wouldn't need a 24-hour clock.

Did they have anything but instinct to support this? No, but when you're a firm's buyer and it's push-up bras one week and food slicers the next, you become expert only in what you feel will sell on a one-time basis. You *are* in the novelty business, so everything is geared to making the best first impression to people who aren't familiar with the "product of the week," anyway.

Digital Readout, but Few Other Features

Both radios have the usual Chinese digital frequency display in unconventional XX.XX format for even shortwave channels (e.g., 9580 kHz appears as 9.58 MHz), and XX.XX5 format for odd shortwave channels (e.g., 9585 kHz appears as 9.585 MHz). Still, these are inexpensive models, so any form of digital readout is a vast improvement over the swarm of old-technology analog, or slide-rule, tuned radios still on the market.

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Cost is kept low, in part, by keeping tuning methods to a minimum. Absent altogether is the traditional tuning knob and, worse, any keypad. Offered, instead, are up/down/"signal seek" slew controls and 20 presets: five for each "band" (AM, FM, etc.). There's also a 9/10 kHz selector for AM, a plus that allows you to use this radio anywhere in the world (for whatever reason, our Casio unit, stamped with a New Jersey address, came with that control incorrectly set to the "Europe" position).

Of course, there's a volume control, although it adjusts up for softer, down for louder — the opposite of what you might expect. Other features are related to the radio's clock/timer functions: a one-event-per-day timer, sleep control and a large snooze button. There is, in addition, an earpiece jack, plus the telescopic antenna both swivels and rotates — a rare virtue in this price class. Also welcome is a low-battery indicator. A 6 VDC power socket allows an outboard AC power supply (not supplied) to be used, although in our tests this generated unusually high levels of hum.

Excellent Size and Weight for Traveling

Travelers will appreciate the size and weight of these two radios. They're smaller and lighter than nearly any other compact. Indeed, they're not all that much beefier than the mini-portables so prized by globetrotters and backpackers who regard every extra ounce of weight as anathema.

Models Differ in Frequency Coverage and Sensitivity

The Casio and Giros models have nearly everything in common except clock format and frequency coverage. The Casio, which doesn't receive longwave, is more oriented to the needs of world band listeners. It covers 2.3-6.2 and 7.1-21.85 MHz, commendable at this price. The Giros, on the other hand, does receive longwave, but covers world band from only 5.95-15.6 MHz.

This coverage comes with a catch, however. Tuning with the slew controls outside world band segments — "out-of-band" — can only advance one channel per push of a slew button. Hold it down for faster tuning, and it suddenly shifts to the nearest world band edge. It's a handy feature so long as you're tuning "in-band," but otherwise it's frustrating.

On the face of it — clocks aside — this makes the Casio the clear winner. But wait! Perhaps because of this difference in tuning circuitry, the Casio is even less sensitive to weak shortwave signals than the Giros, which is already insensitive to weak-signal reception.

Otherwise, Inferior Performance

While you're thinking of which poison is preferable, consider the performance variables the two models have in common: crummy selectivity (adjacent-channel rejection), mediocre image rejection and tiring audio quality. And while you're mulling over that respected Casio name, consider that our Giros unit arrived with a balky on-off control. Luck of the draw? Perhaps, but cheap Chinese OEM portables have not established an enviable track record for durability.

In all, there's precious little reason, even at these low prices, to part with your kopeks for either of these models.

Yaesu's Tabletop FRG-100 to Break Price Barrier

The jury has yet to convene on the Yaesu FRG-100, much less reach a verdict. After all, not even the Yaesu Electronics Corporation, which distributes Yaesu equipment from California, has seen so much as one production unit.

But we do know one thing: It's going to break the low-end price barrier for shortwave tabletop receivers. To be listed at $599.95, it's already being priced at $549.95 in retail catalogs being prepared for distribution early this year.

Yaesu needs something besides the FRG-8800, an aging veteran ready to be put out to pasture. If the company has created a truly up-to-date design and solid performer for this kind of money, we'll all have cause to celebrate.

In time, we'll know. At least one prototype sample, which may or may not reflect the performance of the final version, has been offered for months to reviewers graced by the manufacturer. We'll test the real thing — not a handmade version for reviewers — as soon as it comes off the production line.

Full Report on Lowe HF-150 Now Out

The RDI White Paper on the extraordinary Lowe HF-150 (which this column reviewed in August 1992) has just come off press. This exhaustive report includes complete and independent laboratory measurements of performance, and is profuse with observations from panelists who have lived with this radio for months. See RDI's ad for ordering information.

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John Catalano

Those Oldies But (Maybe) Goodies

I thank you all for your interest and kind words you have expressed over the past year about the Computers and Radios column. I do attempt to cover topics which you ask for in your letters., but sometimes the requests border on the sacrilegious, the unthinkable! For example, one common request that has now built to uncontainable proportions is for a recognition of computers *other* than the IBM PC! Can you imagine such audacity?! Wasn't the IBM PC given down on Mount Ararat?!

Well, I bow to the consensus. We will start at the beginning when dinosaurs ruled the earth and eight-bit machines were considered state of the art (not state of the Ark). What were these forerunners of modern machines? What primitive functions could they perform? And, more down to earth, are they worth the few bucks that you can get them for at flea markets, tag sales, yard sales and ham fests? Let's begin with a chronological review of the major events.

In the early 1970's a game called PONG started it all—a simple tennis-like game conceived by Nolan Bushnell and made into a commercial product having over 100 integrated circuits on a board four times the size of today's 486 mother board. What made this game different was that you played it on your TV! Holy cow!

Around the same time a number of things happened in rapid succession. *Popular Electronics* featured a build-it-yourself computer which took commands via toggle switches—primitive, but critical to the evolution of the home computer. Magnavox brought out a PONG look-a-like with an expanded number of games. The stage was set. All the elements were almost there: a video interface, digital electronics to control the screen, and a primitive number cruncher/language oriented "calculator." Remember, portable calculators were still relatively new and commanded up to $300.

Then the light of ingenuity lit up!! Why not put all these functional things together in a number of special purpose, integrated circuits? The microprocessor concept was born, but the manufacturing capability lagged behind the idea for a number of years.

Finally by the mid 1970's, after many different companies attempted to make a truly useful microprocessor, two companies emerged with eight bit microprocessor chips. MOS Technology of Pennsylvania, a start-up company, brought forth a strange device called the 6502. Meanwhile, Zylog, another start-up, funded by Exxon in California, gave the world the Z-80. Both companies promised a whole range of support chips that would allow their product to communicate with a user, understand a machine specific math-type language and display the results.

To say that the technical community was wary of these claims is an understatement! "Maybe by the year 2000," we laughed. But a couple of real computer (main frame such as the IBM 360) hackers devoted themselves to making these chips develop at a faster rate by bringing them into the home. A home computer?! Crazy. How many people would want to do complex scientific calculations at home, or play Dungeons and Dragons or Startrek (two adventure games using a keyboard as input and a line printer as the output)? Really exciting.

Undeterred, the two Steves and friends used the 6502 as the heart of their machine, called the Apple. Bushnell turned his efforts to a similar machine, but envisioned more TV graphics capability to bring life to games. His effort he called Atari and also used the 6502 as the heart/brain.

MOS Technology, the developers of the 6502, needed a demonstration board for selling their 6502. A single board, microcomputer, with a calculator keypad as its input and seven light emitting diode numbers (also borrowed from a calculator) made up the product called KIM. Later, a revolutionary cassette tape interface for actually storing data blew the technical community away! KIM was programmed using base 16 arithmetic and identifying exactly the location of each programming step. It was as close to the home computer as a paper airplane is to a Boeing 747. But it proved a concept.

Through a series of very "interesting" business gyrations, a company run by J. Tramiel, with its origins in the Canadian typewriter business, took over MOS Technology after being MOS's only major customer. So enters the third big-named computer company familiar to us all today; it used to be called Commodore Business Machines. No, not computers: typewriters.

The Apple II appeared in various forms from the late 1970's through the 1980's. The basic Apple II has a mother board with the eight bit 6502, external (but revolutionary) 5-1/4 inch floppy disk storage, a clumsy internal joystick interface, a keyboard with no lower case letters, large pixel block graphics and black and white video which required an external modulator to view it on a TV or an Apple monitor. Sound neolithic and primitive? NO! To us it was a marvel of technology. The last in the Apple II series was compatible with the original but offered greatly enhanced input/output and storage capabilities. The Apple was never meant to be a graphics machine and it showed that deficiency all through its life.

For use in our radio hobby the Apple's major drawbacks are its plastic case and the unshielded ribbon cable which connects the mother board to all accessories such as disk drives and printers. The radio frequency interference (RFI) problem can be so severe that the whole shortwave spectrum goes bye-bye. I once lived seven miles away from an AP/UPI news RTTY transmitter in England. You could receive it on an electric teakettle; that is, until the Apple IIE was turned on!

One distinction that the Apple has is that it was the first computer to be cloned by the Taiwanese. Apple was not as understanding as IBM has been and legally prevented these companies from bringing any clones into the USA. In my collection I have an AMI II Taiwanese Apple clone which I bought in Switzerland. We'll go over some of the radio related software next month for each of these eight bit computers. But now let's see what the other two companies were doing at this time.

Commodore Continues

Commodore's takeover of MOS gave them a platform to build on with the KIM: good for the technical guys but holding little appeal for the home and business users. To rectify this, the CBM PET was born—an ugly sort of typewriter with a portable TV attached to the top. The PET had limited success, but it led the way for Commodore's evolutionary products. What the home market needed was an expanded PONG or Odyssey video game.

By this time Atari and the Coleco Toy Company had taken video games a bit farther by offering game ROMs for their video game machines which allowed the user to change the games. This cartridge mentality was the next piece of the developing puzzle.

Commodore brought out an Atari/Colecovision-type machine but with a real keyboard (well, almost) and the KIM cassette storage capability. The difference was that they called it a home *computer*, not a video game. When the VIC hit the store shelves they were gone as fast as they could be re-stocked. VIC (or VIC-20) is the daddy of the C-64 and they share common cases, keyboards and, yes, 6502 CPUs. Because of the limited memory in the VIC it was not a real computer, but instead a game cartridge acceptor. As this, or as a dumb terminal, the VIC still has a place today since I've seen it at flea markets for under $10!

But let's concentrate on the C-64, still a capable machine for our radio hobby, with 64K of memory, a very small footprint for easy desk use, an adequate keyboard, internal TV modulator with color capability, largish but acceptable graphics, external floppy or cassette storage, game\ROM cartridge slot, two joystick ports and frustratingly non-standard printer and serial (not quite RS-232) ports. At a price of three hundred dollars it blew away competition in the first-time-home-user market. The C-64 survived until quite

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recently in its original inner form but with a re-stylized case.

C-128 is an upgraded C-64 with larger memory capacity which most programs cannot take advantage of since they were meant for the more popular C-64. The later C-64s have good RFI shielding with a soldered-in bottom metal plate and an aluminized cardboard shield over the top of the circuit board. In order to get all the performance features into the C-64, a number of shortcuts and edge of operation designs were included. These make for more than normal machine breakdowns, for no apparent reason.

These repairs are very costly relative to today's market value. In fact, when I began writing this month's column I fired up the old C-64 only to discover that it is shot. Dead. I recognize the same symptoms which cost me a $60 repair bill three years ago. So buyer beware. However, relative to the computers we have discussed so far, the C-64 is the only one that should be considered useful for the radio hobby. The radio programs are plentiful. We will go over some in the coming months' columns (as soon as I can get the blessed C-64 repaired).

But what about Atari?

Bushnell's approach from the beginning was to produce a much more sophisticated machine than his competitors. The Atari 800 was designed around the 6502, but that is where the similarities ended. In order that the graphics not be limited by the 6502 or limit the speed of the CPU, a second display controller chip was designed by Atari—almost as complex as the 6502! The construction was patterned after a main frame or mini with plug in memory and "personality" boards. This was not to be a throw-away toy! It was capable of using its ROM cartridge slot for new programming languages: for example, BASIC, FORTH and PILOT, as well as PacMan.

The keyboard on the early Atari 800 put the competition to shame, having the feel of an IBM typewriter product. In my estimation this product's design and execution is still superior to anything available to the consumer today. All boards were RFI protected by being enclosed in metal boxes. The Atari 800 provided four joystick ports, video outputs for both TV and monitor (thus further reducing RFI if used with a monitor), another weird serial/parallel port configuration which required an Atari external accessory box to become true parallel and serial ports (but at least it was available), and an excellent keyboard, all housed in a typewriter styled case.

It was the cadillac of the early home computers. Lots of excellent games and simulations were written for the Atari. Radio application software was always thin, with the attention going to the C-64 due to its cheaper price. But some excellent monitoring software was available which we will discuss in coming columns.

What happened to Atari? Well, remember the PONG story? The Atari name got connected to games-only machines and this was their downfall. Through wise marketing tactics of the other companies, Atari was pictured as a "toy" company trying to make a computer. Nothing could have been farther from the truth at that time. In any case, Bushnell unloaded the Atari company for mucho bucks to Warner Brothers just around the time that the Atari 800 hit the market.

At first the sales kept pace with its competitors, but disaster struck when the C-64 price was reduced. The consumer, once again buying on price alone, confounded Atari's marketeers while Commodore's approach won over the market. Atari then began a tortuous succession of models to reduce the price to the C-64 level. The 400 was introduced with what is still the world's worst keyboard. Then the XL line followed with yet cheaper construction. along with a slightly different operating system.

By 1982, Warner couldn't stand the losses and sold Atari to a guy named J. Tramiel. Yep, the very same Canadian typewriter person who had been running Commodore, Atari's arch rival. The el cheapo XL line was followed by an XE line which was just a name and repackaging change. But the 800 series and to a lesser extent, the XL series, are still useful to radio hobbyists on a budget.

The story as I have presented it so far just takes into account the main USA players which survived the early bloody days. A few which should also be mentioned are the Texas Instrument's TI series, Coleco's Adam, and an important player—Radio Shack/Tandy's TRS series. The TRS machine used the Z-80 as its microprocessor, as did another name you may remember, the Timex TS1000.

That brings up a whole different topic: the European computer manufacturers. The Timex was really a Sinclair ZX-81 from England. This will also be a topic for a future column since *MT* has a large European readership and the European companies played a major role in the next phase of development, the sixteen bit machines.

In future columns we will look specifically at some of these oldies but goodies, the radio-related programs available for them and their overall performance relative to the (dare I say it?) ubiquitous standard of the IBM AT. If you are still using some of these computers and programs (as I do), please send me a list of your favorite radio software so that I can include a list at the end of each upcoming column. With all the computer and techno-hype I see these days perhaps we should heed the proverb, "Those who do not learn from history are doomed to repeat it." Maybe in this case, looking back and seeing how technology (and marketing) develop can help us go forward intelligently on our future technological journeys.

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Build a Low-Cost Transistor Tester

You can save dollars by repairing your own shortwave and amateur equipment. Certain basic steps can be taken to effect a cure at home if you are willing to tackle the job. The usual temptation is to box up the receiver or transmitter and ship it off to the factory for service. It can cost a substantial amount of money to have even the simplest of repairs done by the manufacturer's authorized repair agency.

It is not unusual to pay up to $100 for having one or two cheap transistors replaced. The shipping charges (two way) are part of the expense. Then there is the waiting period while your equipment is in transit and being serviced. Simple problems can often be solved by you, if you're willing to look inside the cabinet of your unit and make some simple tests.

Visual inspection should always come first. Look for loose wires, charred resistors and bad PC board solder joints. Measure the operating voltages to make certain they are throughout the circuit. If not, look for the spot where the voltage has been lost and try to determine what went wrong. A signal tracer is helpful when checking stage by stage to learn where the signal is lost, if that is the problem. The cure is often as simple as the replacement of a single transistor.

Testing Transistors at Home

You can construct a simple, low-cost go-no-go transistor tester from surplus parts. Figure 1 contains the circuit I have used for some 20 years. It is a Pierce RF oscillator. Transistor sockets are mounted on the tester to accommodate FETs (field-effect transistors or JFETs) and bipolar transistors (BJTs). Devices of both polarities may be tested by changing the position of S1. Specifically, you can test N and P channel FETs, plus NPN and PNP bipolar transistors by reversing the polarity of BT1.

Dual-gate MOSFETs, such as the popular RCA 40673 and the 3N211 family of MOSFETs can also be tested by twisting the gate no. 1 and gate no. 2 leads together and treating the device as a JFET. In fact, you can use dual-gate FETs as single-gate ones by installing them in the circuit with the two gates tied together.

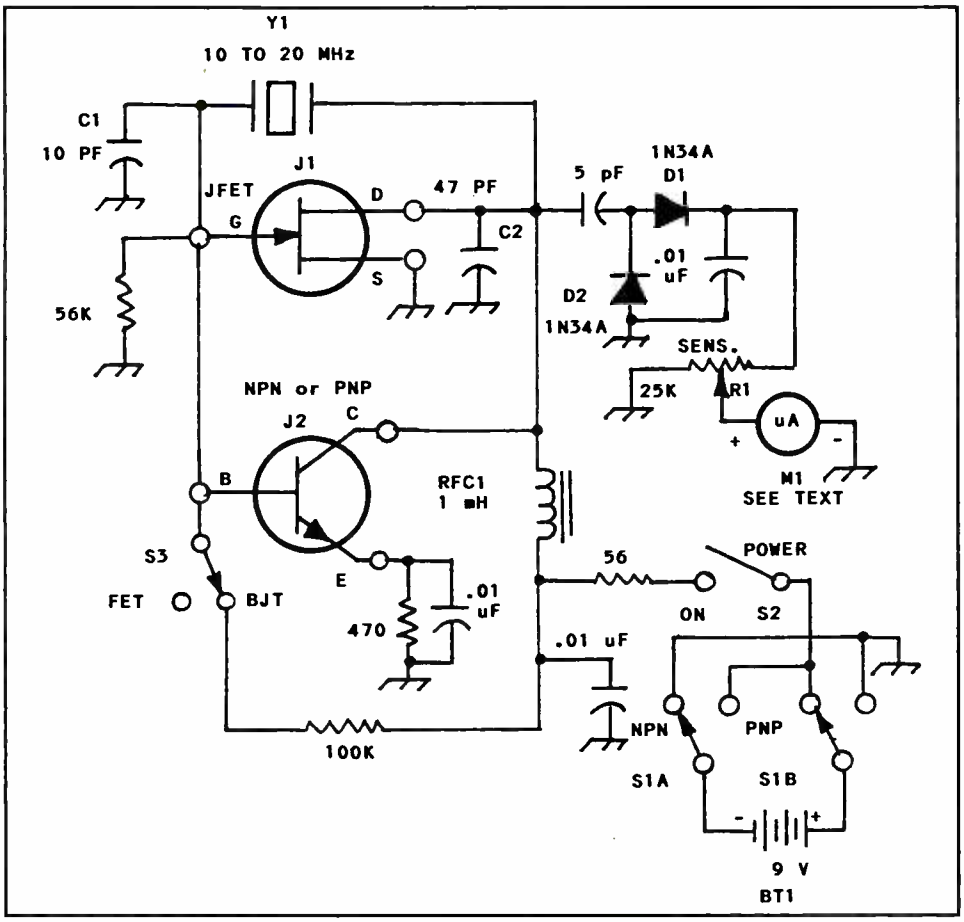

Figure 1: Schematic diagram of the simple transistor tester. Resistors are 1/4- or 1/2-watt carbon film or composition. Capacitors are disc ceramic, 50 volts or greater. Other components are discussed in the text.

The Tester Circuit

The fundamental circuit is that of a Pierce crystal oscillator. Y1 of Figure 1 can be chosen for any convenient frequency from 10 to 20 MHz. Surplus computer crystals are available for as little as $1 these days. C1 and C2 are feedback capacitors for the oscillator. If you have a crystal that doesn't oscillate in this circuit, try increasing the value of C2 to obtain oscillation. Values up to 150 pF are suitable.

RF energy from the oscillator is sampled at the top of RFC1 and routed to D1 and D2. These diodes change the RF voltage to dc. The resultant dc current deflects the needle on M1 to indicate that the circuit is oscillating. R1 is a sensitivity control that is used to set the meter deflection at half or 3/4 scale.

S1 is a DPDT toggle or slide switch that reverses the polarity of battery BT1. The battery is one of the small 9-V rectangular transistor radio units. S2 is the ON-OFF switch for the tester. It can be a miniature SPST toggle or slide switch.

Construction Notes

You can assemble your tester on a piece of Perf Board or you can use point-to-point wiring by connecting the components between a few multilug terminal strips. A neater job can be done if you fashion your own PC board.

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GRE America is proud to introduce a new family of products to enhance your scanning pleasure! First, GRE has designed the new **Super Converter 9001** for base model scanners. The 9001 converts 810 MHz - 950 MHz down to 410 MHz - 550 MHz. The 9001 is the perfect alternative to buying a new, expensive scanner covering the 800 MHz band. Next, GRE announces the new **Super Amplifier 3001** for base model scanners. The 3001 will increase gain by as much as 20 dB, and is engineered to help scanners with low sensitivity pull in weak signals. Both products use BNC connectors, (1) 9 volt battery and have an off/pass switch for returning to normal operation.

Super Converter 9001 & Super Amplifier 3001

Super Converter II

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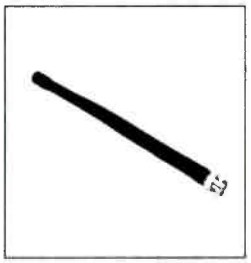

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Keep the leads as short and direct as practicable. This will help to ensure oscillation of Y1 and it will minimize the opportunity for unwanted VHF parasitic oscillations to develop.

The indicating meter, M1, can be one of the many surplus microampere types from 50 to 200 microamperes full scale. Edgewise surplus tuning meters are fine for this circuit. Most of them have 200-uA dc movements.

RFC1 is a miniature RF choke. The value is not especially critical. You can use anything between 1 mH and 2.5 mH for RFC1. In fact, a 500-uH choke would probably be okay if Y1 is for 15 MHz or higher.

Using the Tester

Plug your transistor into J1 or J2, depending upon the type of transistor you are testing. Switch S2 to the ON position. Observe M1 to see if the needle deflects. If not, advance R1 to obtain a meter reading. If there is still no meter deflection, cycle S1 to change the battery polarity while observing M1. If no results are obtained, chances are that the transistor is defective.

Initial checkout of the tester should be done with transistors that are known to be okay. I suggest that you start your tests with a new 2N3904 or 2N2222. An MPF102 JFET can be used to check the FET function. Be sure to insert the TUT (transistor under test) into the transistor test socket correctly. It is a good idea to label the panel so that you know where the base, collector and emitter leads belong. Likewise for the FET at J1 (gate, source and drain).

Alligator clips may be used in place of transistor sockets at J1 and J2. If this is done, avoid using long leads between the tester and the clips. The leads should not be longer than 2 inches.

This tester is designed purely for small-signal transistors. Large audio power transistors will not permit Y1 to oscillate. MT

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Grove Enterprises, a small manufacturer of products for the radio hobbyist, is seeking a non-smoking design engineer with experience in microcontroller/microprocessor system design. Hardware and assembly language software experience is necessary, as well as experience with programmable logic devices. Position requires ability to work with existing designs, as well as development of new advanced products for the monitoring market. BSEE or BSCS preferred but not essential.

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Bill Cheek

Automatic "Birdie" Bypass

We've got an enhancement for you scanner fans this month that will knock your socks off! Once again, "Mr. Digital," Mark Persson of NY, comes up with another circuit to make scanning life a little easier and a lot more fun! Gone are the days of your scanner locking-up on "birdies" and other continuous signals during a SEARCH operation. This circuit will electronically activate the UP or DOWN search keys for you after the squelch has been open for selected periods of 30-sec to one or two minutes.

This feature is especially useful for search operations when you're busy with something else and can't be running to the scanner to press the "resume" keys yourself. Yet, if something interesting comes on, you'll have plenty of time to deactivate the "Birdie Bypass." Real signals rarely keep the squelch open for longer than 30-sec to 2-mins. Each time the squelch closes, the automatic birdie bypass resets to start the countdown anew when the squelch opens again.

Our circuit is effective against not only "birdies," which are internally generated, but also any continuous signal, including computer data, IMTS tones, trunked and cellular system control signals, and anything else that would keep your squelch open for longer than the selected period of time! This circuit is almost a necessity because every scanner has its share of "birdies" and sometime carriers pop up in various bands for no good reason at all. We all know that our scanners often lock up on plain air to prevent reception of whatever our really desired target is. I monitor military aviation on the 225 to 400 MHz band where all sorts of airy signals come and go; sometimes they hang in for hours before the warp closes up or the alien spacecraft departs for distant (or nearby?) parts.

A simple SPST toggle switch enables and disables the automatic birdie bypass circuit. The scanner's squelch gate signal is tapped and fed to the Reset Pin 12 of a CMOS 4060 counter/oscillator IC which serves as a binary counter for periods of up to two minutes. The specified timing capacitor C-1 and resistors R-1 & R-2 at Pins 9, 10 & 11, enable the 4060's Pins 1, 2 & 3 to produce logic high (+5v) outputs within 30-sec, 1-min and 2-min, respectively, when the squelch signal is continuously present at Pin 12.

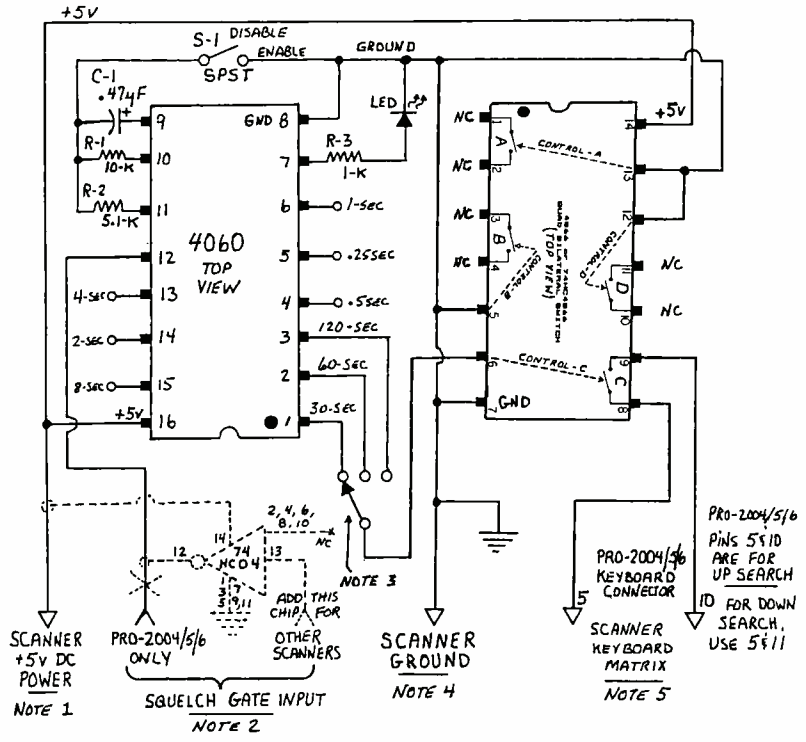
You will select one of these three pins—9, 10 or 11—to feed a control pin of a 4066 CMOS bilateral switch. When this control pin goes logic-high at +5v, the 4066 switch contacts close to electronically activate a key, typically the **UP Search** in the PRO-2004/5/6 scanners. However, the **DOWN Search** or, for that matter, most any other key can be pressed by the Automatic Birdie Bypass circuit, depending on how you hook it up. When either search key is pressed, the scanner resumes searching; stops the counting action of the 4060 and clears the outputs of the binary counter back to logic-low (0-v). When squelch opens again, the count starts all over.

The squelch gate signal in PRO-2004/5/6 is a logic-low (0-v) when open and a logic-high (+5v) when closed. In almost all other scanners it's just the opposite, but Pin 12 of the 4060 chip still has to be fed with the logic described above. Therefore, for all other scanners, an inverter chip, such as a 74HC04, should be used between the squelch tap and Pin 12 to produce the proper logic polarity. Relax, it's no big deal. See the schematic diagram for this option for most all scanners other than the PRO-2004/5/6. If you are not familiar with your scanner, the "World Scanner Report" offers lots of details about squelch circuits and the appropriate access pins for most popular scanners of recent times. See the sidebar.

The ON/OFF toggle switch works by grounding the 4060's timing resistors and capacitor to halt oscillation and, therefore, the count. The 4060's internal counters are reset each time the squelch gate goes high at Pin 12. A fresh count is started each time the squelch opens. When the count reaches your selected elapsed time, a key is electronically pressed to make the scanner resume searching; therefore, it cannot stay hung up on birdies and continuous signals when our circuit is enabled! Of course, we have to have a blinking LED to make casual observers ask questions about our handiwork and so that we can see that the circuit functions properly.

Mr. Persson thinks that tantalum capacitors might not be best suited for C-1 in this circuit, but I have used them in circuits like this one for over

AUTOMATIC BIRDIE BYPASS FOR MOST SCANNERS



Automatic Birdie Bypass Circuit Notes

1. *SCANNER's +5v POWER:* Must be regulated +5v DC. For the PRO-2004/5/6, use the Output tab of IC-8. Refer to a Service Manual for other scanners. First measure the SQUELCH GATE signal in your scanner. If over 5-v, (often 7 to 8 volts), then power for this circuit must be taken from the same level source; 8-volts will usually do nicely, and is a common supply voltage in most scanners. Beware that levels in CMOS chips cannot exceed the supply voltage by more than 0.5-v. On the other hand, levels 33% lower than the DC supply voltage will usually work just fine. In other words, 5-volt logic will usually work ok in chips powered by 7-volts. You would NOT use 7-volt logic in chips powered with 5-volts, however! It's best to use the same DC level as the logic.

2. *SCANNER'S SQUELCH GATE:* For the PRO-2004, the most convenient point of access is CN-504, Pin 9. In the PRO-2005/6, it's CN-3, Pin 5. For most other scanners, it's at the NFM/Discriminator Chip, usually called the "Scan Control" pin. See your Service Manual and/or back issues of the *World Scanner Report*, V1N4, etc. Also see Note 1. The dotted lines represent another IC chip that has to be added for all scanners other than the PRO-2004/5/6. The 74HC04 is readily available and inexpensive. There is not much additional work: Connect together Pins 1, 3, 5, 7, 9 & 11 and then ground the common connection. Pins 2, 4, 6, 8 & 10 aren't connected. Connect Pins 12, 13 & 14 as shown.

3. *BIRDIE BYPASS "DELAY"* can be selected by a 3-pos switch as shown, but this was depicted more for the sake of clarity. You can simply jumper to the delay function of choice, if preferred. Or, you can go hog-wild with a rotary switch connected to ALL the 4060's timed output pins: 5, 4, 6, 14, 13, 15, 1, 2 & 3 in that order! Not that you'd want to, but I thought I'd mention it.

4. *SCANNER GROUND* can be anywhere on the printed circuit board where there is a ground (if you know how to find it), or any accessible place on the scanner's metal frame or chassis.

5. *TO SCANNER'S SEARCH FUNCTION:* For the PRO-2004, this is CN-502, Pins 5 & 10 and for the PRO-2005/6, it's CN-501, Pins 5 & 10. For all other scanners, determine the Column and the Row in the Keyboard Switch Matrix that govern the desired SEARCH function. Connect Pin 8 of the 4066 to the appropriate Column pin and Pin 9 of the 4066 to the appropriate Row pin.

6. *The LED and 1-k resistor* are optional. When the Automatic Birdie Bypass's 4060 chip is counting, the LED displays the count rate at the 1st counter, pin 7, which is useless for anything else. When the 4060 is disabled, the count stops and the LED goes off. Otherwise, it blinks at the count rate! How convenient! Still, you can eliminate the 1-k resistor and the LED, if you want.

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Table 1: 4060 Chip Output Periods

4060 Pin#:	7	5	4	6	14	13	15	1	2	3	Output
Frequency:	4	2	1	.5	.25	.12	.063	.031	.016	.008	Hz
Period Time:	.25	.5	1	2	4	8	16	64	128	256	Seconds
Time to 1st (+) output	.12	.25	.5	1	2	4	8	32	64	128	Seconds

two years without a failure. My test version of this exact circuit functions flawlessly with a 0.47-uF tantalum cap, but if you run into trouble, perhaps this caveat can help bail you out.

The 4060 chip contains a series of **divide-by-two** counters, each with an output as shown in Table 1. Each output, starting with Pin 7 as shown on the first line of Table 1 has a square-wave output with a frequency, Hz, as shown on the second line. The period, in seconds, of one cycle of the frequency of each output is shown on the third line. The voltage level of the first half of each period is logic-low or 0v and the second half of each period rises to logic-high (+5v). Therefore, the bottom line shows the elapsed time at each output before the change from logic-low to logic-high takes place. It's when that transition occurs that things can happen, and which is the basis for the Automatic Birdie Bypass!

Any of these ten outputs could find uses in various versions of this circuit, but only the last three can be considered useful as "anti-birdie" functions, roughly 30, 60 & 120 seconds. For example, if you needed to trigger something to happen every two seconds, just use the output at Pin 14. Astute readers may note that a function seems to be missing from the above series between Pins 15 and 1. No, **this is not an error**; the 4060 is designed that way and I don't know why, so don't ask. We just live with what the chip offers.

You can substitute different values of capacitor at Pin 9 to change the timing, but the design given here seems best for all-round applications. Don't tinker with the value of the resistors, however. If you absolutely have to, a 4.7-k resistor can be substituted for the less common 5.1-k value specified for R-2. The larger the capacitor, the longer the periods; the smaller the capacitor, the shorter the periods. The relationship is roughly proportional; that is, double the value of the capacitor, double the period. So a 1-uF capacitor will produce upwards of 4-minutes at Pin 3 and a 2.2-uF will yield 8-minutes with all parameters changing accordingly across the table.

I had good results with up to 10-uF for C-1, but greater values produced erratic and unpredictable results. It's best to stick with the design here unless you know what you're doing. By the way, last month's Scanner Activity Tagger lockout circuit will work in harmony with the Automatic Birdie Bypass to magnify the power of your scanner!

A few words on construction: Not much is critical here except the values of the timing components and the placement of the 4066 CMOS bilateral switch. The 4066 should be located as close to the scanner's keyboard connector as possible to minimize noise pickup and other little gremlin problems. The rest of the circuit can go anywhere inside the scanner or even in an external project box and wired to the scanner via a short cable! This latter technique might even be mandatory for handheld scanners. Have fun with this one! It might even give you a whole new perspective on scanning!

A few words on operation: Retrofitted digital functions in your scanner can cause weird things to happen in modes other than for which the modification was designed. For instance, the output of the 4060 that fires the CMOS switch is not a burst but a periodic logic-high, essentially a DC level. If your scanner is in manual mode, on a continuous signal and if you forget to turn off the Birdie Bypass function, the CMOS switch will be turned on in 30-120-sec and force the scanner back into the search mode. Likewise, the scan mode will be forced into search if the scanner has a lengthy signal squelch break. This quirk is nothing serious but it's something to keep in mind.

I'm wide open to modifications, tricks, hints and kinks from you experimenters. How about letting us hear from you?!

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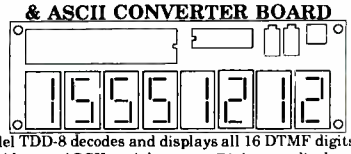

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Vehicular Mobile Antennas

A survey of the traffic at most any busy, metropolitan intersection will show that a vast majority of vehicular, mobile antennas used today are some variant of the vertical whip antenna.

Why Are Mobile Antennas Usually Vertical?

Most man-made electrical interference is vertically polarized. This means that the popular vertical whip antennas are more susceptible to electrical interference than are horizontal antennas. Horizontally polarized antennas, such as the "halo" (a folded dipole shaped into a circle), the directional discontinuity ring radiator (DDRR, fig. 1E) and the horizontal wire loop (fig. 1F) are occasionally used as mobile antennas; however, they are usually unwieldy or difficult to install or to maintain, and are infrequently employed for mobile service.

The mode used for most mobile communications is FM (which essentially ignores electrical noise) This fact, coupled with the practical convenience of constructing, mounting, and maintaining vertical whips, plus the desirability of their nondirectional radiation pattern, has established the vertical whip as the defacto "standard" mobile antenna.

Making a Short Antenna Act Longer

The early vertical whips were those developed for AM broadcast reception in automobiles. Compared to the wavelengths at which they are used, these two to three foot long whips are rather tiny antennas. But an electrically-short whip antenna works quite well for AM broadcast reception, and its design has remained essentially the same for many decades: a short whip element whose output is fed through a very high-impedance coaxial cable to a high-gain receiver.

Early police mobile radio services were assigned frequencies just a bit shorter in wavelength than the AM broadcast band. Because of this, many old-timers can recall tuning in police action at the high end of their AM radio dial! But even the six to eight foot whips used in this service were an insignificant fraction of their operating wavelength, and so some form of antenna loading was needed if these whips were to function adequately for transmitting.

Electrically short mobile whips can be made to radiate signals with moderate efficiency by the addition of a tuning unit at the feed point of the whip, or by adding inductance (a loading coil; see fig. 1A) in series with the whip at its center, its base, or distributed throughout the antenna (helical winding). Antennas can also be loaded by adding capacity (such as the "capacity hat" element in fig. 1A). A short whip so modified, together with the inductors and/or capacitors involved, becomes a resonant antenna, and is fed with low-impedance 50-ohm coaxial cable rather than the very-high impedance coax used with non-loaded, electrically short whips.

As radio communication services moved to higher frequencies, resonant mobile antennas a full quarter wavelength long (no loading needed) became possible. At 30 MHz a quarterwave antenna, worked against the vehicle body as ground, is almost eight feet long. Moving up in frequency above 30 MHz the length required for a quarterwave antenna element is progressively shorter, until at 150 MHz it is about 19 inches. Such lengths allow mounting the antenna on top of a vehicle and thus utilizing the top as a groundplane (fig. 1B). This configuration commonly utilizes 1/4 wavelength whips; however, 1/2 wave and 5/8 wave length whips are also frequently utilized for this design. The length of these elements can be determined by the equations given below.

234/Freq (in MHz) = 1/4 wavelength (in feet)
468/Freq (in MHz) = 1/2 wavelength (in feet)
585/Freq (in MHz) = 5/8 wavelength (in feet)

If you have a chance to measure or estimate an antenna's elements, the above formulas can help you identify the band for which the antenna is designed. But you can't always rely on what you see to identify the type of communication for which an antenna is intended. For reasons of security some vehicles employ "disguise" two-way radio antennas which appear to be ordinary, telescoping AM-FM whip, receiving antennas. It is also possible to utilize an ordinary AM-FM automotive whip as a shortwave or scanner receiving antenna by use of a device called a "multicoupler."

Mobile Antenna Radiation Patterns

As with other antennas, the radiation pattern (how the transmitted power is launched in different directions in space) and the reception pattern (the relative responsiveness to received signals coming from different directions) of a mobile antenna are identical. This is one aspect of what is known as "antenna reciprocity."

In mobile work a nondirectional radiation (and reception) pattern is usually desired. This can be attained by mounting a whip antenna on the automobile's roof; a practical procedure with antennas of the size used above 100 MHz. Trunk-lid mounting of whip antennas gives a more nondirectional radiation pattern than bumper mounting, but has more directionality than top mounting.

At the lower frequencies where longer whips (with or without loading coils) are necessary to approximate a quarterwave element, "bumper mounting" of the whip is usually necessary and so some directionality is introduced into the antenna's pattern. The precise effect on the antenna's radiation pattern due to mounting the antenna on the vehicle's bumper, side, fender top or trunk lid is difficult to predict. Factors such as frequency utilized, presence of an AM-FM broadcast receiving antenna on the same vehicle, and the height of the antenna's base in relation to the top of the vehicle can all affect the antenna's performance.

Mobile Antennas Across the Bands

On the HF and lower bands most mobile antennas are loaded whips. The majority of mobile antennas used for two-way VHF work are

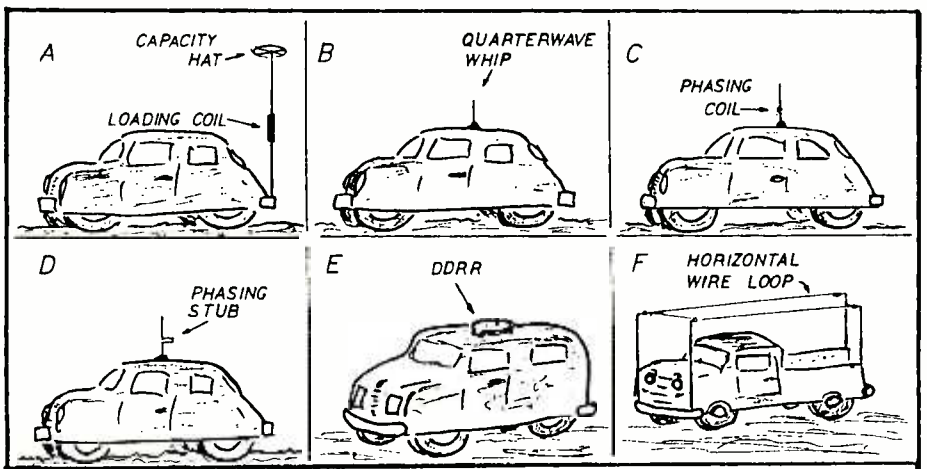

FIG. 1. SOME MOBILE ANTENNA DESIGNS. LOADED WHIP (A), QUARTERWAVE WHIP (B), COLLINEAR WHIP WITH PHASING COIL (C), COLLINEAR WHIP WITH PHASING STUB (D), DIRECTIONAL DISCONTINUITY RING RADIATOR (E), AND HORIZONTAL LOOP (F).

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either quarterwave whips or loaded whips. The length of collinear antennas (fig. 1C and 1D) is almost a full wavelength, sometimes longer—considerably longer than quarterwave whips. Thus they are not much utilized for mobile work below the UHF band.

However, within that band and higher, they are the most popular mobile antenna today, especially for cellular phone installations. An important feature of the collinear, vertical-whip design is that, compared to the quarterwave antenna, it gives a useful increase in gain by concentrating the antenna's radiation closer to the ground where the signal is needed, with less lost in skywaves.

A collinear whip has two or more vertical elements which are usually connected by a phasing coil as in fig. 1C, although some utilize a phasing stub (short transmission line segment) as in fig. 1D. Let's consider an antenna with a single quarterwave element, mounted over a groundplane, as having unity (0 dB) gain. Then the configuration shown in either fig. 1C or 1D yields 3 dB gain over a single quarterwave if the element below the phasing coil is a quarterwave and the element above the coil is 5/8 wavelength long. When both elements are 5/8 wavelength in length the relative gain increases to 5 dB.

A New Antenna Contest

We want to find the world's most unusual antennas: antennas that are quite different from those which we ordinarily encounter in the field of radio communications. Differences can be in terms of appearance, type of construction, application (the job the antenna has to do), the unusual place where the antenna is located or whatever makes the antenna strange or unusual.

I'll consider all entries, decide which are the most unusual, and report them in a future "Antenna Topics" column. Winners will each receive a copy of an interesting and useful book on radio communications. So what is the most unusual antenna you have ever seen, read or heard of? Let me hear from you.

World's Largest and Smallest Antennas?

Did you miss the results of our past contest to find the world's largest and smallest antennas? If enough readers are interested, we can re-run the outcome of that contest in a future column, or send $2 along with an SASE to *MT* and ask for a reprint from April 1987. Just drop a card to me at *Monitoring Times* to indicate your interest on this and other topics.

Radio Riddles

Last Month

Last month I asked: "What other very wide band beam antenna designs are available besides the log-periodic? Why are they not much used outside of commercial, military, or government service?"

Well, the long-wire V antenna and the rhombic wire antenna are both very wide bandwidth beams as compared to beams such as the Yagi Uda or cubical quad. The reason these stellar performers are not much used by us commoners is that they are extremely large and require a lot of real estate for installation. And, once in place they are immobile, making them appropriate for fixed-direction use only.

This Month

We know that all antennas have the same gain when receiving as when transmitting, right? That's one aspect of what we called "reciprocity" earlier in this column. But a rhombic antenna operating below 30 MHz often appears to have twice the effective gain when receiving as it has when transmitting? Why?

We'll have the answer to this month's riddle in next month's issue of *Monitoring Times*. Till then, Peace, DX, and 73.

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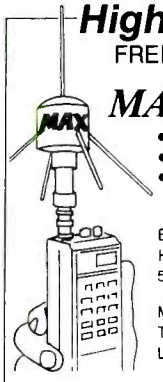

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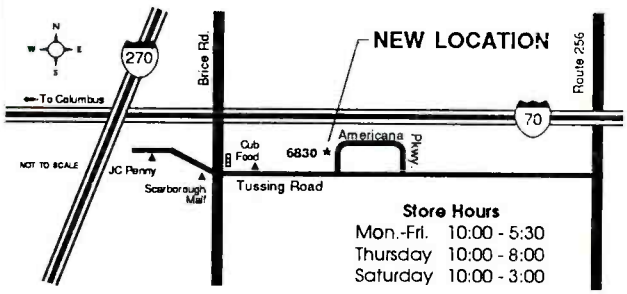

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ask bob

Bob Grove, WA4PYQ

Q. What frequency range are the new generation cordless telephones on? (Bob Gallardo, San Jose, CA)

A. CT-2 phones are in the 902-928 MHz band, formerly used for ISM (industrial, scientific and medical RF devices) and amateurs. They can use any frequencies and any technology, so there are no compatible plans among different manufacturers. Some phones use the old, easy-to-intercept analog, and some use the new, impossible-to-hear spread spectrum.

Q. Is it possible to modify a Kenwood R600 receiver for better 100-500 kHz sensitivity? (Robert Hurley, Baltimore, MD)

A. Virtually all general coverage receivers and amateur transceivers deliberately reduce sensitivity below 1.7 MHz in order to prevent overload from local broadcasters from interfering with shortwave reception.

Ordinarily this is done with a resistive attenuator between the antenna (or immediately after) and the bandpass filter for that frequency range. You will need a circuit diagram to locate these resistors.

The other possibility is, of course, to overcome the loss with an external preamplifier tuned for that part of the spectrum; this would require no modification to the receiver.

Q. Should I connect the preamplifier as close as possible to my TV? Is it possible to cause interference on TV with a preamp like with a scanner? (Randy Hudson, Albemarle, NC)

A. For VHF-TV (channels 2-13), an antenna-mounted preamplifier is unnecessary. For weak UHF-TV reception, especially if you are using a long run of coax line (100 feet or so), the remote-mounted preamp is a good idea. Always use good coax like RG-6/U.

Since a TV set is a receiver, it is just as vulnerable to front-end overload as a scanner or shortwave radio. TV intermod is often seen as wavy lines on the picture.

Q. Is it lawful to use my scanner when I travel from the U.S. to Canada? Can I use it on a Canadian military base? (Daniel Myers, Abington, PA)

A. Canadian listening laws are not as restrictive as American laws. Be sure to carry a bill of sale with the scanner just in case Customs thinks you bought it there.

Use discretion anytime you are near a government installation; while it is lawful to listen in, your proximity to them could be logically interpreted as unwelcome intelligence gathering.

Q. Is there any possibility of back issues of MT becoming available on ROM in the future? (Stephen Newlyn, Australia)

A. The last several years of *MT* are stored on computer disk; we could make them available on disk or CD-ROM if there is an adequate expression of interest.

Q. Is there a simple test I can perform to determine if the synchronous detector on my Sony ICF-2010 is working properly?

A. Select a strong AM station; switch on the synchronous detector and, in the fine tune mode, tune above and below the frequency about 0.5 kHz or so. The USB/LSB LED lights should switch back and forth as you rock past the station's frequency, but should not go out, and there should be no change in the station's sound.

Q. What happens if I connect an appliance to an AC adaptor that has the right voltage, but a current (mA) rating higher or lower than specified? (Joe O'Brien, Bronx, NY)

A. The current (mA) rating of an AC adaptor is the maximum current it can deliver without overheating the adaptor or causing its output voltage to drop below its stated value or permitting excessive AC hum from inadequate filtering.

An AC adaptor's rated voltage is close to that value only when the attached accessory uses the rated current.

Using an AC adaptor with far greater current rating than necessary does no harm to the adaptor, but since such adaptors are invariably unregulated, the voltage may be too high for the accessory which is not drawing enough current to pull the voltage down to its rated level.

Since most accessories operate on some nominal voltage, they are usually quite forgiving if the actual input voltage is one or two volts high or low.

Q. We are told that the San Francisco Bay area will soon have devices placed in cars to hear traffic reports; supposedly they operate on a portion of a UHF-TV signal. Is this like FM SCA? (Bob Gallardo, San Jose, CA)

A. It sure sounds that way. SCA (Subsidiary carrier authorization) is permissible to use on any broadcast carrier—AM, FM or TV. You can't tune it in on a radio or TV receiver; it can only be heard by a secondary circuit connected to the detector of the host receiver.

Bob's Tip of the Month

Blinded by the Light

Bob Kozlarek, WA2SQQ, who works for Panasonic, tells us their technical support department has received several calls from end users who are suddenly having problems with infrared remotes used with VTRs and other related electronic equipment.

Careful investigation has revealed the source of the problem to be with "energy saving" light bulbs. These are actually fluorescent type bulbs using an internal oscillator running at about 33 kHz. The oscillator powers the bulb using low frequency RF. The bulb, which emits a small amount of "low IR illumination," happens to strobe at the same frequency used by most IR remotes—33 kHz.

Bob tried this with several products from VTRs to CD players, each of which was affected. The symptoms decreased at greater range. The solution appears to be switching back to standard tungsten bulbs in the vicinity of your entertainment center.

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Bayonne Emergency Radio Network (BERN)

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Chicago Area DX Club

This all band DX club is always looking for new members within a 150 mile radius of Chicago. Regular columns in their newsletter, "DX Chicago," cover scanning, QSL logs, utilities, AM-FM-TV DX loggings, and other hobby related information. The club hosts periodic get-togethers with the membership.

Membership dues are $15, which includes a subscription to "DX Chicago." For more information write the Chicago Area DX Club, Edward G. Stroh, 53 Arrowhead Dr., Thornton, IL 60476.

Susquehanna County Scanner Club

The Susquehanna Co Scanner Club began in the fall of 1991 with a simple information exchange of frequencies and activities in the Pennsylvania area. It has grown to include monthly meetings with an average attendance of ten. If you live in the area and want to share your love of scanning, contact Alan Grick, P.O. Box 23, Prospect St., Montrose, PA 18801.

Club Listings M - Z

If you belong to a DX club and you haven't seen it listed in *Monitoring Times*, write today and request a Club Circuit listing form. Your club will be listed every other month, and will be featured in a club profile at least once, as well as receiving a complimentary subscription for club use. Listening clubs outside the US are welcome as well and are eligible for the complimentary subscription if they will provide the difference in postage.

One upcoming event can help counteract cabin fever and the winter blahs: The sixth annual Winter SWL Festival February 18-21 in Kulpsville, PA (near Philadelphia) is open to all. For registration information write P.O. Box 591, Colmar, PA 18915. You'll find some familiar folks there from *Monitoring Times*, and make new friends as well.

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Michigan Area Radio Enthusiasts: Bob Walker, P.O. Box 81621, Rochester, MI 48308. Michigan & surrounding; All bands. *Great Lakes Monitor.*

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National Radio Club: Paul Swearingen, Publisher, P.O. Box 5711, Topeka, KS 66605-0711. Worldwide; AM/FM. *DX News* 30 times yearly, sample for a 29 cent stamp.

NYC Radio Fre(ak)Qs: Joe Alverson, 199 Barnard Ave., Staten Island, NY 10307, 718-317-5556. NY boros & LI; VHF/UHF/HF utilities.

North American SW Assoc.: Bob Brown, Executive Dir., 45 Wildflower Lane, Levittown, PA 19057. Worldwide; Shortwave broadcast only. *The Journal.*

North Central Texas SWL Club: Alton Coffey, 1830 Wildwood Drive, Grand Prairie, TX 75050. Central TX area; All bands.

Northeast Ohio SWL/DXers: Donald J. Weber, P.O. Box 652, Westlake, OH 44145-0652. NE Ohio; SWBC and utilities.

Northeast Scanner Club: Les Mattson, P.O. Box 62, Gibbstown, NJ 08027, (609) 423-1603 evenings. Maine thru Virginia; UHF/VHF, public safety, aircraft, military, *Northeast Scanning News (NESN).*

Ontario DX Association: Harold Sellers, General Mgr., P.O. Box 161, Station A, Willowdale, Ontario M2N 5S8, Canada, (416) 853-3169 voice & fax, (416) 444-3526 DX-Change information svce. Predominantly Province of Ontario; SWBC, utility, MW, FM-TV, scanning, technical, propagation. *DX Ontario.*

Pacific NW/BC DX Club: Phil Bytheway, 9705 Mary NW, Seattle, WA 98117, (206) 356-3927. WA, OR, ID, BC; DXing all bands.

Pakistan SW Listeners Club: Mrs. Fatima Naseem, Sultanpura, Sheikhupura , 39350Pakistan; Pakistan; SWBC.

Pitt Cty SW Listeners Club: L. Neal Sumrell, Rt. 1 Box 276, Sumrell Rd., Ayden, NC 28513-9715. Eastern NC; Shortwave bands. *The DX Listeners.*

Puna DX Club: Jerry Witham, P.O. Box 596, Keaau, HI 96749; Puna, HI; SW and MW.

Radio Monitors of Maryland: Ron Bruckman, P.O. Box 394, Hampstead, MD 21074. Maryland; VHF/UHF/HF utilities. *Radio Monitors Newsletter of MD.*

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. *RCMA Journal.*

Regional Communications Network (RCN): Bill Morris, Public Info. Officer, Box 83-M, Carlstadt, NJ 07072-0083. 50 mile radius of NY City; 2-way Radio Public safety notification group.

Rocky Mountain Monitoring Enthusiasts: James Richardson, 11391 Main Range Trail, Littleton, CO 80127, 303-933-2195. Regional Rocky Mtn area; scanner monitoring.

Rocky Mountain Radio Listeners: Wayne Heinen, 4131 S. Andes Way, Aurora, CO 80013-3831. Colorado Front Range; All bands. Annual meeting calendar for an SASE.

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.

Southern Cross DX Club Inc.: G.P.O. Box 1487, Adelaide, SA 5001, Australia. Australia, New Zealand, South Pacific; All bands. *DX Post.*

SPEEDX (Society to Preserve the Engrossing Enjoyment of DXing): Bob Thunberg, Business Mgr., P.O. Box 196, DuBois, PA 15801-0196. Worldwide; SWBC, utilities. *Shortwave Radio Today.*

Susquehanna Cty Scanner Club: Alan D. Grick, P.O. Box 23, Prospect St., Montrose, PA 18801. PA area; Scanning all bands.

Toledo Area Radio Enthusiasts: Ernie Dellinger, N8PFA, 6629 Sue Lane, Maumee, OH 43537. NW Ohio and SE Michigan; Shortwave, scanning, amateur.

Triangle Area Scanner/SW Listening Group: Curt Phillips, KD4YU, P.O. Box 28587, Raleigh, NC 27611. Central NC.

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by computer, and the old hand-written, hand-entered technique. A magnetic disk could also enable reprogramming of portables, and is a step beyond Sony's somewhat experimental SW800 which accepted preprogrammed cards.

• Steven Gregory of Xenia, Ohio, sent along a small but sharp copy of a weather forecast out of Halifax, Canada. "Why did I send along such routine copy? Because it was received on a Sony 2010—99.99% perfect copy! It was translated on a Microcraft Code-Star reader at 100 baud and printed out on a Radio Shack Color Graphics printer. It's just another example of how good a receiver the 2010 is!"

• Lastly, we forward to our readers a request for information from Barry Green of Glendive, Montana. Barry says, "I was at a restaurant in the Tacoma, WA, area and the waitress that took our order entered our selection on a pocketsized keyboard which transmitted the information to the kitchen for the cooks to process. A hardcopy printout of the order also came out in the kitchen area which was utilized as the check given to the customer for payment. Could you please comment on this type of system and is it in widespread use?"

The use of digital data has found its way into all areas of daily and business life, and that data is increasingly transmitted without wires: i.e., by radio waves. Does anyone have more information about the specific service to which Barry Green refers; for example, what frequency is likely to be transmitted by the remote used by the waitress? And a more general question: Is this is an aspect of radio that you'd like *MT* to pursue on a regular basis?

You opinions, questions, and information are always appreciated at *Monitoring Times*, where your radio is always top of the line, your logging is the catch of the month, and yours are the best of all monitoring times.

Rachel Baughn,
Editor

SPECIAL EVENT CALENDAR

Date	Location	Club/Contact Person
Feb 6	Lancaster, PA	Columbia Area ARC/Tim Headings, KA3UQA 444 Woodcrest Ave., Lititz, PA 17543.
Feb 13	Pensacola, FL	Pensacola Area Hams Assn./Bill Benrends, WA4YRN 1050 W. Carlton Rd., Pensacola, FL 32534.
Feb 13	Blaine, MN	Midwinter Madness Hobby Electronics Show/Robbinsdale ARC, 612-527-1722 Location: National Sports Center, $6 admission.
Feb 19-20	Sarasota, FL	So Florida Section ARRL Convention/William Eddie Martin, KI4ZJ 870 Bahia Vista St., Sarasota, FL 34239.
Feb 20	Charleston, SC	Charleston ARC/Jenny Myers, WA4NGV 2630 Dellwood Ave., N. Charleston, SC 29405.
Feb 22	Milton, VT	No VT/NY Winter Hamfest/Joe Tymecki, N1DMP, 802-893-6458 Location: Milton HS, Route 7. $2 admission, talk-in on 145.47/-600 or 146.85/-+ 600.
Feb 27	Lebannon, PA	Appalachian AR Group/Wilson Hein, WJ3G 34 Maple St., Lebannon PA 17042.
Feb 28	Kenton, OH	Champaign/Logan ARC/Jerry Temple, N8MTZ 402 Chesney St., Kenton, OH 43326.
Feb 28	Vienna, VA	Vienna Wireless Society/Nancy Draheim, NK4U 3513 Old Post Rd., Fairfax, VA 22030.
Mar 6	Absecon, NJ	Shore Points ARC/SPARC, P.O. Box 142, Absecon, NJ 08201 Location: Holy Spirit HS, Route 9, approx 1/2-mile so of Route 30. Doors open 9 am. $4 admission. Talk-in on 146.385/.985.
Mar 6	San Benito, TX	San Benito ARC & S.T.A.R./Fred "Al" Wasielewski, WA2VJL RR8 Box 20-B, San Benito, TX 78586.
Mar 7	Northampton, MA	Mt. Tom Amateur Repeater Assoc/Marvin Yale 6 Laurel Terrace, Westfield, MA 01085.
Mar 13	Scottsdale, AZ	Scottsdale ARC/Allen Sklar, AA7BJ P.O. Box 10095, Scottsdale, AZ 85271.
Mar 13	Flemington, NJ	Flemington Hamfest/Cherryville Repeater Association II, Keith Burt, KF5FK P.O. Box 308, Quakertown, NJ 08868-0308; 908-788-4080. Location: Hunterdon Central HS Field House, 1 mile no of the Route 202-31 traffic circle. $5 admission, talk-in on 147.375+.
Mar 13-14	Orlando, FL	No Florida Section ARRL Convention/John Lenkerd, W4DNU 1046 Turner Rd., Winter Park, FL 32789.
Mar 14	Conneaut, OH	Conneaut ARC/Allan Keskinen, 866 Sandusky St., Conneaut, OH 44030.
Mar 21	Yonkers, NY	WECAFEST '93/Westchester Emergency Comm Assoc, Sarah Wilson, N2EYX P.O. Box 831, North Tarrytown, NY 10591-0831. Location: Yonkers Raceway, 9 am-2 pm, $5 admission. Talk-in on 147.060.
Mar 21	Maumee, OH	Toledo Mobile Radio Assoc/Chuck Krukowski, KB8FXJ 9408 Salisbury, Monclova, OH 43542.
Mar 28	Zanesville, OH	Zanesville ARC/Glenn Ridgley, KE8YP 340 Mead St., Zanesville, OH 43701.

Monitoring Times is happy to run brief announcements of radio events open to our readers. Send your announcements at least 60 days before the event to:
Monitoring Times Special Event Calendar, P.O. Box 98, Brasstown, NC 28902-0098

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FOR SALE: DRAKE R4C-MS-4 SW-Ham crystals, $400; HAMMARLUND HQ-100A, $125, both plus shipping, 601-825-8108.

Interested in contacting fellow scanner buffs in the Bryan/College Station, Texas, area to share frequencies and other various scanner information. Also possible starting some type of scanner club for the area. Please contact S. Kapchinski, P.O. Box 11132, College Station, TX 77842.

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WANTED: SONY CRF-230, CRF-320; PANASONIC RF-9000; GRUNDIG 3400. George Resch, 816 Fremont St., Menlo Park, CA 94025. (415) 851-7336.

UNIVERSAL M7006 (latest version), video fax, clock option, all manuals, Gold Star 12" monitor. Excellent condition, original owner. Will pay shipping. $550. Mort Pratt 207-883-2105.

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KENWOOD R-2000 w/VC-10 converter, $450 firm, you ship, 210-687-7101.

Monitoring Post Pinup

John Jones, West Midlands, England, shows us a photo of his shack. His two base main base radios are the AOR 2500 and the Grundig 500.

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Closing Comments

What Will the Future Bring?

A review of news releases over the previous year shows that even while the economy soured, product development soared. New types of personal communications devices similar to portable telephones are already here as the Tampa Bay area experiments with them on cellular frequencies.

Other cordless phones using spread spectrum "CT-2" technology are now popping up on the 902-928 MHz microwave band. A generation of low earth orbiting (LEO) satellites will allow worldwide intercommunication barely dreamed of a few years ago.

To accommodate emerging personal communications services, the FCC has set aside 3 megahertz of precious 900 MHz spectrum exclusively for these imaginative devices. Nationwide paging and pocket phones—anywhere—are just ahead.

Digital compression encourages more efficient use of the spectrum, with commercial television now actively planning to offer 500 or even 1500 channels in a space which previously allowed fewer than 100 channels.

Microcomputers are becoming more and more powerful as the latest 486 technology gives way to Intel's 586 "Pentium." Flat panel displays will grow in clarity and speed while shrinking in cost as yields become more efficient and competition takes its toll. King CRT will fall from his throne as brilliant LCDs rise to every occasion.

While satellite communications enjoy accelerated growth, shortwave will not be abandoned; new digital techniques in signal processing will allow data compression and voice/music definition to reach unprecedented levels of reception quality.

In a few years the international broadcasters will switch from full carrier amplitude modulation (AM) to single sideband (SSB). Not only will this reduction in bandwidth allow more efficient use of the spectrum, but it will invite independent sideband (ISB) transmissions of maps, charts, illustrations and photos to accompany informational broadcasts.

Global positioning satellites—there are now 20 of them—will allow low-cost automotive mapping and location finding; personal GPS satellite receivers will accompany hikers and campers just as they did field soldiers in the Persian Gulf War.

These aren't mere predictions; they are virtual certainties. Would you like *MT* to devote a regular column to tracking such new technologies? Let us know. In the meantime, enjoy these dreams; they are bound to come true.

Bob Grove
Publisher

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