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Monitoring Times

A Publication of
Grove Enterprises, Inc.

Off to Oshkosh!
Great Scanning at the EAA Fly-In

Alternative Radio
An Interview with Radio For Peace International

Communications on Your Scanner
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July 1993

Monitoring Times

Motorola

What Does Your Scanner Hear?

By Dom Mallozzi

What does it mean when ... ? Reading like a page from "Ask Bob," this veteran in mobile radio system design outlines the basic types and operation of VHF/UHF communications systems,and answers the questions he's most often asked by scanner hobbyists.

Radio for Peace International

By Stan Barr

In this insightful interview, travel writer Stan Barr presents a look into shortwave's alternative radio—its beginnings, its goals, and some of the stories from along the way. You'll also enjoy the vignette by German DXer Harald Kuhl, who happened to visit during moving day.

Radio For Peace International

Great Scanning at Oshkosh

By Brett Kollar

If you like scanning, airplanes, and you are anywhere near Oshkosh, Wisconsin, on the last weekend in July, fortune has smiled upon you! That is the date set for the world-renowned Experimental Aircraft Association's annual fly-in. If you're undecided, this article will convince you—unless you don't like crowds, noise, and good fun!

COVER: *A few of the 12,000 planes that park at the EAA Fly-In at Oshkosh, Wisconsin. Photo by Jim Koepnick courtesy of EAA.*

Check Your Mailing Label!

If there is no date above your name, or if it has expired, this is a sample issue of Monitoring Times. To keep it coming, send in your subscription payment today.

Tuning in to our National Pastime 20

By Ken Reitz

Baseball and radio grew up together and still seem to be the perfect match. You'll enjoy this short history of how it all came about. If you're away during a game by your favorite team, don't despair; consult our list for a radio station within earshot that's carrying it.

Manhunt in the Canyon 24

By Roger Mundy

It was July 4th, 1992. A convicted killer was loose in the Grand Canyon and he had vowed not to be taken quietly. It was not your normal tourist experience.

And More ... !

Give a big welcome to "Digital Digest"—a new quarterly column written by Bob Evans, author of two books on aeronautical monitoring and co-editor of Universal's *RTTY Listener*. Bob starts off with an overview of the modes in current use, what kind of traffic they carry, and what you need to monitor them.

Thunderstorms and AM broadcasting—sounds like a formula for frustration. However, "Scanning Report" reminds us that listening to the National Weather Service can clue us in to some dramatic scanning when severe weather strikes. Bob Kay has a technique to suggest to further pinpoint where to find the most scanner activity. And while summer storms are cramping the style of mediumwave DXers, "American Bandscan" takes the opportunity to look at what equipment successful DXers recommend for AM and FM reception.

What is Uniden up to? The new BC890XLT is innovative, effective...and inexpensive! Their new approach gets a thumbs up from reviewer Bob Grove in "Scanner Equipment." Do you wonder what "selectivity" means on the spec sheets? Is it important? You bet! Part One of Experimenter's Workshop tells why; next month will address how to improve it in selected receivers.

DEPARTMENTS

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LETTERS

Freedom to Disagree

The May issue of *Monitoring Times* contained an article regarding scanning in the United Kingdom, which we ran as a guest editorial because of the opinions and unsubstantiated claims it contained. The author, who used the name James Tayler, says "The whole point of the article was to illustrate just how difficult it is to publish articles on radio in this country [England], and the Establishment's reactions to them" (which he exemplified by the controversial case of Terence Cooper).

Neither *Monitoring Times* nor the author (who is not Terence Cooper) can verify the facts of Mr. Cooper's particular case—and several parties have strongly disputed the view we presented. We printed the story in a larger context, but both we and the author (who lives in the UK) had enough basis to feel that the scenario was not an impossible one.

Of more interest to the scanner hobby than Mr. Cooper's guilt or innocence, however, is the surprising difficulty of ascertaining just what is the extent of freedom in the UK to listen to and/or publish VHF/UHF loggings and specific allocations. There seems to be a sharp difference of opinion among hobbyists themselves.

Reader Dick Sharp placed the *MT* article on Compuserve, and received a couple of replies from Compuserve subscribers from across the pond. First, Roy Tait: "In the UK it is not illegal to own a scanner receiver covering DX to light. It is technically illegal to listen to anything other than broadcast and amateur transmissions. However, prosecutions generally only occur where people have been using scanners or information gleaned from scanners to perpetrate a crime or for personal gain.

"I would encourage anyone coming to the UK to bring a scanner along (or buy a 'real' scanner when you are over here), providing you act responsibly. Don't stand beside a police officer with a frequency counter urging him to transmit, or with your scanner blasting out his colleague's transmissions. Don't ever, ever go ambulance chasing."

And from Jonathan Clough: "There have been murmurs from Government Ministers about possible future scanning legislation. This was mostly due to front page press coverage of the 'alleged' tape cellular calls of the Royal Family and certain Inner City trouble spots where scanners were 'found' to be in use for monitoring the Police. This now seems to have blown over—I hope.

"Of the few prosecutions involving scanner related charges that I know of or have read about in local press cuttings, I can safely say that in every case, the defendant was involved in some form of criminal activity, the case in *MT* being no exception.

"After saying all that, at the end of the day I'd rather have your scanning 'laws' even without cellular."

Jack Birse was another from the UK who disagreed with the view presented, claiming that "VHF/UHF frequency books have been published for at least 10 years and freely available."

The author of the editorial, however, stands by his original premise—that printed frequency information has been scarce, overpriced, and is published at some risk.

Birse also maintains that Scot's Law is no less corruptible nor necessarily more fair than English Law. I'm inclined to agree that the

Monitoring Post Pin Up

Frank Orcutt, Buffalo, NY, isn't the only one in his household who enjoys the hobby. Markie, the "DX cat," is listening to Hauser's World of Radio!

judgment was irrelevant; human nature being what it is, all legal systems are corruptible!

Lastly, a thoughtful letter from Elton Byington of Maspeth, NY, puts it all into perspective for those of us in the United States. "Americans often forget how precious the freedoms we take for granted really are. In may other countries an act is deemed illegal until it's specifically allowed by legislation.

"The Founding Fathers were wise in their decision for status quo until an act is proved injurious to the health or wellbeing of the citizenry. But the power to legislate is easily abused, often in a misguided attempt to circumvent some perceived evil.

"Such a case is the ECPA, an act conceived, passed and signed in technological ignorance. It doesn't take an Einstein to see the flaws in logic that led to the ECPA. I think radio enthusiasts should mount a concerted effort to educate the Congress about the facts of our hobby. Failure to do so can only result in further ignorant attempts to curtail our activities.

"As Mr. Tayler so ably points out, things could be a lot worse for us American radio hobbyists. It's in our collective interest to educate our legislators and executives to the fact that we are not criminals, but merely interested listeners."

Monitoring Times welcomes loggings and items of interest to the global audience, especially in the English-speaking countries. If you're afraid to print it there, print it here, and then subscribe!

The Communications Dilemma

This month's feature on the scanner bands is a good introduction to the considerations to be taken into account when a community begins to design a communications system. But, the process is becoming ever more difficult and expensive. Take the community of Middlesex County, New Jersey. A series of clippings sent by Louis Olcsvay, Jr., outlines their problem.

This county had the foresight to apply for and receive six pairs of 800 MHz frequencies to be used within five years in a multi-million dollar trunked radio system. However, the time is up for the county to submit firm planning decisions. It looks as though they will forfeit the frequencies, since they cannot agree on where communications fit in with other priorities, nor if trunking is the only solution to their problem. Should you use existing radios until they're no longer usable? Is it fair to exchange ten much-needed new officers for a new communications system? Is the safety of officers at risk if they don't update the system? These are not easy questions.

Meanwhile, Louis worries they might go to the trunked system. "If they use the encoders, which will be DVP, the beeps, buzzes and squeals are not interesting to monitor. South Brunswick did implement a trunked system; it uses DVP most of the time, and is not even worth listening to any more, but its repeater outputs are 866.0750, 866.4000, 866.7000, 868.4125 and 868.7375."

Roland Soderholm of Virginia Beach, Virginia, raises the point that many communities may be forced to go to 800 MHz if the FCC's spectrum refarming plan goes through. This plan proposes, among other things, converting both the 150-174 MHz band and the 450-512 MHz band to narrow-band operation to provide more channels. Roland comments:

"Evidently the FCC doesn't know or care about the impact the reorganization of radio frequencies would have. I'm with the Mosquito Control here in the city of Chesapeake and we are on 461.225, shortly going to 460.225 which we will share with Animal Control. We just spent $16,000 for a new repeater and have been told that it will be useless if the FCC goes on with their program. Talk is, the city might go the 800 MHz route if they have to buy new radios anyway. And what about all the small businesses that will lose a tremendous amount of money when the plan goes into effect?"

Hm-m-m; I am, however, reminded of Bill Cheek's July column in which he points out that scanners are designed to accept a sloppy signal that can be several Hz off frequency and still be understood. Maybe we've reached to the point where we no longer can afford to give that much space to inefficiency, nor do we need to, considering the technology that's available. What do you think?

Infrequent Low Frequency

Todd Dokey of Lodi, California, has also heard reports of the extremely low audio sound mentioned by Clem Small in his April "Antenna Topics." Todd volunteers to plot reports of such sounds if there is any interest in trying to pinpoint the source(s). Are these waves audio or electromagnetic? Are they in the 17-20 Hz spectrum as suspected? Let us know if you can shed any light on this mystery.

Sponsorships

We made a successful match-up between our last request for a subscription sponsorship and a generous donor. Now I would like to ask for help for a DXer from Lithuania. Would someone like to donate $28.50 toward a contributor who shares his information with fellow hobbyists?

We've been reluctant to get involved with requests for equipment, but as we all know, there are many people who are shut-in or are far from their native land to whom a radio brings new meaning to life. We have a request from a relatively young man faced with spending perhaps the remainder of his life in a nursing home, where the population is much older and less mentally active than he. He owns a 20-year old scanner that will pick up some traffic at night, but it pulls in nothing during the day when his boredom is the greatest. Do you have a scanner you no longer use you'd like to donate? Let us know, and we'll put you in touch with this gentleman—you might find a friend as well.

As a side note, I'd like to pass on a story about "Arcadia Mary," a 68-year-old woman who suffered from asthma and bronchitis, who not only took in and raised a family not her own, but who protected her community for ten years—with a scanner.

Cassie Sisterman, whose story only came to light last May after she died, listened faithfully to her scanner as a community activist, reporting both crime and police misconduct to the media to combat crime and racism. Thanks to Dave Wills of Pasadena, California, for passing on the news clipping. I can think of no better example of the importance of open communications, and of the asset that citizens with time on their hands can still be to their community.

Please address all correspondence regarding sponsorships to the Editor, Rachel Baughn.

Oops!

Following is a clarification from Theo Pappan, author of last month's "The Case of the Vanishing Satellite." In an effort to conserve space, your editor changed Theo's references to Scientific-Weather-Military satellites to the generic "comsat." Theo says, "As you know this is incorrect and very misleading. [*Well, no, or I wouldn't have done it!*] A comsat (COMmunications SATellite) has for its primary mission the relaying of radio signals from the Earth to the satellite and back to the Earth. The satellites I discussed do not have such capability and only send back images and data. This is causing some confusion."

My apologies; if you enjoyed Theo's article and would like to see more on satellite montoring—whether of scientific-weather-military or comsats—we would like to hear from you.

Also, in the "Satellite TV" column, mention was made of a free pamphlet on your rights as a dish owner. Please send $2 plus an SASE for the pamphlet. The American Satellite Television Alliance (16 Broadway, Suite 480, Valhalla, NY 10595) is a non-profit organization with very limited funds.

Continued on p. 111

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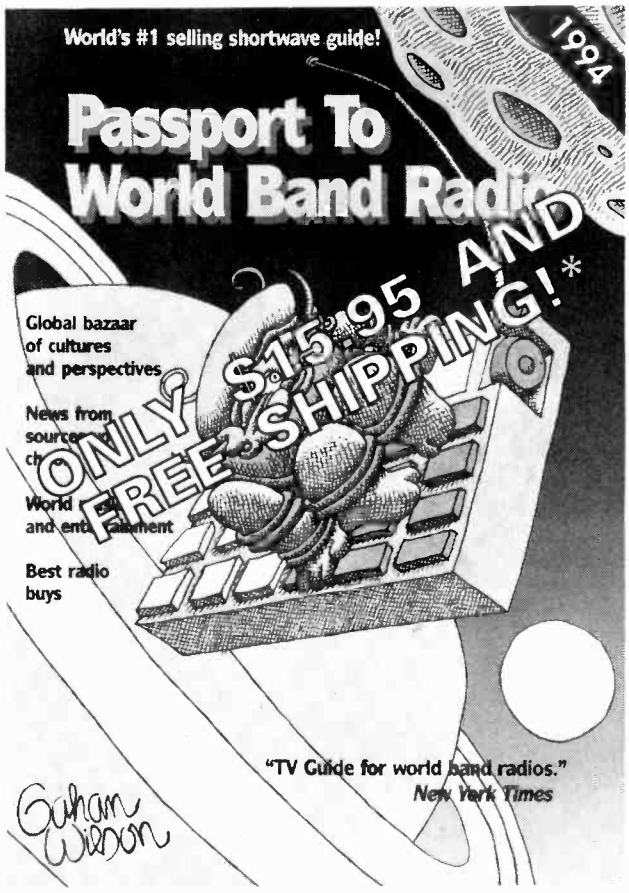

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News Flash!

Radio Shack Withdraws Scanners

Frank Terranella, noted authority on radio law and author of the *Listeners Lawbook*, sent the following late breaking and disturbing news from New Jersey:

Radio Shack has pulled most of its scanners out of its New Jersey stores following a letter from the New Jersey Attorney General's office. The letter from Michael Bozza of the division of Criminal Justice informed Radio Shack that tests of its scanners showed that the radios received cellular telephone calls on several frequencies outside the cellular bands as a result of poor filtering, and harmonic and other images. Scanners with triple-conversion technology are not affected.

Because of the reception of cellular communications outside the cellular band, the New Jersey Attorney General's office considers these low-end radios "primarily useful for the purpose of surreptitious interception" of cellular telephone calls. Mr. Bozza stated that people who wanted to listen to police and fire communications with these scanners would be frustrated by the interference of cellular communications. Mr. Bozza acknowledged that the law in New Jersey is not different from federal law. He said that law enforcement authorities had brought to his attention the cellular reception of these scanners and his office was acting on their complaint.

Karen Wright, attorney for Radio Shack, would not comment on her company's action other than to say that they had decided to comply with the Attorney General's request pending further study of the legal situation in New Jersey and elsewhere. Since the New Jersey wiretap law is identical to the federal ECPA, removing the radios from sale in New Jersey could have nationwide implications for Radio Shack.

Why Radio Shack chose to capitulate when the charge is so patently untrue, is a mystery to us. What the fallout will be from their action remains to be seen.

Island Weiner

"Non-traditional" broadcaster Al Weiner is at it again. According to reports, the near-genius brain behind Radio New York International is in the process of outfitting another boat, this time named "*The Fury*." The boat, it is said, is receiving sponsorship from a religious group in Texas and from Scott Becker of the Becker Satellite Group. Broadcasting will be primarily on shortwave. Two hours will be used by Weiner's Radio New York International.

The last time Weiner attempted a shipboard broadcasting station, he parked the *Sarah* off the coast of New York. The boat was raided and shut down by U.S. authorities. This time Weiner's going to Nevis, off St. Kitts in the Caribbean where they're reportedly working out a deal for anchorage in return for tourism promotion.

Watch the pages of *Monitoring Times* for further details or tune in Glenn Hauser on shortwave for the latest information.

Another 800 MHz Cancer Claim

Almost 15 percent of New York City's 680 female paramedics and emergency medical technicians are affected by gynecological disorders; some are blaming it on their new 800 MHz radios. The radios, they claim, are causing a higher rate of miscarriages, menstrual problems, cervical abnormalities and cancer. New York replaced their 400 MHz radios with 800 MHz units in 1989.

"Our lieutenants tell us, 'This is just a coincidence, you women are nuts.' So why do I have dysplasia?" asks 32 year old Colleen Enderly. "I refuse to carry a radio now."

Motorola says that it has received no complaints related to gynecological problems and New York EMS spokeswoman Lynn Schulman says that she "has not seen any medical or scientific evidence" to back up the technicians' concerns.

However, Leo Birenbaum, an independent scientist from Polytechnic University, said there may be cause for concern. Birenbaum noted that the 800 MHz walkie talkies are held near the pituitary gland at the base of the brain. The gland regulates menstruation and other bodily functions.

Recently, Motorola has had to defend against claims that their 800 MHz cellular telephones are responsible for causing brain cancer.

How Radio Helped the Chinese Cure Shyness

Mr. Chu* was a construction worker in Guangzou, China, whose wife constantly complained about their unsatisfactory sex life. According to the *Bangkok Times*, so bad was the nagging that Mr. Chu finally fled to Shandong Province where, depressed, he finally lost his job.

**not his real name.*

One night, sitting alone in his room with a cheap, locally-produced radio, he happened to tune in Tianjin Radio's hot new sex talk/advice show, "Whispers on the Pillow." Within weeks, his sex life was on track again and Chu was heading home with a full head of steam.

So popular has the program become that fully 48 percent of the city's population is tune in at any one time. The reason, says Chen Zhonglin, a psychologist in Tianjin, is that the Chinese are "too shy" to talk about sex (although, apparently, looking at population figures, that shyness has its limits.)

"Whispers on the Pillow" is now broadcast in Beijing, Shanghai, and several other Chinese coastal cities.

Radio. What a wonder.

Tower Shot Down

David and Sharon Brower (WA4NST and N4XLF) of Vero Beach, Florida, have lost a two-year legal battle with neighbors over their 68 foot ham radio tower. In a final judgement for the plaintiffs (seven neighborhood families), Judge Charles Smith found the radio transmissions to be "a noxious and offensive activity." Said Smith, "This large...tower and antenna sticks out like an eyesore to this subdivision and neighborhood."

Pending appeal, Smith was kind enough to stay his order to remove the radio tower, but enjoined the Browers from further radio transmissions from their home.

Meanwhile, the Browers, after weighing the costs of fighting the initial battle, must decide whether to press on with an appeal. A fellow amateur, James Laseter, N4ZYX, has set up the Brower Legal Defense Trust. Donations may be sent in care of 2716 Robin Street, Ft. Pierce, Florida 34982.

Like A Voice Crying Out on the Wrong Frequency...

It's described as "like a voice crying out from the Twilight Zone," an eerie radio message that some say is coming from the remains of a giant airship that crashed into the ocean off Point Sur, California, in 1935.

According to trawler skipper Nathan Brewer, "You can only hear the signals when you're directly over the *Macon's* wreckage. Move off a few yards and you get nothing. Zilch."

"The signals are in Morse Code but they don't make any sense, except every so often I can make out the . . . . . that spells out SOS and the word Macon," says Brewer.

COMMUNICATIONS

"Each night right after sunset, the signals start. And they keep on till just before sunrise and they quit."

Skipper Brewer says that he hears the signals on his VHF-FM radio (although VHF-FM was not used for those purposes in 1935, and experts comment that signals will penetrate only about a foot of water at that frequency).

"I don't know what's going on down there," says Brewer, "but it's the spookiest thing you'd ever want to hear."

Crime and Punishment in Chicago

Things are getting spooky in Chicago, too, where officials, citing their authority to "exercise power" over anything related to "health, welfare, and morals," are seeking to "restrict" the use of scanners.

Saying that "due to the proliferation of the use of scanning devices capable of monitoring public safety radio frequencies it is imperative that the corporate authorities of the City of Chicago, to protect the safety and welfare of its citizens...restrict the use of such devices." As usual, the old "criminals are using scanners in their cars to avoid detection" argument has once again been marched out. Yawn.

The two people responsible for this pin-headed piece of ill-conceived legislation are Edward Burke, Alderman, 14th Ward and Lawrence Bloom, Alderman, 5th Ward.

We urge you — whether you live in Chicago or not — to call Mr. Burke at 312-471-1414 and Mr. Bloom at 312-667-0900. Tell 'em *Monitoring Times* sent you.

Cell Phones Not Private, Says Judge

Georgia Judge William LeRoy McMurray, Jr. has ruled that cellular telephone users have no justifiable expectation of privacy inasmuch as cellular telephones transmit "FM" radio waves for anyone to hear. Therefore, says the judge, the interception of cellular telephone conversations does not violate a Georgia statute making it unlawful to intercept the contents of a message sent by telephone or by any other means of private communications. Lawyers interested in the case should refer to Salmon v. State, 426 S.E.2d 160 (Ga.App.1992).

Federal laws restricting the monitoring of cellular telephones in Georgia and across the 50 states still, regretfully, apply.

Scanner Listener Breaks NY Scam

When James McFall, Jr., was troubled, he'd call his mother. But before you go getting misty-eyed about a relationship between a boy and his mom, read on.

The FBI arrested McFall after a radio hobbyist tape recorded him using his cordless phone to con elderly victims out of thousands of dollars. According to transcripts of the tapes, McFall even felt guilty about what he was doing and that's when he rang up mom.

"My mind is just not working," a dejected McFall said in one conversation.

"You look very unhappy," Mrs. McFall said.

"Well, it's an unhappy job," McFall said. "You're cheating people out of their life's savings, you know. You can only do it so long without feeling a little bad here [but] I'm going to do it for the time being."

"You have to, because where are you going to get that kind of money?" Mrs. McFall asked her son.

The radio enthusiast stumbled onto the scam when he heard the cordless phone calls and was "so disturbed and upset" by what he heard that he taped the calls and contacted the FBI.

Prosecutors said that McFall picked on extremely unsophisticated people, often people with emotional or physical problems. In one conversation, one of McFall's representatives spent 20 minutes explaining to an elderly victim how to spell the name of his firm and where to send the check while the woman explained that her husband was learning how to walk with a walker.

Prosecutors credit the radio hobbyist with cracking the scam, but did not release his or her name. Jay Albanese, a Niagara University criminal justice professor, said that picking up such conversation by hobbyists is common. "I think it's laudable for a private citizen to contact the FBI about a criminal activity, but I find it a bit disturbing that a [radio hobbyist] is out there conducting his own investigation."

Thanks and a tip 'o the hat to the following readers and other VIPS who contributed to this column. "Communications" is written by Larry Miller from a variety of sources, including Dewayne Bruce, Caringbah, NSW, Australia; Bob Fraser, Cohasset, Massachusetts; Darren Leno, Oakbrook Terrace, Illinois; Tom McKeon, Indianapolis, Indiana; Ricardo Molinar, Fort Lee, New Jersey; Frank Orcutt, Buffalo, New York; Ira Paul, Oak Park, Michigan; Al Radella, Rochester, Pennsylvania; Tom Risher, Whittier, California; Frank Terranella, Ft. Lee, NJ; Robin Verhose, Spring Lake Heights, New Jersey; and David Wills, Pasadena, California; plus *Judicial Highlights, Intelligence Solutions Newsletter, National Scanning Report, Weekly World News, World Broadcast Information, Worldradio* and *W5YI Report.*

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Saturday, October 16

8:00 to 11:30 am
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9:00 am to 12:30 pm
Exhibits Open and
Morning Seminars
12:30 to 3:00 pm
Exhibits Open/Lunch Break
3:00 pm
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3:00 to 5:15 pm
Afternoon Seminars
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Friday evening starts off the weekend with a two hour "**Hobby Talk.**" Moderator Bob Grove will host this open forum of attendees, speakers, international broadcasters and specialists in the radio hobby field. Topics will include the new scanner laws, the future of shortwave broadcasting, new technology and much more. The balance of the weekend seminars will include these new topics for 1993:

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What Does Your Scanner Hear?

Warren Goldberg

By Dom Mallozzi, NLDM

After 20 years of listening to, using and designing land mobile radio systems I have heard and answered quite a few questions. Eventually, I realized they might form the basis of a good introduction to public service radio systems to both new and experienced scanner listeners.

Before we get to some typical questions, I want to point out that system design is not a simple matter. In designing a communications system, the technicians and engineers involved have to consider a lot of factors. Some may seem contradictory or troublesome, but the purpose of engineering is to provide the best system with the least compromises. Some of these considerations are:

Priority of communication: It is obvious that a police officer or firefighter has more communications priority than a public works dump truck. This usually means that police and fire departments get the better (and more expensive) systems. More attention is generally paid to engineering a quality receiver for these systems, resulting in better system performance. Police and fire systems are usually the best maintained and are continually updated with newer equipment.

Coverage: Are you trying to cover a small town or a whole Texas county? Obviously, the larger area results in additional considerations such as, do you want a low band (30-50 MHz) system with a few base stations or an advanced 800 MHz radio system with many fixed transceiver sites? Also, if you have walkie talkies on the system this means that you take into account the disparity in power between the base stations and antennas. It may even entail having to add many satellite receivers (also called voting receivers) to the system. This is not as unusual as it seems. Locales with hilly terrain also pose problems for walkie talkies. I have seen a VHF high band system in a town of 16 square miles that required five voter receivers to allow portables to be heard reliably all over town.

Compatibility with existing/other municipal systems: Many communities try to keep all radio

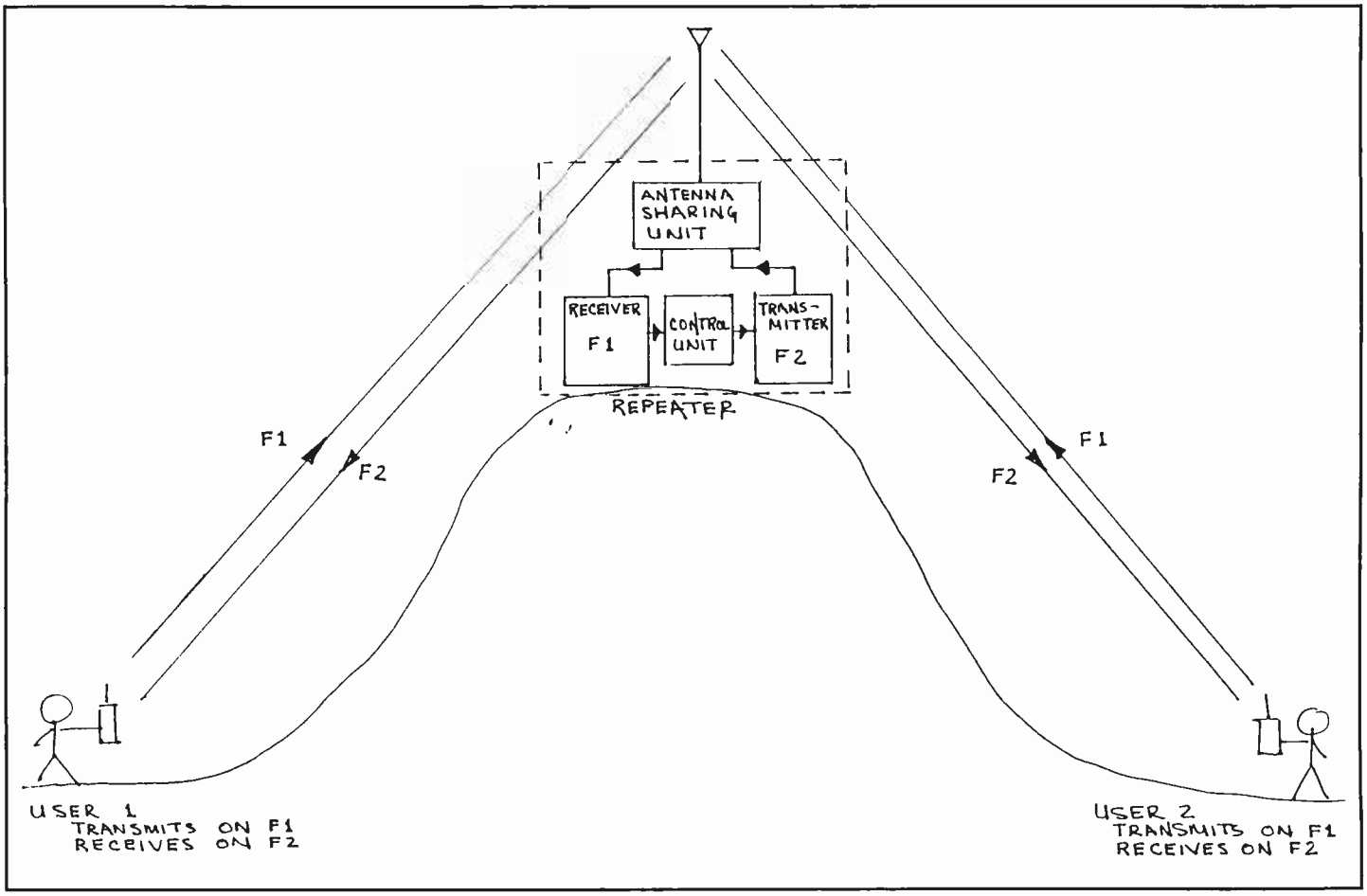


Figure 1: Typical repeater

services in the town on one frequency band. There is good reasoning behind this. For example, in a major disaster like a hurricane, the fire department and public works might wish to talk to each other about gas main leaks and downed power lines. For fire district mutual aid purposes, it is advisable for adjoining towns to be on the same bands.

There are also financial incentives; with all departments buying identical radios, they may be able to obtain quantity pricing. In some cases this can reduce the cost of radios by 20 percent—not a small amount on a $1500 mobile radio.

Bands used: In addition to the compatibility problem there are other problems related to the frequencies to be used. For example, a growing town may need to add more units and eventually more channels. However, especially in large metropolitan areas, it may be difficult to find another available channel on the band you are currently using. So to add channels without resorting to multiple radios in each vehicle, it may be necessary for the engineers to move the systems to another band with less congestion. This is expensive, because all the radios will have to be new, but sometimes it is the only solution when more channels are required.

Now that we have given you some of the design considerations behind the system, let's look at some typical questions that might be asked.

I have a new $500 scanner and an outside antenna, but still don't hear all the mobile and handheld stations that the fire dispatcher is talking to. Why?

First, the fire dispatcher probably has an antenna up high at a better radio site than you have. On VHF, high antennas make a incredible difference.

Also, the dispatcher may be using a system with voting (or satellite) receivers. By spreading two or more receivers over a large area, the voter equipment automatically picks the receiver that is hearing the strongest signal and feeds that to the dispatcher's speaker. It also checks all receivers several times per second, so that if a station is mobile the dispatcher will always hear the best signal.

In my frequency directory I see two frequencies for the local fire department, one on low band and one on UHF. They use low band all the time. Recently at a local fire I saw the chief pick up his walkie talkie and heard him on both the UHF channel and low band. What is going on?

Many departments have had problems with walkie talkies because the district they cover is too large for economical installation of voter receivers and repeaters. Or, they are on low band where walkie talkies have notoriously poor performance. To cure the problem they use a device called a mobile extender.

This device acts as a crossband repeater using the main vehicle radio of the responding equipment and another small transceiver on the walkie talkie channel in the vehicle. This allows the UHF walkie to be picked up in the vehicle and transmitted over the vehicle's main radio. Also, the receiver of the main radio transmits its audio on the small transceiver to the walkie talkie.

These mobile extenders are usually only turned on when the user leaves the vehicle, and the small transceiver is usually low power (between 0.1 watt and 25 watts). The small "extender" transceiver will usually not be heard very far from the incident, so listening to this mobile extender channel is not very productive.

In my frequency directory the local water department has two frequencies listed. One is listed as "repeater in" and the other is listed as "repeater out." Sometimes I hear stations on the "repeater in" channel but I hear everyone on the "repeater out" channel. What does this mean?

A repeater is a device which takes a signal from a low power station coming in on a receiver and then retransmits it on a high powered base station transmitter on another channel. Usually this is located at a high elevation to increase its coverage. In some cases the repeater has a voting receiver (see above) attached to the transmitter. This allows low power stations in a large area to talk to each other and the base stations over a large area.

If you monitor the "repeater out" channel you'll hear everything. The only time listening to the "repeater in" could be useful would be when you hear the dispatcher saying he is turning the repeater off. In those cases the information they are receiving from the field officer is confidential, such as the identity of a dead body. It's kind of rare but it does happen.

I listen to the local hospital channel and I also hear a hospital 25 miles away. But it seems that the local ambulances do not hear the other hospital. Is there something wrong with their radio?

No, their radios are fine but have a special feature called CTCSS or digital squelch. CTCSS stands for continuous tone controlled squelch system, more commonly referred to as PL (an abbreviated form of Motorola's trademark Private Line). This system uses a low level audio tone between 60 and 200 Hertz that is transmitted as long as the mike button on a transmitter is pressed. The receivers in the system have a detector that only "opens" their squelch when the subaudible tone that the system is using is detected. Another user of the same channel in a close location will use another subaudible tone that will only "open" the receivers on his system. This allows local reuse of the same channel.

A similar system using digital signals is available and is starting to become popular. Unfortunately, unless you own a scanner that has a PL module available, your scanner will hear all the users on the channel.

I listen to the local police repeater, but every once in a while I will hear units saying they are going to the "back door" or "talk around." Sometimes I can hear the units talking, sometimes not, but I don't hear the tail on the repeater, and they have that mobile flutter sound when I hear them. Where did they go?

Well, this is common. The two stations switch their radios to an operation where, instead of transmitting on the repeater input frequency, they switch to the repeater output channel. So they are not using the repeater but can hear what is going on. If they are close you will hear the mobile (or portable) stations talking to each other.

There was a big police chase recently on the local interstate. I heard the local police start the chase, then all of a sudden I heard the local police on both the local channel and the state police channel simultaneously. Then I heard the two agencies talking to each other. They are on different bands; how did they talk to each other?

In some dispatch centers it is possible to patch or cross tie one base station to another. This allows two agencies on different radio systems to talk to each other. It acts like the mobile repeater system we discussed earlier. It is a special feature and must be designed into the dispatch center. This source of potential confusion has to be carefully used.

I recently heard the local police say they were going scrambled, then all of a sudden I heard bursts of static on the channel, even with the squelch tight. What did they do?

Welcome to the wonderful world of digital scrambling. Sold under various trade names, it basically uses a digital audio system and a special computer that takes the digitized audio and mathematically encrypts the signal. On the receiving side, the computer removes the digital encryption and reconstructs the audio. The use of computers makes recoding easy by reprogramming the radio. It is quite amazing that all this circuitry can be stuffed into a walkie talkie (sometimes doubling the cost)!

The "noise" you hear is the digital signal. Unlike the older analog scrambling systems it is almost impossible for the scanner user to crack the scrambling. Usually these systems are used by detective, anti-drug and special units. These systems are not perfect (some reduce intelligibility), so often you will hear stations operate in the clear (normal radio) until they are doing something that is confidential.

GLOSSARY

Every business and hobby has its own lexicon; the two-way radio business is no exception. Here is a group of terms that you may come across in scanning newsletters and magazines.

ANI Automatic Numeric Identification (also known as automatic unit identification). This system transmits a unique identification code for each unit that a properly equipped station (usually the dispatch center) can read on a display indicating the identity of the transmitting station. In police and some fire operations this includes an emergency button indicator.

Channel Guard The General Electric trademark for their CTCSS system.

CTCSS Continuous Tone Controlled Squelch System transmits a particular tone in the audio range below 230 Hz that allows CTCSS receivers set for the proper tone to hear a transmission. Stations on the same frequency using a different tone will hear nothing.

Crossband Operation across band limits that takes a signal on one band and retransmits it on another band. For example, the repeater might receive a signal on highband and retransmit it on UHF.

DCS Digital Coded Squelch (see DPL)

DPL The Motorola trademark standing for Digital Private Line. A digital CTCSS system which uses a digital identifier in place of the analog audio member used in CTCSS.

DTMF Dual Tone Multi Frequency signalling is a Bell System trademark. If you have a touchtone phone, this is the dialing system your phone uses. In radio systems it might allow the user to phone patch through a properly equipped system. It can also be used for remote control of equipment.

High Band Probably the most diverse and heavily used band. Between 138 MHz and 174 MHz you will hear almost every conceivable type of user. Range of reception is somewhat terrain dependant, but ranges of 15 to 50 miles are common in repeaterized systems.

Low Band Until recently, the 30 MHz to 50 MHz band handled a significant amount of the wide coverage public service communications, such as state police and power companies. There is still a significant amount of US military/government operation in this band. It is not unusual for skip propagation to allow transcontinental reception; many users on the East Coast regularly receive reception reports from European listeners.

Mobile Data Terminals Computer terminals that allow a user to access a computer system directly by radio (e.g., police doing a license/registration check) without need to involve dispatchers. In addition it allows unit to unit communications in a non-voice mode.

Mobile Extender A system which uses a low power transceiver connected to the main vehicle radio to allow a nearby low-powered walkie talkie to access the system. These are usually crossband operations.

PL The Motorola trademark for their CTCSS system (also known as private line). See CTCSS above.

Repeater A repeater is a station which has a receiver on one channel and a high power transmitter on another channel (usually in the same band) that automatically takes the received signal and retransmits it. The repeater is usually at a high location which allows it to hear stations over a considerable distance. This allows two low power stations to communicate over a area that would normally be impossible. Some times the receiver is actually a "voting receiver" (see below) which allows reliable reception of low power stations like walkie talkies over a wide area.

T Band In certain metropolitan areas with severe radio congestion, the Federal Communications Commission has allowed two way radio users to operate on unused TV channels between channels 14 and 20 (which is adjacent to the UHF band). Because a typical TV channel is 6 MHz wide and a typical land mobile channel is 0.015 MHz wide, this means that each TV channel can accommodate at least 400 users. This band, also referred to as UHF-T, is between 470 and 512 MHz.

Touch Tone A Bell System trademark for DTMF.

Trunked System A system of repeaters (usually between 800 and 900 MHZ) that may allow hundreds of users to share a group of repeaters on a priority basis. These systems are computer controlled and allow an efficient use of spectrum.

VHF Very High Frequency is the part of the radio spectrum (30 to 300 MHz) where until the late 1950's most public service radio occurred. It includes low band, mid band, high band, and the VHF aircraft band (108-136 MHz). Also found in this part of the radio spectrum are TV channels 2 through 13 and the FM radio band.

Voting (Satellite) Receivers A system of receivers which allows a dispatcher or repeater to hear low power portables and mobiles over a large area. Widespread receivers make it possible to hear stations "behind" radio obstructions or in radio black holes such as valleys or behind skyscrapers.

UHF Band The Ultra High Frequency range between 450 and 470 MHz is where much public safety and commercial activity now occurs. Almost all systems on the band are repeaterized, which allows monitoring over a range of 10 to 25 miles.

Every half-hour or so I hear a burst of what sounds like Morse code on the local fire channel. What is it?

It probably is Morse code. Under the FCC rules and regulations, public service and private communications systems are supposed to identify themselves by their FCC assigned callsign every half hour when the system is in use. Many municipalities overlook this. But, manufacturers have solved the problem by adding Morse code identifiers to repeaters they provide to municipalities. This makes the identification process automatic, and saves the users having to remember to do it. The automatic ID is especially useful when a transmitter is generating crud and interfering with other systems.

I took out the local frequency directory when I bought my scanner and programmed in all the channels shown for my town, but I only hear activity on a few of them. Why aren't they all in use?

Well, there could be a lot of reasons. For example a local civil defense channel is probably only active during emergencies (floods, hurricanes, etc.) so it would appear dead the rest of the time. Also, many users change to systems on new frequencies, but fail to notify the FCC that they have discontinued use of their old channels. Because public service and commercial licenses carry a five year term, this means that if the FCC is not notified, the channels may continue to show up in frequency directories for up to five years after they have been abandoned.

I hear my local town operating on a channel that the frequency directory says they are not using. Is it legal for them to do that?

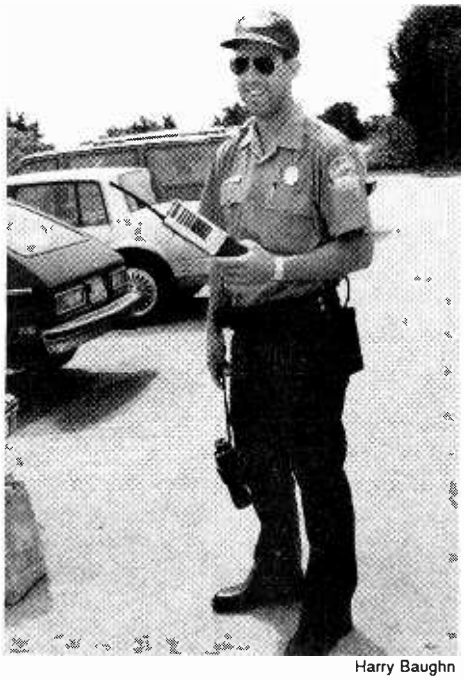
In most cases this kind of operation is actually legal. Many users, such as fire districts, license a system under a single licensee rather than each individual town holding a license. Also, there are some provisions in the FCC rules which permit a user to allow others in his coverage area to use his channel. An example of this is when a local ambulance corps is allowed to operate on the town's fire channel.

Of course, others just forget to renew their FCC licenses and therefore drop off the FCC license listings. This is unfortunate, because the FCC can then reissue "their" channel to other users (and it really does happen).

Trunked Systems

Advanced techniques like "trunking" and mobile data terminals are even more difficult to explain and monitor, but let's take a crack at a bit of information on them.

Trunking uses a system of repeaters under computer control in order to share resources between several users. The system uses a control



Harry Baughn

channel which carries computer data between radios in the system so that groups can be shifted automatically between the available repeaters to allow uninterrupted communications.

The many system users are prioritized to allow the computer to determine who gets repeaters for use first. In a large system, police, fire, public works and public buses may share the system, but police and fire might override the other users. These systems are very spectrum efficient allowing multiple services to share a small amount of channels.

Mobile data terminals are another outgrowth of the computer revolution in the radio spectrum. They allow a mobile user to access computers directly. For example, a police cruiser can check registrations by direct access to registry of motor vehicles computers. They can also provide a private non-voice method of unit-to-unit communications without being overheard by scanner listeners.

The uses for mobile data terminals are almost unlimited, from allowing the local delivery truck to get changes in his delivery orders to enabling the local fire department at a hazmat (hazardous materials) incident to access computer databases containing procedures for neutralizing a particular chemical. This is one of the fastest growing applications in the communications business.

It is also likely that in the next few years as digital radio techniques improve, public service users may go to more digital audio transmission techniques (like digital scrambling). It won't be overnight, because of the cost of conversion, but in the next few years it should start in earnest. Scanner listeners will probably find these systems a major challenge to monitor. But the current systems still offer quite a bit of excitement.

Further reading:

- *The ARRL Operating Manual*: 4th Ed.: ARRL, Newington, CT. 1992.
- Orr, W., *Radio Handbook*: Howard W. Sams Co., Inc., Indianapolis, IN. 1987.

An Interview with Radio For Peace International

By Stan Barr

This interview took place in November 1992 at Radio For Peace International (RFPI), a shortwave station broadcasting from Ciudad Colon, Costa Rica, since 1987. Debra and James Latham are the co-founders of RFPI. The interviewer is Stan Barr, an award-winning travel writer and producer of "Innocents Abroad," a travel show on public radio in the U.S.

Stan: How did Radio For Peace International begin?

Debra: Radio For Peace International is a joint project developed between two universities — the World Peace University with headquarters in Eugene, Oregon, and University for Peace in Costa Rica. There is an international agreement between these universities. But the station's roots started even before that agreement was signed. James can tell you that story, since he was a key figure at that time.

James: We were heading across the U.S. on Operation Salt (Strategic Arms Limitation Talks) March. The year was 1984. If you would roll your thinking back to those times, you may remember it was the warming of the Cold War and a lot of rhetoric was going on between East and West. A group of people launched a national campaign to bring attention to the dangers and possibilities of a nuclear holocaust. During that time, I was in charge of some advance P.R. for Operation Salt March.

I'm an avid long-time shortwave listener and amateur ham radio operator, and I brought along all my shortwave radios to keep in touch with the world. We noted there was very little information about peace activities on the international shortwave bands. Especially, there was no news of any kind about the peace project we were involved in.

After Salt March, Debra and her father, Dr. Richard Schneider, founder of World Peace University, a friend from Germany, Maximillian Löffler, and I met at a ranch in Oregon to plan a shortwave radio station called Radio For Peace. We knew that for the same power required to serve a city the size of Portland, Oregon, on AM or FM, we could reach a global audience on shortwave.

Stan: Did that station become active?

James: We had no capital for start-up — only an idea that was unique at that time. Most shortwave stations are operated by governments or religious groups.

Debra: We started fund-raising and contributions came in. Some of the equipment we needed was donated. Then we bought additional equipment that we had to modify or rebuild. We knew we could sit around writing proposals to get more money or we could build the station and put it on the air with what we had. And that's what we did. It's a philosophy that works for us.

Stan: Why was Costa Rica chosen as the site?

James: In order to build a shortwave station in the U.S., we needed anywhere from one half to three million dollars. This was totally beyond the capital that we came up with — which was about $18,000 — so we were just a little shy of our goal. While we were trying to decide what to do, Dr. Schneider attended a peace conference in San Jose where he met Dr. Rodrigo Carazo, expresident of Costa Rica, and one of the founders of University For Peace.

Dr. Carazo invited us to build a station on the grounds of the University. These grounds are special in that they have autonomy from the rest of the country — similar to how the U.N. Building is in New York. In fact, the University For Peace was founded by a resolution in the United Nations General Assembly.

Debra: In 1987, we packed our equipment — all 1-1/2 tons — into a 1/2 ton pick-up truck and drove to Los Angeles. From there it was shipped to Miami and then flown to Costa Rica.

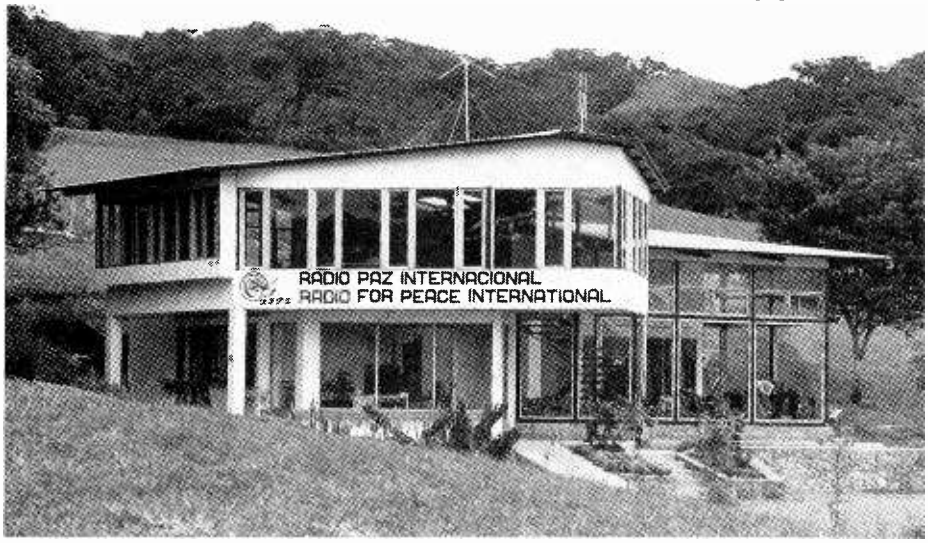
Stan: Your station is adjacent to The University For Peace...

Debra: We're actually on the campus of The University.

Stan: RFPI is located 22 miles from San Jose, the capital. The station is surrounded by many acres of rolling green hills that overlook a lush tropical valley.

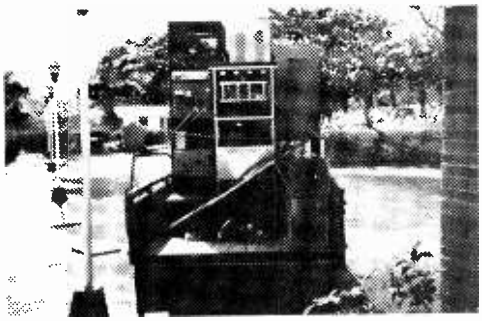
James: As you can see, it's very peaceful here. These grounds are also a preserve. We have some beautiful forest lands with a vast number of animals and insects that crawl and fly around. We even have wild monkeys that occasionally visit us.

Debra: Over the years we had to do a lot of adjusting in order to broadcast from a tropical country. We came down from the U.S. with sort of



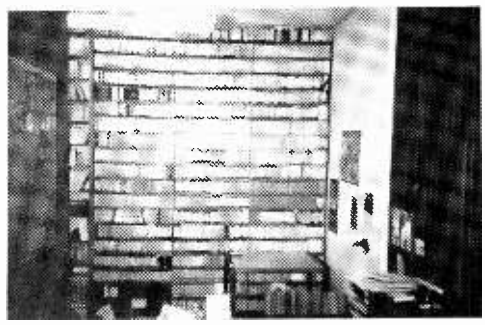
Radio For Peace International

The new Radio For Peace International headquarters is ready for open house during dedication ceremonies.



Harald Kuhl

RFPI on the back of a pick-up.



Harald Kuhl

A view into the sound archives of RFPI.

a set mentality about broadcasting. Here we had to deal with the rainy season — thunder and lightening storms; the dry season — high winds, humidity, and things corroding; poisonous snakes appearing in our transmitter, and scorpions. We faced all kinds of challenges during those early years.

Stan: Tell us about some early broadcasting experiences.

Debra: The first day we went on the air, back in September 1987, our studio was located in a small portion of the University. We were still amidst sawdust from construction then. Our goal was to have that initial broadcast on International Peace Day, which is the third Tuesday in September. We didn't make it. Two days later we thought we were ready again, but just moments before we were set to broadcast we had an equipment failure. We went on with only 40 watts of power, which isn't much if you think of a 40 watt light bulb. But we received phone calls and letters from people who heard us on that first broadcast.

James: With 40 watts of power we were one of the smallest shortwave stations that ever entered the international shortwave band.

Debra: We began to broadcast three hours a day, Monday through Friday. We had a variety of programming from the U.N. and other sources. After we were on the air only a month, we had a more serious equipment failure. We were off the air for several weeks waiting for some tubes from the States.

Stan: What's the range of your present signal?

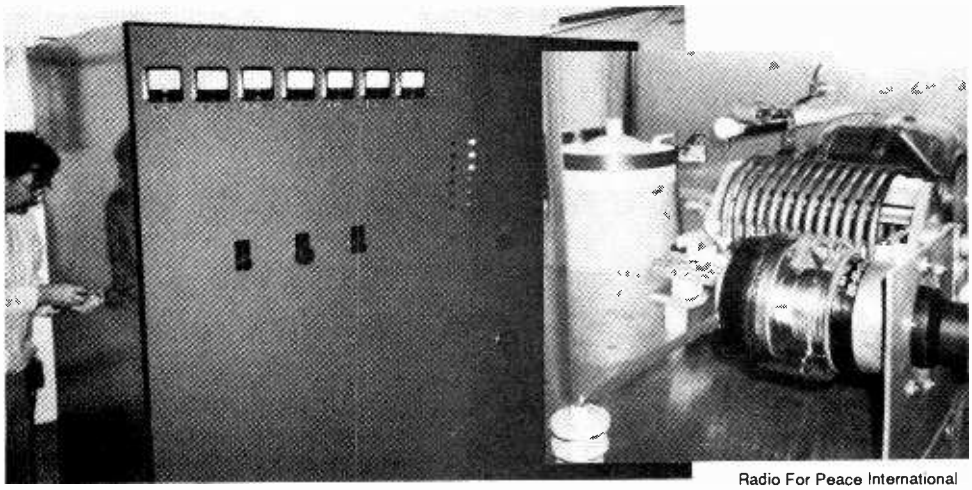
James: With our five transmitters, varying in size from one to five kilowatts, we can cover the Americas fairly well... actually we can be heard clear around the planet, but the further away our listeners are from Costa Rica, the more sophisticated type of radio they need.

Debra: James has spent the last year working on a 30 kill boost transmitter. These 30 kills will make a big difference!

Stan: (To James) As a radio engineer, were you responsible for building this station?

James: Yes. But there's a big difference between working in the U.S. and here. In the U.S. if you needed a particular part you'd call up a company that stocks it. They would ship it, and you'd have it the following day. You'd install it and be back on the air. But we're remote here and don't have companies down the street. Quite often we had to build the equipment ourselves.

Debra: There's an additional challenge here and that's customs. Everything that comes into the country is taxed. There is not even a category for gifts. If you receive photos from your mother, or blank check books from your bank in the U.S. those will be taxed. So that adds an additional expense of bringing parts in. The University for Peace has exonerations, but that is such a nightmarish bureaucratic process that only the brave embark on it. We have done it a number of times but you really have to desperately need something to be willing



Radio For Peace International

James working on 30 kW transmitter he designed and built. Inset: Inside the new 30 kW transmitter.

to go through that process. Sometimes building a part is easier than trying to get it here.

James: We now know how some of the early radio pioneers felt when they had to build their own transmitters. Sometimes all we had were the bare raw materials such as copper wire and plastic insulators. The first transmitter we constructed was actually built in Oregon. It was put together there and checked out to make sure it was operating. Then we immediately had to tear it down for shipment. It felt kind of sad to take something apart that was just built. But then, when we put it together in Costa Rica, it worked!

Debra: Replacing equipment was a real challenge. I remember winding a coil one night to get the station back on the air.

James: That coil — what they call a plate choke — blew out on us. It has real fine wire wound on a little piece of porcelain that's only an inch in diameter. We found some old transformers from a fluorescent light system that had wire about the same size. We unwound it very cautiously. Then we counted the burnt out loops and wound it back onto the insulator. I think we were on the air just moments before we were scheduled to start transmitting.

James: There are a tremendous number of insects here — many more than in Oregon, or North America or most places. All types of insects and they enjoy getting into electronic equipment.

Stan: So you literally had to get the bugs out!

James: (laughs) Not only that, but one day, after taking a lunch break, I returned to work and found a poisonous snake had coiled itself into the equipment I was working on. I could have easily been bitten if I had stuck my hand in there without looking. There's no telling what kind of critters you'll come up against.

Stan: Your new antenna was a hands-on project, built right here outside your studio.

James: Just like in our earlier days, we're still trying to make every dollar go further and so we're still building a lot of our own equipment and transmitters. Antennas for shortwave sell for about $110,000 and we could do a lot with that. We've just completed a tower of 130 feet — free standing. We saved a considerable amount of money by building it ourselves. Our Spanish program director, Willie Barrantes, is also an architect.

He designed it with the help of local civil engineers. Our new high-powered transmitter and rotatable antenna will substantially improve the gain of our signal. We'll soon have good coverage throughout the world specifically to Europe and Asia.

Stan: Willie Barrantes also designed your new studios.

Debra: Yes. We inaugurated the building in November 1991. First of all, we had grown out of our studios at the University for Peace. Then the earthquake of December 1990 shook things up badly. All our equipment ended up on the floor in

A "Moving" Visit to RFPI

By Harald Kuhl

What would you expect to see during a visit to an international broadcaster? A lot of towers, a couple of curtain antennas and some 500 kW shortwave transmitters? Not at Radio for Peace International.

In the spring of 1991, a DXer's dream became reality, and I took a plane to Costa Rica. Besides visiting the country, which is one of the safer ones for tourists, the main reason for visiting was my interest in this unique international broadcaster.

Before starting the journey, I contacted the people at RFPI asking about the possibility of visiting the station, which turned out to be no problem at all. What a contrast to my former trips to Asia and Africa when my "strange" interest in radio stations more than once nearly took me into prison as a suspected "spy"!

After arriving in San José, the capitol of Costa Rica, I contacted RFPI's office. Despite the fact that the public transportation system in Costa Rica is quite good, it would be hard to get to RFPI. The station is located on beautiful property near Ciudad Colon, quite isolated up in the mountains. The University for Peace, which hosts RFPI, runs its own small bus to pick up employees in San Jose and places in between. Fortunately, the very friendly people at both the University and RFPI had no problem letting me catch a ride.

The day I visited, the people at RFPI were just at the stage of moving the transmitter facilities to a new site on the property of the University for Peace. Of course, I took this unique opportunity and lent a hand. There are not too many DXers who can say they've moved an international broadcaster, are there? It really was fun and the new location is absolutely beautiful.

One of the numerous earthquakes which took place in Costa Rica in December 1990 hit the building in which RFPI's transmitting and studio facilities were located. The damages were so bad

Harald Kuhl

Trying to get the antennas up at the new transmitting site. James Latham on the tower, Maximilian Loeffler on the ground.

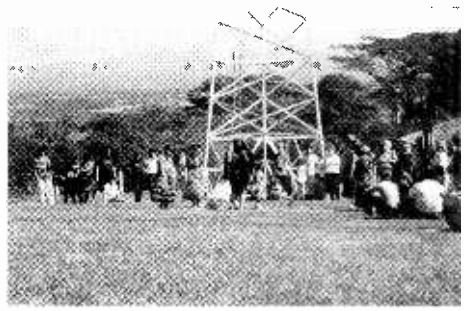
that extensive repair was deemed necessary. Fortunately, the new transmitter building was ready. The office and studio moved temporarily to a small office in another building of the University.

"Future plans," said Harald Kuhl in 1991, "include the building of a new office and studio complex, and 42-meter tower as well as a new 20 kW transmitter. The 'Frequency of Peace' is definitely growing."

Now, of course, RFPI is located in its beautiful new facility; the tower was erected, dedicated, and blew down a few weeks afterward. With typical ingenuity, however, RFPI stayed on the air, and continues to improve their designs.

Harald Kuhl

A view into the small provisional studio in the back of RFPI's office.



Radio for Peace International

Dedication ceremonies at the new antenna tower.

the middle of the recording studio. The damage was so bad that the walls of the building would move if you pushed them. At that time we decided to construct our own building.

Stan: Your new two-storied studio would probably be the envy of a lot of radio stations in the U.S. And the facility is very well equipped. How many people are on your staff?

Debra: We've increased from the initial three to ten; they all receive small stipends that would not even be considered a livable wage in the States. All of us work as a collaborative team. Of course there is the administrative hierarchy structure that exists between the two universities and the board of directors of the station. My position is General Manager. I'm responsible to the Board of Directors, but within the station we work as a team.

Stan: What type of programming does RFPI broadcast?

Debra: Our station is dedicated to specific issues. The environment, human rights, peace and peace education, and providing food for the world. Some of these issues are dealt with in other media but only in passing. We've taken those four issues and linked them to others, such as conflict resolution, peace making, economic rights. We even have programs that are exclusively about shortwave radio.

We're now on the air 24 hours a day, seven days a week. Eight hours of our daily programming is taped for a later broadcast during each 24 hour day.

James: One of the daily programs we produce is *RFPI Reports*. This is our first attempt in creating a news department for the station. Grahame Russell, a lawyer, is one of our contributors to this program. Grahame keeps us informed about new laws going into effect in Central America. He reports on human rights abuses, such as when a prisoner is being tortured, and the economic situation of the people. For example, some new facts and figures have just come out of Panama. The current economic situation for the poor in that country has been deteriorating since the U.S. invasion. And there is a growing drug abuse problem with cocaine.

Stan: Your station is bilingual?

Debra: The majority of our programming is in English with three hours daily in Spanish. We also have an hour a week in German and an hour a week in French Creole. The French Creole programming arises out of the special need at this time in Haiti. Since Jean-Bernard Aristide was ousted over a year ago, there's been a news blackout in the country. They struggled with different methods of getting news to the Haitian people through other than the official government propaganda.

Radio Enriquillo, a station in the Dominican Republic which was honored at the AMARC 5 conference in Mexico, was broadcasting news into Haiti, but they received a great deal of pressure and had to shut down that service. They were only allowed to broadcast music. Well, being very innovative people they began singing the news. They even had to stop that. So we've taken on a special project to broadcast a one hour program in French Creole called *Radyo Neg Mawon*.

Nancy Vargas broadcasts for the Feminist International Radio Endeavour (FIRE).

Stan: Another program I found of interest is called *FIRE*. Tell us a bit about *FIRE*.

Debra: *FIRE* went on the air May 1, 1991, with the cooperation of the Foundation for a Compassionate Society which is based in Austin, Texas. *FIRE* stands for Feminist International Radio Endeavor. We broadcast *FIRE* two hours a day, one hour in English and one in Spanish. It's programming by and about women. We have very enthusiastic team of four women working for *FIRE*.

Stan: How do listeners find RFPI on the shortwave radio band?

James: Shortwave radio stations are notorious for changing their frequencies, so it's best to write to us and get our current frequency schedule. It's easiest to write to our U.S. address: Radio For Peace International, P.O. Box 10869, Eugene, Oregon 97440 and please include an S.A.S.E.

Stan: What's the most satisfying part of operating RFPI?

James: Giving priority to programs that promote peace for the planet. And, of course, knowing that there's an audience out there awake and listening. With shortwave radio it is always "prime time" somewhere in the world.

Debra: Having the opportunity to increase the global awareness of issues facing humanity at this time. That opportunity is our greatest reward.

MT

Great Scanning at the Oshkosh Fly-In

By Brett Kollar

Airplanes park to the right, campers to the left, and pedestrians enter by the "Brown Arch." This is a major aeronautical event, and communications are critical.

What would an event hosting 12,000 aircraft and 830,000 people in a week be called? An average week at New York's Laguardia airport? Atlanta's airport? What about Chicago's O'Hare airport?

Nope. None of them even come close to the Experimental Aircraft Association's 41st annual fly-in to Wittman Regional Airport in Oshkosh, Wisconsin, which will be held on July 29th and ends on August 4th.

The Experimental Aircraft Association, commonly known as EAA, started the annual fly-in back in 1953 at Milwaukee's Curtis Wright Field with less than 40 people flying mostly antique and home built aircraft for a weekend event. In 1960, the fly-in moved to Rockford, Illinois, to accommodate more people and airplanes. It was at this time that the event was expanded from a weekend get together to a week long convention. The EAA moved the event in 1970 to its present home in Oshkosh, Wisconsin, which now accommodates the annual event for people from all around the world. The seven day fly-in is generally considered one of the world's largest and most significant aviation events.

Camping has become an important part of the Fly-In Convention camaraderie for many people.

Not only is it a sight for the aviation buff to see acres of military "warbirds," experimental home built craft, antiques, classics, and modern military aircraft on the ground, but to see them flying in the air is something that cannot be seen at any other air show. Squadrons of fifteen T-6's and twenty T-34's may be flying overhead all at the same time. Three jets, the MiG-21, F-104, and the F-86 Sabre, race around the area together, trying to prove which is the better aircraft. Later in the day a Harrier Jet hovers overhead, floating, appearing lighter than air.

With the sheer number of aircraft involved in this show, it is not only a sight to see, but also to hear. Steven Buss, Communications Coordinator for the show, agrees, "In addition to the frequencies used by the FAA Air Traffic Controllers (118.5 is the Tower) and area law enforcement agencies, EAA utilizes seven different radio networks to communicate with our volunteer Chairmen in the field. For the scanner enthusiast, this is a great place to be."

In the earlier part of the morning you can see a string of aircraft, thirty, forty, fifty planes long all coming in for a landing on runway 27. The controller, talking on 118.500, does not even wait for the aircraft to respond, just asks them to "rock your wings, landing Oshkosh" and clears them to land two at a time in thirty second intervals. Once on the ground, the aircraft contact ground control on 121.900, unless you are a "warbird"; they have their own ground control on 121.400.

Last year, air show control was heard on a number of different frequencies, depending on the time of day and the events taking place; 126.600, 123.900, and 133.850 were the most active. The air-to-air communications were done on the 133.850 air show control frequency, with the exception of Sean Tucker who used 122.920 to talk through the PA system while doing his acrobatics. Don't worry if you don't have a portable to carry around. Last year there were plenty of vendors at the "Fly Market" hawking small hand-held analog air band receivers for $14.95 that were selling like crazy. In addition, WRST on 90.3 FM from the University of Wisconsin-Oshkosh becomes "The voice

1993 Special Events

In addition to the usual programs, forums, shows and exhibits, several special events are scheduled for this year, including visits by the British Airways' supersonic Concorde jet and the Bud Blimp. The fly-in has been chosen as the host site for one leg of the International Breitling Masters World Cup aerobatic competition. Oshkosh '93 will also be honoring Women Airforce Service Pilots (WASPs) at a special evening program on August 2nd.

of EAA Oshkosh" during convention week. WRST carries forums, highlights of each day's activities, personal interviews, and uninterrupted coverage of the daily air show.

When leaving the air show at the end of the day, monitor 452.500 and 462.100 to catch the taxis taking people to their destinations for the night to rest up. The University of Wisconsin-Oshkosh, 155.598, rents out their dorm rooms at a very reasonable rate during the week.

While I was there for the weekend last year, a tornado touched down a few miles to the west of the city. Weather nets were live and active following the storm on the 2 meter ham bands. Up to the minute weather information was relayed on 147.345 and 147.240 as the tornado warning siren sounded in Oshkosh.

Neither was the week long flying event without incident. At least two sea-planes crashed while out over the sea base which had a control frequency of 123.300. A pilot crashed after having a heart attack about one mile from the field, and yet another crashed on the runway in what appeared to be a minor wing scrape--not to mention the heart-stopping call of "MAYDAY, MAYDAY" over the radio as one of the pilots flying in formation had engine problems. 121.500 also brought the eerie sound of Emergency Locator Transmitters going off occasionally.

To help with the event, the Oshkosh Civil Air Patrol was not only busy on 148.150 looking for missing or late arriving aircraft, but also with controlling movements of people and aircraft on the field while the Oshkosh Sheriff directed traffic and kept the peace outside the field on 158.730 and 158.835. The local Ambulance could also be found on 155.235.

All in all, if you are a pilot, airplane buff, or just an aircraft monitor, you don't want to miss this week long event at Wittman Regional Airport in Oshkosh, Wisconsin. Start making plans now to be at this year's 41st annual fly-in, July 29th-August 4th. If you would like more information, you can write to the EAA at: P.O. Box 3086, Oshkosh, WI 54903 or call them at 414-426-4800. To join one of the several divisions of EAA, you may call 1-800-843-3612. Hope to see you there!

MT

Frequency List

27.055	CB Channel 8 - Oshkosh EAA Convention Information
90.300	WRST
*111.800	Oshkosh VOR
*118.500	Oshkosh Tower
*118.900	Oshkosh Airport - FAA Control
*119.050	Oshkosh Clearance Delivery
*120.700	Oshkosh Approach Control
*121.400	Oshkosh Air Show Warbirds Control Tower
*121.500	Emergency
*122.250	Flight Service
*122.950	Sean Tucker Air-to-ground
*123.300	Water Landing Control
*123.900	Oshkosh Air Show Control
*125.800	Oshkosh ATIS Arrivals
*126.600	Oshkosh Tower
128.100	Oshkosh Air Show Control
*128.750	Oshkosh ATIS Departures
*133.850	Oshkosh Air Show Control
*147.240	Oshkosh 2 Meter Repeater KE9XH
*147.345	Oshkosh 2 Meter Repeater WB9ZHN pl 107.2
*148.150	Oshkosh Civil Air Patrol
151.625	Oshkosh Experimental Aircraft Association
155.235	Ambulance
155.890	University of Wisconsin
*158.730	Oshkosh Sheriff Ch.1
*158.835	Oshkosh Sheriff Ch.2
166.175	Oshkosh NTSB Officials
165.750	Oshkosh NTSB Officials
*257.600	Oshkosh Air Show Control Tower
257.800	Oshkosh Tower
*452.500	Taxis
*462.100	Taxis
*464.375	Oshkosh EAA Aviation Foundation
469.375	Oshkosh EAA Aviation Foundation

** Monitored frequencies*

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Frequency Coverage	*Default Steps*
25.000 - 25.995 MHz. (AM)	5.0 KHz
26.000 - 28.995 MHz. (AM)	5.0 KHz.
29.000 - 53.995 MHz. (NFM)	5.0 KHz.
54.000 - 71.995 MHz. (WFM)	50.0 KHz
72.000 - 75.995 MHz. (NFM)	5.0 KHz.
76.000 - 107.995 MHz. (WFM)	50.0 KHz
108.000 - 136.995 MHz. (AM)	12.5 KHz
137.000 - 173.995 MHz. (NFM)	5.0 KHz.
174.000 - 215.995 MHz. (WFM)	50.0 KHz
216.000 - 224.995 MHz. (NFM)	5.0 KHz.
225.000 - 399.995 MHz (AM)	12.5 KHz
400.000 - 511.995 MHz. (NFM)	12.5 KHz
512.000 - 549.995 MHz. (WFM)	50.0 KHz
760.000 - 823.995 MHz (NFM)	12.5 KHz
849.0125 - 868.995 MHz (NFM)	12.5 KHz
894.0125 - 1,300.000 MHz. (NFM)	12.5 KHz

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Bearcat 800XLT-F base/SUPER SPECIAL	$199.95
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Bearcat 200XLT-F handheld/SPECIAL	$208.95
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Bearcat 65XLT-F handheld/SPECIAL	$99.95
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Frequency Coverage	*Steps*
29.000 - 54.0000 MHz. (NFM)	5.0/12.5/25.0 KHz.
108.000 - 136.9950 MHz. (AM)	5.0/12.5/25.0 KHz.
137.000 - 174.0000 MHz. (NFM)	5.0/12.5/25.0 KHz.
216.000 - 224.9875 MHz. (NFM)	12.5/25.0 KHz.
225.000 - 399.9875 MHz (AM)	12.5/25.0 KHz.
400.000 - 512.0000 MHz. (NFM)	12.5/25.0 KHz.
806.000 - 823.9875 MHz (NFM)	12.5/25.0 KHz.
849.0125 - 868.9875 MHz (NFM)	12.5/25.0 KHz.
894.0125 - 956.0000 MHz. (NFM)	12.5/25.0 KHz.

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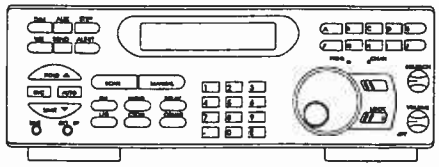

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Tuning in to our National Pastime

By Ken Reitz

For those of us who grew up in the second half of this century the connection between baseball and radio seems obvious. But there was a time, long before the personal pocket stereo and the million dollar rookie, when a summer major league baseball game was a relatively private affair. A crowd of 15,000 was considered a large one for a team involved in a drive for the league pennant.

In 1921 there were 16 major league teams comprising the American and National Leagues with eight teams each. While all the major league teams maintained farm clubs in the hinterlands of the south and west, the "national pastime" was really a northern and eastern concern.

St. Louis had the team furthest west and Washington the southernmost club. To the north and in between were teams from America's industrial heartland, the likes of Detroit, Pittsburgh, Cincinnati and Cleveland. New York hosted three clubs; Chicago, St. Louis, Philadelphia and Boston had two each.

In 1921, during the August drive for the American League pennant, the New York Yankees were trying to shake off a tenacious Cleveland Indians ball club. In the National League, the Pittsburgh Pirates were desperately clinging to a two game lead for the National League pennant.

Meanwhile, 1921 would prove to be a pivotal year for the infant broadcasting industry. Driven by dedicated scientists with extraordinary self images, smooth talking businessmen, and enthusiastic amateurs, wireless charged headlong into the 1920's with a sense of abandon which would later characterize the decade.

Such government regulation as there was in the early days of wireless was done through the U.S. Department of Commerce. Its Secretary, Herbert Hoover, was a vocal supporter of the new medium and attempted to construct some semblance of order in the chaos of the airwaves.

Amateurs had been driven off the medium wave frequencies and consigned to what was then considered a transmitting wasteland below 200 meters. It fell to the Department of Commerce to issue commercial licenses to those who sought to broadcast, on the AM band, to an audience equipped with receive-only radios.

Many early commercial licensees were the former stations of amateurs ready to make the step from two-way experimenter to one-way broadcaster. 8XK was the station of Dr. Frank Conrad, assistant chief engineer at Westinghouse in Pittsburgh. His radio shack was on the second floor of the garage at his home in nearby Wilkinsburg, Pennsylvania.

For years he had worked on transmitting telephony from his station, and by September 1920 he was broadcasting a limited schedule of programming which consisted of recorded music and live vocal and instrumental music.

One of the listeners to Conrad's broadcasts was Westinghouse Vice President H. P. Davis who recognized the financial potential of the general public buying radio receivers for the purpose of home entertainment.

Conrad was put in charge of constructing a new wireless station for Westinghouse at one of their Pittsburgh plants one month before the Harding-Cox election. In an astonishing 11 days from the time of application, Westinghouse received its license and went on the air October 27, 1920, as KDKA. From that day forward, KDKA has been a broadcasting voice for the sports world.

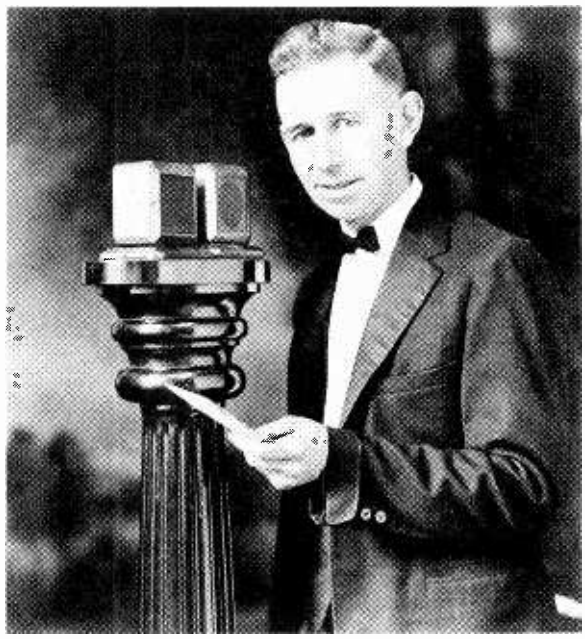
Less than a year after the birth of KDKA, Westinghouse sought to expand its audience with the introduction of the Aeriola, Jr. radio receiver. The small (6 x 6 x 7") crystal set powered a set of earphones and had a range of under 15 miles. It sold for $25. Sets like this combined with similar units by other manufacturers comprised a rapidly growing audience hungry for entertainment.

Ken Reitz

Orioles Park at Camden Yards, Baltimore, Maryland.

Beginning with opening day of the 1921 season, the scores of all major league games were broadcast on KDKA three times each evening. By August of that same year KDKA was ready to try something new. Details of what later turned out to be a momentous occasion for both radio and baseball are not clear, but for the record, on August 5, 1921, KDKA announcer Harold Arlin broadcast the first play-by-play of a baseball game.*

One report says that Arlin set up his "wireless telegraphy" equipment on the field just behind the backstop behind home plate. Another report says that he used a telephone to report the game over a three station hook-up.



KDKA Radio

Radio's first full-time announcer was KDKA Radio's Harold W. Arlin, shown here in a 1920's publicity photo.

Since no one had ever heard a play-by-play announcer, it would be hard to criticize Arlin's delivery, but it's clear that the event did not create an immediate sensation. Neither the next day's *New York Times* nor, indeed, Philadelphia's own *Evening Bulletin* reported the broadcast.

Baseball on the radio in 1921 was a novelty, and broadcast of a game was done more as a publicity stunt. The '21 World Series was an all New York affair and newly licensed WJZ, Newark, arranged to broadcast the opening game hoping to attract listeners. Tommy Cowan did the play-by-play by speaking into a telephone with its hook removed.

And, lest you think that "sports-talk" radio is an invention of recent times, the first baseball commentary program was on WEAF, New York, with Dan Daniel as the commentator. The date was June 10, 1922.

It would be another two years before a radio station would broadcast a regular schedule of baseball games. That honor went to WGN, Chicago (whose call letters stood for World's Greatest Newspaper). Its owner, *The Chicago Tribune*, saw radio not as competition to the newspaper industry, but as a complementary way to advertise.

The Chicago Cubs were owned by the Wrigley family of Chicago who correctly saw that baseball and radio were in the same field: entertainment. The Wrigley's belief in radio was so great that they charged no broadcast fees, and no fewer than seven Chicago stations broadcast Cubs games in the early years of radio. In fact, WGN carried the Chicago White Sox games as well from 1927 to 1943 sharing the Sox feed with WBBM, WMAQ, WCFL, and WJJD, all Chicago stations. This made Chicago the undisputed capitol of broadcast baseball.

Not all team owners were as enlightened in 1934. That year New York team owners were so afraid of radio's impact at the turnstiles that the Yankees, Dodgers and Giants all agreed to a five year ban on all radio broadcasts from their stadiums. But by 1939 radio had hit its stride and become a major industry in America. Millions of homes across the country were tuning into what would later be termed "The Golden Age of Radio." The miserly team owners were forced to follow or step aside.

During the following decades, radio and baseball went on to make millions for each other and satisfy the peculiar urge in most Americans to steep themselves in this summer long ritual. Technically trained announcers like Harold Arlin soon gave way to the professionally paid sportswriter whose familiarity with the players as well as the game made them naturals for the job. It wasn't long before Americans became familiar with the voices of Graham McNamee, Grantland Rice, Andrew White, and "Red" Barber.

There can be no doubt that radio has done more for major league baseball than all the team publicity departments combined since the game's inception. Where once a few tens of thousands enjoyed a single baseball game, now millions

** Pittsburgh won, 8-5, taking three games in a row over Philadelphia. The Pirates would relinquish their lead and settle for a second place finish to the New York Giants at the end of the season. The Giants, in turn, would lose the '21 World Series to the New York Yankees in that team's first of a record 32 World Series appearances.*

either watch through extensive cable and TV networks or listen via the radio. But the beauty of listening is that the medium is nearly perfect for the game. The pace of the game and the cadence of the announcer lets the commuter stuck in traffic, or the jogger on the park path, or the sport fisher out on a quiet lake, enjoy the action.

There can be little doubt as well that it is baseball which has helped save AM medium wave broadcasting in America. The explosion of FM radio in the 1970's made it the musical medium of choice. That left AM to seek other formats. In the past twenty years nothing has succeeded as consistently as sports. With baseball taking up six months of its prime time, AM radio is still a viable business.

Today all twenty-eight major league teams broadcast all home and away games. Many of the minor league teams have radio networks as well. That means that at almost any given summer night in America as many as 1,500 radio stations will be broadcasting a baseball game. Tens of millions will be listening.

And some things just never change. KDKA still broadcasts the Pirates and WGN still carries the Cubs. The accompanying chart lists the flagship stations for all 28 major league teams. Some call signs will be very familiar to AM band DXers. I've included each station's transmitting power to give readers an idea about how easy it might be to tune these stations in.

Baseball has become an international sport in this hemisphere with the addition of Montreal in the National League, the Spanish speaking countries which follow the sport (including Cuba) and the predominantly Spanish speaking neighborhoods of some of America's bigger cities. Table 2 lists baseball's foreign language networks.

Nearly one hundred minor league teams have their own radio networks, too. Most are triple A teams (the highest minor league rank under the major league level) and consist of only one station in the home city. A few of these teams, however, have surprisingly extensive networks. The Pawtucket Red Sox (AAA Boston) boast a seven station network; the Charlotte Knights (AAA Cleveland) have five stations; and the Buffalo Bisons (AAA Pittsburgh) have a seven station line-up for their network.

The Chattanooga Lookouts (AA Cincinnati) have four stations covering two states. The single A Durham Bulls (Atlanta Braves) have five stations covering most of North Carolina. Table 3 is a selected list of minor league teams of interest to baseball fans and DXers alike.

And, finally, try tuning into the only *shortwave* station broadcasting regularly scheduled baseball: CFCX-SW 6005 kHz from Montreal. They carry the English broadcasts of the Montreal Expos.

Table 1: Flagship Stations for Major League Baseball

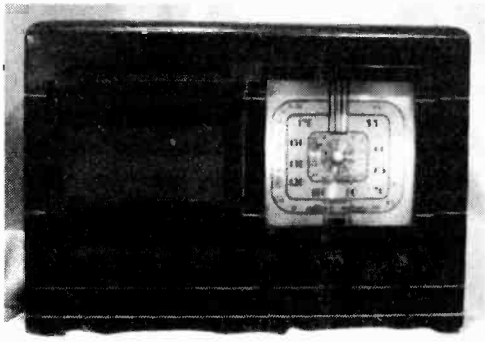
AMERICAN LEAGUE EAST			
BALTIMORE ORIOLES	WBAL-AM	1090	50kW
BOSTON RED SOX	WRKO-AM	680	50kW
CLEVELAND INDIANS	WKNR-AM	1220	50kW
DETROIT TIGERS	WJR-AM 760	50kW	
MILWAUKEE BREWERS	WTMJ-AM	620	5kW
NEW YORK YANKEES	WABC-AM	770	50kW
TORONTO BLUE JAYS	CJCL-AM1430	50kW	
AMERICAN LEAGUE WEST			
CALIFORNIA ANGELS	KMPC-AM	710	50kW (DAY) 10kW (NIGHT)
CHICAGO WHITE SOX	WMAQ-AM	670	50kW
KANSAS CITY ROYALS	WDAF-AM	610	5kW
MINNESOTA TWINS	WCCO-AM	830	50kW
OAKLAND ATHLETICS	KNEW-AM	910	5kW
SEATTLE MARINERS	KIRO-AM710	50kW	
TEXAS RANGERS	WBAP-AM	820	50kW
NATIONAL LEAGUE EAST			
CHICAGO CUBS	WGN-AM720	50kW	
FLORIDA MARLINS	WQAM-AM	560	50kW
MONTREAL EXPOS	CIQC-AM	600	10kW (DAY) 5kW (NIGHT)
NEW YORK METS	WFAN-NY	660	50kW
PHILADELPHIA PHILLIES	WOGL-AM	1210	50kW
PITTSBURGH PIRATES	KDKA-AM	1020	50kW
ST. LOUIS CARDINALS	KMOX-AM	1120	50kW
NATIONAL LEAGUE WEST			
ATLANTA BRAVES	WGST-AM	640	50kW (DAY) 1kW (NIGHT)
CINCINNATI REDS	WLW-AM 700	50kW	
COLORADO ROCKIES	KOA-AM 850	50kW	
HOUSTON ASTROS	KPRC-AM	950	5kW
LOS ANGELES DODGERS	KABC-AM	790	5kW
SAN DIEGO PADRES	KFMB-AM	760	5kW
SAN FRANCISCO GIANTS	KNBR-AM	680	50kW

Table 2: Foreign Language Networks

AMERICAN LEAGUE				
Boston Red Sox Spanish Radio Network	WROL-AM	950	5kW (Day)	
Chicago White Sox Spanish Radio Network	WIND-AM	560	5kW	
Oakland Athletics Spanish Radio Network	KNTA-AM	1430	1kW	
NATIONAL LEAGUE				
Chicago Cubs Spanish Network (Limited Schedule)	WOPA-AM	1200		
Houston Astros Spanish Radio Network				
Harlingen, TX	KGBT-AM	1530	50kW (Day)	10 kW (Night)
Houston, TX	KXYZ-AM	1320	5kW	
Los Angeles Dodgers Spanish Radio Network				
Bakersfield, CA	KCHJ-AM	1010	5kW (Day)	1KW (Night)
Calexico	KICO-AM1490	1kW		
Los Angeles	KWKW-AM	1330	5kW	
Oxnard	KOXR-AM	910	5kW (Day)	1kW (Night)
Great Falls, MT	KMSL-AM	1450		
Las Vegas, NV	KDOL-AM	1280	5kW (Day)	
Silver City, NM	KNFT-AM	950	5kW	
Montreal Expos French Language Network	CKAC-AM	730	50kW	
New York Mets Spanish Language Network	WSKQ-FM	97.9 MHz		

Table 3: Minor Leagues

Birmingham Barons (AA Chicago White Sox)	WAPI-AM 1070
Memphis Chicks (AA Kansas City Royals)	WREC-AM600
El Paso Diablos (AA Milwaukee Brewers)	KHEY-AM 690
Colorado Sky Sox (AAA Colorado Rockies)	KSSS-AM 740
Albuquerque Dukes (AAA L. A. Dodgers)	KKOB-AM 770
Carolina Mudcats (AA Pittsburgh Pirates)	WKIX-AM 850



Ken Reitz

1936 RCA Victor AM-SW radio

Tips On Tuning In

Next time you watch a baseball game on TV, turn off the volume and tune the game in on a radio. You may be surprised at how much more interesting the game can be. Television announcers are truly superfluous. Since you can see what's going on and character generators give you the statistical information you need on screen, there's simply no reason to have two people chatting about tonight's TV line-up or what great restaurants they've eaten at lately. Great radio announcers stick to the game. They are the best way to understand what's happening on the field.

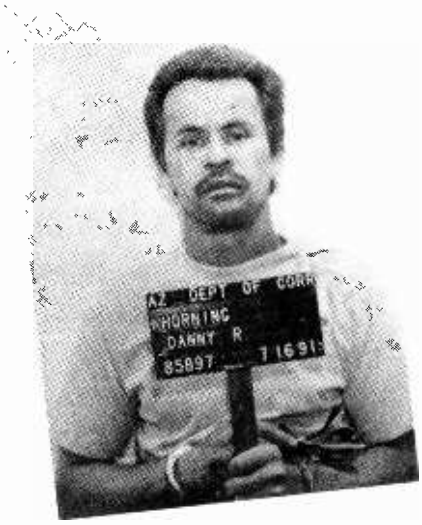
When you go to the ballpark, whether it's a major or minor league affair, don't forget to take a radio. But, don't take your high priced DX portable. In fact, don't take any radio costing over $20. The best ballpark radios are the small, speakerless AM-FM radios with lightweight headphones. Most of these radios will run for months on two AA batteries. Avoid portable radios with speakers (others around you may not appreciate listening with you). I can guarantee that when the crowd is whooping it up you'll never be able to hear the speaker anyway. You'll also find it's a great help to be able to listen to the game as you wander around the ballpark looking for food and something cold to drink.

Tuning in at home may take some work. Everything you've heard about medium wave DXing applies. It's best to use a decent receiver with an outdoor antenna. The main thing is to experiment. I listen to a lot of games on the general coverage receiver built into my amateur radio transceiver attached to an 80 meter dipole at fifty feet. But I get terrific reception using a 1936 RCA Victor multi-band radio using a ten foot piece of wire stretched out behind the sofa. The truly adventurous will want to build a crystal set and simulate the days when radio was young.

Whatever you do, I hope you'll fire up an AM radio this evening and tune around. Red Barber was still heard on public radio until his death this past spring. But if you listen closely, you might imagine you can hear Red calling the second game of the 1935 World Series. MT

Ken Reitz has authored a comprehensive guide to team/station affiliations. For more information, see the description of The Baseball Listener's Guide on page 90.

The Arizona Republic Monday, July 6, 1992 **Fugitive's odyssey is over...**



Manhunt in the Canyon

By Roger Mundy, KQ8C

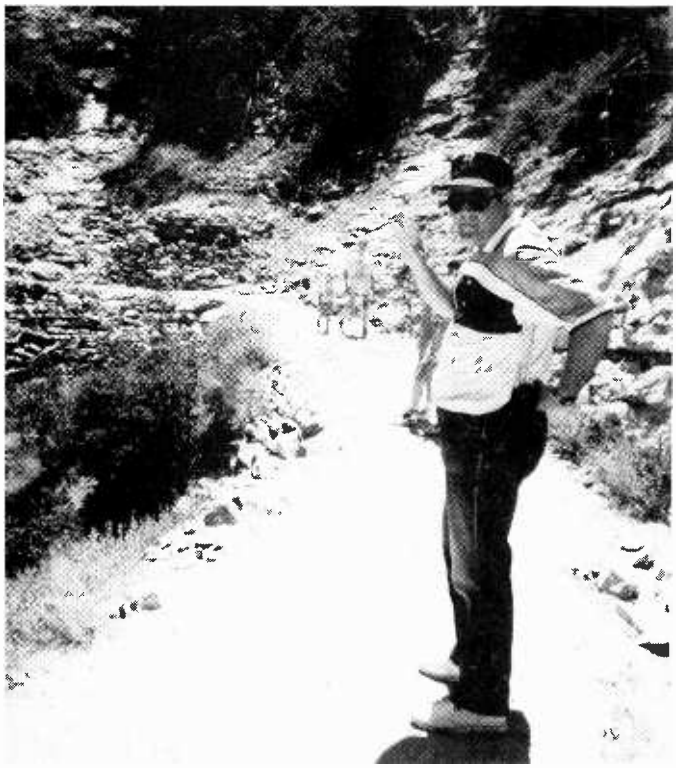
It was early in the morning of July 4th, 1992. We had just arrived at the entrance to the Grand Canyon National Park in anticipation of a fun day with some friends from Missouri. Our friends were renting a cabin about a half mile from the south rim of the canyon.

We were greeted by two park rangers, one of whom was passing out a flyer with a picture and description of a Danny Ray Horning, an escaped fugitive from the Arizona State Prison. He was known to be on the loose in the canyon and was armed and dangerous. Danny was serving four life sentences for first degree murder, armed robbery, kidnapping, aggravated assault, attempted murder, and was accused of killing and dismembering a man in California. In addition, Danny had been trained as a survivalist in the military and, rumors were, he had worked at the canyon for six months and knew the terrain well.

I had the frequency of the ham radio repeater located on the north rim of the canyon programmed into my ICOM 2SRA (147.320 MHz) and offered my help, but the federal officials told me things were well in hand and to report any sightings to the park rangers. Needless to say, I was becoming somewhat apprehensive about this visit.

As I drove past the entrance, I immediately saw a roadblock set up with four police cars and a line of cars waiting to be questioned and searched. Getting in was easy, but getting out would be another story!

We located our friends and headed toward the south rim of the canyon. I used the time to search



Roger Mundy on the path leading to the south rim of the Canyon.

Federal agents with rifles were stationed at strategic positions on the trail. We decided to go shopping instead.

The Grand Canyon — the scene of Danny Ray Horning's last run.

through the federal frequencies, hoping to pick up any information. Two minutes into the search mode the ICOM 2SRA stopped on frequency 168.070 MHz, which was buzzing with chatter and turned out to be the command frequency for the search.

"Sam, this is Jim. We have an open door at the storage facility on canyon rim road; send over the tracking dogs and the dogs that bite," barked the radio. This was going to be an interesting day!

Earlier in the day Danny sent a tourist up from the canyon floor with a message that he would not be taken alive and was going to go out with a bang. Well, it's July 4th, I thought; an appropriate day to go out with a bang, but let's hope he doesn't take any innocent people with him.

"Danny had kidnapped two women and made good his escape..."

We decided to walk down the path leading to the floor of the canyon from the south rim, but not to descend all the way. On the path was stationed an FBI agent dressed in black fatigues searching the canyon with binoculars and carrying a high powered rifle around his neck. That sight turned me around, and I headed back into the village!

The nicest thing about the ICOM 2SRA is that you can monitor one frequency while transmitting on another, so while I was waiting for more action, I heard WB2VVV call CQ on the ham radio repeater. It was Chris from New Jersey who was over on the north ledge of the canyon. It was good to be able to talk to someone on the repeater and know I could get help if needed. Chris told me his car had been searched three times at various roadblocks and we stayed in contact with each other throughout the day.

The radio came alive again, "Jim, this is Doug, we just had a motorcycle turn around and speed back into the park towards the village from the south rim roadblock; apprehend and identify." My heart jumped up into my throat. That's where we were!

The description of the motorcycle and driver were easy to remember—black motorcycle, black helmet, and black clothes. Although I heard the engine, I never saw the cycle. A few minutes later a voice cracked, "Disregard: the cyclist is not our man."

As I walked along taking pictures of the canyon with my camcorder, many people stopped to stare at me as my radio came alive with new sightings. While I am sure they thought I was with the FBI, I was hoping Danny would think the same thing and stay clear of us.

By now it was getting late in the afternoon and finally about 3:30 pm came the call that Danny had kidnapped two women and made good his escape. Danny had passed through the east rim road block posing as a tourist and tied the women up in the woods once he was out of the canyon. Once the women broke loose, they notified the authorities. Meanwhile, Danny cracked up the rental car outside Flagstaff and escaped into the woods.

"Wouldn't you know," I thought. Flagstaff was where I was spending the night!

Danny Ray Horning was captured and taken into custody without resistance at 2:13 am July 5th, after 54 days on the run. At his hearing, Danny stated that was the most attention he had ever received and even offered to come up with the $2 million dollars bail if he could have 24 hours freedom. Not in this lifetime, Danny!

MT

Shortwave Broadcasting

Glenn Hauser
P.O. Box 81874, Albuquerque, NM 87198
Ph. 505-266-9012/FAX 505-237-1042

All times UTC; all frequencies kHz.
**asterisk before/after time signifies station sign-on/sign-off;*
// means parallel; + means continuing but not monitored;
= 2 x indicates 2nd harmonic of following frequency.

ANTARCTICA AFAN's 6012 transmitter not likely to return—trying to reduce impact of HF carrier on experiments! Not needed anyway due to local cable stations at bases (Brent Jones, South Pole, Radio Netherlands *Media Network*)

AUSTRALIA Au. Armed Forces R., 25322.5 SSB at 0920-0950 (B.A. Möller, Germany, *Play-DX*) Now using Royal Au. Navy USB transmitters in Exmouth, Belconnen instead of R. Australia Darwin—original one-hour program of family messages at 0300 on 19037.5, 23678.5, repeated at 0900 on 20418.5, 25322.5, 1200 on 12070.5, 1400 on 13508.5, for forces in Cambodia, Somalia, Pakistan, Sahara; service to continues 12 months even where forces withdrawn (RN*MN*) Also on 10815 at 1400 (S. Aoki & Y. Kato, RJ*MR*)

AUSTRIA *Flash des Ondes*, DX program in French, UT. Suns. 0030 on 6015, 9880 (*DX Daily*)

BOLIVIA R. Ecología Internacional, San Matías, in the "green hell" on the Brazilian border, is new on 4441.3 or 4421.3?, to 0200* (Henrik Klemetz, Colombia, DX Daily)

BULGARIA Home services tested one day 0800-1340 on 17675, 15720 because a western station wants to buy time on this transmitter (Anker Petersen and Finn Krone, Denmark, DSWCI *SW News*) R. Varna programs relayed by Sofia, *Horizons for Youth*, in English heard last Dec. at 1800 on 6235; reply says this will be on 11660 at 2200-0100, and other Varna shows at 0400-1000, 1300-1500 (N. Aoi, R. Japan *Media Roundup*)

CAMBODIA Up from 11938+ to 11939.05 at 1225-1300+ (David Clark, Ont. *Fine Tuning*) V. of Great National Front of Kampuchea, 5408 is very good without drift at 1200-1400* (Victor Goonetilleke, Shri Lanka, RN*MN*) Has added English Thu. only at 0100, 1300 (BBCM)

CAMEROON Enugu, Nigeria has been reported on new 3970; ludicrous to use same frequency so close to Buea. CRTV known to pull news feeds from other stations: heard at 0448 (David Sharp, FL, *DXSF*)

CANADA Alan Maitland is retiring—again—from CBC, probably in late June. The *As It Happens* co-host retired officially 8 years ago at 65, but kept doing the program on contract (Press Report in CIDX *Messenger*) CIQC, 600, Montréal has not changed call of SW relay on 6005 to CIQX as assumed—licence renewal still shows CFCX (Sheldon Harvey, *DX Ontario*) Larry King says he's now heard worldwide on SW, but no details—to keep up with Rush? (*DX Daily*) He is on CFRX, 6070, at 0607-0900 (Tim Hendel, FL) Good coverage for 1 kW, but hardly worldwide; is something bigger brewing? (gh) Northwest SW Relay Company wants to set up SW relays to improve European stations in Western N. America, from existing AM/FM sites in the Victoria to Kelowna area in B.C. Stations interested in being relayed, or in providing site, please contact M. Hackett, VE7MHE, Owner/Operator, NSRC, P.O. Box 395, 720 Sixth St., New Westminster, BC V3L 3C5; phone 605-589-4688 (*DX Daily*) Any connection?—CKNW, 980 heard on 2160.3 USB, not a harmonic, at 1150-1203 (Ed LaCrosse, CA, *DX Daily*) CKNW not aware of it (gh) CKFX Vancouver revival on 6080 delayed 'til late summer or fall, but definite (Jack Wiebe, CKWX C.E. on *DX Daily*)

CHINA CRI was very late in moving up to summer morning frequencies, May 11—15210 at 1200, 11855 at 1300, 1400. Fujian 1 on 4975 with advanced English lesson, Thu. 1350 (Bill Flynn, OR, *DX Daily*)

COLOMBIA R. Koinonia, Greek-named Catholic evangelical unlisted in Manizales on nom. 1590 heard on 3160 ± 6 kHz, FM at 1015-1105 (Henrik Klemetz, Bogotá, *DX Daily*) R. Fascinación, unlisted on AM 1350, heard on 2700 at 2235-2257* abrupt, city unknown (Santiago San Gil, Venezuela, *DX Daily*) R. Buenaventura drifted from 4833 to 4835, irregular at 1104-1130 (Takeshi Sejimo, Japan, *RNM*) Government counter-clandestine El Pueblo Responde is back, 0035-0104+ on 5835, next to guerrillas' Radio Patria Libre, 0105 on 5840, saying instructions would be sent on 7636 USB; and RPL at 1125 very good on 6270 (Santiago San Gil)

CONGO RTVC has weekly English news roundup, Sats. 2202-2216 on 4765, 5985 (RVI *Radio World* via Steven Cline)

COSTA RICA It's been a full-time job for RFPI manager Debra Latham trying to get equipment through customs, such as a new transmission line capable of handling new 30 kW transmitter. The guyed tower 52 meters high was completed in mid-May, 3-element Yagi and rotor for 7 MHz mounted atop it—7375 and 7385 should be stronger. 15030 intermittent depending on antenna work; 13630 antenna badly damaged in storm. To be replaced by log-periodic at night, shared with 21465 daytime (RFPI *Mailbags*, Joe Bernard) See last month for *World of Radio* times; quarterly program changes due July 1.

CROATIA CR, Zagreb replaced 6145 with 5920 in late April (BBCM) English news on 5920, 9830 is at 0604, 0804, 1204, 2104 (*DX-Antwerp* via W. Büschel) And 13830?

CZECHIA R. Ropa Info. satellite service from Germany also testing SW via Czechia, for a few weeks, 5980 at 0300-2300 (RN*MN*) Heard at 0307-0410 on 5980.17, address is P.O. Box 5568, Daun, Germany (Brian Alexander, PA, *DX Daily*)

CHILE R. Esperanza, 6088.5, is only active Chilean, sometimes a clear ID around 0759 (Dan Gartner, ACT, *Australian DX News*) Audible weekends only (Craig Seager, *ibid.*)

ECUADOR HCJB has six different QSL designs still available for almost every year back to 1979, a different theme each year, and several more to 1976. A checklist compiled by Mike Barraclough appeared in World DX Club *Contact*, and presumably can be obtained from HCJB (*World of Radio*) HCJB has made no attempt to fix defective transmitters: 9745 has been putting out a strong hissing noise very night for more than a *year*. Extending from 9725, to 9765; same later from 0500 on 11835, hissing 11815-11855. Can anyone get this message through to them and ask them to stop the interference (Ernie Behr, Ont., *W.O.R.*) A new 100 kW transmitter is expected this summer; ours are in use 90% of the time, VOA's only 50% (*DX Partyline*) *HCJB Today*, UT Mon. July 12 at 0200, provides the inside scoop on HCJB's 500 kW transmitter and its computer controls (*Program Notes*) Programs at 0230 have shifted to 0300, and at 2030 on 21455-USB to 2100, including *DXPL* Sats., UT Suns. (*DXPL*) *Música del Ecuador* is a program in English, but I prefer the original Spanish, and without evangelism by Jorge Zambrano, Fris. 2330-2400 on 15140 (gh) Some slogans monitored: 3350.6, *Cumandá, la estación líder en la Amazonía ecuatoriana*; 4680 harmonic, *R. Central, la radio que trabaja con responsabilidad y sentido vocacional*; 5049.8, Emisoras Jesús del Gran Poder, *voz cristiana en el cielo de América* (Henrik Klemetz, Colombia) 2340 = 2 x 1170 at 0120-0133, R. Central, Riobamba, *la estación de las ideas brillantes* (Yimber H. Gaviria, Colombia, *Play-DX*)

EQUATORIAL GUINEA R. Africa, Sat. until 2315* in English on 7203.32 announcing 7190; another Sat. on 7203 at 2300, Sun. on 7190.47 from 2140 to 2258* as R. East Africa, very strong good signal but sometimes just open carrier (Brian Alexander, PA, *DX Daily*)

FRANCE [& non] RFI added Laotian at 1100, Cambodian at 1200 on 12025 via Irkutsk, Russia (BBCM) *Courrier Technique*, like *Waveguide* on BBC, heard on RFI Sat. 2324; Sun. 1220 on 15365, 2153 on 9495 (Bill Westenhaver, PQ, *DX Daily*) RFI in English to us at 1230-1300 on 17575, 21635, 21645; Africa 1600-1700 on 11705, 11845, 12015, 15330, 17620, 17650, 17795, 17850 (Don Moore, IA, *USENET* via George Thurman)

GEORGIA No trace of English broadcasts as given last month (Tom Sundstrom, NJ, *DX Daily*)

GERMANY Essential languages DW is likely to keep after reductions include German, English, Spanish, Portuguese, Hausa, Swahili, Hindi, Urdu, Chinese, Indonesian, Russian (RN*MN*) [non] DW via Portugal in English to S. Asia at 0200 on 13790 is just as strong as the N. American at 0300 (Malcolm Kaufman, MA, *DX Daily*)

HAWAI'I Applications for SW transmitter operators at KWHR are now being accepted by Joe Hill, WHRI, Box 12, South Bend, IN 46603 (Jeff White, RMI)

HONG KONG Trans World Radio, which has studios here producing programs broadcast from Guam, is being sued by Bishop Rev. Peter Kwon Kong-Kit for $127,900 plus costs for office rent not paid (*S. China Morning Post* via Scott Edwards, CA) Called TWR HQ in NC and faxed article, but no comment—guarding state secrets? (Edwards)

INDIA AIR Lucknow on 3245 ex-3205 at 0025-0200, 1225-1740, opening 3205 for some other AIR station (Supratik Sanatani, *OzDX*) AIR testing new transmitter from Bombay on 10330, 0100-0400, 0700-1100, 1330-1730 with variety program *Vividh Bharati* (Alok Das Gupta, *ADXN*)

INDONESIA VOI in English at 0800-0900 regular but poor on 11752, no parallels (David Norcross, Guam, *DX Daily*) RRI Jakarta at 1102 on 4777.2 up from 4774.5, // 9679.5 (Tsutomu Kito, Japan, *Play-DX*) RRI Jambi 1100-1700* sometimes 4925 or switch to 4927 at 1400 (Kito, *OzDX*)

IRAN VOIRI heard best at 1930 on 15260 until blocked by BBC at 2000 (Norm Blakely, Ont., *W.O.R.*) 9743 perhaps regional outlet at 2030-2050* down from 9745, QRMing VOA in Arabic and no sign of Bahrain (Bob Padula, Victoria, *DX Daily*) [non] V. of Human Rights and Freedom of Iran, cland. on new 15100.05 at *0230 in English weak, // very strong 9350.04 with WCSN gone, fair on 11470.02, mid-May (Brian Alexander, PA, *DX Daily*)

IRAQ Baghdad in English 2100-2300 down to 11805 from 11810, including Spanish, German, French news during last half-hour (Eugene Gebreurs, RVI *Radio World*, via Steven Cline) English news at 2114 strong but co-channel VOA until 2200, totally covered by Moscow after 2230. Next day English heard at 2211 during the clear half-hour. Then moved to 17940 after 2159 with English at 2342-2400 (Alexander, PA, *DX Daily*)

IRELAND R. Stella, 82 Pentland Place, Kirkcaldy, Scotland, runs Sat. 2200 to Sun. 1200 with 20-30 Watts on 7446, 11413, 3945 ex-3910 (Ken Baird, DSWCI *SW News*) Heard Sat. 0800 on 7446 (G. Domina, France, *Play-DX*) Sat. 0645-0835 on 11413.3 (L. Botto Fiora & R. Scaglione, Italy, *ibid.*) Dun Laoghaire Radio, DL-106-FM, on 6226.2 24 hours (G. Domina, *ibid.*) Mon.-Fri. 1600-0100, Fri.-Sun. 0900-0400, 120 watts to 22 meter dipole, 12m above ground; report with one IRC to DLR-106-FM, Dun Laoghaire, Co. Dublin, Ireland (Tommy, Germany, *Play-DX*)

ISRAEL IBA new Director General is Mordechai Kirschenbaum, 45 (*Jerusalem Report* via Daniel Rosenzweig, Fidonet *SW Echo* via George Thurman) Now complain to him about lack of prime-time SW service!

ITALY R. Europe, testing 150 Watts daily on 7410 USB at 2200-0500; reports welcomed, and add $1 if you want a blue & white cloth pennant, c/o Play-DX, Via Davanzati 8, I-20158 Milano, Italy (Alex Bertini)

JAPAN On Mother's Day, R. Japan pre-empted *Media Roundup* without notice for a report on Thai prostitutes in Japan; this also came as a surprise to *MR* staff (*DX Daily*) Due to Golden Week holiday (Bruce MacGibbon, OR, *SW Echo* via Thurman) Oh

JORDAN A SW transmitter is being leased to Iraq for broadcasts to Europe, N. Africa, 3 hours per day (Kuwait News Agency via BBCM) No details

KAZAKHSTAN R. Almáta, English at 1700-1735, 1835-1905 on 17910, 17605, 15270 (RVI *Radio World* via Steven Cline) added 17740, best (*ibid.* later) more, best on 15360, also 17715, 15285, 15155, 11825, 9505 (Wolfgang Büschel, Germany, *DX Daily*) At 2300-2330 on 7255, 5915 (RVI *RW* via Cline)

KENYA KBC in English 0200-2110 on 4935; Swahili 0200 on 6075, 0630 on 7140, 1330-2110 on 6150; Central service weekdays 0300-1100, 1300-1905 on 4915; Eastern service weekdays 0900-1905 on 4885; the last two also relay Swahili irregularly at other times (BBCM)

KIRIBATI RK on 17440 at 0550 music, 0600 BBC news, 0610 local news and commentary, 0620 music (David Norcross, GU, *DX Daily*)

LIBERIA Nigerian ECONOMOG station on 7275 withdrawn, since Kaduna government needed the transmitter (ELBC via BBCM)

LITHUANIA Future of external service is precarious; emigré community could help financially (Gediminas Ilgunas, LRTV chairman, on R. Vilnius via BBCM) Later: can stay on air until August (BBCM)

MONACO R. Monte Carlo, losing money is to be privatized this year by French government, says the Comms. Minister; hope Moroccans don't get it, but Time-Warner and La Cinq interested (HCJB *DXPL*) used by TWR

MONGOLIA RUB on 12015, English Sat. 1200-1230, poor with QRM from China and another, // very weak 11851.11 (Brian Alexander, *DX Daily*)

MOROCCO Initial broadcasts from new VOA relay as early as late June (Dan Ferguson, VOA, NASWA *Journal*)

NETHERLANDS RN features in July: *Mirror Images*, Tues., film frontiers: the cutting edge. *Marks on Mechanics*, Weds., bells, clocks, etc. *Studies in Jazz*, Weds. at alternate times. *Sounds Interesting*, first Sat., dubbing for Disney; first Sat. in August, Just a game?—link between colonialism and sports (via W. Martin, D. Mauer, F. Orcutt, G. Lytle)

NEW ZEALAND Rudi Hill hosts *On the March*, military band music, on RNZI Thu. 0505-0530 on 15120 (*Mailbox*) Kiwi Radio, pirate at Box 1437, Hastings, was regular on Sundays in April on 7445 as early as 0645, as late as 0900, at least 0730-0830 (David Martin, Vic., *OzDX*) Testing to Europe with 250 watts, Suns. around 0600-0800 on AM/SSB (Paul Ormandy, NZ, *Play-DX*)

PAKISTAN R. Pakistan, best in three years on 15555 at 1600-1630 (Norm Blakely, Ont., *DX Daily*) also on 11570, 13590, 15515, 15675, 17725, some vary; at 1700-1800 on 11570, 15550 (Mark Vissers, Belgium, *SW Echo* via Baxter)

PALAU KHBN sked last month contradicted by monitoring: on 9830 from 1200 Chinese, 1402 English, 1431 Vietnamese, 1446 Farsi, 1502-1532* Vietnamese (Ernie Behr, Ont., *DX Daily*) Same 7 days a week? (gh) KHBN plans to add a second transmitter (Arthur Cushen, RNZI *Mailbox*)

PALESTINE [non] Al-Quds Radio complains it is being jammed by Israel, and interference is heard on MW 702, 630; AQR not heard on 5910 or 5990. Advises listeners in Jerusalem to direct radios toward northeast or tune to SW frequencies (BBCM) 5910 heard at 1640, believed from Syria (Björn Fransson, Sweden, *SW Bulletin*)

PERU Best in Europe is R. Visión 2000, 5131.1 at 2345-0459 (D. Monferini, R. Puppo, R. Novarino, W. Mola, Italy; G. Domina, France, *Play-DX*) R. Cajamarca is the station on 4238.1, morning and night. R. Frecuencia VH. 4485.1, put another outlet on 6150.2 to cover Seventh Day Adventist conference in Celendín, daily, second half of May from 2300 (Henrik Klemetz, Colombia, *DX Daily*)

POLAND Polish R. Warsaw in English, 55 mins. ea.: 1200 on 11815, 9525, 7145, 6135; 1500 on 11840, 9525, 7285; 1700 on 9525, 7270; 1930 on 9525, 7285, 7270, 6135; not to us.

PORTUGAL Lisbon's Portuguese service includes English news for 5 minutes Sats. and Suns.: 0820 on 21720, 21655; 0830 on 11975, 9815. Weekday half-hour English: 1430 on 21515, 1800 on 9780, 1900 on 17900, 0130 on 11840, 9705, 9570 (BBCM)

ROMANIA Another country adds SW relays of home service—first program on 7225 from 0147 past 0253 when DW interferes (Bill Westenhaver, PQ, *DX Daily*) It's 2100-0500 on 7225, 9625, 0500-1030 on 11940, 15250, but 7225 heard as late as 0600 (RIAS-DX via Büschel)

RUSSIA RMWS summer schedule has blank blocks daily at 0330, 1930, for R. Aum Shinrikyo, but its own schedule shows still at 0430 and 2030; some R. Moscow programs sked at 2030 actually heard at 9130; and Aum still heard at 2030 by Craig Seager, *ADXN* (*DX Daily*) R. Tsentr heard at 0530 on 12010 (Brian Alexander, PA, *DX Daily*) Then gone from SW for not paying bills (HCJB *DXPL*) Still on, heard next day 1530 on 15185. R. Galaxy, 11880 changed time again to 2100-2200 (Alexander, *DX Daily*) Five former Soviet republics still relayed from Balashikha 20 kW former jammers near Moscow; Azerbaijan 0200-1300 on 7300, 1305-2000 on 15175. Armenia 0200-1455 on 7175, 1500-1900 on 17705. Belarus 0300-1600 on 6150, 1605-2200 on 13645. Kazakhstan 2300-1400 on 9690, 1405-2100 on 6010 and 21490. Ukraine 0000-1400 on 6010, 1405-1900 on 9675 (*Klub DX*, V. of Russia via Anatoly Klepov, *DX Moscow* via *Play-DX*) KNLS, Alaska programs in Chinese at 1200-1400 Fri.-Sun., heard via Russia on 11970 (S. Aoki & Y. Kato, R. Japan *Media Roundup*)

SERBIA R. Yugoslavia still with UN *Bridges of Humanity* program, UT Mon. 0049-0056 on 9580, 11870 (Bill Westenhaver, PQ, *DX Daily*) RY added more English, to Europe 1000 on 9580, 11805 (BBCM) New program to Europe, English at 1400 on 9505 (W. Büschel, Germany) It's domestic relay, different interval signal (Richard Measham, BBCM, RN*MN*) And new 2130 to Australia on 9720 (RVI *Radio World* via Cline)

SEYCHELLES FEBA now in English: 0500-0553 Fris. on 17750; 1500-1555 (Sun. 1558) on 11710; different program 1500-1600 Mon.-Sat. on 9810, 15330 (via Bill Westenhaver, PQ, *DX Daily*)

SHRI LANKA Marconi got $35 million contract for new VOA transmitters, on by late 1994, three for starters (Goonetilleke, RN*MN*)

SLOVAKIA RSI external services are all from transmitters here, whilst R. Prague uses those in both Czechia and Slovakia (Bob Padula, Australia, *DX Daily*)

SOMALIA R. Rajo renamed R. Manta (Today) upon change from U.S. to U.N. control, Somali broadcasts at 0410, 1000, 1300 on 9540, 1600 and 1900 on new 6170 (BBCM) International Amateur Radio Network says it has agreement with Somali government (?) to set up R. Free Somalia, open to all, and to organize ham radio (John Norfolk, OK)

SOUTH AFRICA New J93 schedules: Radio Orion continues on 3320 2300-0300. R. Oranje, 0300-0455 3230, 0500-0625 4875, 0630-0725 5965, 0730-1525 7125, 1530-1725 4875, 1730-2200 3230 (via Bill Westenhaver, PQ, *DX Daily*)

SWEDEN R. Sweden budget cut by one third so from July 1, dropping Spanish, French, and making Swedish relays of home service only (George Wood; *Media-Scan*) [non?] R. Piraña International, with an address in Sweden, active again, often noted Sat. and Sun. evenings on 3917 LSB (Mike Barraclough, England, *Contact*) Other active frequencies: 7415, 12392, 15043 (*Free DX* via *Contact*)

TAIWAN Contrary to reports, VOFC not likely to cease June 30; plans relay via DW to Europe within a year (Jeff White, *DX Daily*) The P.O. Box in San Francisco has been closed; must report direct to Taipei. VOFC has a new announcer, an American, Mike Rothman, co-hosting *Journey into Chinese Culture* with Paula Chao, enlivening the program into the contemporary, focusing on his culture shock, and he also talks about living on the mainland—UT Thu. 0230, 0730, 2230, Fri. 0330. Best audio on the 2200 on 17750, 21720. Also new, *Business Chinese* lessons ending the UT Tue. and Sat. broadcasts, alternating with elementary, intermediate, advanced lessons and pronunciation practice (Bill Westenhaver, PQ, *DX Daily*)

TAJIKISTAN R. Tajikistan, new English to S. Asia, 1645-1700 on 7245, also announced 0345; reception difficult in Europe (BBCM)

THAILAND Second VOA Udorn transmitter tests: 11905 at 1130-1330, 11705 at 1330-1500, 7215 at 1500-1800, all 300°, partly in English (Dan Ferguson, VOA, *USENET* via George Thurman)

TONGA A3Z definitely on 5030 Apr. 15 at 0810 with island music, very weak and noisy and not heard since (Alex Wellner, NSW, *ADXN*) Programs from this station have appeared every few weeks on RNZI's *Presenting the Pacific*, Tue. 0505-0600 on 15120 (gh)

TRISTAN DA CUNHA ZOE ceased SW 3290, now on FM 93.5 only; don't mistake Namibia or PNG on 3290 for this! (Pete Pavarotti, South Africa, RN*MN*)

UAE Abu Dhabi, 2200-2400 in English on 11885, 15305, 15315 (Bill Westenhaver, PQ, *DX Daily*) Dubai summer channels to N. America 0330—11945, 13675, 15400, 17890 (*AMID* via Büschel)

UKOGBANI During July, BBC runs *Sherlock Holmes* stories Thu. 1130, 1715, Fri. 0230 (*BBC Worldwide*)

USA Regarding the remark in June column: the electrical inspector *ruled* the WWCR fire was not electrical; that was not the cause. The station met all local codes (George McClintock, WWCR) **WWCR** resumed broadcasting only 37 days after the fire, May 11 with Gene Scott on 13845, 5935; and 8 days later with everything else on 15685 at 1000-2400, 7435 at 0000-1000 though usually off after 0500 at first. *World of Radio* is back here too at summer timings, Fri. 2115, Sun. 2300, Mon. 1230, Tue. 1130 on 15685; UT Sun. 0305 on 7435. *Spectrum*, new show succeeding *Signals*, UT. Sun. 0335. *Radio Techniques* would be Sun. 2200. Pres. Clinton's *Saturday Radio Talk*, 2232, Sun. 1247 (*W.O.R.*) New building design has room for five transmitters, and numer 3 is again expected in a few weeks (Adam Lock via Gary Bourgois, *Genie*, via Kirk Baxter) W.O.R. also on WHRI 7315, UT Sat. 0030 and 0530—also on 9495, Mon. 0300; see also Costa Rica last month. *DX Daily* off for summer, maybe back in fall.

Not satisfied with neo-Nazi broadcasts only in English, **WRNO** added one in German, Sun. 2100 on 15420, from the "Adolf Hitler of Canada," Ernst Zündel, opposing the German government and its mouthpiece, DW; and picked up Rush Limbaugh live weekdays at 1600-1900. Then a Rush repeat was announced for 2000-2300, supposedly the reason for cancelling *World of Radio* abruptly after 11 years (gh, Westenhaver, Behr) Zündel sounds like something out of Berlin 1940, denies the Holocaust (RN*MN*) We question whether WRNO is operating responsibly in the public interest.

Responding to a remark in your May column: we broadcast the Rosary in the way Chinese recite it, and could hardly be expected to do otherwise. If it sounds "cultish" to American ears, so be it (W. Glen Tapley, WEWN) WEWN activated 3rd transmitter around May 20, and expected the fourth and final 500 kW on a month later (George Jacobs via George Thurman)

Monitor Radio has made major changes in 2nd-hour programming. Schuyler Sackett, presenter of popular *Letterbox* left, replaced by Kim Shippey, and cut from 13 minutes daily to 3. Individual program titles, *Home Forum, Kaleidoscope*, etc., dropped and hour retitled *Monitor Radio Worldwide*—more news and analysis, not as diversified as before; and Fridays' *Encore* is no more (Jim Moats, Ravenna, OH, *DX Daily*)

KTBN, 15590, until now 100% TBN TV net soundtrack, heard with a separate musical radio show, offering QSLs, at 1900-2100 (Fred Waterer, *DX Ontario*) 1800-2000 now?

VOA Somali retimed to 0400-0415 on 6065, 6155, 9775, 9900 (Dan Ferguson, VOA, *SW Echo* via Baxter) So they concluded 0245 *was* too early; which from Botswana? (gh) 6065, 9885 (John Vodenik, VOA Bethany via Diane Mauer, WI) Later changed to 6065, 6155, 9775, 9900, 11805 (VOA on SWL-List via Will Martin)

WRMI Miami delayed by local building permit paperwork; FCC construction permit extended to mid-August, but should be on well before then. Kenntronics corner-reflector antenna expected to arrive in late May; check 9955 (Jeff White, WRMI, *DX Daily*)

VENEZUELA Ecos del Torbes, 9640 and 4980 Tue.-Sat. 0330 has an external service, *Buenas Noches para los Venezolanos en el Exterior*—letters, greetings, folk music. R. Rumbos, 9660 and 4970 Mon.-Sat. 0400-0900 is *Rumbos de Media Noche*, Caribbean music by night people in Venezuela and other countries (Santiago San Gil, Barinas, *DX Daily*) R. Los Andes uses 6010 only for football or bullfights (Jairo Salazar, BDXC *Communication*)

Until the next, best of DX and 73 de Glenn!

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.

0012 UTC on 4600
BOLIVIA: Radio Perla del Acre. Spanish. Frequency quote to local time checks and Latin ballads. (Ed Rausch, Cedar Grove, NJ) Two additional Bolivian's heard as; Radio San Miguel on 4925.5 kHz 0300-0315*, Radio El Mundo on 6015.9 kHz at 1000. Regional type news items, ID and local ads. (Sam Wright, Biloxi, MS)

0020 UTC on 6010
CUBA: Radio Havana. Latin American Newsline topics. (Bob Fraser, Cohasset, MA) Magazine show on travel heard this freq to 0130. National news and *Letterbox* show heard on 9550 kHz at 0215. Cuba's Radio Rebelde heard on 3366 kHz at 0110. (Thomas Banks, Dallas, TX)

0050 UTC on 5950
TAIWAN: Voice of Free China via WYFR, French. Music to talk and time tones 0100. Chinese service at 0100 into instrumental music. WYFR relay heard on 9680 kHz at 0229 with Taiwanese instrumentals to announcer.(Banks, TX) Station heard via T'ai-pei site on 11825 kHz at 0900 in Chinese. (Rausch, NJ)

0105 UTC on 5960
JAPAN: NHK-Radio Japan. Very good signal quality of international news topics on United States, North Korea, South Africa, and Europe. "Tokyo" ID to United Nations update on Bulgarian peacekeepers, Cambodia, and Azerbaijan. (Banks, TX)

0105 UTC 5970
CYPRUS: BBC relay station. Sports report on soccer highlights. Show heard on // 5975 kHz. BBC's Oman relay station audible on 9590 kHz at 0215. News topics from Israel, Ivory Coast, and Pakistan. (Banks, TX)

0110 UTC on 9720
SRI LANKA: SLBC. Lady hostess presents instrumental music program and dedications to listeners. SLBC audible on 15425 kHz at 0120 with pop tunes, IDs and news bits. (Don Taylor, Green Cove Springs, FL)

0121 UTC on 11530
LEBANON: Wings of Hope. Religious programming with listener call-in. Signal monitored past 0500. Station ID at 0501. (Dave Frenz, Milwaukee, WI)

0125 UTC on 5995
UNITED STATES: VOA. Medical transplants update to station ID. *Issues in the News* program. VOA heard on 9455 kHz at 0155 with international news and *Issues in the News* program. VOA promo to 0200*. (Brian Bagwell, St. Louis, MO)

0135 UTC on 6040
GERMANY: Deutsche Welle. National news to Germany's ecology efforts. Deutsche Welle's Rwanda relay heard on 7225 kHz at 0423. African news and *European Magazine.* (Frenz, WI) (Banks, TX)

0145 UTC on 4409
BOLIVIA: Radio Eco. Spanish. "Eco" ID at tune-in. Latin vocals and ballads to canned frequency/ID announcement. Bolivia's Radio Frontera heard on 4450 kHz at 0940. IDs included with local news items and regional music. (Jerry Wilkins, Denver, CO)

0145 UTC on 6724.3
PERU: Radio Satelite. Spanish. "Futbol" match to 0200 time check. Peru's Radio Horizonte tentatively ID'd on 4505 kHz at 0400. Tough signal copy amid static crashes. Programming included a Spanish radio opera. (Rausch, NJ)

0145 UTC on 11800
ITALY: RTV-Italiana. Closing bits of pop music vocals. Station ID and program news for fair signal. (Wilkins, CO) Italy's IRRS (Italian Radio Relay Service) monitored on 7125 kHz at 0200. News and IDs to UN feature, *Women in the Caribbean.* (Rausch, NJ)

0150 UTC on 4755
BRAZIL: Radio Educacao Rural. Portuguese. Station ID to time check and US/Brazilian pop vocals. Brazil's Radio Nacional Brasilia noted on 15445 kHz with *1155. English programming of IS, IDs, and feature of life in Brazil. (Wilkins, CO) (Wright, MS)

0200 UTC on 9475
EGYPT: Radio Cairo. Fanfare instrumental to 0205. Program on the history of the Islamic world and the Holy Koran. Station audible on 9850 at 0250 in Arabic, and 9900 at 0255 with Arabic IDs, music and news at 0300. Call to prayer noted on 9900 kHz at 2235.(Frank Hillton, Charleston, SC)

0245 UTC on 9755
CANADA: Radio Canada Intl. Discussion on cultural differences between Russians and French Canadians. (Bagwell, MO)

0245 UTC on 9800
FRANCE: Radio France Intl. French. Instrumentals to ID and featured interviews. (Banks, TX) Station heard at 2055 on 12350 kHz. Interval signal to 2100 sign-on. Frequency possibly the first harmonic of 6175 kHz? If not, what are they doing on maritime simplex frequency? (Rausch, NJ)

0253 UTC on 9880
RUSSIA: Radio Moscow. Spanish service with announcer duo to music. // 9870 kHz. (Hillton, SC) Additional Radio Moscow monitoring; 2128 on 9820 kHz, 2153 on 15355 kHz. (Fraser, MA)

0345 UTC on 4800
LESOTHO: Radio Lesotho. Sesotho. Station ID and announcer program news. BBC Lesotho relay audible but very weak on 3255 kHz at 0330. (Rausch, NJ)

0345 UTC on 4820
HONDURAS: La Voz Evangelica. Spanish. Religious programming, fair signal. US/Honduran addresses. Anthem to 0355*. (Louis Metzman, Cupertino, CA) Luz y Vida on 3250 kHz at 0350 with ID and religious music. (GVH)

0356 UTC on 11830
ROMANIA: Radio Romania Intl. Regional news and commentary on the Balkans. ID and comments on station's listener club. (Frenz, WI)

0428 UTC on 3230
PERU: Radio Sol de los Andes. Spanish. Multilingual Latin pops to ID. Peru's Radio San Martin audible on 4810 kHz at 0937, with station IDs and info, to Peruvian huaynos music. (Rausch,NJ)

0430 UTC on 9165
SUDAN: Radio Sudan. Indigenous. Regional music, time pips, march music to "Radio Sudan." Long discourse by male announcer. (Jerry Witham, Keaau, HI) Tentative ID on station on 7200 kHz at 0345 with Arabic music. (GVH)

0510 UTC on 21700
UNITED ARAB EMIRATES: UAE Radio-Dubai. African news update and editorial comments. Local weather forecast to ID. Weak signal observed. (Witham, HI) UAE's Radio Abu Dhabi noted on 11710 kHz at 2215. *Poets of Arabia* featuring the works of II Asha. (Fraser, MA)

0515 UTC on 17840
CANADA: Canadian Forces Network Radio via RCI. News and info about the military, concluding with a humorous ditty to the tune of "Home, Home on the Range." ID to French service. (Witham, HI)

0536 UTC on 7255
NIGERIA: Voice of Nigeria. Great signal. Features, IDs, music, and public service announcements. (Charles Link, Kissimmee, FL) Radio Nigeria-Enuga heard on 3970 kHz at 0515. Radio Nigeria ID given during international news topics. Radio Nigeria at 0615 on 4770 kHz with news, and ID. (Wright, MS)

0550 UTC on 3316
SIERRA LEONE: SLBS. Carrier audible to 0555 sign-on. English greetings to morning prayer. World news at 0600. (Frenz, WI)

0628 UTC on 4815
BURKINA FASO: Radio Burkina. French. African music show to intermittent ID breaks. Monitored to fade at 0700. (Frenz, WI)

0630 UTC on 9700
NEW ZEALAND: Radio NZ Intl. Special early frequency switch for rugby coverage. IS to ID and community service announcements. Lite pops to resumed rugby match. (Rausch, NJ)

1015 UTC on 4753.4
INDONESIA: RRI-Ujang Padang. Indonesian. Interval signal at 1100 into national news and features. (Rausch, NJ) Indo's RRI-Kendari heard on 3996 kHz at 1625. Radio drama to Indonesian music at 1630. Drastic format change to western-style vocals at 1635 to fade-out 1650. (Witham, HI)

1100 UTC on 11820
THAILAND: VOA Relay. Interval signal to ID and program in Mandarin Chinese. (Rausch, NJ) Radio Thailand heard on 9655 kHz at 1210 with newscast and local updates. (Taylor, FL) (Bagwell, MO)

1100 UTC on 9977
NORTH KOREA: Radio Pyongyang. National anthem to program previews and news. Featured revolutionary songs. (Rausch, NJ) Arabic service noted on 6540 kHz at 1758. Interval signal with ID, anthem and 1800 sign-on. News topics from African nations. (Witham, HI)

1200 UTC on 9655
CHINA: Radio China Intl. Very poor signal, with not much audible past the interval signal. (Fraser, MA) Russian service heard on 7780 kHz at 1757. ID noted as, "Radio Chakai." News and music at 1800. Station feeder heard on 8260 USB at 1820 in Chinese. (Witham, HI) IS to ID on 7435 kHz at 2200 in presumed Portuguese. Asian music and features to 2226*. (Rausch, NJ)

1840 UTC on 7180
SWAZILAND: TWR. Interval signal to English ID. Religious programming to Portuguese service at 1845. (Witham, HI)

2242 UTC on 4649
BOLIVIA: Radio Santa Ana. Spanish. ID and local time check to regional news items. Bolivia's Radio Difusora Tropico. Santa Maria prayers heard in Spanish on 4549.4 kHz at 2350. Hymns and ID to 0030*. (Rausch, NJ) *Ed, is this a frequency shift from 4552.5 kHz?*

2315 UTC on 4765
CONGO: RTV-Congolaise. French. Afro reggae tunes in English/French. Station ID to anthem and 2358*. (Rausch, NJ)

2325 UTC on 5770
NICARAGUA: Radio Miskut. Spanish. Frequency and location announcements to Latin pops. Announcer welcomed reports (but gave no address). Station heard as early as 2200-0200. 5970 kHz in *WRTH* and *Passport.* (Rausch, NJ)

IS = Interval Signal

Utility World

Larry Van Horn
c/o MT, P.O. Box 98
Brasstown, NC 28902

The Goldwing System

If you are an avid HF (High Frequency) listener you have probably come across the HF Goldwing system used by the Military Intelligence Corps of the United States Army and Air Force. Goldwing is simply a portable, low power, encrypted, synchronous data system that supplements the otherwise sophisticated communications systems used by Military Intelligence units.

Each Goldwing station consists of a portable "HF Flyaway Transceiver" which is limited to a 10 and 125 watt setting with no linear amplifier, and is self contained in its own aluminum carrying case. The Plantronics 1280A modem supplies the synchronous data normally at 600 baud, but may be adjusted to accommodate band conditions at any time. The data is then sent to the KG-84A Encryption/Decryption device (which, incidentally, is the replacement for the outdated KW-7). This device provides encryption/decryption capabilities to more Department of Defense communications than any other system.

A typical Grid Laptop PC with the accompanying Goldwing software (hence the system name) acts as the Input/Output device for the composing, editing, addressing, receiving, etc... of message traffic.

The network is very similar to that of a packet net in that each station has its own selcall (called a "node") such as Goldwing (000) through (999). Only stations specifically addressed to receive a message transmission will respond. The data is recognizable by its high pitched "preamble" of two or three tones, followed by the message at high speed even by HF standards (usually 600 baud). The message transmission sounds like a "scrrraaaatch," which is then answered back by the receiver for validation or for repeat requests. Generally, when a net assembles on a particular frequency you will hear the substations calling each other by node in plain (non-secure) voice.

So, if you are ever monitoring the HF bands (normally the military allocations between 3 and 10 MHz/USB), and you hear... "Zero Zero One - this is Zero Zero Seven, radio check, over"... then a series of high speed scratching back and forth, you will know exactly what it is: a Goldwing net on the air!

Many thanks to GI Joe for passing this information on to me via the Grove Enterprises BBS. If you have a computer modem and you haven't joined in on the fun, then be sure to check in on the Grove Enterprises BBS. Now that I am full time in B-town, I expect to be a great deal more active in the months to come.

Loggings and content for this column can be left as E-mail for me, upload files or messages to the Utility World section of the BBS. Telephone numbers for the BBS can be found in this issue of *Monitoring Times* and the Grove Catalog. You can also reach me via the Genie system at my personal mailbox L.VANHORN1.

Blue Angels Flying High!

It's that time of year again and the Blue Angels are in the air thrilling thousands to get aerial demonstrations. (In spite of rumors that the team is grounded due to the Tailhook investigation, we have had no verification that any shows have been cancelled.) It's great to go to the air show and enjoy the high flying performance of this precision flight demonstration team and their F/A-18 Hornet aircraft. Most all of us take our scanners to these air shows to enjoy monitoring the teams UHF Air-to-Air and Air to Ground communications. What you may not realize, is that a valuable member of the Blue Angels can be heard from time to time on HF.

Yes sir, Fat Albert, the C-130 aircraft that transports the Blue Angel ground maintenance team and spare parts, can be heard occasionally on the USAF Global HF System (GHFS) communicating via phone patch with NAS (Naval Air Station) Pensacola (home of the Blues) and various air show sites. Check for possible activity one or two days prior to a scheduled air show for possible Fat Albert radio activity on these regular GHFS channels: 4725, 6738, 8967, 8993, 11176, 13201, 15015 and 17975.

To aid those of you who might want to attend a Blue Angel show or look for possible Fat Albert activity on HF, I have enclosed the remainder of the 1993 Blue Angel Air Show season schedule below.

July 1993		**September 1993**	
3 & 4	Elmira, NY	4 & 6	Cleveland, OH
10 & 11	Whiting Field NAS, near Milton, FL	11 & 12	Oceana NAS, near Virginia Beach, VA
17 & 18	Hibbing, MN	18 & 19	Reese AFB, near Lubbock, TX
24 & 25	Offutt AFB, just south of Omaha, NE	25 & 26	Lafayette, LA
31	Seattle, WA	**October 1993**	
August 1993		2 & 3	Cecil Field NAS, just west of Jacksonville, FL
1	Seattle, WA	9	San Francisco, CA
7 & 8	Eugene, OR	16 & 17	Barbers Point NAS, HI
14 & 15	Miramar NAS, just north of San Diego, CA	24	Point Mugu NAS, CA
21 & 22	Avoca, PA	30 & 31	El Paso, TX
28 & 29	Malmstrom AFB, near Great Falls, MT	**November 1993**	
		6 & 7	Dallas NAS, TX
		12 & 13	Pensacola NAS, FL

German Ute Callsigns

In the January issue of Ute World, I discussed the DFU callsign series in Germany. According to Michael Marten in Germany, these callsigns have been deleted. They had been designated to the Usingen transmitter plant from Deutsche Bundespost Telekom for HF communications.

Usingen, 15 miles north of Frankfurt, ceased all operations on shortwave a little over two years ago. It is now the largest satellite earth station in Germany. According to Michael, there is no longer any antenna or transmitter for shortwave at Usingen.

Usingen belongs to the so-called Funkamt Frankfurt. International Telecommunications Union (ITU) listings also give transmitter locations in Bonames and Eschborn, which are both suburbs of Frankfurt. The equipment at these two sites have been out of service for more than ten years. For the time being in Germany, the only site for HF communications is in Elmshorn, ten miles west of Frankfurt in the northern part of Germany. The callsigns at Elmshorn all start with the DG-prefixes. For example, here is a breakdown of the callsign DGU20HD:

DG	Elmshorn site
U20	Frequency Family
H3	Frequency Offset (H means High, L means Low; so H3 is 3 kHz above the nominal U20 center frequency; L2 would be 2 kHz below the designated frequency).

Under the German system, when a shortwave transmitter has two or more simultaneously transmitted subchannels, every transmission channel can be identified by breaking down its callsign.

Two New LDOC Stations on the Air!

Michael Marten has also sent in some information this month on two new Long Distance Operational Control (LDOC) stations in the United Kingdom: Monarch and Britannia Operations. Both of these LDOC stations have established their own HF facilities at Luton Airport near London. Prior to the establishment of their own stations, Portishead Aeradio managed the traffic for these companies. Frequencies to watch for activity include: 6556.0, 10021.0 and 11363.0 kHz. According to Michael most of the activity involving these two companies will be heard on their 11 MHz frequencies.

These two LDOC stations do QSL, and the addresses are as follows:

• Britannia Airways Ltd., Britannia House, London Luton Airport, Bedfordshire, England LU2 9ND, Attn: Ian Forsdike, Passenger Relations Officer.

• Monarch Airlines Ltd., London Luton Airport, Bedfordshire, England, LU2 9NU, Attn: K.J.Brooker, Operations Superintendent.

I would like to thank Michael for this interesting information. Be sure to check in with us often, Michael.

An Important New FAX Frequency?

Robert Hall, our South Africa reporter, checks in with some interesting information on new FAX activity from his monitoring post.

In recent weeks, Robert has been picking up some excellent FAX charts on 17443.7 kHz USB, using 120 rpm drum speed and 576 IOC. Transmissions are frequent through the day and come in strongly in Capetown although there is QRM from Nairobi Meteo RTTY signals on 17442.0. FAX signals also emanate from Nairobi, which has now become a "Regional Meteo Centre" with links to Offenbach and Bracknell (and rebroadcasts from both).

The FAX charts cover a wide area; some stretch from north of Norway to south of Capetown, taking in all of Europe and the African Continent. The emphasis is on East Africa and the Middle East, including Iran and most of India. These new FAX and Meteo frequencies are not listed in the *Confidential Frequency List* (CFL) or the latest Klingenfuss Utility Guides.

As a footnote to the above, Robert says that during March/April of last year, he received good FAX signals from SAAM Molodezhnaya and USN Diego Garcia (on 20310.0). He notes that this year he has not received transmissions from either site, although Diego Garcia still transmits on 20300.0 kHz USB.

Aero USB — An Experiment.

Robert has also passed on some interesting experiments he has done regarding aero reception with his current receiver/antenna setup. Here is that report:

"I recently conducted an experiment which might be of interest to Utility World readers. It really was a comparison of reception using three different antennas and two different filters with my two Icom-71E receivers. I selected the frequency 10066.0 kHz because of the very short and long range of some of the transmissions. I would tune into this frequency for three hours each evening (South African time) when one could always find heavy traffic.

"ICOM number one had the very expensive FL-44A filter installed especially to improve the quality of USB reception. The receiver was connected to both a 25 meter long wire antenna with a magnetic balun and a ZSRX vertical whip. This setup was purchased in my tender DXing years at the advice of the chairman of the South African DX Club.

"ICOM number two had the standard R71 cheapie ceramic filter connected up to a homebrew 60 meter closed delta loop antenna mounted horizontally 1.5 meters above the rooftop of my shack, costing next to nothing to build.

"The results...the cheapie number two outfit won this listening contest hands down!"

Thanks for the insight and report, Robert. It is always nice to hear from you in these pages.

Red Cross Geneva Frequencies.

In many international crises and disasters the International Red Cross can be found on the air as a major player. Recently the *Radio Monitors Newsletter of Maryland* listed the following radioteletype frequencies often used in the international headquarters of the Red Cross transmissions. Look for data transmissions using the SITOR-A mode on:

6899.0	13915.0	13966.5	13973.0	13998.0	14375.0	20735.0
20753.0	20754.3	20818.0	20939.0	20996.5	27702.5	27999.3

The same newsletter also lists frequencies for the Medical Advisory System (MAS) based out of Ownings Mills, MD. This outfit provides medical assistance to marine vessels at sea 24 hours a day. Look for USB and SITOR-A transmissions on the following frequencies:

4893.0 7952.0 12327.0 16450.0 16590.2 22722.0

Thanks to the *RMNM* for the above material.

Testing, testing, one, two, three...

I recently received a nice letter from Mike Carroll in regard to a question I ran in the Feb. '93 logging section under 9950 kHz.

Mike clarifies that the *USS San Diego* is conducting long-haul HF connectivity checks with Naval Sea Support Facility Charleston (NAVSEASUPFAC Chas, or in the clear, "SEASUP Charleston"), a civilian technical station.

These tests are required to be conducted in the clear, with immediate reception reports of signal strength, clarity and interference. Mike suggests this is an excellent opportunity for listeners to QSL some Navy ships.

That particular logging indicated that the *USS San Diego* was completing scheduled shipyard maintenance and was preparing to reenter service. *San Diego* has twenty-three years of service and steam propulsion—both strong arguments for decommissioning under the current fleet reduction environment in the Navy today, says Mike. Thanks for the update, Mike.

Mike also passed on his favorite Navy frequency for monitoring: the US Coast Guard OPBAT/Navy Atlantic Anti-Submarine Warfare reporting and control frequency of 11190 kHz. Mike says you can hear a daily rollcall of Gulf of Mexico shipping on this frequency.

FDLE Frequencies.

John Fulford, down in Florida, sent in a nice list of frequencies assigned to the Florida Department of Law Enforcement (FDLE). Some clear voice may be heard on these frequencies, but all data is encrypted packet.

FL Dept. of Law Enforcement (freqs kHz):

5356.0	5364.0	5767.0	6782.0	6884.0	7318.0	7416.0
7650.0	9080.0	9245.0	9415.0	11422.0	11469.0	11642.0

Stations (incomplete):

WNQD777	Jacksonville, FL
WNQD776	Miami, FL
WNQD775	Tallahassee, FL, plus several mobiles.

Thanks, John, for the info and if anyone else has information to add about this network, feel free to contact me at the address in the masthead.

Well, that about does it for this month. Now it is time to check out what you have been hearing from the world of utility band listening—our monthly loggings section.

Utility World

Utility Loggings

Abbreviations used in this column

AB	Air Base	LSB	Lower Side Band
AFB	Air Force Base	MARS	Military Affiliate Radio System
AM	Amplitude Modulation		
ARQ	Synchronous transmission and automatic repetition teleprinter system	Meteo	Meteorology
		MFA	Ministry of Foreign Affairs
ARQ-M2	Multiplex ARQ teleprinter system with two data channels	M/V	Motor Vessel
		NA	Noticias Argentinas
		Net	Network
CAP	Civil Air Patrol	Ops	Operations
CCG	Canadian Coast Guard	PLO	Palestine Liberation Organization
CF	Canadian Forces		
CG	Coast Guard	RFE	Radio Free Europe
CQ	General Call for any Station	RTTY	Radioteletype
CW	Continuous Wave (Morse Code)	SAM	Special Air Mission
		Selcal	Selective Calling
FAA	Federal Aviation Administration	SITOR-A	Simplex teleprinting over radio system
FAF	French Air Force	UNHCR	United Nations High Commission on Refugees
Fax	Facsimile		
FEC	Forward Error Correction teleprinter system	Unid	Unidentified
		USB	Upper Side Band
FEC-A/192	One Way traffic FEC teleprinter system	US	United States
		USAF	United States Air Force
FSK	Frequency Shift Keying	USCG	United States Coast Guard
F/V	Fishing Vessels		
GHFS	Global HF System	USCGC	United States Coast Guard Cutter
HF	High Frequency		
ID	Identification	USN	United States Navy
ISB	Independent Side Band	USNS	United States Navy Ship
LDOC	Long Distance Operational Control	Wefax	Weather facsimile

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

2638.0 USCG Woods Hole, MA, working *F/V Orion* with a sick person on board at 0304 in USB. (Mark Janacek-Summit, NJ)

2670.0 *USCGC Tamaroa* working Woods Hole about the *F/V Orion* in USB at 0343. (Janacek-NJ)

3109.0 T5M and E6V, sounded like British military with position of convoy *Commodore* in USB at 0515. (J.Metcalfe-KY)

3291.6 Spanish female 5-digit number station in AM at 0403. (Fernandez-MA)

3840.3 LRO23-NA Buenos Aires, Argentina, with Spanish weather using 75 baud RTTY. (Robert Hall-RSA)

4015.0 US Army MARS: AE1AM-Somalia working USAF MARS AE1USA-Lohnsfield, Germany, at 1716. AE1BPM-Baumholder checking mail box for active messages at 1722. AE1FGT-Hanau working AE1SR at 1725. AEM1US-US Army MARS Heidelberg working AE1USA at 1836, all using 300 baud packet. (Boender-Netherlands)

4017.0 Kilo Mike/Victor/Tango working "Control" in USB or 75 baud RTTY at 0005. (Gary Inman-Knoxville, TN) Same bunch in USB at 0345. (Mike Comer-Titusville, FL)

4265.0 PPL-Belem Radio, Brazil, with V CW marker at 0427. (Dettmann-IL)

4463.0 Israeli Mossad English female with 5-digit numbers in AM at 0208. (Fernandez-MA)

4469.0 CAP Red Star, Georgia, working net in USB at 0235. (Dettmann-IL)

4610.5 Gulf of Mexico Oil rigs with activity reports of last 24 hours in USB at 1041. (Ed Rausch-Cedar Grove, NJ)

4721.0 Quebec looking for Ping Pong. Also heard Whiskey, Hotel, Echo, Delta, Foxtrot Tango, Kilo and Papa in USB at 0250. (Jeffrey L. Jones-Tracy, CA)

4780.0 KPA2-Israeli Mossad number station in AM at 0215. (Fernandez-MA)

4880.0 Israeli Mossad English female 5-digit numbers in AM at 0404. (Fernandez-MA)

5000.0 YVTO-Caracas, Venezuela, time station with time pips in AM at 0245.(Jones-CA)

5080.0 Plead Control-Pt. Mugu, CA, coordinating missile tracking and recovery in USB at 1640. (Jones-CA)

5091.0 Israeli Mossad English female 5-digit numbers in AM at 0406. (Fernandez-MA)

5310.0 Numerous units of the UNHCR Naval Operations force off the old Yugoslavia enforcing the UN sanctions against Serbia in USB at various times from 2045-0146. (Boender-Netherlands)

5320.0 Ft. Macon working *USCGC Staten Island* in USB at 1100. (Harry Riddell-Rochester, NY)

5350.0 Space Shuttle mission audio in USB at 0306. (Jeff Haverlah-Humble, TX)

5437.0 ANR2-Israeli Mossad English female 5-digit numbers in AM at 0416. (Fernandez-MA)

5511.0 4XO-Israeli Navy Haifa with V CW marker at 2356. (Janacek-NJ)

5604.0 Rainbow Radio, Canada, with a phone patch for Delta flight 80 concerning a passenger having stomach pains in USB at 0022. (Jim Henderson-Wilmington, DE)

5610.5 Several fisherman using foul language in USB at 0140. (Bob Pettengill-Blanchard, OK)

5696.0 CG Group San Diego working *USCGC Point Stuart* at 0206. *USCGC Citrus* working *USCGC Point Stuart* at 0212. (Gordon Levine-Anaheim, CA)

5800.0 Commercial fisherman in USB at 0325. These guys talked for hours non-stop. I began to wonder if maybe the military hired them to check out the HF equipment. (Jones-CA) *How did you find that out, Jeff, it was supposed to be a secret, Hi-Larry.*

5805.0 French military net, call signs heard include FAM10/18/20 with exercise messages in USB at 0712. (Robin Hood-UK)

5820.0 Israeli Mossad English female 5-digit numbers in AM at 0425. (Fernandez-MA)

5973.5 Zeppelin One working Bad Boy at 0022 in USB. (Gerald Brookman-Kenai, AK)

6224.0 WQX682-Wynne, AR, working *M/V Harriett Ann* in USB at 1435. WHX672-Brownsville, TX, working *M/V Southern Cross* in USB at 1340. WDC-Greenville, MS, working *M/V Miss Dixie* in USB at 1359. (Neal Perdue-Madison, AL)

6351.5 P2M-Port Moresby Radio, Papua New Guinea, with DE CW marker at 0911. (Dix-NY)

6357.0 EBA-Spanish Navy Madrid with coded RTTY messages at 0154. (Boender)

6376.0 WCC-Chatham Radio, MA, USA with V CW marker at 0148. (Boender)

6510.0 YUS-Split Radio, Serbia, with female voice marker in USB at 2350. (Eugene Lish-Seminole, FL)

6444.0 SVD3-Athens Radio, Greece, with DE CW marker at 0116. (Boender)

6483.0 UFB-Odessa Radio, Ukraine, with CW traffic list at 0234. (Boender)

6513.0 Unidentified station in USB at 2220 with weather for the Grand Banks and offshore. Also heard on 4408.0, 8785.0, 13113.0. (Bob Fraser-Cohasset, MA) *Probably VCS-CCG Halifax, Bob-Larry.*

6636.0 Paris LDOC, France, working an unid Air France plane with selcal check in USB at 0047. (Boender)

6681.0 Pirate Ute stations in France, Belgium, Italy and Luxembourg using 300 baud packet and what appears to be a BBS at 1020. Noted information on propagation, beacon and satellite news. (Boender)

6682.0 DAN-Norddeich Radio, Germany, with CW ID and SITOR-A idling at 2135. Strange frequency. (Boender) *Yep, sure is, Ary. Don't really understand this one-Larry.*

6683.0 Andrews AFB on F-118 working Funfare with radio check for data transmit. Said to use F-375 for voice in USB at 0240. (Jones-CA)

6735.0 Briney 1/2/3 working unid station in USB at 0337. (Haverlah-TX)

6756.0 Andrews AFB on F-380 working SAM 683 at 0100 in USB. (Jones-CA)

6798.0 FDY-FAF Orleans, France, with 50 baud RTTY RY's at 1657. (Boender)

6812.0 Andrews on F-888 working Air Force 2 at 0317 in USB. (Jones-CA)

6817.0 Sam Control working Sam 970 in USB at 0125. They needed a CADC card due to bad one on board. (Pettengill-OK) Andrews AFB on F-064 working SAM 205 in USB at 2340. (Jones-CA)

6836.0 Unid station sending 5-digit numbers in CW at 2044. (Boender)

7535.0 Norfolk SESEF testing transmitters with USNS Bighorn at 1350 in USB. Tests in USB, LSB, ISB, CW, and AM modes. Bighorn advised FSK generator not working. (Rausch-NJ)

7536.5 Alpha 55 working Alpha 1 in USB at 1642. (Richard Baker-Austintown, OH)

7552.0 Bulldog calling Warrior Ops in USB at 1244. (Metcalfe-KY)

7605.0 VLB2-Israeli Mossad number station in Am at 0145 and 0449. (Fernandez-MA)

7655.0 English female 3/2-digit number station in AM at 2115. (H.R.Dutcher-Brooklyn, NY)

7700.0 Muskie 63 to Muskie 62 advised he was going to 11176.0 for a phone patch in USB at 2314. (Jones-CA)

8031.0 UNHCR Belgrade with a message to UNHCR Zagreb using SITOR-A at 0754. (Robin Hood-UK)

8086.0 Reach 9365 working Andrews AFB with phone patch to Metro for

MacDill weather at 2325 in USB. Believe this is F-736 but not confirmed. (Jones-CA)

8294.0 WJK-Miami, FL, working *M/V Port Everglades* in USB at 1503. (Perdue-AL)

8297.0 Fisherman talking about repair list to boats in USB at 2350. (Pettengill-OK) WPK-Port Canaveral, FL, working *M/V Juliet* ? in USB at 1400. KYY895-Lafayette, LA, working *M/V Santa Lucas* then changed frequency to 6227.0 and worked *M/V Bordeleaux* (*my Cajun bretheren*) in USB at 1603. (Perdue-AL)

8461.0 CBA-Antofagasta Radio, Chile, with CW CQ marker at 0133. (Dix-NY)

8475.0 UID/UID2-Unidentified station with V CW marker at 1031. (Dix-NY) *Anybody have an idea on this one?-Larry.*

8616.4 LYL-Klaipeda Radio, Lithuania, with CW CQ marker at 2129. (Dix-NY)

8694.0 4XO-Haifa Radio, Israel, with CQ CW marker at 2119. (Boender)

8722.0 SVN-Athens Radio, Greece, with voice marker in USB at 0125. (Baker-OH)

8737.0 ZLW-Wellington Radio, New Zealand, working phone patch traffic with vessel *Majorca* at 0737 in USB. (Rausch-NJ)

8740.0 SVN43-Athens Radio, Greece, with male voice marker in USB at 0125.(Lish-FL) 8746.0 JBO-Tokyo Marine Radio, Japan, with traffic list in USB at 1028. (Rausch-NJ)

8749.0 TAN-Istanbul Radio, Turkey, working a vessel in USB at 0320. (Baker-OH)

8764.0 8PO-Barbadoes Radio with phone patch traffic in USB at 0040. (Lish-FL)

8773.0 SVN47-Athens Radio, Greece, with female voice marker in USB at 0130. (Lish-FL)

9014.0 Ouzo 11 calling Raymond 7 with phone patch request for Raymond 37 in USB at 1715. (Haverlah-TX)

9017.0 Thrasher working Weede Patch at 2317 in USB. (Jones-CA)

9018.0 Shadow 92 working 93 coordinating some sort of search, said was checking Charlie 6 in USB at 0050. (Jones-CA)

9023.0 Trenton and Edmonton Military Canada working Sidecar with phone patch to Yeager (Luke AFB) in USB at 1230. (Haverlah-TX)

9027.0 Unid aircraft calling for unid USAF GHFS station in USB at 0528. (Haverlah-TX) *Interesting, Jeff, looks like it is still in use-Larry.*

9150.0 RCH73-Tashkent Meteo, CIS, with poor fax chart at 1840. (Hall-RSA)

9193.0 BAA23-Beijing Meteo, China, with 50 baud RTTY at 1835. (Hall-RSA)

9228.3 RXO70-Khabarovsk Meteo, CIS, with fax weather chart at 1833. (Hall-RSA)

9292.2 5DTQ working 73DC, 23KK, BY9T and 6FVA with radio checks at 1125 in LSB. Also active next day. My strange log for the month. (Riddell-NY) *Yep, I agree, anyone want to take a stab at this?-Larry.*

9318.5 Unidentified fax station with Fax from Naval Eastern Oceanography-Norfolk, VA/Keflavik/Bermuda broadcast schedule at 0001. (Dix-NY) *Anybody know who this is?-Larry.*

9809.0 Perimeter calling unid station on W-106 in USB at 0025. (Metcalfe-KY)

10420.0 RFE Holzkirchen, Germany, feeder in Am at 0325. (Jones-CA)

10546.5 Spanish female 4-digit number station in AM at 0325. (Jones-CA)

10500.0 German female 3/2-digit numberstation in AM at 1906. (Fernandez-MA)

10873.5 Unidentified fax, did not look like a wefax chart at 0207. Not listed in my references. (Pettengill-OK) *Not listed in mine either, Bob, but it is now-Larry.*

11020.0 PWX33-Brazilian Navy, Brasilia, with 75 baud RTTY messages at 1415. (Todd Dokey-Lodi, CA)

11053.0 Executive 1 Foxtrot working Andrews AFB with flight data in USB at 1740 on F-283. Andrews AFB working SAM 29000 and SAM 050 in USB at 0220 on F-536. (Jones-CA)

11156.0 Executive 1 Foxtrot working Andrews AFB for relay to SAM control in LSB at 0215. Tail #31683. (Jones-CA)

11176.0 Reach 50V (KC-135 #580036) working Ascension GHFS in USB at 0245. (Carl Pinsonat-Plaquemine, LA) Ringy 30 with phone patch to Andrews via Ascension GHFS in USB at 0108. Wanted to know the Mystic Star frequency they were to use, was told 11209.0 and they went there. (Pettengill-OK)

11220.0 Roofless working Chop House with data link setup at 1855 in USB. (Jones-CA)

11226.0 Air Force 1 working Andrews with phone patch to Crown #13 in USB at 1502. SAM 682 working Andrews checking satellite communications link on channel 10 in USB at 1415 on F-141. (Jones-CA)

11229.0 Scorecard working Oilcloth on Xray 210 at 1705 in USB. (Jones-CA)

11410.0 Durant working Gold Bloom Alpha on duplex set-up in LSB at 0450. (Jones-CA)

11363.0 Bucharest LDOC working unid aircraft in Romanian at 0932. Britannia Operations Luton working Britannia G-BGYJ at 0943 in USB. Monarch Operations Luton working Monarch 493; aircraft reporting a delay in USB at 0943. (Boender)

11441.0 J-Walker working Skillful and Pump Shed with KL-43 traffic in USB at 0300. (Jones-CA)

11488.0 SAM 972 working Andrews AFB. Phone patch to Andrews metro in USB at 2338. (Jones-CA)

11494.0 Reach 60164 working Thule AB GHFS with phone patch to Hilda West in USB at 1520. (Jones-CA)

11545.0 WP-English female with German 3/2-digit numbers in AM at 0100. (Jones-CA)

11976.6 AR0011-CAP station using 300 baud packet at 1724. (Metcalfe-KY)

12356.0 WBV-Port Richmond, NY, working M/V Shelia in USB at 1442. (Perdue-AL)

12663.0 CBV-Valparaiso Radio, Chile, with CW DE marker at 0539. (Dettmann-IL)

12726.0 CFH-CF Halifax, NS, with V CW marker at 1714. (Dettmann-IL)

13030.25 FUF-French Navy Fort de France, Martinique, with CW marker at 2338. (Mike McDaniel-West Bloomfield, MI).

13207.0 Pops 91 working Pops Ops (Little Rock AFB, AR) at 2108 in USB. (Haverlah-TX)

13208.5 Iron Lung working MacDill GHFS in USB at 2006. Trenton Military working Sidecar in USB at 1739 on "one three two zero eight." (Haverlah-TX)

13217.0 Turn Pike looking for Nut Shell on X-906 in USB at 2210. SAM 60205 working Andrews AFB with phone patches on F-103. (Jones-CA)

13440.0 Andrews AFB trying to raise SAM 31681 on F-181 in USB at 0105. (Jones-CA)

13574.0 U3H-French Embassy calling RFGW-MFA Paris using FEC-A/192 at 1406. (Robin Hood-UK)

13855.0 OXT-Copenhagen Meteo, Denmark, with a fax ice chart at 1818. (Dix-NY)

14390.0 PLO network, Tunis, Tunesia, working Amman in USB at 1850. (Boender)

14508.0 Zairean Bank circuit with SITOR-A French traffic at 0750. (Hall-RSA)

14750.0 CIO2-Israeli Mossad number station in AM at 1944. (Fernandez-MA)

15048.0 Policeman working Postcard on 9017.0 with phone patch to Sunbird, later working MacDill on 8993,.0 15015.0, and finally 15048.0 in USB at 1438. (Haverlah-TX)

15460.0 English female 3/2-digit number station in AM at 1500. (John L. Gomer-Sacramento, CA) *I have heard them on 15450.0; maybe they moved up, John-Larry.*

16077.7 FDY-FAF Orleans, France, with 50 baud RTTY RY and ID at 1930. (Hall-RSA)

16914.5 SPB-Sczecin Radio, Poland, with SITOR-A idler and CW ID at 2020. (Dix-NY)

16984.0 PPR-Rio de Janeiro Radio, Brazil, with V CW marker at 2236. (Dettmann-IL)

17113.0 GKB6-Portishead Radio, UK, with DE CW marker at 1946. (Dettmann-IL)

17145.0 CBV-Santiago, Chile, with wefax chart at 2333. (Pettengill-OK)

17165.6 CLA41-Havana Radio, Cuba, with DE CW marker at 2000. (Dettmann-IL)

17251.0 VIP-Perth Radio, Australia, with phone patch in USB at 1930. LFN4-Rogaland Radio, Norway, with ID in USB at 1955. (Lish-FL)

17275.0 3AC-Monaco Radio with ID at 1359 in USB. (Lish-FL)

17296.0 FFL84-St Lys Radio, France, with phone patches in USB at 1515. (Lish-FL)

17341.0 DAI-Norddeich Radio, Germany, with ID at 1945 in USB. (Lish-FL)

17344.0 OXZ-Lyngby Radio, Denmark, with ID in USB at 2108. (Lish-FL)

17353.0 SPO82-Szczecin Radio, Poland, with ID in USB at 1813. (Lish-FL)

17356.0 EHY-Madrid Radio, Spain, with phone patch in USB at 1918. (Lish-FL)

17377.0 Rome Radio, Italy, with phone patch in USB at 1843. (Lish-FL)

17389.0 Athens Radio, Greece, with ID in USB at 1940. (Lish-FL)

17425.0 Spanish female 5-digit number station in AM at 0030. (Jones-CA)

17443.7 5YE-Nairobi, Kenya, with weather fax charts at 1200. New frequency. Also possible RTTY on 17442.0. (Hall-RSA)

18175.7 Zaire Bank circuit with SITOR-A French traffic at 1150. (Hall-RSA)

18264.8 CNM78-MAP Rabat, Morocco, with French 50 baud RTTY news at 1638. (Hall-RSA)

18416.7 MFA Jakarta, Indonesia, with Indo news using 50 baud RTTY at 1201. (Hall-RSA)

19225.4 RFFUGU-FAF Bordeaux/Merignac with French traffic using ARQ-M2 at 1244. (Hall-RSA)

20115.0 English female 3/2-digit number station in AM at 0020. (Jones-CA)

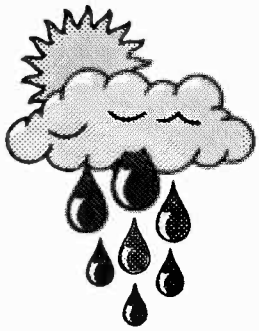
22395.0 UBN-Mariupol Radio, Ukraine, working UOHQ *M/V Mikhail Stenk* with telexes using SITOR-A at 1226. (Robin Hood-UK)

22679.0 SVG7-Athens Radio, Greece, with de CW marker at 1603. (Boender)

22723.0 SVN72-Athens Radio, Greece, with phone patch in USB at 1550. (Lish-FL)

The Scanning Report

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



Scanning the Weather

Global weather patterns seem to be changing. In the United States, floods, tornados and damaging hail have already affected many area the Mid-West. During March of this year, the "Storm of the Century" ravaged the entire Eastern Seaboard with heavy rain in the South and blizzard conditions in the North.

According to the National Weather Service (NWS), our severe weather patterns are expected to continue. The NWS predicts that in 1993 seven hurricanes will develop. Three of these hurricanes are expected to become large, dangerous storms that will threaten the Gulf Coast and/or Eastern Seaboard.

Scanning during severe weather can be an exciting experience. However, if you're not prepared, you'll miss more than half of the action. When the weather changes, your scanning shack must be ready. This is not the time to research frequencies, charge batteries, or to check your antenna system.

Preparations to scan the approaching storm should begin with a review of your frequencies and how they are stored. It's a good idea to dedicate one bank of frequencies on your scanner radio to include a variety of agencies. Don't worry about placing the frequencies in any sort of order. It's okay to have a Coast Guard frequency on channel 9, a highway maintenance frequency on channel 10 and an airport tower frequency on channel 11. At this point, you're not trying to hear all of the action. You are merely sampling a variety of frequencies and using them as a guide.

Suppose that you're listening to a bank of 50 random frequencies and you hear a boat distress call on 156.800 MHz. It only takes a second to activate the bank where you have stored a group of marine frequencies. Or let's say that you hear a medevac helicopter request on 155.340 MHz. Simply push the button that represents your ambulance/medevac frequencies and you're instantly tuned to the action. Get the idea? It's simply a fast way to scan a large number of agencies without having to activate several hundred channels.

Power interruptions, power surges, and lightning strikes are common during severe weather. To protect your equipment during a storm, don't rely on outside antennas or A/C current. Voltage spikes from lightning strikes that are miles away can instantly fry an expensive computer or scanner radio. Before the storm arrives, unplug everything. Equipment that is turned off, but not unplugged, can be damaged by a power surge. The same rule applies for outside antennas. Unplug the antenna connector from your scanner radio—it's the only way to guarantee the safety of your equipment.

The automotive battery is one of the most common and readily available 12 volt power supplies. Fully charged, an automotive battery will power your scanning equipment for extended periods. Another popular power source is the "Deep Cycle Marine" battery that is specifically made to be charged and discharged repeatedly. Automotive and marine batteries, however, can be dangerous. Everyone is probably familiar with maintenance free or "sealed" batteries that do not require the user to add water. The term "sealed," is a misconception that can be fatal.

All automotive and marine batteries are "vented," and produce hydrochloric gas. In addition to irritating your respiratory system, hydrochloric gas is explosive. The gas is present at all times and is produced in large quantities during the charging process. When utilizing this type of battery indoors, you must provide adequate ventilation. And do not, for any reason, charge an automotive or marine battery within your home.

Scanning during severe weather can also save your life. Last year, a reader living in Kansas was listening to his scanner radio when he heard the state police give the location of a large tornado. Realizing that the tornado was heading in his direction, the scanner buff ran to the basement. Minutes later, the storm passed within a hundred yards of his home.

With a little ingenuity, you can prepare your listening post to withstand the rigors of an approaching storm. Inside antennas mounted in the attic or in similar areas will allow you to continually monitor the action. A hand held scanner with a fresh supply of batteries is another absolute must. Rechargeable nicad batteries and heavy duty alkaline batteries should be at the ready. Don't rely on rechargeable nicads that have been sitting on a shelf for extended periods. A recharged nicad will loose approximately 1% percent of its charge per day.

Handwritten lists or printed computer lists should also be arranged so that you can instantly find a single, specific frequency. A small, pocket flashlight is another gadget that you never think about until the lights go out. There should also be at least one light source in your listening post that does not rely on A/C current.

Are global weather patterns changing? The answers to that question are as varied and as uncertain as our weather patterns. But one thing is certain: scanning the weather is an exciting experience. Hopefully, mother nature will allow you to hear the action, without making you a part of the action.

Treasure Hunt

Scanning is the high tech hobby of the nineties. Simply push a button and you can instantly monitor the scanning action throughout your entire neighborhood.

Wouldn't it be nice if you could monitor the local weather in exactly the same manner? Imagine pushing a single button to instantly access your local temperature, wind direction, wind speed and barometric pressure.

The "Weather Monitor II" is a professional weather monitoring station that you can win. Answer a few questions and win the lucky draw.

With the help of Davis Instruments and the Weather Monitor II, you can instantly scan your local weather conditions by simply touching a pressure sensitive pad. The unit will display your outside/inside temperature, wind velocity, wind direction, and barometric pressure.

A few of the features of the Weather Monitor II include a large digital display, high/low temperature recall, high wind speed recall, wind chill factor with recall of lowest point, barometric pressure recall, alarms for wind speed, wind chill, temperature and humidity. And here's the best part: The Weather Monitor II can be controlled with an IBM compatible computer. The Weather Link, from Davis Instruments, will allow you to create graphs, calculate weather conditions, generate summaries, analyze trends, and much more. To win the Weather Monitor II and the Weather

Link, simply find the answers to the following. Mail in as many postcards to Treasure Hunt as you wish (postmarked separately), and hope for the lucky draw at the end of August.

1. The Uniden Bearcat 800 XLT has a separate weather button to instantly access the National Weather Service. True or False?
2. The large damaging lightning bolts that occur during thunderstorms travel from ground to cloud. True or False?
3. Where is the coldest spot on Earth?
4. How much does the average cloud weigh?
5. Fill in the missing letters of this four letter word that is mainly responsible for spectacular sunsets: D _ S _.

The Weather Monitor II is supplied with the display unit, anemometer/wind vane, 40' of cable, external temperature sensor, junction box and A/C adapter. Erecting the combination anemometer/wind vane is easy. Simply bolt the unit to your existing antenna mast and route the cable next to your antenna coax cable. The entire installation will probably take less than an hour.

In addition to the Weather Monitor II, Davis Instruments has several other models that are priced to accommodate your budget. For more information, contact them at 3465 Diablo Ave, Hayward, California, 94545. The toll free order line is 1-800-678-3669.

Frequency Exchange (all freqs MHz)

Grab your suntan oil and beach blanket. We're off to visit with Stan Mayo. Stan lives in the state of ***Maine,*** and here are his favorite frequencies:

39.620	Sheriff (Statewide)	151.07	Turnpike
47.14	Dept. of Transportation (DOT)	153.11	Scott Paper Company
		154.65	State Police Zone #2
47.22	DOT	154.665	State Police Zone #1
47.26	DOT	154.71	State Police (Statewide)
47.32	DOT	155.865	State operated buildings
47.34	DOT	155.94	State Corrections
47.72	Maine Power & Light	156.045	Turnpike
47.86	Maine Power & Light	160.62	Railroad (RR)
47.98	Maine Power & Light	161.25	RR yard operations
48.10	Maine Power & Light		

Our next invitation is from Brad Sportini. Brad's list of frequencies are for ***Fairfield, Connecticut.***

39.46	State Police	160.545	Metro North car maintenance
42.04	State Police Troop G		
42.58	State Police speed traps	161.16	Power Control
42.64	State Police speed traps	161.28	Track maintenance
151.835	Fairfield University	463.275	University of Bridgeport
151.865	Bridgeport University	464.55	BJ's Wholesale Club
151.895	Fairfield Cab Company	464.775	Trumbull Shopping Park
151.925	Fairfield University		Operations
160.335	Metro North emergency	464.825	Sacred Heart University
160.410	Metro North Railroad (RR) signaling	464.975	Hi Ho Center Mall

David Wolf lives in ***Pittsburgh, Pennsylvania,*** and his invitation will take us to the Pittsburgh airport.

119.100	Departure	128.900	US Air maintenance
119.350	Departure	129.150	Gate Assignments
121.900	Ground Control	129.300	United Airlines
123.950	Approach	453.925	Airport Security
124.150	Approach	453.975	Runway Maintenance
128.300	Ramp Clearance		

If you're not afraid to fly, climb aboard! We are about to fly non-stop to ***Atlanta, Georgia.***

Traffic Reporter Frequencies

123.02	WXIA-TV	"Sky Cam" helicopter
161.64	WGST AM 640	Traffic helicopter
161.73	WZGC Z-93	Traffic helicopter
450.05	WSB TV	Channel 2 news "Chopper 2"
450.1125	WAGA TV	Channel 5 news "Chopper 5"
450.15	WXIA TV	Channel 11 news "Sky Cam"
450.25	WSB 750 AM	Traffic Reports
450.3125	WFOX 97	Traffic Reports
450.35	WSTR 94	Traffic Reports
450.3875		Metro Traffic
450.45	WAGA TV	Channel 5 News helicopter
450.4875	WSB TV	Channel 2 News helicopter
450.50	WAGA TV	Channel 5 News helicopter
450.55	WSB TV	Channel 2 News helicopter
450.5875	WALR 104	Traffic Reports
455.65		"Trooper Dave"

The above frequencies were provided by Herbert Newberg. If you want Herb's complete one page list of traffic reporting frequencies, it's free. Send a #10 SASE to the Frequency Exchange, P.O. Box 98, Brasstown, NC, 28902.

From Atlanta, we head north to ***Oakland County, Michigan.*** We have been invited to the home of Paul Ira. In addition to serving coffee and doughnuts, Paul offers the following frequencies:

42.02	State Police	42.680	State Police
42.586	State Police	151.835	Oakland Co. College

154.04	Huntington Woods Police	424.325	Southfield Police
423.625	Fire	425.300	Fire ground
423.675	Emerg. management	463.175	Hospital to life support
424.025	Southfield Police	468.175	Life support to hospital

Since we are already in Michigan, it would be considered rude if we didn't stop to visit with Dave Brainerd. Dave lives near ***Ann Arbor***, and he has invited us to listen to the following:

37.94	Washtenaw County Highway Dept.	153.56	Detroit Edison
		155.28	Huron Valley Ambulance
48.46	Consolidated Gas	158.190	Consolidated Gas
150.830	Brewer's Sunoco	462.975	Med 10, Livingston Dispatch
150.935	Sakstrup's Towing		
153.50	Detroit Edison		

I hope that you haven't discarded your suntan oil and beach blanket. (Hey, I told you to bring them along!) Our next stop is ***Sacramento, California.*** John Gomer is a local resident and when he's not at the beach, he's listening to the following:

33.40	Taco Bell order window
151.49	Granite Construction Company
151.655	California State University, Sacramento
151.715	San Juan Unified School District
151.895	Natomas Unified School District
453.775	Animal Control/Parking
453.825	Transit buses
464.8375	Arden Fair Mall security

Our final stop will really give you the opportunity to use that beach blanket. Welcome to ***Maui, Hawaii***! Our invitation is from the entire "Rodney" family.

154.22	Honolulu Fire	155.67	Wailuku Police
154.77	Hana Police	155.685	Honolulu Police
154.995	Maui forestry	155.73	Lahaina Police
155.19	Honolulu SWAT	155.760	Kah. Airport security
155.31	Hawaii Island Police (Big Isle)	155.955	Maui Fire
		157.15	Maui rescue
155.37	Honolulu Police	169.55	Haleakala Rangers
155.415	Kauai Island Police	453.30	Maui Sheriff
155.43	Honolulu Police	453.70	Honolulu Ambulance
155.520	Honolulu Police	460.725	United Air
155.565	Honolulu Vice	462.00	Hawaiian Air
155.625	Hana Vice squad		

Inviting the Frequency Exchange to your home town is easy. Simply send a list of your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902. We accept typed, handwritten, and computer printouts. Requests for anonymity will be granted.

Monitoring Waco

Remember the Davidian Compound in Waco, Texas? It became national news when Alcohol, Tobacco and Firearms agents tried unsuccessfully to raid the complex. The resulting stand-off between the cult and law enforcement officials ended when the complex burned to the ground. A reader who asked to remain anonymous monitored the event on the following frequencies:

154.68	Dept. of Public Safety	167.5625	FBI
155.46	Dept. of Public Safety	167.535	Used as tactical frequency
155.445	Dept. of Public Safety	167.2875	Used occasionally
154.95	Inter Agency, car to car	163.20	U.S. Marshall
154.875	McLennan Co Sheriff	450.1125	News reporters
156.165	McLennan Co Sheriff	450.1875	News reporters
155.505	Texas Rangers	461.900	News reporters
165.2875	ATF agents		

According to our anonymous source, cellular phone frequencies were originally used for relaying tactical information. But, when law enforcement officials learned that the news media was monitoring their cellular calls, this practice stopped abruptly.

More 911 Anonymity

In several past columns readers have sent in a variety of techniques that could be used to block the identity of a 911 caller. Roy Lavender, of Long Beach, California, claims that 1-900-STOPPER defeats caller ID, defends unlisted numbers, and deletes called party number from billing record.

The above information has not been verified. Readers are warned that phone numbers beginning with 1-900 charge the caller by the minute. If you have additional information regarding this service, please send it to the Scanning Report, P.O. Box 98, Brasstown, NC 28902.

Male vs. Female Dispatchers

A few months ago I asked, "Who makes the better dispatcher? A man or a woman?" As expected, your responses were varied, sometimes heated. At this writing, most people seem to favor the male dispatcher.

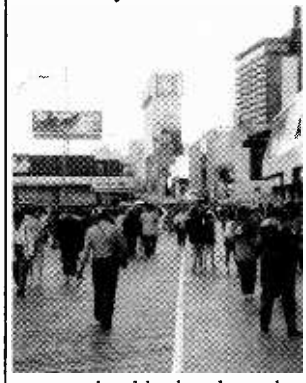
But here's an interesting comment. Air Force engineers at Wright-Patterson AFB are working on computers that actually speak. The engineers found that the male electronic voice was commonly ignored. The female voice, on the other hand, was listened to attentively.

Scanner Repair

Several scanner buffs have reported that the "Electronic Repair Center," 9490 Franklin Ave, Franklin Park, IL 60131, (708) 455-5105, is a great place to have your old scanners brought back to life.

The Electronic Repair Center repairs all types of scanners, but they seem especially capable of fixing the older Bearcat modes, i.e.: BC 250, BC 101, BC 100's and Canadian models.

If you have an old scanner that needs repair, maybe the Electronic Repair Center can revive it. Don't forget to tell them that you were referred by *MT*.



Casino Scanning

Taking a scanner radio to a casino in New Jersey could be hazardous to your health. An anonymous reader claims that security guards at Resorts International Casino told him that scanner radios are not permitted. When our anonymous friend hesitated to accompany the guards to the main entrance, he was physically removed from the casino.

Scanner buffs willing to pursue the matter should take along the following frequencies:

Resorts Casino in Atlantic City

154.57	Security	461.1125 Surveillance
464.675	Security	466.2625 Surveillance

Next Month

Check your subscription renewal date. We don't want you to miss a single edition. And if there's no expiration date appearing on your label, this is a sample issue. Call or send in your payment today (along with the order form on page 91) for your subscription. Keep on top of the world of radio!

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"Uncle Skip" Arey, WB2GHA

GEnie T.AREY1

In Search of Pirate Gold

Every July, the family and I take a trek down to the Outer Banks of North Carolina. During the routine R&R, you eventually stumble upon the incredible history of the place. This was the region where the great pirates of the past were thought to have buried their ill gotten gain amongst the dunes. Somewhere along the line, Number One and Number Two Sons will break out the metal detector and shovels in hopes of succeeding where thousands of tourists have previously failed.

Is this a travelogue or a radio column, Uncle Skip?

Bear with me, Oh Boss of Bosses! I'm heading down the right path. While my kids are out looking for gold (but only coming up with ghost crabs), your humble radio sage will be rendezvousing with REAL LIVE PIRATES! On any weekend and most holidays (such as the 4th of July), tuning your shortwave receiver to 7415 kHz will bring in the signals of these modern day pirates. Monitoring pirate radio activity, also known as the Free Radio Movement, can be great fun. You can even QSL these stations if you follow a few simple rules. So hoist the Jolly Roger and paint the poop deck red. It's time to take a look at...

UNCLE SKIP'S GUIDE TO PIRATE BROADCASTING

By the strictest definition, pirate radio would encompass any signal that is transmitted without the permission from the authorities that control the airwaves. The stations you find listed in books such as the *World Radio TV Handbook* and *Passport to World Band Radio* all broadcast in compliance with governmental license and under international treaty. In the case of the United States this licensing authority would be the Federal Communications Commission (FCC). While there are many signals of questionable origin out there, this article will concentrate on North American pirates: folks who see no need to invite the FCC to their broadcasting sessions.

Since the dawn of radio, there have always been a few folks who have operated stations outside the strict boundaries of the law. Current FCC regulations allow for up to a $10,000 fine and up to a year in prison for broadcasting illegally. These penalties extend to each individual broadcast; in other words, a pirate who broadcast five times could receive five charges, five fines and five jail terms. This is serious business, folks! Yet there remains a group of folks who still risk it to get on the air. Some do it for political or philosophical reasons. Many do it for just plain fun or the challenge of trying to beat the system. Regardless of the reasons, these signals make great monitoring.

Where to Listen

The challenge for a beginning pirate monitor is finding the signals. Pirates would like to avoid being found out by the government while still being found by their listening audience. For this reason, popular pirate frequencies periodically change. At the beginning of the article I mentioned 7415 kHz as the current harbor for pirate activity. If you park your receiver on this frequency on any weekend or holiday evening you will be sure to hear a pirate broadcaster or two.

However, this was not always the case. When I first became curious about monitoring pirates back in the 70's (Hey, it beat listening to disco music!), the hot frequency was 1620 kHz, just outside of the traditional medium wave band. A few years later you would go looking for most pirate activity on 7425 kHz.

Currently 7415 kHz is the hot frequency. However, with strong signals from VOA on 7405 kHz and WEWN on 7425 kHz, it's probably just a matter of time until the pirate operators move on to other places. Pirates have been monitored in the recent past in these frequency ranges:

1620	-	1630 kHz
6200	-	6300 kHz
6800	-	7000 kHz
7410	-	7420 kHz
15040	-	15050 kHz

When to Listen

Pirate broadcasters also maintain very flexible operating schedules. This is done both to avoid detection and to cooperate with other pirates sharing the frequency. Further complicating matters, some pirates will relay other pirates' programming or even broadcast using another pirate's station identification. Confusing, huh?

How do you hit a moving target? This is probably the primary question for a first time pirate monitor. Beyond leaving your receiver permanently tuned to 7415 kHz, you get by with a little help from your friends. First you can keep track of dominant pirate activity by following our own George Zeller's "Outer Limits" column right here in the pages of *MT*. George is one of the most widely accepted experts on pirate broadcasting with over 200 loggings to his credit. George always includes a good list of recent pirate activity and trends.

Speaking of George Zeller, if you really get bit by the pirate monitoring bug, there are a couple of books you will want add to your library (available from the advertisers here in the pages of *MT*, of course).

The Pirate Radio Directory by George Zeller, $9.95, 90 pages, Tiare Publications, Lake Geneva, WI, is one addition.

George provides an overview of the previous year's pirate activity of the 170+ North American pirate broadcasters including detailed information about the announcers and formats of the stations you are likely to hear. The fifth edition of this book is about to hit the press, thanks to the assistance of another pirate radio expert, Andrew Yoder.

And speaking of Andy Yoder, you will want to take a peek at his latest creation: *1993 Worldwide Pirate Radio Logbook* by Andrew Yoder, $10.00, 86 pages, Snallygaster Press, Springs, PA.

This book is a peek into the logs of all the folks who have been diligently monitoring the abovementioned pirate frequencies over the past year. This is probably one of the best ways to get up to speed as a newcomer to the world of pirate broadcasting.

If you have been following my column for any length of time, you know I believe clubs and organizations are great source of information and education for beginning members of the monitoring hobby. The predominant club for

The Heathkit DX-100 Transmitter is a popular tool of pirate broadcasters.

pirate monitors is the Association of Clandestine Radio Enthusiasts (A*C*E). Their monthly publication, *The ACE*, gives timely information that helps monitors to plan their listening, as best as anyone can, given the transitory nature of this type of broadcasting. A*C*E can be reached at P.O. Box 11201, Shawnee Mission, KS 66207-0201; annual membership is $18.00 in the United States.

Hearing Your First Pirate

Okay, so let's assume you want to give this form of monitoring a try. You are sitting around your shack with 7415 kHz dialed in one Saturday night. Now what?

First of all, it is helpful to have a tape recorder hooked up or at least a pad and pen handy, because you will want to get as much information down as possible for your verification letter. Things tend to happen pretty fast in the pirate radio world.

Once you detect a signal, be ready to follow it up or down a few kilohertz; also, pirates will sometimes broadcast in upper and lower sideband as well as the more traditional AM, so make sure you have a finger poised over the mode switch. I have even known stations to announce they would move to another frequency in another band. Be ready for anything in this free form radio world.

Most pirates go out of their way to let you know who they are, giving frequent station identification messages and QSL addresses. Stations will identify themselves by either a name, such as RADIO AZTECA, SECRET MOUNTAIN LABORATORY, RADIO USA, or by self-proclaimed callsigns such as KMRZ, WLIS, WREC. Pay close attention, because the collegial nature of pirate radio leads to broadcasters mentioning other stations and even playing their ID's as part of their programming.

Occasionally, a station will come on the air identifying itself by another broadcaster's name or call. This confusion is usually only sorted out by the "real" broadcaster issuing a denial via the pirate columns and club magazines. Even Old Uncle Skip is not immune to this confusion as witnessed by a recent confirmation of a "Fake WLIS" broadcast by way of the "Real WLIS" issuing me a QSL letter telling me that I did NOT hear them.

Tape or copy as much information as you can about the program. Pirate radio broadcasters usually want to receive detailed reports including your comments on the programming. Most pirates use home built or modified amateur radio equipment for their broadcasts. For this reason, stations really like to know the quality of their signal. Don't forget to let the station know what equipment you are using to hear their signal.

There are almost as many program formats as there are pirate broadcasters. Some stations play music, some deliver political messages, many perform parodies of existing radio programs. They don't call this Free Radio for nothing! Anything goes. Some programs take a decided turn toward adult humor so you may want to chase the kids out of the room during certain broadcasts.

Programs can vary widely in length. Most operations seem to limit their broadcasting to one half hour, more or less. However, a few brave souls have been known to keep their signal on the air in excess of an hour. Also, don't count on stations beginning or ending their broadcasting "on the hour" even if you have a report that the station will come on at that time. If you don't hear anything right at 01:00, wait around until 01:10 or even 01:20. The only thing that stays the same in pirate radio is change!

Verification

Since pirate radio stations want to keep their locations secret from the authorities, most will utilize a "Mail Drop" for QSLing. This is an independently established address, usually run by a hobbyist, that allows for the transfer of information between listeners and broadcasters. Verification reports come into the mail drop, and are then forwarded to the pirate station. QSLs are then sent by the pirate back to the mail drop to be forwarded back to the listeners. For this reason, most broadcasters expect you to include at least three mint first class stamps with each verification request. Most stations will announce their favorite mail drop in the course of their programming. The two most popular mail drops in current use are: P.O. Box 109, Blue Ridge Summit, PA 17214, and P.O. Box 452, Wellsville, NY 14895

Other mail drops can be found listed in the "Outer Limits" column and club publications such as *The ACE*. Return time on verifications is usually quite reasonable.

Pirate activity has remained high in spite of periodic "visits" by the FCC to some broadcasters. The occasional raids, equipment confiscation and prosecutions all seem to add to the overall intrigue of the pirate radio world. George Zeller even recalls monitoring the raid on station WHBH, considering it his all time best QSL effort.

We don't intend these comments to be an encouragement to these broadcasters or others to violate federal law. Still, there is no law against listening to or communicating with these stations for the purposes of receiving a QSL card or letter. So relax and have fun. Don't forget that holidays have been known for increased pirate activity. Maybe you can celebrate Independence Day by listening in on some very independent broadcasters — those bastions of Free Radio, the North American Pirates. Be sure to share your loggings. George Zeller is waiting to hear from you!

MT

Steve Douglass

Scrambler Scramble

They call it the *Clipper Chip*, and it is meant to be an effective and inexpensive way to insure privacy in communications. Manufactured by Mykotronx Inc., a military contractor in Torrance, California, the encrypter chip will soon be a part of telecommunications equipment such as cellular phones, fax machines, cordless phones, computer modems, two-way radios and just about any other device that needs some protection from interception.

The Clipper Chip was designed to make telecommunications private again and do so affordably. The chip sells for $25 each (if 10,000 or more are purchased). AT&T liked the chip and the price so much that it has begun buying millions of them to put into encrypters they will sell for $1200.

Even the White House loves the Clipper Chip, for it announced that the chip developed by the National Institute of Standards and Technology would "provide state-of-the-art protection against eavesdropping on corporate secrets." The chip was also cleared for production by the National Security Agency (the super secret intelligence agency responsible for breaking codes, eavesdropping and protecting U.S. Government communications), and the administration is negotiating with AT&T for the purchase of thousands of the new encrypters.

"Clipper Chip" technology promises cellular telephone security, but, with a built-in "back door," you will never really be sure who is listening in.

This all means big business for AT&T which makes more security devices than anyone else; they said they would immediately integrate the scrambling chips in many of their products.

All of this is being done in the name of telecommunications security. The cellular industry has been moaning for a long time that their communications were vulnerable to the bands of "radio hackers" and "cyberpunks" just waiting to take advantage of the new technology. With the Clipper Chips, AT&T can assure the public that their computers, cellular phones and FAX machines are protected.

In Reality

What sounds great on paper in advertising hype is in fact far from the truth. What AT&T and the government won't advertise is that a secret "back door" exists in the Clipper Chip. Each Clipper Chip device will have two unique numbers or "code keys" that enable authorized (or unauthorized) agencies to decode the transmissions.

When manufacturers build the scrambling devices, the two key numbers that enable the communications to be descrambled would be sent to a government data base to be established by the Attorney General. The reasoning behind this is to enable the FBI access to the chip if "criminal" activity is suspected. The Clinton administration is assuring that only "properly authorized officials" would get access to the keys.

Keeping the keys to the Clipper Chip out of the wrong hands will be a monumental task. If the chip is as widely reproduced and distributed as AT&T plans for it to be, then anyone with access to the scrambler codes could have access to your computer, cellular phone, and FAX machine without you knowing it. A false sense of security will prevail for those who believe the chip is ensuring their telecommunications privacy, when in fact anyone from the FBI, CIA, NSA, AT&T or someone at the Clipper Chip factory could be eavesdropping.

Just as cellular phone account numbers and hacking techniques have filtered out of electronic firms and onto the streets, so will the Clipper Chip codes. In creating a scrambling chip that enables access by authorized and unauthorized persons, the new technology is not only worthless, it's dangerous and accomplishes just the opposite of what it was intended to do: it will make your telecommunications even less secure.

Motives

One can't help but question the motives behind the government's backing of the Clipper Chip. It is well known that many electronics firms have been working on scrambling systems. With the approval of the Clipper Chip by the NSA, and with a giant in telecommunications like AT&T promising to distribute it widely, the number of different encrypted systems in use drops dramatically, making it easier for those wishing to monitor. The real bonus to the telecommunications industry would be if devices containing the Clipper Chip could be exported in massive numbers to countries in competition with the U.S.! Who better to accomplish a feat like this than AT&T?

In a move to "greatly expand the market for voice-scrambling technology," the U.S. Government is awarding a "sole-source" contract to AT&T for exclusive procurement of a Pentagon-developed voice scrambling device based on the Clipper Chip which virtually kills any other company's chances of marketing a low-cost scrambling device. The award has sparked protests from many defense electronics companies who fear that AT&T will now monopolize the telecommunications privacy market.

According to Motorola officials, the use by the government of AT&T Clipper Chip devices boosts AT&T's chances of selling its products throughout the federal government. Because the AT&T device uses specialized telephone technology that is different from technology used by other telecommunications companies, government officials will find it easier to buy additional AT&T telephones than to undergo the trouble of ensuring that Clipper Chip telecommunications devices are compatible with competing equipment.

The government says that they want to make the Clipper Chip technology available to all companies wanting to manufacture similar scrambling devices and thus eliminate "incompatibility." However, it is this editor's opinion that, while this would make it easier for the government to control and monitor this new technology, it would also make it easier to defeat.

MAILBAG

Altered States

An interesting note comes from frequent Federal File contributor Elwood Johnston of Boswell, NM. It seems that Elwood sent in his PRO-2004 to Radio Shack for servicing. The CPU had crashed and required replacement. Elwood received his PRO-2004 back in working order, but noticed that the factory had made a few changes in his scanner! It seems the techs down at Radio Shack replaced the diode that (when removed) enabled reception of the cellular phone frequencies. They also removed the diode that Elwood had added to expand his 2004 to 400 channel capability.

It only took Elwood a few minutes to return his scanner to its original altered state, but it was curious that Radio Shack would have gone to the trouble to "un-alter" the receiver. Elwood had also recently made the modification (featured in a recent Federal File) to access the scanner's 455 kHz output for interfacing with a shortwave communications receiver. This modification was left alone except that the factory actually improved it by soldering in a better piece of mini-coax and improving a ground connection!

Hillary's Visit

From Don Storck comes an interesting letter concerning a recent visit by First Lady Hillary Clinton to the University of Michigan, where she was the commencement speaker for graduation. Don says, "The command post (in the stadium) was transmitting on 165.375 MHz.

"Not a heck of a lot of traffic but think the motorcade or group was referred to as 'Trademark.' Hillary was referred to as 'Evergreen.' 'Bondi?' seemed to be making all the calls. At one time there was a quick call to Detroit for a radio check. Also used was 164.750 (even less frequently) by 'Bondi' for short traffic. The funniest thing heard was this transmission from the Command Post: 'Hillary has left her honorary degree at the podium!'" Good catch, Don!

Blue Angels Grounded?

Have you noticed something yellow & blue missing from the airshow circuit lately? According to an Associated Press clipping, the Navy's Blue Angels may have been temporarily grounded from flying at any airshows because several of the members are being questioned about their involvement in the Navy's Tail Hook scandal. Until Congress can question the Blue Angel's officers involved, the premier flight demonstration team will not be allowed to participate in any airshows. Congress has plans to question three Blue Angel's pilots, including the team's leader.

Stealth Update
Sea Shadow Stealth Ship

The U.S. Navy recently revealed that, since 1985, it has had in its inventory a stealth craft: not a stealth aircraft, but a stealth *seacraft*!

The Sea Shadow stealth ship was developed by the same geniuses who brought us the F-117A stealth attack aircraft—Lockheed's Advanced Development Projects organization, otherwise known as the *Skunk Works*.

The Sea Shadow is a joint Navy/Defense Advanced Research Projects Agency/Lockheed project to test the feasibility of adapting low observable technology to Navy ships. Just as stealth is revolutionizing military aviation, it will also be a design factor in all future military seagoing vessels.

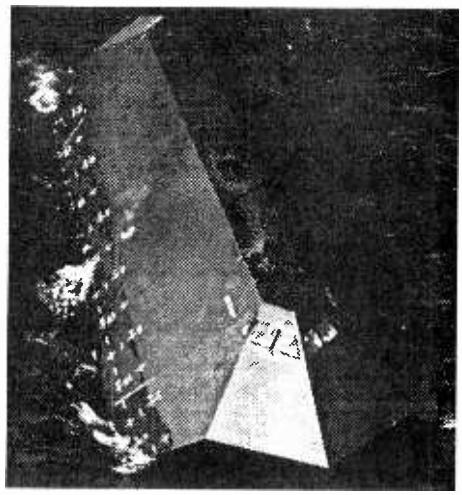


Photo courtesy U.S. Navy

F-117 with no wings?

The Sea Shadow is not the only stealth vehicle operated by the Navy, for smaller vessels were built and still remain secret. Some of these vessels may be for clandestine transport of Navy Seals into hostile areas.

The main mission envisioned for Sea Shadow type vessels are as surface-to-air missile launch platforms to protect the perimeters around a carrier group from air attack. The stealth ship would also make an ideal tactical surveillance platform that could sneak into enemy shipping and report information concerning formations, enemy ship strength, heading, etc., via laser satellite.

The Sea Shadow looks like a large F-117 that has had its wings cut off. The bizarre looking vessel exhibits the same radar defeating faceting of the F-117 and owes its design to Lockheed's breakthrough stealth computations program called *Echo*.

The 160 ft. long, 17 ft. wide ship is made of welded steel, displaces 560 tons and has a 14 ft. draft. Described as a small-waterplane-area twin hull (SWATH) design, the ship floats on two large submerged pontoons that contain the drive section, powered by a conventional diesel-electric engine which drives twin counter-rotating propellers, carefully designed not to leave a large wake. Other anti-wake features include a pinched waist on the submerged pontoons and a carefully designed ratio of propeller diameter to the distance between the pontoons. The test bed ship has a four-man crew: ship commander, helmsman, navigator and engineer. No weapons are outfitted and the cruise speed is thought to be between 13 and 15 knots.

Construction of the Sea Shadow began in 1983 and first tests were conducted in 1985. It was built in total secrecy inside the Hughes Mining Barge (HMB-1) floating drydock moored at Redwood City, California. The ship was unveiled by the Navy on April 11. MT

James R. Hay

This 'n' That

Channel Zero

Following January's column, I received a letter from Geoff Halligey of Bridgend, Mid-Glamorgan, in the United Kingdom. Geoff pointed out that the U.K.'s channel zero was left off the list. Channel zero, 156.000 MHz, is used by Her Majesty's Coastguard for communications between their own stations and the air/sea rescue service. Geoff gave a brief description of some of their work:

"In the U.K., the Coastguard has a rather different function as compared with the U.S.A. Here the Coastguard maintains visual lookouts for pleasure boats inshore, and conducts VHF radio watches and radio traffic management in congested waters — e.g., the Dover Straits.

"They work, of course, in close collaboration with the RAF's helicopter ASR (Air Sea Rescue) service. Life saving (waterborne rescue) is carried out by the Royal National Lifeboat Institution (RNLI), whose boats are manned by volunteers (usually local fishermen) and supported entirely by voluntary contributions from the public: no Government assistance. But they are well funded, have very fine self-righting boats, and a very high reputation.

"The Coastguard coordinates the helicopters and lifeboat services."

Table 1: Loggings

Freq	Mode	Callsign	Time	Vessel/Station/Traffic
Ships				
4125	USB	HQUF4	1536Z	*M/V Neptune Breeze* working Townesville Radio (VIT)
12460	CW	ATUD	1751Z	*M/V Bharatendu* working Bahrain Radio (A9M)
16620.5	CW	3EHJ7	2058Z	*M/V Visayan Glory* working JCU
8375	CW	C4PC	0330Z	*M/V Mairouli* working Scheveningen Radio (PCH) the vessel was in Beirut — a nice catch!
Coast Stations				
4125	USB	KCI 95	0536Z	Cold Bay, AK, Weather forecast and ship weather reports
8294	USB	WJK	1125Z	Miami, FL, Belcher Towing Co.
4125	USB	KGD 91	1424Z	Yakutak, AK, Weather forecast
8294	USB	WLX	0630Z	Honolulu Marine Radio misc. traffic
4125	USB	WFZ	0420Z	Morgan City, LA, Tidewater Towing
4149	USB	KNG	0445Z	Seattle, WA, working tug *Warrior* in Alaska
8294	WPE	USB	0516Z	Jacksonville, FL, working various offshore tugs

Loggings

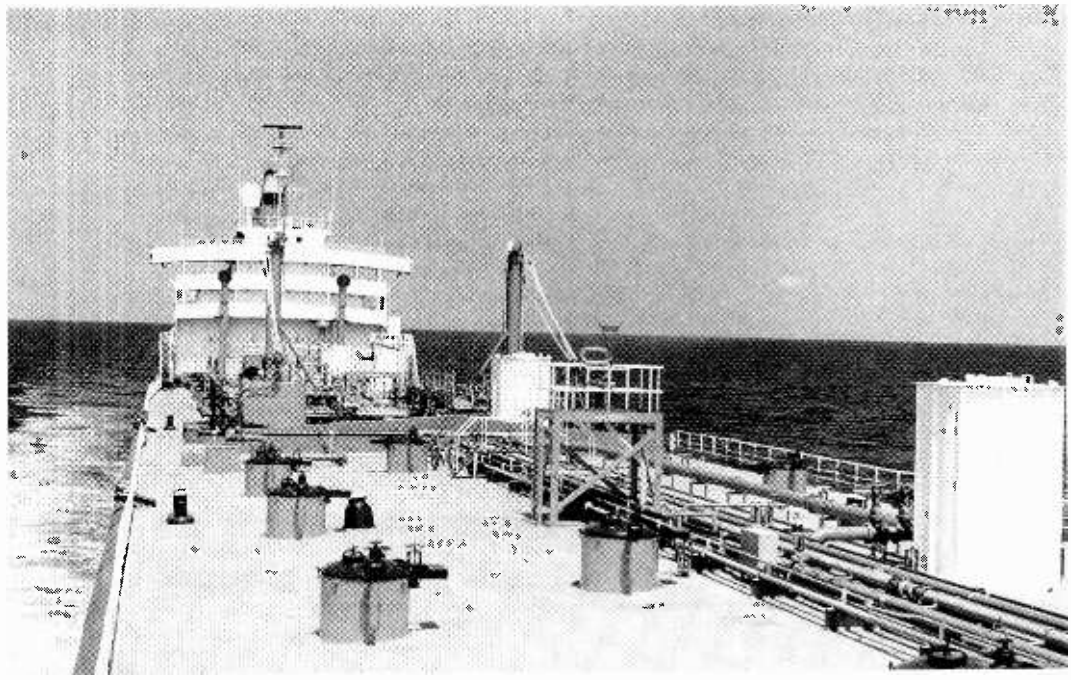
The mailman also brought a letter from J.G. McDonald of Port Coquitlam, British Columbia, who responded to last column's request for loggings. From Mayne Island, BC, Mr. McDonald offers the catches in Table 1.

These loggings offer a good idea of what is out there to be heard. Hearing a ship in Beirut from the Canadian West Coast is a very fine catch. Not every one will be like that, but they do happen. Mr. McDonald also offers his comment on maritime traffic today:

"The maritime traffic is not what it used to be. Still there are plenty of interesting things to be heard, especially on CW. There is a lot of CW traffic in the southeast Asia area, and some mornings there are hundreds of ships working the 4, 6, and 8 MHz bands."

Some frequencies for Lyngby Radio in Denmark were given on the Montreal Area Shortwave Listeners Net on two meters recently by VE2/OZ1KNM, Henning. Henning is living in Montreal for the next two years and offered the following USB frequencies for OXZ (freqs kHz):

8770 13116 17290



This photo of the SS Guadalupe was sent to us by Radio Operator C. Brown of Groves, TX.

Collective Callsigns

About ten years ago in this column, I published a list of collective callsigns. These are callsigns which are used to call either all or any of a certain group of ships: for example, all U.S. Navy ships or any U.S. Navy ship. The calls are not widely used, and it would therefore be interesting to know how many times they have been heard. Please write to this column if you have heard any of these, or if you know of any others. We'll tally them up and report back on their frequency of use.

CGMP	All Royal Canadian Mounted Police vessels
CCNS	All Royal Canadian Navy ships
CSAA	All Portuguese merchant ships
DAAD*	All merchant ships of the Federal Republic of Germany
DAAZ*	All merchant ships of the Federal Republic of Germany
EHHH	All Spanish merchant ships
FAAA	All French Navy ships
FBBA	All French merchant ships
GBMS	All British merchant ships
GBXZ	All Royal Navy ships
IAAC	All Italian merchant ships
LMNO	All Norwegian merchant ships
KGMM	All ships controlled by McKay Radio Telegraph Co.
KRCA	All ships controlled by RCA Communications Inc.
KSVS	All ships of Mobil Oil Corp.
NADN	All U.S. merchant ships
NUKO	All ships copying Mercast Broadcasts
ONKA	All Belgian merchant ships
OXXO	All Danish merchant ships
PCAA	All Dutch ships
PCHR	All Dutch ships responsible for relaying messages between Scheveningen Radio (PCH) and other Dutch ships
SAHP	All Swedish merchant ships
SWOL	All Grek merchant ships
VCSS	All ships of Imperial Oil Co.
VODD	All Canadian Merchant Ships
VGGG	All Canadian Merchant Ships
WGBG	All U.S. merchant ships
WOFO	All ships controlled by Ocean Gate Radio (WOO)
WOOL	All U.S. ships on the Great Lakes
WRCA	All ships controlled by RCA Communications Inc.
WUAA	All U.S. Army transports
YTSV	All Yugoslav merchant ships
4XAA	All Israeli ships

The two stations marked with an asterisk are now assigned to the re-unified Germany. While it is assumed that the callsigns are still valid, I must confess that this has not been verified.

That's all for this month. Send in your interesting or rare loggings to share with others, let me know if you hear any collective callsigns, and keep your ideas coming. Your letters are always welcome and get first priority in selecting column topics.

Until next time, good listening and enjoy the summer.

MT

Kevin Carey, WB2QMY

On The Road

Summer vacations, whether two weeks long or just a few days, can be great opportunities for longwave adventure. What better time of year than July to gather up your gear and take to the open road? You can add many new beacons to your list while traveling, and also pursue a favorite activity among LF listeners—finding actual beacon sites!

Whether you're planning on a camping "DXpedition," or just a daylong trek through the countryside, here are some equipment ideas to make your listening more enjoyable:

Fresh batteries for your portable: A big advantage of going on the road is that you can escape the problems of AC line noise and other man-made static sources that interfere with reception. You don't want your batteries quitting on you in the middle of a busy listening session.

Map, Compass, and Ruler: These are a must for the beacon site hunter. By plotting two or three directional beacons onto a map, you can get a pretty good idea of where a station is located. By the way, virtually all LF portables have a built-in ferrite rod antenna that can be quite effective for direction finding. Simply orient the set for a deep null (dip) in the beacon signal strength. When this occurs, the ferrite rod will be in line with the direction of the station. A disadvantage of these antennas is that they will not work very well inside a car.

Logbook: You'll want to enter those new catches as soon as you hear them, so don't forget this important accessory. If you'll be monitoring from several different locations, you could append a code to each entry indicating where you were at the time of reception.

Reference Materials: Besides your radio, good references can be your next most important tool. I like to take along the *Aero/Marine Beacon Guide*. Time and time again the *Guide* has proven itself useful for identifying the tough ones. Incidentally, an Updater for the beacon guide is now available that makes it accurate to 1993. The price for the Updater is $3.00 postpaid. Orders should be sent to: Ken Stryker, 2856-G West Touhy Ave., Chicago, IL 60645. The complete *Aero/Marine Beacon Guide* (which includes the Updater) is available for $15.00 postpaid from the same address.

Some other helpful references to include are: aviation charts, *The Canadian Forces Flight Supplement*—if you're in or anywhere near Canada—and the *DOD Flight Information Handbook*. See the mini-review below for information on obtaining these items.

Camera: Once you find an elusive beacon site, you'll want a souvenir to take back with you. Pictures of beacons are always welcome at *MT*. Send me a photo of your prize catch and you may see it here in *Below 500 kHz*.

Beacon Changes

The following U.S. beacons are newly authorized or on the air as reported by Ken Stryker in *The Lowdown*:

FREQ.	ID	LOCATION
209	UYM	McMinnville, TN (ex-RN)
332	PH	Port Huron, Mi (ex-PHN, JI)
344	SE	Selma, AL (Craig Fid.-Reeta)
358	CKC	Grand Marais (Cook Cnty.)
384	DCZ	Lumberton, NC (ex-JB)
423	PCW	Port Clinton, OH (ex-414)

Mini Review

Every now and then, an exceptional LF monitoring tool comes along that is worthy of special mention. This was the case recently when I reviewed some aviation references supplied by Aerial Development of New England (ADNE). This firm is a direct distributor of aviation sectional maps, government flight reference books, and also technical manuals for commercial and military grade receivers.

From the start, I was impressed with the quality of this firm's materials and the numerous applications that they hold for LF monitoring. In particular, the flight maps which I examined were in crisp, like-new condition, and they plainly showed the frequencies, IDs, and locations of dozens of beacon sites and airports. Their booklets, such as the *Canadian Forces Flight Supplement* and the *DOD Flight Information Handbook* were stuffed with interesting tidbits ranging from beacon frequencies to emergency procedures for hijacked aircraft.

If this type of reference material interests you, I suggest writing ADNE at: P.O. Box 661, Dept. MT, Bangor, ME 04402-0661, for a product listing and information sheet.

Summertime Loggings

Ken Cornell, author of *The Low and Medium Frequency Radio Scrapbook*, wrote recently concerning my comments in the May issue about the "DX season coming to a close." Ken noted that while the atmospherics can be very severe at times in the summer, some of his best LOWFER intercepts have actually been on hot, hazy mornings—"from daybreak to about 11 am." After that, he says the interference begins to build up making things more difficult. The best advice here is to get out early, and *be persistent*.

To get you started, here's a list of frequently heard beacons from all over North America. Good luck!

MT

FREQ	ID	LOCATION
194	TUK	Nantucket, MA
198	DIW	Dixon, NC
206	AJR	Cornelia, GA
206	VNC	Venice, FL
208	SSN	Romulus, NY
210	HL	Wheeling, WV
212	ESN	Easton, MD
215	UIZ	Utica, MI
216	CLB	Wilmington, NC
227	ASE	Aspen, CO
227	GDX	Upperville, VA
230	PD	Pendleton, OR
230	NRN	Norton, KS
236	FOR	Forsyth, MT
236	GNI	Grand Island, LA
239	HKF	Middletown, OH
241	PVG	Portsmouth, VA
245	NKT	Cherry Point, NC
245	YZE	Gore Bay, Ont
246	DFI	Defiance, OH
247	ILT	Isleta, NM
248	FRT	Spartanburg, SC
248	KZ	Toronto, Ont
253	UR	Burbank, CA
257	CGE	Cambridge, MD
257	MWX	Montpelier, VT
257	SQT	Melbourne, FL
258	ORJ	Corry, PA
260	JH	Jackson, MS
260	YSQ	Atlin, BC
263	GR	Grand Rapids, MI
263	YGK	Kingston, Ont
269	SWT	Seward, NE
272	TYC	Cambellsville, KY
272	YQA	Muskoka, Ont
275	GEY	Greybull, WY
276	TWT	Sturgis, KY
276	YHR	Chevery, Que
277	ACE	Kachemak, AK
278	FD	Poplar Bluff, MO
278	OS	Los Angeles, CA
281	SGK	Knoxville, TN
281	EWK	Newton, KS
281	TOT	Denver, CO
284	DPG	Dugway Pvg. Gnds, UT
293	MP	Montauk Pt., NY
296	ARF	Albertsville, AL
296	CRZ	Cornina, IA
296	G	Galveston, TX
296	LQR	Larned, KS
299	TR	Bristol, TN
299	HW	Wilmington, OH
301	PH	Portland, ME
304	BH	Boston, MA
305	RO	Roswell, NM
318	X	Sandusky, OH
320	OM	Omaha, NE
329	CH	Charleston, SC
329	PJ	Whitehorse, YT
332	HK	Hickory Hills, IL
337	NA	Santa Ana, CA
338	POB	Ft. Bragg, NC
338	CMQ	Anchorage, AK
341	EGV	Eagle River, WI
344	AVN	Avon, NY
344	CL	Cleveland, OH
344	FCH	Fresno, CA
346	LW	Lewisburg, WV
350	CWH	Huntsville, AL
350	RG	Oklahoma City, OK
350	SI	Covington, KY
350	ME	Chicago, IL
352	QS	Windor, Ont
353	LI	Little Rock, AR
356	FOX	Fairbanks, AK
359	BO	Boise, ID
362	LYL	Lima, OH
366	YMW	Maniwaki, Que
368	IMR	Marshfield, MA
371	FND	Baltimore, MD
379	BRA	Asheville, NC
382	CR	Corpus Christi, TX
388	CDX	Somerset, KY
392	BAJ	Sterling, CO
392	CLY	Worcester, MA
394	ENZ	Nogales, AZ
394	EZZ	Cameron, MO
400	FGX	Flemingberg, KY
400	RO	Rochester, NY
404	LVV	Lake Lawn, WI
404	XCR	Little Falls, MN
411	HDL	Holdenville, OK
413	CBC	Anahuac, TX
413	YHD	Dryden, Ont
413	OEG	Yuma, AZ
417	HHG	Huntington, IN
432	MHP	Metter, GA

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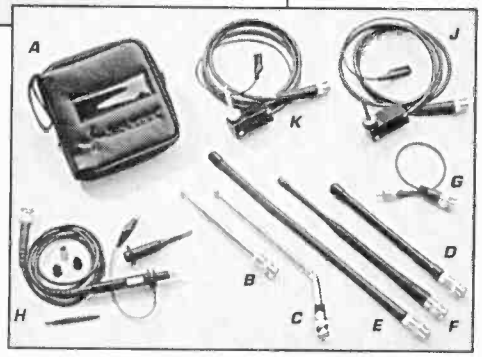
Frequency Counters		
1350	1-1300 MHZ 3 gate times, quality & economy	*119* ~~$129.~~
3500	10 HZ-3500 MHZ Extremely wide frequency range	*239* ~~250.~~
15-BG	(not shown) 1-1500 MHZ Ultra high sensitivity, Bar Graph	*169* ~~220.~~
35-BG	1-3200 MHZ Ultra high sensitivity, Bar Graph	*249* ~~265.~~
New *ATH™* Series		
ATH-15	1-1500 MHZ, *ATH*	*199* ~~235.~~
ATH-30	1-2800 MHZ, *ATH, ONE-SHOT*	*259* ~~299.~~
HST-15	HIGH STAB TCXO fact. inst. option, 0.2 PPM accuracy	*100* ~~125.~~
Accessories		
A ***CC-90***	Case for all models	12.
B ***TA-90***	Telescope BNC antenna	12.
C ***TA-90-L***	Telescope elbow antenna	16.
D ***RD-150***	150 MHZ rubber duck	16.
E ***RD-2750***	27-50 MHZ rubber duck	28.
F ***RD-800***	800 MHZ rubber duck	29.
G ***M-207-IC***	Interface cable for MFJ-207	10.
H ***P-110***	200 MHZ, 1x, 10x probe	39.
J ***LP-22***	Lo-Pass, audio usage probe	25.
K ***DC-10***	Direct, 50 OHM probe	20.



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Simply The Best

What equipment should you use when only the best will do? With hundreds of different receivers, antennas, and accessories to choose from, opinions vary widely! We asked leading DXers around the country what they prefer, and we got some interesting answers. If you think they don't make them like they used to, you may be right!

The Receiver

Possibly the best receiver ever manufactured, it's certainly the most impressive. The Collins-designed ***R-390*** continues to be the ultimate choice of shortwave and mediumwave DXers alike, 26 years after the last one was manufactured. Covering 500 kHz through 32 MHz, these 95 pound military surplus behemoths now sell for around $400 in good working condition and remain unsurpassed in quality and durability.

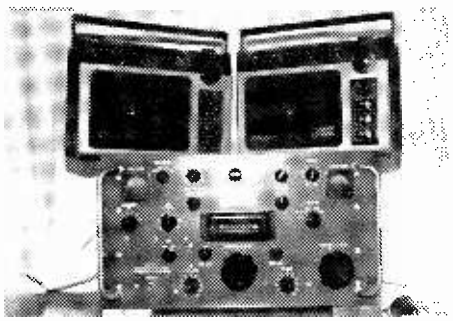
This is not a simple radio. It is a complex machine featuring a fascinating and extremely accurate analog tuning system employing a clockwork of beautifully machined gears. An R-390 mainframe houses six completely removable subassemblies for easy servicing. In the world of radio, it is a work of art.

Introduced in 1950, about 70,000 R-390 receivers were produced by several contractors for use by the American Armed Forces before the design was retired in 1967. You can enjoy it as a high fidelity radio for the finest in entertainment listening, or challenge its performance in a demanding amateur radio CW pileup. Using precision mechanical filters unsurpassed by common crystal filters, its selectivity can be as sharp as a knife, narrower than 100 cycles!

Unlike today's relatively noisy CPU-driven solid-state receivers, the R-390 operates with over thirty tubes providing an ultra-quiet noise floor and amazing sensitivity and signal handling. More contemporary designs by Racal, Drake and NRC may serve as serious challengers to an R-390, but nothing surpasses its quality of construction, durability, and ease of service. The R-390a was designed to survive parachute delivery unscathed!

Our rookie-of-the-year award goes to the new ***Drake R-8***. Now that most of the initial bugs have been worked out of its design, the R-8 stands as the finest performer to be introduced in recent memory. Patrick Martin, one of the most expert medium wave DXers in world, pulled in All India Radio on 864 kHz on his Drake R-8 at his home in Seaside, Oregon. Pat uses several Beverage antennas strung across a cow pasture along with a Grove TUN-4 as a preselector/preamp to produce his miraculous reception of over 2,000 mediumwave stations!

The ***General Electric Superadio*** and Superadio II deserve mention as a mediumwave DXer's best buy. Commonly sold as a household portable for around $50, they live up to the words printed on their dials: long range and high selectivity. Their sensitive, tuned, RF stage front end and beautiful sound provide delightful listening for DXers and everyday casual users. Problems in the first production of the new Superadio III appear to have been corrected on this new model, but here's simple advice: If you can find an original Superadio or Superadio II, grab it! It's already a classic!



The GE Superadio (left) and the Superadio II make a great portable companion to the classic R-390a (below).

The Antenna

Certainly the best antenna for mediumwave is a ***Beverage***. It requires a lot of real estate: simply spool out a couple of thousand feet of wire and terminate the end of it with a selected resistor connected to a ground stake. Your reception from the direction the wire is running should be quite remarkable. Combine this antenna with an excellent ground system, and you'll enjoy enormous signal strength from far away places.

Not good enough? Slew and phase two or more Beverages for extreme directivity and cancellation of unwanted signals. Another leading DXer, Mark Connelly, has developed simple-to-build phase boxes that can manipulate medium wave signals arriving from multiple antennas with precise accuracy. Adding his invention to your shack allows you to null out annoying local stations to dig for rare catches.

Those of you who can't devote endless pastures to Beverage antennas should consider ***loop antennas***. The AM broadcast band is now crowded and cluttered by scores of stations on each frequency. To lift out a rare station from this kind of pileup, a directional antenna that can be nulled and peaked indoors will be more important than the brute force of an outdoor Beverage. A loop antenna provides a useful bidirectional pickup pattern. Boost the incoming signals with a high gain low noise tuned preamp, and the results can be quite satisfying.

A new product from Kiwa Electronics, 612 South 14th Avenue, Yakima, WA 98902, has quickly become the leader in this field. They manufacture a compact air-core loop with a highly selective preamp that has DXers talking! The Kiwa advantage is twofold: You gain the ability to peak and null signals with ease, and their preamplifier acts as a highly selective front-end adding signal strength and variable bandwidth to any radio.

Two good places to learn about AM DXing are the International Radio Club of America and the National Radio Club. Send an SASE to: IRCA, P.O. Box 70223, Riverside, CA 92513 or NRC, P.O. Box 5711, Topeka, KS 66605-0711, and join the fun. Both clubs publish books, guides and monthly tips and loggings.

FM Equipment

If the world of FM radio is more your style, get in touch with everyone at the Worldwide TV-FM DX Association. Their monthly publication keeps you in touch with hundreds of fellow DXers who scour the bands above 50 MHz. An SASE to P.O. Box 514, Buffalo, New York 14205-0514 will bring you details. Ace FM DXer and WTFDA member, Bill Nienajadly, offered us many recommendations for success between 88 and 108 MHz:

Bill's all-time favorite FM tuner is the ***McIntosh MR-78***. Built by McIntosh Laboratories in Binghamton, New York, between 1972 and 1979, the MR-78 originally sold for about $1800. This precision analog-tuned unit still commands that price, if you can find one! It shares the secret ingredient of the R-390a: beautifully constructed mechanical filters. MR-78 owners enjoy three levels of selectivity: normal, narrow, and super narrow. No other tuner can match its performance. Mechanical filters cut through the clutter like nothing else!

Japanese designers at Onkyo Corporation in Tokyo may have used the MR-78 as inspiration. Their ***T-9090 II*** FM tuner also offers three levels of selectivity, and many other remarkable features. Onkyo uses a unique dual phase locked loop system for precise tuning. This sleek, jet-black jewel also includes two antenna inputs, two levels of RF sensitivity, a high-blend switch to improve the sound of distant stereo signals, and a mono/stereo selector, all controlled by front panel switches.

Twenty frequencies can be preset into its memory, and it can switch from station to station on a built-in timer. Not only can it scan to find the strongest available signals, but it can automatically place them in memory, as well. A 31

function remote control operates most everything from the palm of your hand. The Onkyo offers many features only a digital design can provide, and the T-9090 II is available new! The McIntosh still reigns supreme in basic sensitivity and selectivity. Our best advice: if you can afford it, own both!

The ultimate FM antenna is unquestionably the *Channel Master Model 4408 "Stereo Probe 9."* This nine element Yagi design has four driven elements providing a narrow beam width, very high gain, and an excellent front-to-back ratio that rejects stations outside of the direction it is pointing. Use two, each on a separate rotor, combined with an FM phase box designed by WTFDA member Andy Bolin, and no one will be able to touch your DX capability!

Bits 'N' Pieces

• Migration begins in the spring, and American radio stations are taking part this year. The AM broadcast band will soon expand adding ten more frequencies between 1610 and 1700 kHz, and the rush for allocations has begun. During the past two months existing AM stations were given the opportunity to apply for a new expanded band slot. Daytime AM stations providing the only radio service to cities of over 100,000 people will be given first preference for a new dial position. A pledge to operate in stereo will score a few brownie points, too.

WJDM in Elizabeth, New Jersey, has a lot to gain as an expansion station. Operating only during daytime hours with one kilowatt, they serve about two million people. By meeting all the criteria for a new allocation, they will probably be authorized to become a 10,000 watt full-time station serving the entire New York metropolitan area of over 17 million people.

The AM band expansion will also provide a welcome addition for DXers. Broadcasts on these high frequencies will travel great distances via skywave. A ten kilowatt station, all alone on a new frequency, will easily be heard for thousands of miles. Recent experimental broadcasts on 1660 kHz tested new antenna systems and digital transmission modes using low wattage. DXers logged these stations all over the country. Listening to these pioneers come on the air above 1600 kHz will be an experience that should not be missed!

• Big news in Los Angeles: The number one rated radio station continues to be Spanish-speaking 97.9 KLAX. Last summer they switched their format to high-energy Ranchera music, and improved their signal. KLAX broadcasts a mixture of this Northern Mexican folk music and Banda, an upbeat dance music like the Texas two-step. Play a record by Freddy Fender's Texas Tornados to taste the flavor of KLAX. An FM radio station that appeals to a young Hispanic audience is an irresistible combination in L.A. Due to their outstanding success, KLAX morning drive advertising rates have quadrupled in six months!

Mailbag

David Guest has won £5500 (almost $10,000) for not having a television set. Britain's Television Licensing Authority hounded Guest for over 17 years seeking payment of license fees for a television he never owned. The Authority claimed they observed a flickering light from Guest's bedroom window at night, but they could not obtain a proper search warrant with such insufficient evidence. A court in his home town of Edinburgh, Scotland, granted him the award to cover his legal expenses.

Over 400,000 people in The United Kingdom do not own television sets, but are routinely hounded and subject to abuse by The Licensing Authority, according to Guest. He and his wife, Alison, replied to numerous inquiries by mail, and finally gave up answering their insistent pleas for money. His lack of response brought a series of house calls by "unsavory and heavily-built men who were not too polite" in Guest's words. He will file an additional claim for harassment if The Authority refuses to settle out of court. News of this Scotsman's triumph comes to us from *MT* correspondent Ron Carruthers in Edinburgh.

International Bandscan

If you're travelling in Europe this summer, you may be hungry for a radio station that speaks your language: English. Here's where to look: The BBC operates a half-megawatt powerhouse in Orfordness, England, on 648 kHz broadcasting to all of Northern Europe. It can be heard effortlessly in Paris all day long! Visiting Vienna? Try Blue Danube Radio on 103.8, 92.9 FM, and many other FM frequencies across Austria. Enjoying the Mediterranean sun? Tune in Monaco's Riviera Radio on 106.3 and 106.5 FM. Two Anglo stations serve the Malaga and Costa del Sol regions: Coastline Radio on 97.7 FM and Onda Cero International on 88.7 and 101.6 FM. The Voice of America operates numerous FM relay stations across Europe: Sofia 97.6, Helsinki 103.7, Paris 99.0, Venice 98.45, and Bergen, Norway, on 105.8, along with many others. Also try their powerful 300 kW AM outlet from Munich on 1197 kHz. *MT* reader Richard Molinar mailed us this information from *The European* newspaper. Until next month, Happy Fourth! and happy trails!

MT

HI-FI DXing via Satellite

Tired of dead bands and static crashes? Low sun-spot count got you down? Want to listen to your favorite shortwave stations without fading or interference in high fidelity sound? Step up to the world of satellite radio DXing!

Many popular shortwave radio stations have found homes on North America's domestic broadcasting satellites. In addition, many domestic AM and FM broadcasters can be found here as well, the presence of these broadcasters has been a feature of satellite TV systems that few owners even know about. For the millions who have such systems, no extra equipment is needed.

How Do They Do That?

The transmissions discussed here are called "audio subcarriers." Here's how it works: Video programming is relayed via satellite on a carrier which is 36 MHz wide. Since the video transmission and guard frequencies don't take up the whole bandwidth, there's plenty of room for separate transmissions. This makes it possible to add as many as ten separate audio sources (twenty for stereo transmissions) to the carrier. The important thing to remember here is that these subcarriers are transmitted on the video carrier. They depend on the presence of that carrier and are not separate transmissions.

The audio for the video programming is handled in several ways. If the video is encrypted, the audio (usually in stereo), will be digitized and sent in the data stream subcarrier. The decoding device separates the audio and feeds it to the output jacks of the satellite receiver. When the video is not encrypted the audio is sent on a number of separate audio frequencies. Usually these are a left channel, right channel and a mixed mono channel. In addition, separate frequencies may be used for foreign language translations of video material or as a network cue channel for affiliate stations.

How To Tune In Subcarriers

Satellite receiver designers have come up with dozens of ways to tune in the subcarriers. Most new IRD receivers (Integrated Receiver Decoder) have on-screen graphic displays which allow tuning of separate audio by using the remote control. Various other commands regarding the audio may be keyed in as well: volume control, stereo mode selection (discreet, matrix or mono), narrow or wide bandwidth and noise reduction may be selected as well.

Older models, while not as sophisticated, still do a great job. Most allow the left and right channel tuning of subcarriers and selection of audio parameters. If you are planning to buy a used system specifically for audio reception, make sure the receiver has a stereo processor built in and a way to determine the exact frequency being tuned.

What You'll Hear

All satellite TV program guides have listings of the various services, but by far the most comprehensive guide is the *Satellite Channel Chart* published by Westsat Communications. I've mentioned this publication many times in the past and continue to do so because it is a one-of-a-kind periodical. It is the most detailed listing of video and audio available. Information on Westsat may be found at the end of this column.

Among the international broadcasters you'll hear on satellite are: RAI Radio (Italy); Deutsche Welle Radio (with separate English and German channels); BBC World Service; Radio France Internationale; Radio Canada; AFRTS; and The Voice of America.

But Wait, There's More!

If the above list hasn't made you actually drool then this might. In addition to all of the above international broadcasters you'll also be able to tune in the following American broadcasters: WFMT-FM (classical music) Chicago; KJAZ-FM (jazz format) Alameda, CA; WSM-AM (country music) Nashville, TN; KSKA-FM (Alaska Public Radio) Anchorage, AK; KNOW-AM (public radio) Minneapolis-St. Paul, MN; WCCO-AM (talk radio) also from the Twin Cities; WQXR-FM (classical) New York City; KLON-FM (non-commercial jazz) Long Beach, CA; WDET-FM (NPR) Detroit, MI; KUCV-FM (NPR) Lincoln, NE; WCBS-AM New York; WCMQ-FM (hispanic adult contemporary) Miami, FL.

And, yes, there's still more. Other services which are not retransmissions of existing radio stations are broadcast services themselves. For instance, you can tune into CNN Radio Network; CBN Radio Network; Business Radio Network; Cable Radio Network; several reading services for the sight impaired; numerous "background" music services; and one of my all-time favorites: Yesterday USA Superstation—re-broadcasts of programs from the "golden age of radio." These are just a sampling of the audio services to be found on every satellite TV system. Many more special services for ethnic and religious groups may be heard as well.

Getting Started

Since audio subcarriers depend on the presence of a video carrier to "ride" to the satellite, everything you've read in this column about receiving satellite TV signals applies. In most areas of the U.S., adequate signals may be had from typical parabolic dish antennas as small as 6 feet in diameter. For stationary reception of one of the newer high powered satellites such as Galaxy 5, a dish as small as 4 feet will do an adequate job. Get the biggest dish you can afford. You should be able to find a used dish with motor and mount for under $200.

Table 1

INTERNATIONAL DXING ON SATELLITE TV

Service	Satellite/Channel	Freq (MHz)
RAI Radio (Italy)	Satcom C1/12	7.38
Deutsche Welle (in English)	Satcom C4/5	8.10
BBC World Service	Satcom C3/7	5.40
Radio France Internationale	Anik E1/17	5.41 & 6.12
Radio Canada	Anik E2/15	5.76
Voice of America	Spacenet 2/3	5.92 & more
AFRTS	Spacenet 2/20	6.20

AMERICAN BROADCASTERS ON SATELLITE

Station	Location	Satellite/Channel	Freq (MHz)
KSKA-FM	Anchorage, AK	Satcom C5/24	7.38/7.56 (DS)*
WFMT-FM	Chicago, IL	Galaxy 5/7	6.30/6.48 (DS)
KJAZ-FM	Alameda, CA	Galaxy 5/7	6.30/6.48 (DS)
WSM-AM	Nashville, TN	Galaxy 5/18	7.38/7.56 (DS)
KNOW-AM	Minneapolis, MN	Satcom C4/10	8.235
WCCO-AM	Minneapolis, MN	ASC 1/22	6.20
WQXR-FM	New York, NY	Satcom C4/15	6.30/6.48 (DS)
WROL-AM	Boston, MA	Spacenet 3/3	6.20
WDET-FM	Detroit, MI	Spacenet 3/21	5.80/6.20 (DS)
KUCV-FM	Lincoln, NE	Spacenet 3/2	5.76/5.94 (DS)
KLON-FM	Long Beach, CA	Spacenet 3/15	5.58/5.76 (DS)
WCBS-AM	New York, NY	Telstar 301/20	7.40
WCMQ-FM	Miami, FL	Spacenet 2/9	7.75/7.93 (DS)

*(DS) Discreet Stereo format. KSKA may be very difficult for most locations because C5 at 125 degrees west appears very low on the horizon. Frequencies which are carried out to the third and fourth decimal place indicate very narrow bandwidth transmissions and may be too narrow for most home satellite receivers.

OTHER RADIO SERVICES ON SATELLITE

Service	Satellite/Channel	Freq (MHz)
CNN Radio Network	Galaxy 5/5	6.20
CBN Radio Network	Galaxy 5/11	6.12/6.30
In Touch (reading serv.)	Satcom C1/3	5.58
	Satcom C4/10	7.875
Radio Talking Book Net	Spacenet 3/2	6.48
Business Radio Network	Satcom C4/10	8.055
Cable Radio Network	Satcom C3/23	7.2377

It's important to make sure you have a way of moving the dish to the different parts of the Clarke Belt in which the various satellites reside. For this you'll need a polar mount and an actuator motor; Azimuth-Elevation mounts which are used in fixed dish installations cannot be adapted to track the Clarke Belt. A motor attached to the polar mount under the dish allows one to control the movement of the dish east or west to receive these geostationary satellites.

As mentioned earlier, a good used satellite receiver may be had through local dealers for $150 and under. Look for 950-1450 MHz block receivers with built-in stereo processors. These receivers also have built-in dish drives with memory chips to store the location of the various satellites. When buying used receivers, make certain that the necessary power supplies and remote control units are included. Don't pay more than $50 for a good used C band feedhorn and LNB (Low Noise Block downconverter) in the 80 degree range.

A good used satellite system shouldn't cost more than $300 to $400. I've known a number of people who have installed such systems for half that cost. If you want a brand new, off the shelf system complete with built-in VC II Plus RS (latest in descramblers) you can pay as little as $1,500. The point here is that satellite DXing can be yours for the price of a decent shortwave radio. And, by the way, did I tell you about the video aspects of having a home satellite system? Well, that's for another month.

Table 1 lists just a few of the more than 100 audio subcarriers listed in most satellite TV guides. For a more thorough list of all transmissions on our domestic broadcast satellites write for a sample issue of the *Satellite Channel Chart*. Send $2 to cover postage and handling to Westsat Communications, P.O. Box 434, Pleasanton, CA 94566. This publication also includes a pictorial diagram of all C & Ku satellites in our ITU region and a transponder frequency chart for all channels on those satellites.

Transponder Notes

Last month I noted the reappearance of the *BBC Nightly News* on Galaxy 2 channel 23. Another newscast, *ITN World News*, airs a nightly newscast on Spacenet 4 channel 12 at 5:30 PM (ET). I have no idea how new this is, but it's good to have it alongside the BBC.

Speaking of the U.K., I recently received a very nice letter from John Locker of Merseyside England. John explains that the situation regarding C & Ku band satellite transmissions in the U.S. is just the opposite in the U.K. He says that the prime frequencies to watch are in the Fixed Satellite Service (FSS) 10950-11750 MHz, Direct Broadcast Satellite (DBS) 11750-12200 MHz and Telecom 12200-13200 MHz. Using a dish just 90 cm in diameter, he says, decent pictures can be obtained. He writes:

"My main reason for 'scanning' the satellites is to keep up with the world events, taking the information from...newsfeeds direct from the 'hot spots.' This way the true picture can be seen. It's surprising how much is censored by the BBC and Independent News Companies in the U.K..." This is the same reason that many Americans have their satellite systems as well. John continues, "Having a clear view of the horizon, I can 'see' PanAmSat 1 very well and very often see the internal news feeds being relayed to the many T.V. stations throughout the States."

John, a ham radio operator who enjoys following Space Shuttle missions, wishes they were able to receive our NASA Select Channel (Satcom F2R at 72 degrees west channel 13). And, finally, John asks that I invite readers to send in details of rare feeds..."

Well, John, I'm happy to invite all *MT* readers to share their most interesting catches, especially with a photo. Please attach a note describing the photo (date it was taken, satellite, channel, etc.), with your own name and address on it if you wish the picture returned.

As to NASA Select, I'm afraid there is no sign that there'll be a change in frequency. According to an article sent in by Doug Chandler of Utah, NASA Select is a bare bones operation. Cost to operate the channel, the report says, is $1.5 million, probably one of the smallest items in the government's budget. While the 24 hour a day channel is made available to cable operators free of charge, few systems have taken advantage of the offer. Likewise, few educators have found a way to incorporate this service into the classroom, to our surprise.

MT

Pasokon SSTV

Being an avid Slow Scan TV enthusiast, I was intrigued by a new system that recently came on the market. Pasokon SSTV system is a board that installs in your computer and displays the picture in real time (that is, you see the picture being painted as it is sent). A 286 or higher grade of computer is required to use the Pasokon system.

Pasokon offers a lot of features for the $199.95 kit price tag ($229.00 for the wired and tested unit). For example, it can receive all of the popular SSTV modes, it fits totally inside the computer, has mouse support, and provides 256 colors with a standard VGA monitor. In addition, the unit allows the user to enhance and enlarge the picture after it has been received.

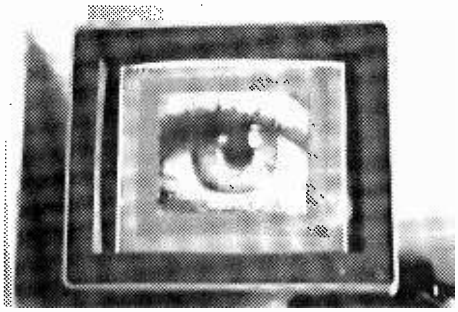


Photo 1

Photo 2

Installing Pasokon

The unit is installed in an expansion slot in any IBM compatible computer. You may need to set a jumper on the Pasokon board to avoid conflict with other devices you are presently running (all spelled out in the manual and simple to accomplish).

The next step is to connect the rig to the board. A shielded wire connects the audio output and mike input to the unit.

To receive pictures, tune to an SSTV signal (an on-screen tuning indicator makes this very easy) and sit back and watch the pictures come through. Pictures are very sharp and show great detail (see photos one and two).

In order to transmit pictures, a camera or scanner is required. If using a camera or camcorder, a device called a frame-grabber must be used. A frame grabber freezes a frame and digitizes it so it can be stored in a PCX or Gif file that can be recalled and used by the computer. A scanner is a device that scans a picture line by line and puts it in digital form again to be stored in a file the computer can use. Prices for frame grabbers run from about $200 up.

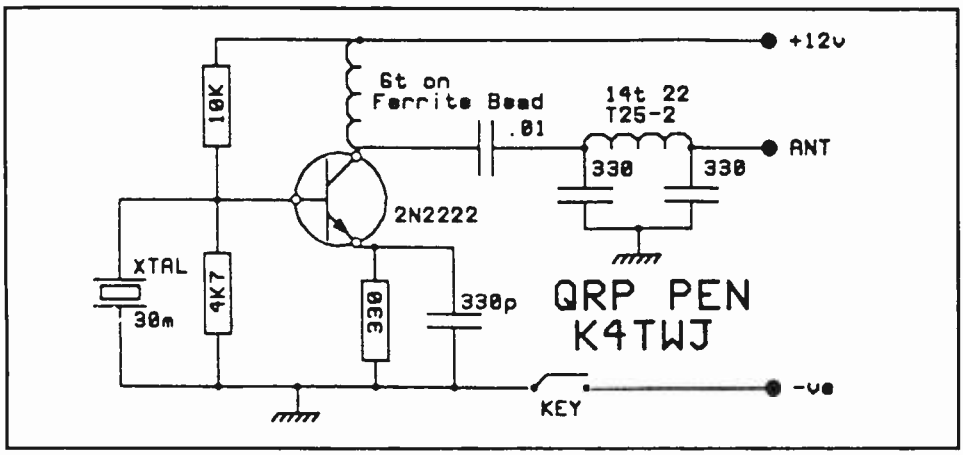
Scanner prices start at under $100.00 and run as high as several thousand dollars depending on what you want to do. My personal choice was a Logitech Scanman 32 which is a hand scanner costing under $150 and include all the software for copying pictures plus an optical character recognition program for copying and manipulating text. The Scanman will copy any material you scan with it, from line drawings to color photos, and reproduces them in black and white. It then stores the data in Gif, Tif or PCX files.

SSTV encourages creativity. Many operators put together stories about their shacks, families, trips and hobbies; others simply love to send interesting photos and graphics to their friends. If you are interested in art, photography or video recording, SSTV is a mode you should explore, and the Pasokon TV system is a great way to get started.

My thanks to David Eisenberg, WA3HVR, for the initial testing of the Pasokon system and photos.

The K4TWJ QRP Pen

Circuit one is a schematic of a 30 meter low power transmitter built by K4TWJ, Dave Ingram. Even though Dave built the transmitter inside a *pen*, the rig has a self contained key and power supply. The power supply is a 12 volt lighter battery and the key is a pushbutton on top of the pen. Even if you choose to build this little transmitter in a more spread out fashion(i.e. on perfboard), it will provide a lot of fun.



The choke (6t on ferrite bead) uses number 30 wire. Everything else should be self explanatory. It is, of course, possible to scale this little unit to other bands (but you must use a fundamental crystal).

(Thanks to *SPRAT Magazine* for their permission to use this circuit).

FCC Visits 14.313

As many of you know, the frequency 14.313 MHz has been plagued with problems. The major difficulty was deliberate interference to established nets on the frequency. Several GOOFBALL hams have been wreaking havoc on these nets. The FCC has finally taken steps to prosecute the guilty amateurs, and one individual has been sentenced to a jail term and fine; others have received stiff fines for their offenses.

The FCC has been very slow to act in this case, citing low budget and lack of staff; they had hoped the problem could be resolved without their involvement. Unfortunately this was not the way things turned out.

In years past, the FCC carried a big stick and used it when required. The effect of this was a well disciplined group of users in the amateur bands. Yes, there were GOOFBALLS then, too, but they got slapped and slapped hard. As amateur radio grows, the need for a strong and active enforcement agency also grows. Several years ago the FCC had established fees to provide a budget for implementing law enforcement, but Congress declared that any fee collected by a government agency had to go into the general kitty which was controlled by Congress! The result of this action was to erode the effectiveness of the FCC as a law enforcement agency.

Perhaps the time has come to get the FCC back into action; the only way to do this is to request our law makers to allow them to collect fees for amateur licenses and use those fees to provide a staff which will ensure continued harmony in the ham bands. Your comments please.

That's all for July, keep the letters coming, and, hey, — how about some shack photos?

73 de Ike, N3IK

Rob Leonard's Ham DX Tips

Depending upon where you live, the Northern or Southern hemisphere, July can be a hot or a cold month. Whichever way, if you are having problems coping with the weather, then you might want to go back indoors and try to see if you can log these DX tips...

BOSNIA-HERCEGOVINA The new prefix for this DXCC country is T9. T90=Special Events stations and visiting amateurs; T91 for use by club stations only; T92 by newly licensed amateurs; T94, T95 and T96 by previously licensed amateurs; T97 through T99 are reserved for future usage. Carl, T90/OH6XY, is a member of the United Nations monitoring team here, has been active on the following frequencies, CW only: 3512, 7012, 14030 and 21030 kHz. Carl asks that QSL requests be sent to: Ray Skogohilhs, SF-21710 Korpo, Finland. Carl is scheduled to be here through October. T95X (whose QSLing address is: Slaven Galic, Box 22, 88220 Siroki Brijeg, Hercegovina, Via 58000 Split, Croatia, Europe) can be found between 14200 and 14205 kHz SSB almost daily starting at 0400 UTC; 14003 to 14005 kHz CW some days at 0300 UTC; and on 21275 kHz SSB starting at 1530 UTC again almost daily. 4N4ENS (whose QSL manager is DJ0JV, Nusret Abadzic, Erminodstr 189, D-8000 Muenchen 83, Germany) offers this country on RTTY around 14087 kHz daily starting at 0400 to 0430 UTC. ***CONTESTS*** The *CQ HF WPC* contest will be held 10 and 11 July; activity will be CW and SSB mostly on frequencies above 50 MHz. The first *Islands on the Air (IOTA)* contest will be held 24 and 25 on all SW amateur bands. ***CZECH REPUBLIC*** OM3LA (Ivan Dobrocky, Gagarinova 16, S-97401 Banka Bystrica) has been on 14082 kHz RTTY starting at 2200 UTC daily. ***FIJI*** WB6RZK (Robert Ferrero, Jr., 855 Kirkcrest Rd., Alamo, CA 94507) will operate a 3D2RF 21 to 27 July, and especially during the IOTA contest the weekend of 24 and 25 July. Outside the contest period he will be on 14260, 21260 and 28460 kHz, the IOTA frequencies. ***MEXICO*** Several amateurs including W5OZI (Pat Rose), K5AWK (Paul Stern), and KB5IUA (John Godwin) will operate XE2AWK on 50,115 kHz SSB and on the 6 meter coordinating frequency of 28,885 kHz, with the possibility of some operation on the 2 meter SSB frequency of 144.200 MHz. They will activate several "Grid Squares" (The 2 degree by 1 degree geographic subdivisions of the earth that VHF/UHF SSB and CW DXers collect) in Mexico: DL98 (the Paiedras Negras area), DL97 (Nuevo Laredo area), DL96 (Sabinas Hidalgo), and DL95 the Monterrey area. QSLs go to W5OZI at the following address: Pat Rose, P.O. Box 393, Junction, TX 76849. ***NETS*** The East Coast Satellite Net meets on 3840 kHz SSB at 0100 UTC Tuesdays (UTC) W8GUS is net control. That net is followed by the Mid America AMSAT net hosted by W0CY which starts on the same frequency at 0200 UTC. The East Coast and Midwest Amateur TV net meets Tuesdays at 9 pm Eastern (US) local time throughout the year on 3871 kHz SSB. The West Coast Amateur TV Net meets Sundays at 10 am Pacific (US) local time on 7243 kHz SSB. The Caribbean Traffic net meets daily on 14283 kHz SSB at 1100 UTC, per 9Y4NG. ***PENGUIN ISLANDS*** These barren uninhabited rocks owned by South Africa are a DXCC country. DJ0WQ (James Clarkson, Heidelbergerstr 73, D-6101 Reichelsheim, Germany), DK2WH (Gunter Hartman, Rubenstr 17, D-6120 Erbah, Germany), DJ2ZS (Peter Bertam, Breslauer Strl. D-6087, Buettelbor 3, Germany) hope to make this a less rare spot by operating from here 160 to 10 meters CW, SSB, and RTTY 24 July to 3 August. Each operator will amend his call with a /ZS1. QSL to their home addresses. ***ST. PAUL ISLAND*** The weekend of 9 to 12 July WV9B/CY9 (QSL to Duane Traver, 99 Oregon Hill Rd., Lisle, NY 13797) will operate from this Canadian possession located at Lat 44 Long 68. Duane will reach the island by driving up the coast of Canada to Nova Scotia and he will be active during that period on 14336 kHz the "County Hunters Net." While on the island he will operate mostly SSB on as yet unannounced frequencies. ***ST. PIERRE & MIQUELON*** Also active for the weekend of 9 to 13 July will be several hams from the US 8th call area operating from here adding to their callsign /FP0 on all bands CW, SSB and RTTY. QSL their efforts to: NU8Z Mark Hinkleman, 108 E. Kilbuck, Tecumseh, MI 49286. ***TUVALU*** WB6RZK (see Fiji for his address) will be operating as T26RF 28 July to 3 August. Check the frequencies of 14260, 21260 and 28460 kHz SSB. ***USA*** The Canton Amateur Radio Club will operate special event station 8AL to celebrate Pro Football and the Football Hall of Fame 26 July to 1 August 1000 UTC to 0200 UTC daily on the following freqs: SSB 3780, 7270, 14270, 18150, 21350, 24950, 28350 kHz; CW 28125, 24910, 21125, 18080, 14050, 10120, 7125 and 3700 kHz. They will also be active on RTTY around 14085, 21085 and 28085 kHz, on Packet, AMTOR, Satellites and 2 meter SSB (check around 144.200 MHz). They will QSL with a certificate if you send them a 9 x 12 SASE with two first class stamps to: Randy Phelps, KD8JN, 1226 Delverne Ave. SW, Canton, OH 44710-1306. ***VENEZUELA*** YW5LT (QSL to W1AF, Harvard Wireless Club, 6 Linden St., Harvard University, Cambridge, MA 02138) will honor the founding of the Venezuelan Navy 15 to 18 July operating from Testigos Island 160 to 10 meters SSB, CW and RTTY.

Have a good summer or winter. 73 de Rob

Anti-Castro Clandestines Jammed

In a very unusual development, jamming interference has suddenly appeared on anti-Castro clandestine programming from several licensed and unlicensed broadcasters. Your columnist first noticed the jamming in early May. Since then it has continued on a daily basis. Harold Hausenfluck (WB4JSP) of Richmond, VA, confirmed the existence of the jamming during the Sunday morning ANARC amateur radio Shortwave Listeners Net (audible weekly in lower sideband mode on 7240 kHz at 1400 UTC).

The jamming format consists of steady multiple tones that are continuously transmitted on top of the AM mode carrier used by the clandestines. In over three decades of DXing, I have never noticed this particular type of jamming before. The noise directed at **Radio Caiman's** 9965 kHz broadcast sounds very much like a constant automobile horn. **La Voz del CID** on 9941.6 kHz suffers from a similar noise, although the pitch of the audio tones is different.

Most anti-Castro clandestines currently purchase air time via licensed USA broadcasters such as **WRNO** or **WHRI,** mainly through the services of Jeff White's **Radio Miami International.** Non-clandestine rock or religious shows on these stations (including Glenn Hauser's "World of Radio") remain unjammed. But when the USA SWBC stations carry anti-Castro Spanish language fare, they compete with the new jamming noise.

The technology used by the jammers is unclear. It sounds as though multiple heterodynes are being broadcast by AM jamming transmitters. However, the same effect could result from two or three dead carriers operating +/- 2000 Hz from the clandestines' center frequencies. All of the clandestines are still clearly audible at my Ohio location despite the interference, but the effectiveness of the jamming in Cuba is uncertain. Perhaps some of *MT's* readers in southern Florida can provide us with some signal reports.

Cuba has not jammed anti-Castro shortwave clandestine stations in the past, although they occasionally have fired up powerful AM broadcast band transmitters while expressing displeasure with USA efforts such as **Radio Marti** and **TV Marti.** The shortwave jamming suggests that new political tactics have been implemented in Havana. This could be significant, so we will keep our eye on the situation.

You should be aware that the heterodyne jamming effect is subtle in comparison with the usual annoying buzzsaws, sirens, pulses, etc. If you have never heard a heterodyne before, try tuning to 4830 kHz in the evening for the jumble created by Radio Tachira in Venezuela and Radio Reloj in Costa Rica on nearby 4832 kHz. The loud high-pitched whistle on 60 meters is similar to the anti-Castro jamming sound.

Radio G'Day from Australia

MT reader Douglas Stingley of Salem, OR, says that he will be moving to take a job in Australia late this year. We wish him luck! Douglas asks if anyone has any recent frequency information on **Radio G'Day,** the Australian pirate. Our regular reporter Gigi Lytie of Lubbock, TX, may have read Douglas' mind. She sends in two excellent logs of this station.

Twice during one May weekend she fished out a very weak G'Day upper sideband signal on 21590 kHz. One broadcast ran from 1724-1808 UTC, while the other sneaked in at 1347-1401. Despite a signal strength right down at the noise floor, Gigi heard multiple definite "G'Day Radio" identifications.

If the high bands are open on summer weekend mornings, a check of 21590 kHz is obviously a good idea. Some European and North American pirates occasionally experiment on 13 meters as well.

Haiti Clandestine Veries

Rob Ross of London, Ontario, is pleased to report that QSL's from two Haitian clandestine stations have arrived in his mailbox. **Radio 16 DeSanm,** relayed UTC Sundays by **WHRI** on 17835 kHz at 2200 UTC, sent a QSL card for Rob's report c/o Chancery of Haiti, 2311 Massachusetts Avenue, Washington, DC 20008. Louki Yves Cal was the verie signer. Rob also bagged a QSL sheet from **Radyo Neg Mawon,** relayed by Radio for Peace International in Costa Rica at 0230 UTC on Sundays. Jean Jean-Pierre signed this QSL for Rob's report mailed to Box 557, Warwick, NY 10990.

Terry Provance of Zanesville, OH, reports identical success with Neg Mawon. 16 DeSanm claims to be the voice of the "legitimate government of Haiti," while Neg Mawon is operated by an advocacy collective that promotes the restoration of Haitian democracy. Broadcast schedules have shown some slight variability lately as a result of program schedule adjustments at the USA relay stations, so you might want to check for these clandestines at times near those that we list here.

Other Clandestine News

The anti-Colombian **Radio Patria Libre** is still well heard in North America. BBCMS says that the station announces a schedule over the air at 0030 UTC on 5730 kHz, with a repeat at 1130 UTC on 6300 kHz. The station admits that these frequencies are slightly variable from day to day. However, I still hear them occasionally on the 19 meter frequency of 15050 kHz at 0130 UTC. Their programs usually run for a little over 30 minutes. According to BBCMS, the station says that it is the voice of the Camilist Union-Army of National Liberation.

A new shortwave frequency for **National Radio of the SADR** has been making it into North America with decent signals. Their longstanding medium wave service is now supplemented by a transmission on 11520 kHz between 1700-0000 UTC. The station opposes Moroccan policy in Western Sahara. BBCMS believes that Algeria is behind the operation.

Interesting Rumors

We have some good speculation to pass along this month. Bob Thomas of Bridgeport, CT, spotted local press accounts about plans for another offshore shipboard broadcaster. Brother Stair, an evangelist formerly heard on **WWCR** and **WHRI** with strong criticism of other preachers such as Dr. Gene Scott, is apparently raising funds toward the purchase of four transmitters. He anticipates installation of the transmitters on a vessel that would operate off the coast of New England.

It remains to be seen if these plans will materialize. But, as **Radio New York International** and others have found, the FCC and the USA Coast Guard have taken a dim view of maritime pirates like this in the past.

Another anonymous contributor sent in a numbers log at 0000 on 5930 kHz. As *MT* has reported in the past, a transmitter site in Warrenton, VA, has been used for some of the numbers transmissions that we hear. Although a final decision had not been rendered by the deadline for this column, the Warrenton site has appeared on a list of facilities to be closed by the Federal Government for budgetary reasons. It remains to be seen if this development will impact the volume or transmitter locations of numbers stations in the future.

What We Are Hearing

Our readers have forwarded another large batch of recent North American pirate loggings. Times are listed here in UTC, with frequencies in kHz. We welcome information on *your* catches, which you can send to Brasstown. Despite the crowded evening band conditions around 7415

kHz that we discussed last month, plenty of pirates can still be found here. But, the areas around 1620, 6210 and 6850 kHz have seen increased use during 1993, and you might wish to monitor these bands in addition to the traditional 41 meter hot spots.

Maildrop contact addresses used by pirates listed here include P.O. Box 452, Wellsville, NY 14895; P.O. Box 109, Blue Ridge Summit, PA 17214; P.O. Box 293, Merlin, Ontario N0P 1W0; P.O. Box 923, Saratoga, CA 95071; P.O. Box 402, Glen Oaks, NY 11004; and 82 Pentland Place, Kirkcaldy, Scotland, UK.

CSIC- 7413 at 2230. Pirate Rambo is still popular. I heard his third anniversary show on my Philips DC-777 while driving down the road! Craig heard the same program on his DX 440; welcome to the column, Craig! Addr: Blue Ridge Summit. (Craig McMaster, South Lima, NY; Alan Masyga, Winona, MN; Joe Frieder, Wallingford, CT)

Ground Level Network- 7413 at 2300. Announcer "Just Bob" concentrates mainly on medical tips. Craig's QSL from them arrived in only three weeks! Addr: Wellsville. (Scott Krauss, Cleveland, OH; Masyga; McMaster)

He Man Radio- 7415 at 2300. Although most of his shows plug male chauvinism, He Man once produced a show dominated by the rock oldie "Red Rubber Ball." He sometimes tests his transmitter using this tune with no ID's. Addr: Blue Ridge Summit. (McMaster)

Hit Parade Radio- 7415 at 2245. Their nostalgia format recreates top 40 AM hits from the 1960's. A spring show either included bits from Europirate **Radio Marabu,** or else it was QRM'ed by a Marabu relay. Addr: Wellsville. (Pat Murphy, Chesapeake, VA; Ross; McMaster)

KMRZ- 6205 at 0000. Dr. Lobotomy has operated lately up on 49 meters, since his transmitter has trouble on 41 meters. He proudly (and correctly) claims that he was the most active North American pirate in 1992. Addr: Wellsville. (Murphy)

KNBS- 7415 at 1830. Phil Muzik's veteran marijuana advocacy station features a slogan: "America does not have a drug problem, it has a drug law problem." Addr: Wellsville. (Murphy; McMaster)

Omega Radio- 7413 at 2130. Host Dick Tator shrugged off an FCC bust last year, and is still active with a mix of rock, religious programming, and conservative political features. Addr: Wellsville. (Masyga)

Radio Airplane- 7416 at 0315. Pirate Captain Eddy has been verifying many reports lately, including Rick's first pirate QSL. Congratulations! But, Eddy's broadcasting activity level diminished noticeably this spring. Addr: Wellsville. (Rick Havner, Matthews, NC; Lytle)

Radio Blandx- 7415 at 1430. Ralph Jensen and Don Perry occasionally air their DX program parody on Sunday mornings, immediately before or after the ANARC 7240 net. Addr: Blue Ridge Summit. (McMaster)

Radio Scottish Montreal- 7413 at 0215. This Quebec ethnic pirate normally uses **CSIC's** transmitter as a North American relay. The May *ACE* noted that they are sometimes relayed in Europe by the **Northern Ireland Relay Service** on 6239 kHz. Addr: Blue Ridge Summit. (McMaster)

Radio Stella International- 7413 at 2300. This Europirate normally uses 3945, 7446, and 11413 kHz from Ireland for relay of its Scottish productions, but my report on Jock Wilson's new USA relay via **North American Pirate Relay Service** was verified in only two weeks! Addr: Kirkcaldy. (Direct from the station)

Secret Mountain Laboratory- 7415 at 0000. This nine year veteran still features folk music from a location in Hilo, Hawaii. They normally spice the music with amusing comedy segments and relays of other pirates. Addr: Wellsville. (Murphy)

The Fox- 7415 at 0130. Their reasonably diverse program content includes rock, comedy sketches, seasonal holiday shows, and coverage of pirate radio. The male announcer has a distinctive deep voice. Addr: Wellsville, Blue Ridge Summit, and Merlin. (Jim Keeling, Overland Park, KS; Murphy)

The Jersey Devil- 7415 at 1800. When this one occasionally goes on the air, it mainly programs Beatles music. Addr: Blue Ridge Summit. (McMaster)

Union City Radio- 15050 at 2000. All classic rock broadcasts from this recently reactivated veteran 1980's pirate have been heard on 19 meters. This frequency is also used by Europirates, so it is a good spot to monitor. Addr: Wellsville. (Krauss)

Voice of the Smooth- 7415 at 0530. Well known *PopComm* columnist Harry Helms bagged the #1 QSL pictured here from this underpublicized West Coast pirate, which uses a unique maildrop. Nice catch, Harry! Addr: Saratoga. (Harry Helms, San Diego, CA)

Wire Line Radio- 7425 at 0045. They recently have mixed their own rock and comedy productions with relays of programming from other pirate stations. Addr: Wellsville. (Masyga; Keeling)

WJLR- 7415 at 0230. This new one features the gruff-voiced Captain Crook, who combines rock music with brief pirate radio commentaries. Despite a "John Lennon Radio" slogan, they play tunes by various artists with an interval signal of strange synthesized howling noise. Addr: None yet. (Murphy)

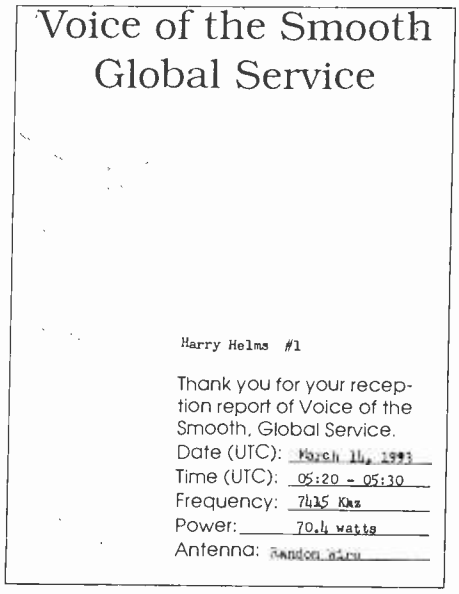
WLIS- 7413 at 2300. A recent third anniversary broadcast parodied their distinctive format of actual SWBC station interval signals. The parody featured previously obscure station signatures of a jackhammer and a table saw. Addr: Blue Ridge Summit. (Jim Laughlan, Youngstown, NY; McMaster)

WMAD- 7435 at 0300. Host Al Jaffe was one of the first pirates to use WWCR's old frequency after a tragic fire temporarily silenced the licensed Nashville broadcaster. Addr: Wellsville. (McMaster; Murphy)

WRMR- 1620 at 0430. Although their rock oldies format is not unusual, their frequency can remind us to check out the high end of the AM broadcast band. Particularly on the East Coast, some pirates like to operate here. Addr: Glen Oaks. (George Zeller, Cleveland, OH)

WSKY- 7415 at 0515. In April we printed Jim's first pirate logging. We now are pleased to report his first pirate QSL from Engineer Doug Barley at Whiskey Radio. Congrats! Addr: Wellsville. (Keeling; Ross)

The Voice of the Smooth is a new West Coast target.


Voice of the Smooth
Global Service

Harry Helms #1

Thank you for your reception report of Voice of the Smooth, Global Service.
Date (UTC): March 11, 1993
Time (UTC): 05:20 - 05:30
Frequency: 7435 Khz
Power: 70.4 watts
Antenna: Random wire

Bob Evans

An Overview

Welcome to the inaugural column of the quarterly DIGITAL DIGEST.

As the column masthead suggests, our focus will be on all facets of digital radio communications monitoring. To many of you, I'm sure, the word "digital" brings to mind Baudot Radioteletype (RTTY), one of the oldest codes still in use today. Nowadays, RTTY comprises only about 50 percent of the decodable signals out there, and digital transmissions are no longer limited to the short waves.

By way of introduction, we'll examine which stations/facilities use these modes, identify their major message types and briefly describe currently used digital modes.

Utility stations generally operate within one of three broad classifications: Aeronautical, Maritime and Point-to-Point, and may be designated as either *fixed* or *mobile* with respect to location. Unlike the international shortwave broadcasters, utility station traffic is intended only for the parties involved, and is therefore confidential in nature.

Utility stations use a variety of modulation types. These include the "3 R's" — Radiotelephony (Voice - ISB/SSB), Radiotelegraphy (Morse Code/CW) and Radioteletype (RTTY and other digital modes) as well as Facsimile (FAX). Traffic currently being monitored by digital hobbyists includes the following:

AERONAUTICAL

Aeronautical Fixed Telecommunications Network (AFTN) Stations
- Aeronautical Actual and Forecast Weather
- Terminal Area Forecasts (TAF)
- Aircraft Flight Plans and Arrival/Departure Messages
- Notices To Airmen (NOTAMS)

ACARS (Air/Ground Aviation Messages and Aircraft Telemetry)

MARITIME

Inland Stations
- Great Lakes Weather and Traffic

Coastal Stations
- Weather Synopsis, Reports, Watches and Warnings
- Iceberg Alerts (North Atlantic)
- HYDROLANT/HYDROPAC Broadcasts
- NAVTEXT and NAVAREA Broadcasts
- Telex Traffic to Individual Vessels
- News, Sports & Financial Reports

Vessels/Ships
- AMVER Position Reports
- Telex Traffic to Shore Stations
- Soviet Fishing Fleet

POINT-TO-POINT

Military
- World Air Forces, Navies and Armies
- Coded and "In-the-Clear" Message Traffic
- Military Flight Plans and Routings
- FAX Charts and Maps (Weather and Tactical)
- Naval High Seas Weather Broadcasts
- MARS (Military Affiliate Radio System) Traffic

Coast Guard (American and Canadian)
- Coast Guard Communication Stations/CG Cutter Traffic
- FAX Weather Charts and Maps
- Iceberg Alerts (North Atlantic)
- HYDROLANT/HYDROPAC Broadcasts
- NAVTEXT and NAVAREA Broadcasts
- Various Maritime Service Broadcasts
- Satellite Photo Rebroadcasts

Press Agencies
- International News Agency Broadcasts
- Newspaper Press Photos (FAX)
- Non-Latin Alphabet Press (FAX) Chinese, Russian, Arabic, Japanese

Meteorological Stations (Worldwide)
- Forecast and Actual Weather Broadcasts
- Weather Charts and Maps
- Orbiting Weather Satellite Photos

Diplomatic/Government Embassies
- Inter-Embassy Traffic
- Ministry of Foreign Affairs Press Bulletins
- Law Enforcement
- INTERPOL Traffic
- Police Communications

Science and Research
- Antarctic Research Stations
- Astronomical Observatories

International Relief Agencies
- United Nations Agencies
- International Red Cross/Red Crescent

Point-to-Point Circuits
- International Banks and Financial Agencies
- International Business Corporations
- Pager Communications

You'll notice that the above list of HF modes contains many which are specific to the embassy traffic of one or more countries (generally encrypted). An analysis of digital HF signals from over 4,000 reported fixed station frequencies heard in North America during the past 12 months has revealed the following mode usage:

RTTY	53.7%	
SITOR	20.4%	
ARQ-M	11.1%	
ARQ-E3	9.4%	
ARQ-E	4.5%	
FEC-A	0.7%	
All Other	0.2%	(combined)

Monitoring Equipment

To monitor digital transmissions you require a decoder. Decoders are available as independent outboard units or as an integral part or your personal computer system. In either case, they take the audio signal from your receiver and convert it to intelligible form that is displayed on a video monitor or the decoder's own "marquis-like" display. Many of today's decoders are also capable of translating Morse Code (CW). A stable shortwave communications receiver is required for serious non-voice utility monitoring.

Only very recently have decoders become available for ACARS and Pager Modes in the VHF/UHF bands.

Most of us *old-timers* in the hobby originally started by listening to the international shortwave broadcasters and gradually began to notice other AM transmissions in the shortwave bands. A limited number of aeronautical stations and numerous cable and wireless transmissions began to appear. With the introduction of SSB modes, the true Ute Listener was borne. Increasing use of Baudot RTTY on the airwaves saw the introduction of out-board decoders.

Only the strongest and cleanest signals could be decoded by the early AEA, HAL and Kantronics units—more sophisticated monitoring required more expensive equipment, often in the form of surplus commercial hardware. Then in the 70's, Infotech introduced its high end/high priced line of decoders. The Wavecom unit was introduced in Europe, but was never promoted successfully here in North America. And so RTTY monitoring continued to be a practice requiring additional peripheral equipment and much experimentation until the 80's.

With the advent of satellite technology, RTTY monitors lost the myriad of frequencies once used by the major press agencies such as the Voice of America, Associated Press and United Press International. With the demise of the Soviet Union, over 50 former TASS frequencies are now silent. Despite the services that have now opted for newer modes, there is still plenty to monitor for today's digital utility enthusiast.

The introduction of the personal computer has led to increased interest in digital communications by hobbyists. A relatively simple interface, coupled with intelligent software, now provides not only a means of decoding but also of analyzing digital transmissions. I am convinced that the personal computer solution is the way of the future.

Some shortwave utility stations have fixed broadcast schedules; others transmit only when they have traffic. Most stations have several frequencies from which to choose. The general rule-of-thumb is that they will use the highest

HF DIGITAL MODES (Shortwave Bands)

ARQ-E, -E3
Newer mode, mostly used by French military, stations may idle for hours on end.
ARQ-M2/4
Older mode, used by all three categories of utility stations, transmissions may idle for hours.
ARQ-N
Newer mode, single channel ARQ, very few frequencies identified to date.
ARQ-S
Newer mode, very few frequencies/stations found to date.
ARQ6-90/98
Newer modes, used by French and Italian Embassies, no North American loggings known.
ASCII
No commercial usage at this time - some experimental use (Amateur Radio).
AUTOSPEC
Limited to a small number of British maritime stations.
CIS (Commonwealth of Independent States - former Soviet Union)
Synchronous teleprinter system using 11/14/27 bits. European loggings only.
COQUELET
Similar to PICCOLO, used by Belgian and French Military/Police.
CW (Morse Code)
Currently being phased out for Maritime usage - still heavily used by the Ham community.
DUP-ARQ
Newer mode, used only by Hungarian Embassies.
FAX (Facsimile)
Transmission of Weather Charts and Maps, Press and Satellite Photos by International Press and Military, Maritime, and Meteorological stations.
FEC-A
Newer mode, not many stations logged to date (German Press, German, Serbian and Indian Embassies).
FEC-S
Newer mode, not many stations/frequencies logged to date.
HC-ARQ
Newer mode, Haegelin-Cryptos teleprinter system, European loggings only.
HNG-FEC (Hungarian FEC)
Newer mode, used exclusively by Hungarian Embassies.
Packet
Repetitive inter-computer traffic. Widely used by Hams and some U.S. MARS stations.
Piccolo
Used by British Military almost exclusively. Limited number of stations, now generally encrypted.
POL-ARQ (Polish ARQ)
New mode, used exclusively by Polish Embassies.
RAC-ARQ
Newer mode, 150 Baud teleprinter system. No reports of any loggings, anywhere.
RS-ARQ
Newer mode, Rhode & Schwarz simplex ARQ teleprinter system - no intercepts to date.
RTTY
Oldest and most widely used mode by all Utility categories. Largest single user is the former Soviet Maritime fleet.
RUM-FEC (Romanian FEC)
Newer mode, used exclusively by Romanian Embassies.
SI-ARQ
Newer mode, used primarily by Austrian and Indonesian Embassies.
SI-FEC
Newer mode, no traffic reported to date by monitors.
SITOR (Simplex Teleprinting Over Radio - aka ARQTOR/FECTOR)
SITOR-A mode is the primary Maritime mode used for inter ship/coastal station communications. This mode is also widely used for diplomatic Embassy traffic. **SITOR-B** mode is the primary Maritime Coastal Station Broadcast mode for weather advisories and ship traffic lists.
SPREAD
Newer mode, used exclusively by Romanian Embassies.
SWED-ARQ (Swedish ARQ)
Newer mode with usage limited to Swedish Embassies.
TWINPLEX
Newer mode, used by INTERPOL and Danish/Norwegian Ministries of Foreign Affairs.
VFT (Voice Frequency Telegraphy) British, Canadian and German military mostly. Most difficult mode to tune due to multiplex (multi-channel) signal.

VHF/UHF DIGITAL MODES (Scanner Bands)

ACARS (Aircraft Communications Addressing and Reporting System) Digital Air/Ground traffic including aircraft telemetry.
FAX (Facsimile) Weather satellite photos from orbiting Russian and American weather satellites.
POCSAG (Digital Pager Code) Used to transmit telephone numbers and short alphanumeric text messages to personal pager units.
GOLAY (Golay Sequential Pager Signaling System) A more sophisticated system used to transmit text messages to personal pager units.

frequency that supports current propagation conditions during their local day, gradually moving to lower ones as local night falls.

Although most stations use very low transmitting power compared to the international shortwave broadcasters, you will often be amazed at the strength of their signal. For example, one prized North American catch for the broadcast listener is the Voice of Kenya with a power of up to 250 kW. During the last 25 years, your editor has only heard them twice from his QTH.

On the other hand, both Nairobi Air and Nairobi Meteo deliver a 15 kW RTTY signal every night that will rival that of a local AM radio station. Digital transmissions, because of their signal nature, often have a way of "getting through," especially during poor propagation conditions when the broadcast bands seem dead.

Many of the digital transmissions you will encounter are indecipherable. Military and embassy traffic of a sensitive nature is generally encrypted (coded). When first starting out in this phase of the hobby, it is just as important to know "what not to listen to." All too often new monitors are easily discouraged because they are trying to decode the wrong signals. With patience and experience you will develop an "ear" for the various modes, and in many cases be able to identify the mode by its sound. Many experienced monitors can even audibly determine the baud rate.

In future columns we'll consider such topics as how to get started, what equipment to buy and where to tune. We'll also explore the various digital modes in more detail.

MT

Letters...I Get Letters!

By far, the most frequent questions I receive are for address sources for shortwave broadcasters and utility stations.

World Radio TV Handbook lists station addresses with each country, and don't forget "Addresses Plus" in the 1993 *Passport to World Band Radio*. Each station lists how to contact them and what's for sale and even what's free! Both source books are available through Grove Enterprises.

For utility listeners, try the 2nd edition of *Utility Address Handbook* available through Universal Radio, 1-800-431-3939. This comprehensive edition offers the hobbyist an extensive list of addresses for stations transmitting on short, medium and long wave. The ship and embassy addresses have been extensively revised, as well as numerous government radio services.

One other utility address source from Grove Enterprises is the *Klingenfuss Utility Guide 1993*. Beginning on page 468, you'll find listings from Afghanistan to Zimbabwe.

CANADA

VCS Halifax Coast Guard Radio, 12874 kHz. Full data QSL photo-card, signed by Robert N. Ward-Radio Operator. Received in 75 days for a copy of CW report, and one IRC. Station address: Ketch Harbour, Halifax County, Nova Scotia, BOJ 1XO, Canada. (Martin Nagl, Neulengbach, Austria)

CHINA

Voice of Jingling, 4875 kHz. Partial data scenery card, without veri signer. Received in 40 days for a taped report. Station address: P.O. Box 268, Nanjing, Jiangsu, People's Republic of China (Charlie E. Washburn, Robbinston, ME)

COSTA RICA

Radio For Peace Int'l, 15030/7375/13630 kHz. Full data logo card signed by James Latham-Manager. Station photo included. Received in 86 days for an English report and one IRC. Station address: World Peace Univ., P.O. Box 10869, Eugene, OR 97440 (Stephen Hunter, Drexel Hill, PA; Mike Hardester, Jacksonville, NC; Mikell Goetsch, Pittsburgh, PA)

FRENCH GUIANA

RFO Guyane, 5056 kHz. Full data QSL card, station stickers, and program schedule. Received in one year for a taped report in French. Station address: Boite Postal 336, Cayenne, F-97305, French Guiana. (Stephen J. Price, Conemaugh, PA)

GUATEMALA

TGNA-Radio Cultural, 3300 kHz. Partial data QSL card, signed by Wayne Berger-Chief Engineer. Spanish program guide included. Received in 23 days for an English report, one U.S. dollar, and a souvenir postcard. Station address: P.O. Box 601, 01901 Guatemala City, Guatemala, Central America. (Hunter, PA)

MOROCCO

RTV Marocaine, 11920 kHz. Frequency/time map card, signed by Tanane Mohammed Jamal Eddine. Received in 22 days for an English report and one U.S. dollar. Station address: Boite Postal 1042, Rabat, Morocco. (Hardester, NC)

NON DIRECTIONAL BEACONS

IH-Indianapolis, IN. 266 kHz. Full data prepared QSL card, verified by Steve Lawrence-Tech. Support Office. Received in 20 days for an English utility report. Station address: Airways Facilities Sector Hub, Air Mail Field Office, Box 41507, FAA, Indianapolis, Indiana. 46241. (Hank Holbrook, Dunkirk, MD)

UGS-Athens, OH. 250 kHz. Full data prepared QSL card, verified with illegible signature. Received in 13 days for an English utility report. Station address: Airport Operations, Ohio University, Athens, Ohio 45701. (Holbrook, MD)

GAS-Gallipolis, OH. 420 kHz. Full data letter signed by Larry Beebe. Received in 22 days for an English utility report. Station address: Gallia-Meigs Regional Airport, 200 Upper River Rd., Gallipolis, Ohio 45631. (Holbrook, MD)

PAKISTAN

AQP 6-Pakistan Naval Radio Station, 13011 kHz. Full data QSL card and letter signed by Muhammad Azam Khan-Lt. Cmdr PN Staff Officer. Received in 81 days for a copy of CW report and one IRC. Station address: Directorate of Signals, Operations Division, Naval Headquarters, Islamabad, Pakistan. (Martin, Austria)

PALAU

KHBN, 9830 kHz. Full data map card signed by Ben Cabral. Received in 20 days for an English report and one U.S. dollar. Station address: P.O. Box 66, Koror, Palau 96940. (Washburn, ME; Frodge, MI; Loyd Van Horn, NC)

RUSSIA

Radio Aum Shinrikyo, 15425 kHz. Full data card, signed by His Holiness Shoko Asahara. Received in 15 days for an English report and one U.S. dollar. Station address: 381-1 Hitoana, Fujinomiya, Shizuoka 418-01 Japan. (Frodge, MI)

SHIP TRAFFIC

BLUENOSE-C6DZ, 500 kHz (RO/RO Passenger/Auto Carrier). Full data prepared QSL card verified. Received in 29 days for an English utility report and one U.S. dollar. Ship address: Marine Atlantic Inc., 100 Cameron St., Moncton, NB, Canada. (Holbrook, MD)

EXXON WILMINGTON-WBVZ, 500 kHz (Tanker). Full data prepared QSL card verified. Received in 52 days for an English utility report and one U.S. dollar. Ship address: Exxon Communications, P.O. Box 2180, 800 Bell Ave., Houston, TX 77001. (Holbrook, MD)

SWEDEN

SAG 4- Televerkets Kuststation, 8498 kHz. Date only QSL card signed by Sten-Eric Petersson. Goteborg Radio sticker, info booklet, and broadcast schedule included. Received in 180 days for a copy of CW report, and one IRC. Station sticker, Goteborg Radio, 439 00 Onsala, Sweden. (Martin, Austria)

TURKEY

Turkish State Meteorological Station, 6900 kHz. Date/frequency card signed by Mehmet Ormeci-Director General. Turkish travel brochure included. Received in 21 days for an English report, one IRC and an address label (used). Station address: T.C. Tarim Bakanligi, Devlet Meteoroloji Isleri, Genel Mudurlugu, P.K. 401, Ankara, Turkey. (Hardester, NC)

UNITED STATES

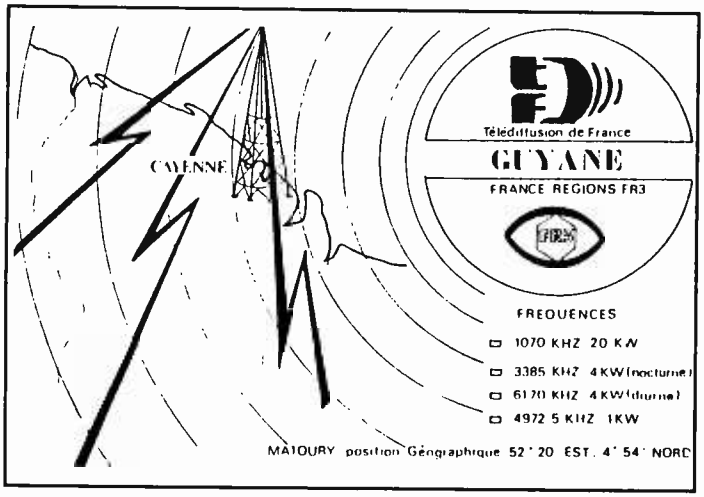
USN MARS Station-NNNONBL, 14464 kHz. Full data QSL card, and full data prepared QSL card verified by Steve M. Canyon-RMC. Received in 38 days for an English utility report and a SASE. Station address: Box 200, NAVSUBASE New London, Groton, CT 06349. (Russ Hill, Oak Park, MI)

NAS Whidbey Island, MARS Station-NNNONUW, 14441.5 kHz. Full data prepared QSL card verified by Debbie Banta. Received in 13 days for an English utility report and an SASE. Station address: NAS Whidbey Island, Oak Harbor, WA 98278. (Timothy Starr, Swansea, SC)

USCG Alexandria, VA. MARS Station-NNNONCG, 14441.5 kHz. Full data prepared QSL card verified, plus station QSL verified. Received in 17 days for an English utility report and an SASE. Station address: USCG Information Systems Center, MARS Station NNNONCG, 7323 Telegraph Rd., Alexandria, VA 22310-3999. (Starr, SC)

Radio Miami via WRNO New Orleans, 7395 kHz. Full data QSL certificate, signed by Jeff White-Manager. Program schedule and station profile sheet included. Received in 8 days for an English report and two US mint stamps. Station address: RMI, P.O. Box 526852, Miami, FL 33152. (Stephen R. Hunter, Drexel Hill, PA; Goetsch, PA)

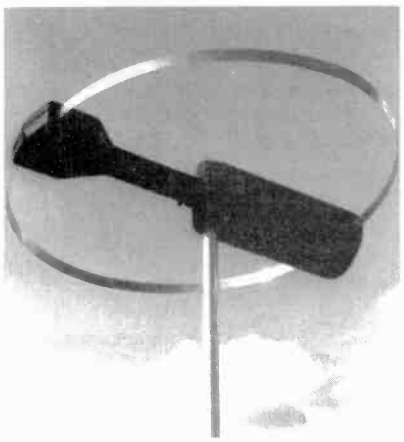
WBXR-1140 AM, Hazel Green, AL. Partial data letter. signed by Butch Menefee-Manager. Received in 8 days for an English AM report and an SASE. Address: P.O. Box 778, Fayetteville, TN 37334. (Frodge, MI)



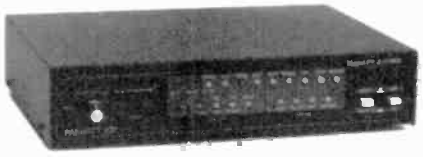
Stewart Todd Morgan, Raleigh, NC, shares this Guyane QSL.

STEP UP YOUR SHORTWAVE SET UP.

ISOLOOP 10-30 HF PORTABLE ANTENNA.
This is the one that gives you freedom of speech, whether you have to deal with restrictive covenants at home or in your apartment or condo, or if you are traveling in your boat, car, or RV. It features 150 watts, continuous coverage from 10 to 30 MHz, narrow bandwidth to suppress out-of-band signals. The IsoLoop antenna comes fully assembled with no mechanical joints. There is simply no better value in antennas!



PK-232MBX DIGITAL MULTI-MODE CONTROLLER.
It can receive eight different types of data signals, including Morse code, Baudot, ASCII, Time Division Multiplex (TDM), WEFAX, NAVTEX, Packet and AMTOR. Also featured is SIAM which automatically identifies many types of digital signals, excellent software support for PC compatibles, Macintosh and Commodore 64 & 128 computers. This unit is essential for the serious digital listener.



AEA-FAX.
Here's the superior way to decode multi-level gray fax images received by your general coverage receiver. Featured is AEA's exclusive on-screen tuning scope that allows you to simultaneously tune and receive. There is also Autolist for unattended image capture and save-to-disk, "daisy-chain" external RS-232 input allowing AEA-FAX to share a COM port with PK-232 MBX, up to 16 gray levels (VGA), support for EGA, CGA and Hercules formats. AEA-FAX prints to HP LaserJet or Epson compatible printers and includes hardware demodulator, 3 1/2" and 5 1/4" software disks plus a comprehensive instruction manual. AEA-FAX is a must for your set-up!

To connect with the AEA dealer nearest you or for product sheets, call (800) 432-8873.

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PO Box C2160, 2006 - 196th St. SW, Lynnwood, WA 98036 Sales: (206) 774-5554

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 Daylight Saving Time) 4, 5, 6, or 7 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 (8:30 PM Eastern, 5:30 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	A: 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	as:	Asia
na:	North America	au:	Australia
ca:	Central America	pa:	Pacific
sa:	South America	va:	various
eu:	Europe	do:	domestic broadcast
af:	Africa	om:	omnidirectional
me:	Middle East		

Consult the propagation charts. To further help you find the right frequency, we've included 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.

Hot News and Hot Spots

Spectrum

We hope you caught the first edition of this new international communications and technology program. *MT* columnist Larry Van Horn was scheduled to be among the guests on the first show June 12th. *Spectrum* airs on WWCR Sundays at 0335 UTC on 7435 kHz, and also on the Let's Talk Radio Network (Spacenet 3 Transponder 21, 5.8 MHz subcarrier wideband audio.)

Each show features a live phone in segment using an 800 number (for callers within North America) announced during the program; people who have GEnie's on-line service can also submit real-time questions while *Spectrum* is on the air (GEnie address: Spectrum).

Spectrum is hosted by Dave Marthouse and Mark Emanuele, and is underwritten by Overleaf International, a data processing and telecommunications consulting firm.

Red Cross Broadcasting

Although the Red Cross' published schedule (see last month's "Hot Spots") only shows the non-directional Sunday and Monday monthly broadcasts to Europe on 7210, Glenn Hauser's *DX Daily* confirmed in April and May that the *Red Cross Review* is still carried in the last half of Swiss Radio International's directional English broadcasts on the last Thursday of the month, plus UT Friday.

In more news on Swiss broadcasting, Jeff White of Florida noted in *DX Daily* that the 0040 Saturday broadcast ran Sunday programs instead of the final repeat of *Merry-go-Round*. Some upcoming SRI Sunday specials, according to Bob Zenotti via Larry Nebron: June 27, *Folk Music School*; July 4, *The Jura Question*.

Korea Heats Up

In the SPEEDX publication, *Shortwave Radio Today*, Tsunaaki Ashimori of Japan reports that the Kim Dynasty is becoming more and more nervous about people hearing the truth about their paradise through radio. Most Korean language transmissions from the West are now jammed. He says, "I am startled to discover how many SW transmitters this poor country possesses, often mixed in with R. Pyongyang audio."

Watch for a feature on Broadcasting in the Two Koreas to be published in a fall issue of *Monitoring Times*.

Redistributing the Wealth

As TransWorld Radio dismantles its shortwave broadcasting service in Bonaire, people are also being reshuffled. McDaniel Phillips, deep-voiced host of TWR *Morning sounds*, says his program may not continue on mediumwave once shortwave is closed. He prefers face-to-face contacts over air work, but he will stay in Bonaire until the technical "brains" are reassigned elsewhere, he said in an interview on HCJB's *DX Party Line*.

GMT and Jolly Old England

If you have the chance to visit the Old Royal Greenwich Observatory, home of Greenwich Mean Time and the East-West meridian, don't pass it up. The 17th century observatory has undergone a face-lift and has become a very up-to-date museum with sound and light shows, working exhibits for children, and a light display which signals when you cross the international meridian that divides the East from the West.

Is England only significant for things past? An interviewer from the *Boston Globe* commented to BBC presenter Hugh Prysor-Jones that there didn't seem to be much British news on BBC's Newshour. Here is his basic answer: "What you hear over here is the World Service, which puts foreign news at the top. So we're rather harder on British news: Do we really need this British story? Is it really important? Is Britain really an important country anymore? Often the answer to that is no."

Thanks to Dave Marthouse, Glenn Hauser, PNBCDX Club, and Kannon Shanmugam for this month's news items.

English language

shortwave guide

newsline

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

0000 UTC
(8:00 PM EDT, 5:00 PM PDT)
BBC ("Newsdesk")
CBC, Northern Quebec
China Radio Int'l
Christian Science Monitor
Croatian Radio, Zagreb [M-A]
Radio Australia
Radio Bulgaria
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l
Radio Norway Int'l [M]
Radio Prague
Radio Thailand
Radio Ukraine Int'l
SBC Radio 1, Singapore
Spanish National Radio
Swiss Radio Int'l
Voice of America
WWCR [T-A]
0005
Radio Pyongyang
0010
China Radio Int'l*
0030
All India Radio
Christian Science Monitor (as) [M]
Christian Science Monitor [T-F]
FEBC Radio Int'l, Philippines
HCJB
Radio Havana Cuba [T-S]
Radio Korea
Radio Moscow
Radio Netherlands
Radio New Zealand Int'l [M-F]
Radio Yugoslavia
Voice of America (am,as) (Special English) [T-S]
V of America (as) (Spec Eng) [M]
0035
All India Radio (News Service)
0045
Radio Korea (News Service)
0055
WRNO [W, A]

0100 UTC
(9:00 PM EDT, 6:00 PM PDT)
BBC
CBC, Northern Quebec [S-M]
Christian Science Monitor
Croatian Radio, Zagreb [S]
Deutsche Welle
FEBC Radio Int'l, Philippines
Radio Australia
Radio Canada Int'l [S-M]
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [M-A]
Radio Norway Int'l [M]
Radio Prague
Radio Romania Int'l
Radio Slovakia Int'l
Radio Tashkent
Radio Thailand
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 (as) [M]
Christian Science Monitor [T-F]
FEBC Radio Int'l, Philippines
Radio Austria Int'l
Radio Bangladesh
Radio Havana Cuba [T-S]
Radio Moscow
Radio Netherlands
Radio Portugal [T-A]
Radio Tirana
Radio Yugoslavia
Voice of Greece
0145
Radio Finland [M-A]
0155
Voice of Indonesia

0200 UTC
(10:00 PM EDT, 7:00 PM PDT)
BBC ("Newsdesk")
CBC, Northern Quebec [T-S]
Channel Africa, Johannesburg
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Budapest
Radio Canada Int'l [T-A]
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Norway Int'l [M]
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
Voice of Kenya
0230
Christian Science Monitor (af,me) [M]
Christian Science Monitor [T-F]
HCJB
Radio Havana Cuba [T-S]
Radio Moscow
Radio Netherlands
Radio Pakistan (Special English)
Radio Tirana
SLBC, Sri Lanka
0245
All India Radio (News Service)
0250
Radio Yerevan

0300 UTC
(11:00 PM EDT, 8:00 PM PDT)
BBC
CBC, Northern Quebec
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Bahrain
Radio Bulgaria
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio Prague
Radio Romania Int'l
SBC Radio 1, Singapore
Voice of America
Voice of Free China
Voice of Kenya
WRNO [F]
WWCR [T-A]
0305
Radio Bangladesh
0309
BBC*
0310
China Radio Int'l*
0315
Radio Cairo
Radio Havana Cuba* [T-S]
0330
BBC (af)*
Christian Science Monitor (af,me) [M]
Christian Science Monitor [T-F]
Radio Austria Int'l [T-A]
Radio Bahrain
Radio Havana Cuba [T-S]
Radio Moscow
Radio Netherlands
UAE Radio, Dubai
Voice of Greece
0355
Radio Japan [M-F]
WYFR (Network) [T-A]

0400 UTC
(12:00 AM EDT, 9:00 PM PDT)
BBC
CBC, Northern Quebec [T-S]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
Kol Israel
Radio Australia
Radio Bahrain
Radio Canada Int'l
Radio Havana Cuba [T-S]
Radio Moscow
Radio Norway Int'l [M]
Radio Prague
Radio Tanzania
Radio Thailand
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
Voice of Kenya
Voice of Turkey
ZNBC Radio 2, Lusaka
0402
Radio Botswana
0405
Radio Pyongyang
0410
China Radio Int'l*
0425
Radiotelevisione Italiana
0430
Christian Science Monitor (af,as) [M]
Christian Science Monitor [T-F]
Radio Bahrain
Radio Finland [M-A]
Radio Havana Cuba [T-S]
Radio Moscow
Radio Romania Int'l
0445
BBC (af)* [M-F]
0450
Channel Africa, Johannesburg

0500 UTC
(1:00 AM EDT, 10:00 PM PDT)
BBC ("Newshour")
CBC, Northern Quebec
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
HCJB
NBC, Windhoek
Radio Australia
Radio Bahrain
Radio Havana Cuba [T-S]
Radio Japan
Radio Lesotho
Radio Moscow
Radio New Zealand Int'l* [M-F]
Radio Thailand
SBC Radio 1, Singapore
Spanish National Radio
Voice of America
Voice of Kenya
WWCR [M]
ZNBC Radio, Lusaka
0510
China Radio Int'l*
Radio Botswana [M-A]
0515
Radio Canada Int'l [M-F]
Radio Havana Cuba* [T-S]
0520
Radio For Peace Int'l [T-A]
0530
Christian Science Monitor (af,as) [M]
Christian Science Monitor [T-F]
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Moscow
Radio Romania Int'l
Radio Thailand
RTM, Malaysia
UAE Radio, Dubai
Voice of Nigeria
0545
Radio Romania Int'l
Voice of Nigeria*

0600 UTC
(2:00 AM EDT, 11:00 PM PDT)
BBC
BBC (af)* [A-S]
Channel Africa, Johannesburg
Christian Science Monitor
Deutsche Welle
GBC Radio, Accra*
Radio Australia
Radio Bahrain
Radio Havana Cuba [T-S]
Radio Korea
Radio Moscow
Radio New Zealand Int'l
Radio Nigeria
Radio Prague
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
Voice of Kenya
Voice of Malaysia
ZNBC Radio, Lusaka [M-A]
0603
Croatian Radio, Zagreb [M-A]
0605
Radio Pyongyang
0609
BBC*
0630
BBC (af)* [M-F]
Christian Science Monitor [M-F]
Radio Austria Int'l [T-A]
Radio Havana Cuba [T-S]
Radio Moscow
Radio Vlaanderen Int'l
RTV Congolaise, Brazzaville [M-F]

Voice of Nigeria
0645
Radio Finland [M-A]
Voice of Nigeria*
0650
Radio New Zealand Int'l* [M-F]
0655
Radio Korea [M-F]

0700 UTC
(3:00 AM EDT, 12:00 AM PDT)
BBC ("Newsdesk")
Christian Science Monitor
GBC Radio, Accra
LBS, Monrovia
MBC, Blantyre [M-A]
Radio Australia
Radio Bangladesh
Radio Japan
Radio Liberia
Radio Moscow
Radio New Zealand Int'l* [M-F]
Radio Nigeria, Ibadan
SBC Radio 1, Singapore
SLBS, Freetown
Voice of Free China
Voice of Kenya
Voice of Myanmar
0703
Croatian Radio, Zagreb [S]
0705
Radio Pyongyang
0730
All India Radio (News Service)
BBC (af)* [A]
Christian Science Monitor [M-F]
HCJB
Radio Austria Int'l
Radio Ghana
Radio Moscow
Radio Netherlands
Radio Prague
0750
Radio For Peace Int'l [T-A]
Radio Pacific Ocean [A]
0755
Radio Japan [M-F]

0800 UTC
(4:00 AM EDT, 1:00 AM PDT)
BBC
Christian Science Monitor
GBC Radio 1, Accra [S]
GBC Radio 2, Accra
MBC, Blantyre [S]
Radio Australia
Radio Bahrain
Radio Finland [M-A]
Radio Korea
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Pakistan
SBC Radio 1, Singapore
SLBS, Freetown
Voice of Indonesia
Voice of Kenya
Voice of Malaysia
ZNBC Radio 2, Lusaka [M-A]
0802
Radio Botswana
0803
Croatian Radio, Zagreb [M-A]
0805
Radio Pyongyang
0830
All India Radio (News Service)
Christian Science Monitor [M-F]
Radio Austria Int'l
Radio Moscow
Radio Netherlands
Radio Slovakia Int'l
0840
Voice of Greece [M-A]
0850
All India Radio (News Service) (Special English)
0855
Radio Korea [M-F]
Voice of Indonesia

0900 UTC
(5:00 AM EDT, 2:00 AM PDT)
BBC
China Radio Int'l
Christian Science Monitor
Deutsche Welle
GBC Radio 1, Accra [M-F]
GBC Radio 2, Accra
LBS, Monrovia
MBC, Blantyre M-A]
Radio Australia
Radio Bahrain
Radio Japan
Radio Liberia
Radio Moscow
Radio Vlaanderen Int'l [M-A]
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of Kenya
Voice of Nigeria
0910
China Radio Int'l*
0915
Radio Korea (News Service)
0930
All India Radio (News Service)
Christian Science Monitor [M-F]
FEBC Radio Int'l, Philippines
Radio Afghanistan
Radio Moscow
Radio Netherlands
0940
Radio Togo
0945
Deutsche Welle (af)* [M-F]
0955
Radio Japan [M-F]

1000 UTC
(6:00 AM EDT, 3:00 AM PDT)
All India Radio
BBC
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
GBC Radio 2, Accra [A]
HCJB
IRRS, Milan [S]
Kol Israel
MBC, Blantyre [S]
Radio Australia
Radio Bahrain
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Tanzania
SBC Radio 1, Singapore
Voice of America
Voice of Kenya
WWCR [M-F]
WYFR (Network) [M-F]
ZNBC Radio 2, Lusaka [M-A]
1005
Radio New Zealand Int'l* [M-F]
1010
China Radio Int'l*
1030
Christian Science Monitor [M-F]
MBC, Blantyre [M-F]
Radio Austria Int'l [M-F]
Radio Bulgaria
Radio Korea
Radio Moscow
Radio New Zealand Int'l* [M-F]
Radio Prague
RTM, Malaysia
UAE Radio, Dubai
Voice of Nigeria
WYFR (Network) [M-F]
1040
Voice of Greece [M-A]
1055
All India Radio

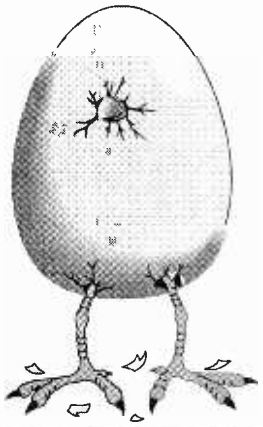
1100 UTC
(7:00 AM EDT, 4:00 AM PDT)
BBC ("Newsdesk")
CBC, Northern Quebec [A-S]
Channel Africa, Johannesburg
Christian Science Monitor
Deutsche Welle
GBC Radio, Accra [A-S]
MBC, Blantyre [A-S]
Radio Australia
Radio Bahrain
Radio Japan
Radio Jordan
Radio Korea
Radio Moscow
Radio New Zealand Int'l ("Newsdesk")
Radio Nigeria, Ibadan
Radio Pakistan
SBC Radio 1, Singapore
Swiss Radio Int'l
TWR, Bonaire [M-F]
Voice of America
Voice of Kenya
WWCR [M-F]
ZNBC Radio, Lusaka
1105
Radio Pakistan (Special English)
Radio Pyongyang
1110
Radio Botswana [M-F]
1115
Radio Korea (News Service)
Radio Nepal
1125
Radio Botswana [A-S]
WYFR (Network) [M-F]
1130
Christian Science Monitor [M-F]
Radio Austria Int'l [M-F]
Radio Finland [M-F]
Radio Lesotho
Radio Moscow
Radio Netherlands
Radio Thailand
Radio Vlaanderen Int'l [S]
Radio Yugoslavia
RTM, Malaysia*
1135
All India Radio (News Service)
1145
Deutsche Welle* [M-F]
1150
Channel Africa, Johannesburg
1155
Radio Japan [M-F]
Radio Korea [M-F]

1200 UTC
(8:00 AM EDT, 5:00 AM PDT)
BBC
CBC, Northern Quebec [A-S]
China Radio Int'l
Christian Science Monitor
LBS, Monrovia
MBC, Blantyre [M-F]
Polish Radio, Warsaw
Radio Australia
Radio Bahrain
Radio Canada Int'l [M-F]
Radio Moscow
Radio Nacional do Brasil [M-A]
Radio New Zealand Int'l [H-T]
Radio Nigeria, Ibadan
Radio Norway Int'l [S]
Radio Romania Int'l
Radio Tashkent
Radio Thailand
RTM, Malaysia
SBC Radio 1, Singapore
SLBC, Sri Lanka
TWR, Bonaire [A-S]
Voice of America
Voice of Kenya
WYFR (Network) [M-F]
1203
Croatian Radio, Zagreb
1210
China Radio Int'l*
1215
HCJB [M-F]
Radio Korea
1230
All India Radio (News Service)
Christian Science Monitor [M-F]
Radio Cairo
Radio Finland [M-F]
Radio France Int'l
Radio Moscow
Radio Netherlands
SLBC, Sri Lanka
WYFR (Network) [M-F]
1235
Voice of Greece
1245
SLBC, Sri Lanka
1255
Radio Bangladesh
1257
HCJB [M-F]
1258
Africa Number One, Libreville

1300 UTC
(9:00 AM EDT, 6:00 AM PDT)
BBC ("Newshour")
CBC, Northern Quebec
China Radio Int'l
Christian Science Monitor
GBC Radio, Accra
Kol Israel [S-H]
Radio Australia
Radio Bahrain
Radio Canada Int'l (na) [S]
Radio Iraq Int'l
Radio Jordan
Radio Moscow
Radio Norway Int'l [S]
Radio Tanzania [A-S]
Radio Vlaanderen Int'l [M-A]
SBC Radio 1, Singapore
Swiss Radio Int'l
Voice of America
Voice of Kenya
WYFR (Network) [M-F]
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 (as)
Radio Finland [M-A]
Radio Moscow
Radio Netherlands
Radio Romania Int'l
Radio Tashkent
RTM, Malaysia
UAE Radio, Dubai
Voice of America (SpecEng)
Voice of Turkey
1346
All India Radio [A]

1400 UTC
(10:00 AM EDT, 7:00 AM PDT)
BBC
CBC, Northern Quebec [A-S]
China Radio Int'l
Christian Science Monitor
GBC Radio, Accra
LBS, Monrovia
MBC, Blantyre [M-F]
Radio Australia
Radio Bahrain
Radio Canada Int'l (na) [S]
Radio France Int'l
Radio Japan
Radio Korea
Radio Liberia
Radio Moscow
RTM, Malaysia*
SBC Radio 1, Singapore
Voice of America
Voice of Kenya
WWCR [M-F]
ZNBC Radio 2, Lusaka [M-F]
1410
China Radio Int'l*
1415
LBS, Monrovia (Special English)
Radio Canada Int'l (eu)
Radio Korea (News Service)
Radio Nepal
1425
HCJB [M-F]
LBS, Monrovia
1430
All India Radio (News Service)
Christian Science Monitor [M-F]
FEBC Radio Int'l, Philippines
Radio Austria Int'l
Radio Moscow
Radio Netherlands
Radio Portugal [M-F]
WYFR (Network) [M-F]
1440
FEBC Radio Int'l, Philippines* [M-F]
1445
All India Radio
BBC (as) (Special English) [M-F]
Voice of Myanmar
1455
Radio Korea [M-F]

1500 UTC
(11:00 AM EDT, 8:00 AM PDT)
BBC
CBC, Northern Quebec [A-S]
China Radio Int'l
Christian Science Monitor
Deutsche Welle
GBC Radio 2, Accra
Polish Radio, Warsaw
Radio Australia
Radio Bahrain
Radio Canada Int'l [S]
Radio Japan
Radio Jordan
Radio Moscow
Radio Nigeria
Radio Omdurman, Sudan
Radio Prague
RTM, Malaysia
SBC Radio 1, Singapore
SLBC, Sri Lanka
Swiss Radio Int'l
Voice of America
Voice of Ethiopia
Voice of Kenya



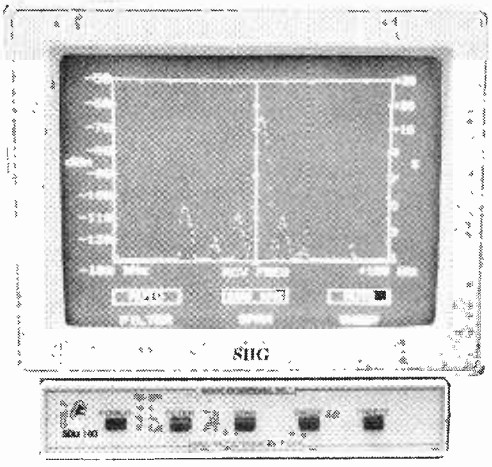
Isn't it time that YOU broke out of your shell?

$50 OFF if purchased with an ICOM R7100 or R7000

The Grove SDU-100
SPECTRUM DISPLAY UNIT

For your ICOM R7000 and R7100

Something a little different...



The all-new **Grove SDU-100** allows you to do something that has never been **SEEN** before at this price; it allows you to **LOOK** at the radio spectrum and to **SEE** signals as they are transmitted. The **SDU-100** plugs directly into the IF output on the back of your receiver and, as you tune, it follows your dial, showing you up to a 10MHz span of spectrum. Don't miss those brief transmissions. Overcome the hit-and-miss tactic of scanners. **SEE** everything at once!

Along with this intercept power, you can also analyze your signal with a real-time oscilloscope! And if necessary, freeze it, right there on your screen!

Powered by the supplied AC adaptor, the SDU-100 can be configured to work with almost any receiver that has an IF output such as 8.8, 10.7, 21.4, 45 and 70 MHz. It outputs to a standard TTL monochrome monitor like the Grove VID-100, and can operate on 12 VDC for mobile or field environments!

So if you are ready to break out of the standard listening environment, get ready to fly! The SDU-100 is the next generation of the listening hobby!

Specifications:
SPAN: 10, 5, 2, 1, MHz; 500, 200, 100, 0 (Time) kHz
DISPLAY ACCURACY: +/-3% or +/-3 dB, whichever is larger
RESOLUTION BANDWIDTH: 5, 30 kHz
SWEEP TIME: 0.1, 0.5, 2, 6 seconds
IF: 10.7 (others available by special order)
VIDEO OUTPUT: TTL to optional monochrome monitor
MINIMUM DETECTABLE SIGNAL (MDS): -130 dBm nom.
DISPLAY DYNAMIC RANGE: 80 dB

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Special pricing when you order the SDU-100 Spectrum Display Unit and VID-100 9" CRT monitor together:

$599.95!

Plus $12 UPS;
$23.50 2nd Day Air;
$25.50 US Priority Mail;
$16 Canadian UPS;
$30.50 Canadian APP

Ordered separately:
SDU-100 Spectrum Display Unit: $499.95
Plus $7.50 UPS; $10.50 2nd Day Air; $11.50 US Priority Mail; $10.50 Canadian UPS; $14 Canadian APP

VID-100 9" CRT Monitor: $149.95
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newsline

WYFR (Network) [A]
1505
Radio Pyongyang
1510
China Radio Int'l*
1520
Radio Tallinn [M-F]
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 Bangladesh
Radio Finland
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]
1555
Radio Veritas Asia [A-M]

1600 UTC
(12:00 PM EDT, 9:00 AM PDT)
BBC
CBC, Northern Quebec [A]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
Deutsche Welle
GBC Radio 2, Accra
LBS, Monrovia
MBC, Blantyre
Radio Australia
Radio Bahrain
Radio Canada Int'l
Radio France Int'l
Radio Jordan
Radio Korea
Radio Lesotho
Radio Liberia
Radio Moscow
Radio Nigeria
Radio Norway Int'l [S]
Radio Pakistan
Radio Tanzania
SBC Radio 1, Singapore
Voice of America
Voice of Kenya
Yemen Radio
ZNBC Radio 2, Lusaka [M-A]
1609
BBC*
1610
China Radio Int'l*
Radio Botswana [M-F]
1615
Radio Pakistan (Special English)
1630
Christian Science Monitor [M-F]
HCJB [M-F]
Radio Canada Int'l (as)
Radio Moscow
Radio Romania Int'l
UAE Radio, Dubai
V of America (eu) (Spec Eng)
1655
Radio Korea [M-F]

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)
BBC
CBC, Northern Quebec [A]
Channel Africa, Johannesburg
China Radio Int'l
Christian Science Monitor
GBC Radio 2, Accra
IRRS, Milan [S]
Kol Israel
Polish Radio, Warsaw
Radio Australia
Radio Bahrain
Radio Japan
Radio Moscow
Radio New Zealand Int'l* [M-F]
Radio Nigeria, Kaduna
Radio Norway Int'l [S]
Radio Pakistan
Radio Prague
SLBC, Sri Lanka
Swiss Radio Int'l
Voice of America
Voice of Kenya
WWCR [M-F]
1705
Radio Bangladesh
Radio Pyongyang
1710
China Radio Int'l*
1715
Radio Korea (News Service)
1725
Radio New Zealand Int'l* [M-F]
Radio Surinam Int'l [M-F]
1730
All India Radio (News Service)
Christian Science Monitor [M-F]
Radio Bulgaria
Radio Moscow
Radio Netherlands
1740
BBC (af)*
1750
Channel Africa, Johannesburg

1800 UTC
(2:00 PM EDT, 11:00 AM PDT)
All India Radio
BBC ("Newsdesk")
CBC, Northern Quebec [M-H]
Christian Science Monitor
GBC Radio, Accra
KVOH
MBC, Blantyre
Radio Afghanistan
Radio Australia
Radio Bahrain
Radio Canada Int'l
Radio Moscow
Radio Nacional do Brasil [M-A]
Radio New Zealand Int'l* [M-F]
Radio Omdurman, Sudan
Radio Portugal [M-F]
Radio Romania Int'l
Radio Tanzania
Radio Vlaanderen Int'l
Voice of America
Voice of Kenya
WWCR [M-F]
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 Austria Int'l
Radio Finland [S-F]
Radio Kuwait
Radio Mogadishu
Radio Moscow
Radio Netherlands
Radio Slovakia Int'l
Radio Yugoslavia
Voice of America (Spec Eng)
1835
Radio New Zealand Int'l* [F]
1840
Voice of Greece
1845
BSKSA, Riyadh*
Radio Cote d' Ivoire
Radio Guinea, Conakry
1855
Radio New Zealand Int'l* [M-H]
Radio Omdurman, Sudan
1857
BBC (af)* [M-F]

1900 UTC
(3:00 PM EDT, 12:00 PM PDT)
All India Radio
BBC
China Radio Int'l
Christian Science Monitor [M-A]
Deutsche Welle
GBC Radio 2, Accra*
HCJB
Kol Israel
KVOH
Radio Australia
Radio Canada Int'l
Radio Japan
Radio Korea
Radio Liberia
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Norway Int'l [S]
Radio Portugal [M-F]
Radio Vilnius
RAE, Buenos Aires [M-F]
SLBS, Freetown
Spanish National Radio
Voice of America
Voice of Kenya
1903
Croatian Radio, Zagreb [S]
Voice of Greece
1910
China Radio Int'l*
Radio Botswana
1930
BBC (af)* [S, F]
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
Polish Radio, Warsaw
Radio Ghana
Radio Moscow
Radio Netherlands
Voice of Nigeria
1935
Radiotelevisione Italiana
1945
Radio Togo
1955
Radio Korea [M-F]

2000 UTC
(4:00 PM EDT, 1:00 PM PDT)
BBC
CBC, Northern Quebec [S-F]
China Radio Int'l
Christian Science Monitor
GBC Radio, Accra
KVOH
MBC, Blantyre
Radio Australia
Radio Bahrain
Radio Bulgaria
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Prague
Radio Romania Int'l
SLBS, Freetown
Swiss Radio Int'l
Voice of America
Voice of Indonesia
Voice of Nigeria
ZNBC Radio 2, Lusaka
2002
Radio Botswana
2005
Radio Pyongyang
2010
China Radio Int'l*
Radio New Zealand Int'l* [S-H]
2025
Radiotelevisione Italiana
2030
Christian Science Monitor [M-F]
Radio Moscow
Radio Nacional de Angola
2045
BSKSA, Riyadh
Radio Korea (News Service)
2055
Voice of Indonesia

2100 UTC
(5:00 PM EDT, 2:00 PM PDT)
All India Radio
BBC ("Newshour")
CBC, Northern Quebec [S-F]
China Radio Int'l
Christian Science Monitor [M-A]
Deutsche Welle
GBC Radio 2, Accra*
KVOH
MBC, Blantyre
Radio Australia
Radio Bahrain
Radio Budapest
Radio Canada Int'l
Radio Havana Cuba [M-A]
Radio Iraq Int'l
Radio Japan
Radio Liberia
Radio Moscow
Radio New Zealand Int'l [S-H]
Radio Nigeria
Radio Norway Int'l [S]
Radio Prague
Radio Ukraine Int'l
Radio Vlaanderen Int'l
Radio Yugoslavia
SLBS, Freetown
Spanish National Radio
Voice of America
Voice of Kenya
Voice of Turkey
ZNBC Radio 2, Lusaka
2103
Croatian Radio, Zagreb
2110
China Radio Int'l*
Radio New Zealand Int'l* [S-H]
2120
Radio Cairo
Radio For Peace Int'l [M-F]
2125
Radio Havana Cuba* [M-A]
2130
Christian Science Monitor [M-F]
Kol Israel
Radio Austria Int'l [M-F]
Radio Cairo
Radio Finland [S-F]
Radio Havana Cuba [M-A]
Radio Moscow
Radio Vilnius
2145
Radio Bulgaria
Radio Korea
Radio Yerevan

2200 UTC
(6:00 PM EDT, 3:00 PM PDT)
All India Radio
BBC
CBC, Northern Quebec [M-F]
China Radio Int'l
Christian Science Monitor
CIQX, Montreal [M-F]
GBC Radio 2, Accra
MBC, Blantyre
Radio Australia
Radio Canada Int'l
Radio Havana Cuba [M-A]
Radio Moscow
Radio New Zealand Int'l [A-H]
Radio Tirana
Radiotelevisione Italiana
SBC Radio 1, Singapore
SLBS, Freetown
Swiss Radio Int'l
Voice of America
Voice of Free China
2209
BBC*
2210
China Radio Int'l*
2215
Radio Cairo
2225
Radio Havana Cuba* [M-A]
2230
Christian Science Monitor [M-F]
Radio Havana Cuba [M-A]
Radio Moscow
Voice of America (Spec Eng)
2240
Radio Cairo
Radio Korea [M-F]
Voice of Greece
2245
GBC Radio, Accra
Radio Yerevan

2300 UTC
(7:00 PM EDT, 4:00 PM PDT)
All India Radio
BBC
CBC, Northern Quebec [A]
Christian Science Monitor [M-A]
Radio Australia
Radio Canada Int'l
Radio Japan
Radio Liberia
Radio Moscow
Radio New Zealand Int'l [A]
Radio Norway Int'l [S]
Radio Vilnius
RTM, Malaysia
SBC Radio 1, Singapore
Voice of America
Voice of Turkey
WYFR (Network) [M-F]
2305
Radio Pyongyang
2330
Christian Science Monitor [M-F]
Radio Moscow
Radio Nacional, Bogota [A]
Radio Netherlands
Radio Vlaanderen Int'l
RTM, Malaysia*
2335
Voice of Greece
2345
SLBC, Sri Lanka [M]
2350
Radio For Peace Int'l [M-F]
2355
Radio Japan [M-F]
WRNO [W, F]

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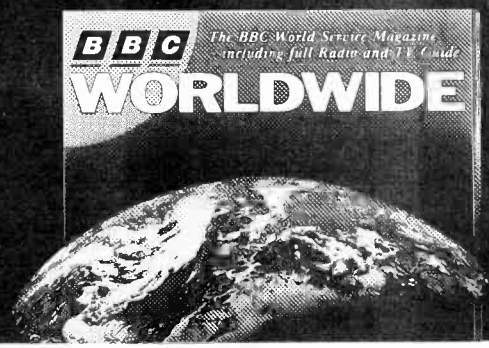

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Mr/Mrs/Ms/Miss _____

Address _____

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_____ Postcode _____

Date _____ Signature _____

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Lawrence Magne
Monitoring Times

"The best of the best for high-quality listening to news, music and entertainment from afar. Superb for reception of faint, tough signals."

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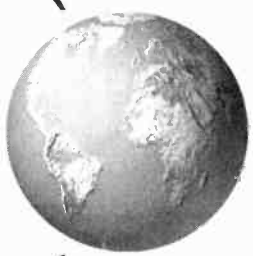
Bill Clarke
73 Amateur Radio Today



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0000 UTC [8:00 PM EDT/5:00 PM PDT]

FREQUENCIES

0000-0100	Australia, ABC Brisbane	4920do	9660do		
0000-0100	Australia, ABC Perth	9610do			
0000-0030	Australia, Radio	5880pa	13605pa	15320as	15365pa
		17750as	17840as		
0000-0100	Bulgaria, Radio	11720na	15330na		
0000-0005	Canada, CBC Northern Svc	9625am			
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	China, China Radio Intl	9770na	11715na		
0000-0100	Costa Rica, AWR Alajuela	9725ca	11870ca		
0000-0100	Costa Rica,R forPeace Int	7375na	7385na	13630na	15030na
0000-0100 a	Croatian Radio via WHRI	7315na			
0000-0100	Cuba, Radio Havana Cuba	6010na	9815na		
0000-0030	Czech Republic, R Prague	5930na	7345na	9485na	9810na
		11990na	13715na	17535na	
0000-0045	India, All India Radio	9910as	11745as	11785as	15110as
		15145as			
0000-0100	Netherlands, Radio	6020na	6165na		
0000-0100	New Zealand, R NZ Intl	15120pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0030 m	Norway, Radio Norway Intl	9675na	15165na		
0000-0100	Palau, KHBN Voice of Hope	9830as			
0000-0100	Philippines, FEBC Manila	15450as			
0000-0100	Russia, Radio Moscow Intl	7220na	7335na	9480na	9530na
		9765na	9815na	9860na	11750na
		11790na	11805as	11840as	15410na
		15425na	15470na	17570as	17720na
		17860as	21625as	21690as	
0000-0100	Singapore, SBC Radio One	5010do	5052do	11940do	
0000-0100	Spain, Spanish Natl Radio	9530am			
0000-0030	Switzerland, Swiss R Intl	6135na	9650na	9885na	12035na
		17730na			
0000-0100	Thailand, Radio	9655as	11905as		
0000-0100	Ukraine, R Ukraine Intl	6090eu	7150eu	7195eu	7240eu
		9500eu	9550eu	9560eu	9600eu
		9640na	9685na	9860eu	10344eu
		11720na	15195am		
0000-0030	United Kingdom,BBC London	5975na	6005sa	6175na	6180eu
		6195as	7325am	9570as	9580as
		9590na	9915am	11750sa	11945as
		11955as	12095na	15070na	15260sa
		15280na	15360pa		
0000-0100	USA, CSMonitor Boston MA	5850na	9850af	13760sa	17555as
0000-0100 sa	USA, CSMonitor Boston MA	17865as			
0000-0100	USA, KCBI Dallas TX	15725am			
0000-0100	USA, KTBN Salt Lk City UT	15590am			
0000-0100	USA, KVOH Los Angeles CA	17775am			
0000-0030	USA, VOA Washington DC	5995ca	7405ca	9775ca	11580ca
		15120ca	15205ca		
0000-0100	USA, VOA Washington DC	6130ca	7215as	9455ca	9770as
		11695ca	11760as	15185as	15290as
		17735as	17820as		
0000-0100	USA, WEWN Birmingham AL	7425na	15650na		
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		7355na		
0000-0100	USA, WWCR Nashville TN	13845va			
0000-0100	USA, WYFR Okeechobee FL	6085na			
0010-0015	Kirghizia, Kirghiz Radio	6080as			
0030-0100	Australia, Radio	11880pa	15240pa	15320as	15365pa
		17750as	17795pa	17880as	21740pa
0030-0100	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0030-0100	Iran, VOIRI Tehran	9022am	11790am	15260am	
0030-0100	Netherlands, Radio	6020na	6165na	9825as	9860as
		11655as	11835na	13700as	
0030-0100	Serbia, Radio Yugoslavia	9580na	11870na		
0030-0100	South Korea, Radio Korea	15575am			
0030-0100	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0030-0100	United Kingdom,BBC London	5975na	6005sa	6175na	6180eu
		7325am	9580as	9590am	9915am
		11750sa	12095na	15260sa	15310as
		15360pa			
0030-0100	USA, VOA Washington DC	5995ca	7405ca	9775ca	11580ca
		15120ca	15205ca		

SELECTED PROGRAMS

Sundays

0011 Radio Moscow: Adamov's Mailbag. Joe Adamov presents listener letters.
0012 Radio New Zealand Int'l: Focus On Politics. Developments on the New Zealand political scene.
0030 BBC: The Ken Bruce Show. Ken Bruce plays the latest releases, from pop to jazz to country.
0031 Radio Moscow: Audio Book Club. The best of Russian classics and contemporary Russian literature.
0045 Radio New Zealand Int'l: From The Back Country. No details available.

Mondays

0005 Radio New Zealand Int'l: Midday Report.
0011 Radio Moscow: Adamov's Mailbag. See S 0011.
0030 BBC: In Praise Of God. This month: services from Washington (5th), Wales (12th), and Bristol (19th).
0031 Radio Moscow: Russian By Radio. See S 0631.
0040 Radio New Zealand Int'l: Rural Report. No details available.

Tuesdays

0005 Radio New Zealand Int'l: Midday Report. See M 0005.
0011 Radio Moscow: Focus On Asia And The Pacific. News and comments on events in the region.
0030 BBC: Panel Game. Steve Race hosts another series of "My Music" (through August 3rd).
0031 Radio Moscow: Music. See S 0531.
0040 Radio New Zealand Int'l: Rural Report. See M 0040.

Wednesdays

0005 Radio New Zealand Int'l: Midday Report. See M 0005.
0011 Radio Moscow: Focus On Asia And The Pacific. See T 0011.

Thank You!

Frequency data and schedules for the July 93 Frequency Section were compiled from the following contributors:

Ed Rausch, NJ; David Norcross, Guam; Bob Fraser, MA; Robert C. Merrill, NJ; Ralph Krug, MI; Jim Frimmel, TX; Michael Murray, EDXC; Glenn Hauser, NM; Kevin Klein, WI; Grove BBS; Radio Netherlands *Media Network*; RVI *Radio World*; *BBC Monitoring Service*; *Shortwave Radio Today*; *The NASWA Journal*; *Fine Tuning*; *Play DX*.

0030 BBC: Omnibus. Topical features on a range of topics, from Dracula to drugs. This month: "Silicon Valley" (7th).
0031 Radio Moscow: Music. See S 0531.
0040 Radio New Zealand Int'l: Rural Report. See M 0040.

Thursdays

0005 Radio New Zealand Int'l: Midday Report. See M 0005.
0011 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
0030 BBC: Comedy (except 1st, 29th: Two Cheers). See W 1530.
0031 Radio Moscow: Music. See S 0531.
0040 Radio New Zealand Int'l: Rural Report. See M 0040.

Fridays

0005 Radio New Zealand Int'l: Midday Report. See M 0005.
0011 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
0030 BBC: Music Feature. This month, Maddy Prior examines a cappella singing in "In Good Voice."
0031 Radio Moscow: Music. See S 0531.
0040 Radio New Zealand Int'l: Rural Report. See M 0040.

Saturdays

0010 Radio New Zealand Int'l: Money Matters.
0011 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
0030 BBC: From The Weeklies. The best extracts from the week's newspapers and magazines.
0031 Radio Moscow: Music. See S 0531.
0045 BBC: Recording Of The Week. See M 0615.
0045 Radio New Zealand Int'l: Pioneer Families Of New Zealand.

0100 UTC [9:00 PM EDT/6:00 PM PDT]

FREQUENCIES

0100-0200	Australia, ABC Brisbane	4920do	9660do		
0100-0200	Australia, ABC Perth	9610do			
0100-0200	Australia, Radio	5880pa	11880pa	15240va	15320pa
		15365as	17715pa	17750as	17795pa
		17840as	17880as	21740pa	
0100-0200	Bulgaria, Radio	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			
0100-0159 sm	Canada, RCI Montreal	6120na	9535am	9755na	11845am
		11940am			
0100-0130 twhfa	Canada, RCI Montreal	9535am	11845am	11940am	
0100-0200	Costa Rica,R forPeace Int	7375am	7385na	13630am	15030am
0100-0200	Cuba, Radio Havana Cuba	6010na	9815na		
0100-0130	Czech Republic, R Prague	7345na	9485na	11990na	
0100-0200	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9565na
		9700na	9765na	11810na	11865na
		13610na	13770na	15105na	
0100-0200	Guam, KSDA Agana	15610as			
0100-0130	Iran, VOIRI Tehran	9022am	11790am	15260am	
0100-0120	Italy, RAI Rome	9575am	11800am		
0100-0200	Japan, NHK Tokyo	5960na	11815as	11860as	17810as
		17835as	17845as		
0100-0130	Laos, National Radio of	7116as			
0100-0200	Namibia, Namibia BC Corp	3290af			
0100-0130	Netherlands, Radio	6020na	6165na	11835na	
0100-0200	New Zealand, R NZ Intl	15120pa			
0100-0130 m	Norway, Radio Norway Intl	9560na			
0100-0200	Philippines, FEBC Manila	15450as			
0100-0200	Russia, Radio Moscow Intl	7335na	9480as	9530na	9765na
		9810na	9815eu	9840na	9860na
		9870na	9875na	11790na	11805as
		11905as	12050na	15385na	15410na
		15425na	15470na	17570na	17590na
		17655as	17720na	17835na	17860as
		17870na	21625as	21690as	21770as
0100-0200	Singapore, SBC Radio One	5010do	5052do	11940do	
0100-0127	Slovakia, Slovak Radio	5930am	7310am	9810am	
0100-0130	South Korea, Radio Korea	15575am			
0100-0200	Spain, Spanish Natl Radio	9530am			
0100-0200	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0100-0130	Sweden, Radio	9695as	11820as		
0100-0200	Thailand, Radio	9655as	11905as		
0100-0130	United Kingdom,BBC London	5975na	6005sa	6175na	6180eu
		7325am	9590am	9915am	11750sa
		11955as	12095na	15260sa	15310as
		15360pa	17790as		
0100-0200	USA, CSMonitor Boston MA	5850na	9850af	13760sa	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	7115as	7205as
		7405am	7651as	9455am	9775am
		11580am	11705as	15120am	15160as
		15205am	15250as	17740as	21550as
0100-0130	USA, WEWN Birmingham AL	7425as			
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	13845am			
0100-0200	USA, WYFR Okeechobee FL	6065am	6085am	9505am	15440am
0100-0130	Uzbekhistan, R Tashkent	5955as	5995as	7325as	7335as
		9740as	9755as	11975as	
0130-0200	Albania, R Tirana Intl	9580na	11840na		
0130-0200	Austria, R Austria Intl	6015na	9880na		
0130-0150 mtwhfa	Greece, Voice of	9375na	9420na	11645na	
0130-0200	Netherlands, Radio	9860as	11655as	12025as	13700as
0130-0200 mtwhf	Portugal, Radio	9555na	9570na	9600na	9705na
		11840na			
0130-0200	Serbia, Radio Yugoslavia	9580na	11870na		
0130-0200	United Kingdom,BBC London	5975na	6005na	6175na	6180eu
		7325am	9580am	9590na	9915am
		11750sa	11955as	12095na	15260sa
		15310as	15360pa	17790as	
0145-0200 smtwhf	Finland, Radio	11755na	15185na		
0145-0200	Vatican State, Vatican R	7125pa	9650as		

SELECTED PROGRAMS

Sundays

0100 R New Zealand Int'l: National Radio Afternoon or Sport. New Zealand domestic radio, or the weekend's sports.
0101 BBC: Play Of The Week. This month: Daniel Massey and Geraldine James star in Mikhail Bulgakov's "The Master And Margarita."
0107 Radio Canada Int'l: Innovation Canada. Canada's new ideas and technological developments.
0111 Radio Moscow: Music And Musicians. Music from world-famous performers and composers.
0133 R Canada Int'l: Earth Watch. Environmental developments.
0145 Radio Finland: Focus. No details available.

Mondays

0101 BBC: Feature. This month: "AD" (5th); "Badgers and Birds' Nests: The Vision Of John Clare" (12th); "The Record Producers" (19th, 26th).
0105 Radio New Zealand Int'l: Correspondence School.
0107 Radio Canada Int'l: Arts In Canada. See S 1337.
0111 Radio Moscow: Music And Musicians. See S 0111.
0133 Radio Canada Int'l: The Mailbag. See S 1237.
0145 BBC: Musical Feature. This month, Jihad Racy travels the Middle East in search of "Arabian Sounds."
0150 Radio Finland: Compass North. See S 1535.

Tuesdays

0105 BBC: Outlook. See M 1405.
0105 Radio New Zealand Int'l: Correspondence School.
0107 Radio Canada Int'l: Spectrum. See M 1237.
0111 Radio Moscow: Update. Comments on and in-depth analysis of the latest developments worldwide.
0130 BBC: Folk Routes. Ian Anderson presents a selection of roots music.
0131 Radio Moscow: Folk Box. See S 2331.
0141 Radio Portugal: Welcome To Portugal. See M 1441.
0145 BBC: Health Matters. New medical developments and methods of keeping fit.
0150 Radio Finland: Compass North. See S 1535.

Wednesdays

0105 BBC: Outlook. See M 1405.
0105 Radio New Zealand Int'l: Correspondence School.
0107 Radio Canada Int'l: Spectrum. See M 1237.
0111 Radio Moscow: Update. See T 0111.
0130 BBC: Talks. This month: "From Age To Age" (7th, 14th, 21st); "Poems By Post" (through August 25th).
0131 Radio Moscow: Music At Your Request. See M 1131.
0141 Radio Portugal: Music Time. See T 1441.
0145 BBC: Country Style. Selections of country music.
0150 Radio Finland: Compass North. See S 1535.

Thursdays

0105 BBC: Outlook. See M 1405.
0105 Radio New Zealand Int'l: Correspondence School.
0107 Radio Canada Int'l: Spectrum. See M 1237.
0111 Radio Moscow: Update. See T 0111.
0130 BBC: Waveguide. See W 0415.
0131 Radio Moscow: Jazz Show. See M 0431.
0140 BBC: Book Choice. See W 0425.
0141 Radio Portugal: Challenge Of The '90s. See W 1441.
0145 BBC: The Farming World. An examination of agriculture, forestry, and fishing worldwide.
0150 Radio Finland: Compass North. See S 1535.

Fridays

0105 BBC: Outlook. See M 1405.
0105 Radio New Zealand Int'l: Correspondence School.
0107 Radio Canada Int'l: Spectrum. See M 1237.
0111 Radio Moscow: Update. See T 0111.
0130 BBC: On The Move. Travel and transport news.
0131 Radio Moscow: Music At Your Request. See M 1131.
0141 Radio Portugal: Portugal Past and Present. See H 1441.
0145 BBC: Global Concerns. An update on environmental issues.
0150 Radio Finland: Compass North. See S 1535.

Saturdays

0105 BBC: Outlook. See M 1405.
0105 R New Zealand Int'l: National Radio Afternoon or Sport. See S 0100.
0107 Radio Canada Int'l: Spectrum. See M 1237.
0111 Radio Moscow: Update. See T 0111.
0130 BBC: Short Story (except 3rd, 31st: Seeing Stars). See S 0430.
0131 Radio Moscow: Jazz Show. See M 0431.
0141 Radio Portugal: Feature. See F 1441.
0145 BBC: Jazz Now And Then. George Reid presents a mix of new releases and classic tracks.
0150 Radio Finland: Compass North. See S 1535.

0200 UTC [10:00 PM EDT/7:00 PM PDT]

FREQUENCIES

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, ABC Brisbane	4920do	9660do		
0200-0300	Australia, ABC Perth	6070do	9610do		
0200-0300	Australia, Radio	5880pa	11720va	15240pa	15365pa
		17715pa	17750as	17795pa	17840as
		21595pa	21740pa		
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			
0200-0259	Canada, RCI Montreal	6120na	9535am	9755na	11845am
		11940am			
0200-0300	Costa Rica,R forPeace Int	7375na	7385na	13630na	15030na
0200-0300	Cuba, Radio Havana Cuba	6010na	13600na		
0200-0300	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0200-0300	Egypt, Radio Cairo	9475na	11825na		
0200-0210 smtwhf	Finland, Radio	11755na	15185na		
0200-0250	Germany, Deutsche Welle	7285as	9615as	9690as	11945as
		11965as	13790as	15185as	15560as
0200-0300 as	Guam, KSDA Agana	13720as			
0200-0300	Hungary, Radio Budapest	9835na	11910na	15220na	
0200-0230 mtwhfa	Kenya, Kenya BC Corp	4935do			
0200-0300 smtwh	Malaysia, RTM Radio 4	7295do			
0200-0300	Namibia, Namibia BC Corp	3290af			
0200-0300	Netherlands, Radio	9860as	11655as	12025as	13700as
0200-0300	New Zealand, R NZ Intl	15120pa			
0200-0230 m	Norway, Radio Norway Intl	9565na	11925na		
0200-0230	Philippines, FEBC Manila	15450as			
0200-0300	Romania, R Romania Intl	6155na	9510na	9570na	11830na
		11940na			
0200-0300	Russia, AWR Russia	11835eu			
0200-0300	Russia, Radio Moscow Intl	7150na	7335na	9480na	9530na
		9685na	9765na	9810na	11805na
		11840na	12050na	15220am	15375am
		15385am	15410na	15425na	15470am
		17560am	17570am	7590am	17655as
		17720na	17835am	17850na	17860na
		21625am	21690as		
0200-0300	S Africa, Channel Africa	9730af			
0200-0300	Singapore, SBC Radio One	5010do	5052do	11940do	
0200-0300	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0200-0230	Sweden, Radio	9695na	11705na		
0200-0230	Switzerland, Swiss R Intl	6135am	9650am	9885am	12035am
0200-0300	Taiwan, VO Free China	5950na	9680na	9765pa	11740ca
		11860as	15345na		
0200-0300	Thailand, Radio	9655as	11905as		
0200-0230	United Kingdom,BBC London	5975na	6005sa	6175na	6195eu
		7135me	7325am	9410eu	9590am
		9915am	11730af	11750sa	11955as
		12095na	15260sa	15310as	15360pa
		15380as	17790as	21715as	
0200-0300	USA, CSMonitor Boston MA	5850na	9350af	9455na	13760sa
0200-0300 sa	USA, CSMonitor Boston MA	17555as	17865as		
0200-0230	USA, KCBI Dallas TX	9815am			
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0230	USA, KVOH Los Angeles CA	17775am			
0200-0230 twhfa	USA, VOA Washington DC	5995am	7405am	9775am 1	1580am
		15120am	15205am		
0200-0300	USA, VOA Washington DC	7115as	7205as	7651as	11705as
		15160as	15250as	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	USA, WRNO New Orleans LA		7355na		
0200-0300	USA, WWCR Nashville TN	5935am			
0200-0300	USA, WYFR Okeechobee FL	5985am	6065am	9505am	15440am
0205-0238	Honduras,La Voz Mosquitia	4911do			
0205-0230 tes-vl	Moldova, Natl R of Moldov	7125na			
0230-0300	Albania, R Tirana Intl	9580na	11840na		
0230-0300 s	Kenya, Kenya BC Corp	4935do			
0230-0245	Pakistan, Radio	9515as	17705as	17725as	21485as
		21730as			
0230-0300	Philippines, R Pilipinas	17760as	17840as	21580as	
0230-0300	United Kingdom,BBC London	5975na	6005sa	6175na	6195eu
		7135me	7325am	9410eu	9915am
		11730af	11750sa	11955as	12095na
		15260sa	15310as	15360pa	17790as
0230-0300	USA, KCBI Dallas TX	9815am			
0245-0259	Armenia, Radio Yerevan	11790na			
0250-0300	Vatican State, Vatican R	9605na	11620na		

SELECTED PROGRAMS

Sundays

0200 Radio New Zealand Int'l: National Radio Afternoon or Sport. See S 0100.
0207 Radio Canada Int'l: The Inside Track. A sports feature magazine.
0211 Radio Moscow: Adamov's Mailbag. See S 0011.
0230 BBC: Feature. This month: "Just The Job" (4th, 11th); "Who Says I'm Mad?" (18th); "The Odd Couple" (25th).
0231 Radio Moscow: Your Top Tune. A quiz show featuring popular music.

Mondays

0205 Radio New Zealand Int'l: In Touch With New Zealand. Wayne Mowat presents a magazine program.
0207 Radio Canada Int'l: Open House. See S 2307.
0211 Radio Moscow: Adamov's Mailbag. See S 0011.
0230 BBC: Composer Of The Month. Profiles of famous classical composers. This month: the Burgundians.
0231 Radio Moscow: Ads. See S 0431.

Tuesdays

0205 RN Zealand Int'l: In Touch With New Zealand. See M 0205.
0207 Radio Canada Int'l: The Best Of Morningside. Details not available.
0211 Radio Moscow: Newmarket. See M 1611.
0230 BBC: Quiz. See M 1215.
0231 Radio Moscow: Audio Book Club. See S 0031.

Wednesdays

0205 Radio New Zealand Int'l: In Touch With New Zealand. See M 0205.
0207 Radio Canada Int'l: The Best Of Morningside. See T 0207.
0211 Radio Moscow: Science And Engineering. See S 0511.
0230 BBC: Development '93. Aid and development issues for developing nations.
0231 Radio Moscow: Russian By Radio. See S 0631.

Thursdays

0205 RN Zealand Int'l: In Touch With New Zealand. See M 0205.
0207 Radio Canada Int'l: The Best Of Morningside. See T 0207.
0211 Radio Moscow: Adamov's Mailbag. See S 0011.
0230 BBC: Sports International. Live play-by-play, interviews, features, and discussions from the sports world.
0231 Radio Moscow: Audio Book Club. See S 0031.

Fridays

0205 Radio New Zealand Int'l: In Touch With New Zealand. See M 0205.
0207 Radio Canada Int'l: The Best Of Morningside. See T 0207.
0211 Radio Moscow: Mailbag. See S 0611.
0230 BBC: Drama. See H 1130.
0231 Radio Moscow: Russian By Radio. See S 0631.

Saturdays

0200 Radio Finland: Starting Finnish. See S 0645.
0200 Radio New Zealand Int'l: National Radio Afternoon or Sport. See S 0100.
0207 Radio Canada Int'l: The Best Of Morningside. See T 0207.
0211 Radio Moscow: Adamov's Mailbag. See S 0011.
0230 BBC: People And Politics. Background to the British political scene.
0231 Radio Moscow: Audio Book Club. See S 0031.

0300 UTC [11:00 PM EDT/8:00 PM PDT]

FREQUENCIES

0300-0400	Australia, AAF Radio	19037af	23678af		
0300-0400	Australia, ABC Brisbane	4920do	9660do		
0300-0400	Australia, ABC Perth	9610do			
0300-0400	Australia, Radio	5880pa	11720pa	15240as	15365pa
		17715pa	17750as	17795pa	17840as
		21525as	21595as	21740pa	
0300-0400	Bulgaria, Radio	9850na	11765na		
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,Faro del Carib	5055do	9645na		
0300-0400	Costa Rica,R forPeace Int	7375na	7385na	13630na	15030na
0300-0400	Cuba, Radio Havana Cuba	6010na	9655na	13660na	
0300-0330	Czech Republic, R Prague	5930na	7345na	9485na	9810na
		11990na			
0300-0400	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0300-0330	Egypt, Radio Cairo	9475na	11865na		
0300-0350	Germany, Deutsche Welle	6085na	6145na	9640na	9700na
		11810na	11890na	13610na	13770na
		13790na	15205na		
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400 m	Honduras, La Voz Evangel	4820do			
0300-0400 sm	Honduras, R Luz y Vida	3250ca			
0300-0330	Japan, NHK Tokyo	11725as	15230am	15325am	17810am
0300-0400	Kenya, Kenya BC Corp	4935do			
0300-0400 smtwh	Malaysia, RTM Radio 4	7295do			
0300-0330	Netherlands, Radio	9860as	11655as	12025as	13700as
0300-0400	New Zealand, R NZ Intl	15120pa			
0300-0330 m	Norway, Radio Norway Intl	9560na	11865na		
0300-0330	Philippines, R Pilipinas	17760as	17840as	21580as	
0300-0400	Russia, Radio Moscow Intl	7205na	9530na	9765na	9860na
		11665as	11790na	11840na	15375as
		15385na	15410na	15425na	15470as
		15535as	17560as	17570as	17640as
		17670as	17685as	17735as	17850as
		17860as	21690as		
0300-0400	S Africa, Channel Africa	9730af			
0300-0400	S Africa, Radio Oranje	3230do			
0300-0400	Singapore, SBC Radio One	5010do	5052do	11940do	
0300-0400	Sri Lanka, SLBC Colombo	9720as	15425as		
0300-0400	Taiwan, VO Free China	5950na	9680na	9765as	11740as
		15345na			
0300-0400	Tanzania, Radio	5985af	9685af	11765af	
0300-0400	Thailand, Radio	9655as	11905as		
0300-0400	Turkey, Voice of	9445na			
0300-0330	United Kingdom,BBC London	3255af	5975na	6005va	6175na
		6180eu	6190af	6195me	7135me
		7230eu	7325am	9410eu	9600af
		9915am	11730af	11750sa	11760me
		11955me	12095va	15260sa	5310as
		15360pa			
0300-0400	USA, CSMonitor Boston MA	5850na	9350af	9455na	13760sa
0300-0400 sa	USA, CSMonitor Boston MA	17555as	17865as		
0300-0400	USA, KCBI Dallas TX	9815am			
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9785sa			
0300-0400	USA, VOA Washington DC	6065af	7265af	7280af	7405af
		9575af	9885af		
0300-0400	USA, WEWN Birmingham AL	7425na			
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	5935am			
0300-0400	USA, WYFR Okeechobee FL	6085am	9505am		
0300-0345	Vatican State, Vatican R	9605na	11620na	11625af	
0330-0400	Albania, R Tirana Intl	9580na	11825na		
0330-0400	Austria, R Austria Intl	6015na	9870na	9880na	
0330-0400	Japan, NHK Tokyo	15210as	15320na		
0330-0400	Netherlands, Radio	6165na	9590na		
0330-0400	UAE, UAE Radio Dubai	11945na	13675na	15400eu	17890eu
0330-0400	United Kingdom,BBC London	3255af	5975na	6005af	6180eu
		6190af	6195eu	7230eu	9410eu
		9600af	11730af	11760me	11955me
		12095va	15260as	15310as	15420af
		21715as			
0340-0350 mtwhfa	Greece, Voice of	9375na	9420na	11645na	
0345-0400	Tajikistan, Radio	7245eu			

SELECTED PROGRAMS

Sundays

0300 Radio New Zealand Int'l: National Radio Afternoon or Sport. See S 0100.
0311 Radio Moscow (na): Interview. No details available.
0311 Radio Moscow (World Service): News And Views. Russian views on news developments.
0315 BBC: Sports Roundup. News from the world of sports.
0330 BBC: From Our Own Correspondent. Reporters comment on the background to the news.
0331 Radio Moscow (na): Time Line. No details available.
0331 Radio Moscow (World Service): Radio Oumu Shinri-Kyo. A Japanese evangelical program relayed by Radio Moscow transmitters.
0350 BBC: Write On. Listener letters, opinions, and questions.

Mondays

0300 Radio New Zealand Int'l: In Touch With New Zealand. See M 0205.
0311 Radio Moscow (na): Science And Engineering. See S 0511.
0311 R Moscow (World Service): News And Views. See S 0311.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Anything Goes. See S 1430.
0331 R Moscow (North America): Audio Book Club. See S 0031.
0331 R Moscow (World Service): Radio Oumu Shinri-Kyo. See S 0331.

Tuesdays

0300 R New Zealand Int'l: In Touch With New Zealand. See M 0205.
0311 Radio Moscow (North America): Update. See T 0111.
0311 R Moscow (World Service): News And Views. See S 0311.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: John Peel. Newly released albums and singles from the contemporary music scene.
0331 R Moscow (North America): Russian By Radio. See S 0631.
0331 R Moscow (World Service): Radio Oumu Shinri-Kyo. See S 0331.

Wednesdays

0300 R New Zealand Int'l: In Touch With New Zealand. See M 0205.
0311 Radio Moscow (North America): Update. See T 0111.
0311 R Moscow (World Service): News And Views. See S 0311.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Pop Science. Janice Long presents pop selections and answers to science questions (through August 25th).
0331 R Moscow (North America): Audio Book Club. See S 0031.
0331 R Moscow (World Service): Radio Oumu Shinri-Kyo. See S 0331.

Thursdays

0300 R New Zealand Int'l: In Touch With New Zealand. See M 0205.
0311 Radio Moscow (North America): Update. See T 0111.
0311 R Moscow (World Service): News And Views. See S 0311.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Assignment. A weekly examination of topical issues, from Batman to bandits.
0331 R Moscow (North America): Russian By Radio. See S 0631.
0331 R Moscow (World Service): Radio Oumu Shinri-Kyo. See S 0331.

Fridays

0300 R New Zealand Int'l: In Touch With New Zealand. See M 0205.
0311 Radio Moscow (North America): Update. See T 0111.
0311 R Moscow (World Service): News And Views. See S 0311.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: Focus On Faith. Comment and discussion on major issues in the worlds of religion.
0331 R Moscow (North America): Audio Book Club. See S 0031.
0331 Radio Moscow (World Service): Radio Oumu Shinri-Kyo. See S 0331.

Saturdays

0300 Radio New Zealand Int'l: National Radio Afternoon or Sport. See S 0100.
0311 Radio Moscow (North America): Update. See T 0111.
0311 R Moscow (World Service): News And Views. See S 0311.
0315 BBC: Sports Roundup. See S 0315.
0330 BBC: The Vintage Chart Show. Paul Burnett presents classic Top 20 hits. This month: 1957 (3rd); 1978 (10th); 1965 (17th); 1985 (24th); 1970 (31st).
0331 Radio Moscow (North America): Interview. See S 0311.
0331 R Moscow (World Service): Radio Oumu Shinri-Kyo. See S 0331.

0400 UTC [12:00 AM EDT/9:00 PM PDT]

FREQUENCIES

0400-0500	Australia, AAF Radio	17900af				
0400-0500	Australia, ABC Brisbane	4920do	9660do			
0400-0500	Australia, ABC Perth	9610do				
0400-0500	Australia, Radio	15240pa	15320as	15365pa	17670as	
	17715pa 17795pa	21525as	21595as	21740pa		
0400-0404	Botswana, Radio	3356do	4830af	7255af		
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				
0400-0429	Canada, RCI Montreal	9650me	11905me	11925me	15275me	
		15445me				
0400-0500	China, China Radio Intl	11680na	11840na			
0400-0500	Costa Rica,R forPeace Int	7375na	7385na	13630na	15030am	
0400-0430	Croatian Radio via WHRI	7315na				
0400-0430	Cuba, Radio Havana Cuba	6010na	6180am	9655na	13660na	
0400-0430	Czech Republic, R Prague	7345na	9485na	9810na	11990na	
		13715af	17535sa			
0400-0430	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am	
0400-0450	Germany, Deutsche Welle	6015af	6130af	6145af	7150af	
	7225af 9565af	9765af	11705af	11765af	13610af	
	13770af					
0400-0430	Guatemala, Radio Cultural	3300do				
0400-0415	Israel, Kol Israel	9435na				
0400-0500	Kenya, Kenya BC Corp	4935do				
0400-0500	Lebanon, King of Hope	11530as				
0400-0500 smtwh	Malaysia, RTM Radio 4	7295do				
0400-0430	Netherlands, Radio	6165na	9590na			
0400-0500	New Zealand, R NZ Intl	15120pa				
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as		
0400-0430 m	Norway, Radio Norway Intl	9655na	9740na			
0400-0430	Romania, R Romania Intl	6155na	9510na	9570na	11830na	
		11940na				
0400-0500	Russia, Radio Moscow Intl	7205na	7335na	9530na	9610eu	
	9750eu 9765eu	9860na	11790na	12050na	12070am	
	13650am 15180na	15280na	15410na	15425na	15470na	
	15500na 15535na	17570as	17590as	17605na	17850na	
	17860na 21690as					
0400-0500	S Africa, Channel Africa	3995af	7230af	9695af		
0400-0500 vl	S Africa, Radio Oranje	3230do				
0400-0500	Singapore, SBC Radio One	5010do	5052do	11940do		
0400-0430	Sri Lanka, SLBC Colombo	9720as	15425as			
0400-0430	Switzerland, Swiss R Intl	6135na	9860na	9885na	12035na	
0400-0430 mtwhf	Switzerland, Swiss R Intl	3985eu	6135eu	6165eu	9535eu	
0400-0430	Tanzania, Radio	5985af	9685af	11765af		
0400-0430	Thailand, Radio	9655as	11905as			
0400-0430	United Kingdom,BBC London	3955eu	5975na	6005af	6180eu	
	6195eu 7230eu	9410eu	9600af	11760me	11955me	
	12095va 15280as	15310va	15575va	21715as		
0400-0500	USA, CSMonitor Boston MA	9455am	9840af	13760sa	17780as	
0400-0500 sa	USA, CSMonitor Boston MA	17555as				
0400-0500	USA, KCBI Dallas TX	13720am				
0400-0500	USA, KTBN Salt Lk City UT	7510am				
0400-0500	USA, KVOH Los Angeles CA	9785am				
0400-0430	USA, VOA Washington DC	5995eu	6040eu	6065eu	6140eu	
	6155eu 6873eu	7170eu	7200eu	7265af	7280eu	
	7405eu 9575eu	9885eu	11965eu	15205eu		
0400-0500	USA, WEWN Birmingham AL	7425na				
0400-0500	USA, WHRI Noblesville IN	7315na				
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	5935am	7435am			
0400-0500	USA, WYFR Okeechobee FL	6065am	9505am			
0425-0440	Italy, RAI Rome	5990eu	7275me			
0430-0500	Cuba, Radio Havana Cuba	6010na	6180na	9815na		
0430-0450 s	Finland, Radio	6120eu	9665eu			
0430-0450	Finland, Radio	11755me	15440af			
0430-0500	Italy, AWR Europe	15125eu				
0430-0500	Nigeria, Radio	3326do	4770do			
0430-0500	Russia, AWR Russia	15125eu				
0430-0500	Swaziland, Trans World R	5965af	9655af	11740af		
0430-0500	United Kingdom,BBC London	3955eu	5975na	6005af	6175eu	
	6180eu 6190af	6195eu	9410eu	9600af	11760me	
	12095va 15280as	15310va	15400af	15575va	21470va	
	21715as					
0430-0500	USA, VOA Washington DC	3980eu	5995eu	6040eu	6140eu	
	6873eu 7170eu	7200eu	7265af	7280af	9575af	
	15205eu					
0435-0500 mtwhf	Namibia, Namibia BC Corp	4965af				
0445-0500 t	Sri Lanka, SLBC Colombo	9720na	15425na			
0455-0500	Nigeria, Voice of	7255af				

SELECTED PROGRAMS

Sundays

0400 RNZealand Int'l: Nat'l Radio Afternoon or Sport. See S 0100.
0407 Radio Canada Int'l: Innovation Canada. See S 0107.
0411 R Moscow (North America): News And Views. See S 0311.
0411 Radio Moscow (World Service): Top Priority. Major events.
0415 BBC: Feature. This month: "Growing Points In Medicine" (4th, 11th); "Mightier Than The Sword" (through August 8th).
0430 BBC: 4th : Seeing Stars, astronomy. Short Story: "Golden Sand Of Brittas" (11th); "Dadiji's Trunk" (18th); "Second Lesson" (25th).
0430 Radio Finland: Focus. See S 0145.
0431 R Moscow (na): Moscow Medley. No details available.
0431 Radio Moscow (World Service): Ads. Airtime for sale.
0445 BBC: Musical Feature. World party music is the fare on "Party, Party" (through August 8th).

Mondays

0400 RN Zealand Int'l: In Touch With New Zealand. See M 0205.
0407 Radio Canada Int'l: The Mailbag. See S 1237.
0411 R Moscow (North America): News And Views. See 0311.
0411 Radio Moscow (World Service): Top Priority. See S 0411.
0415 BBC: Talks. Anna Horsburgh-Porter profiles powerful women in "The Power Behind The Throne" (through August 2nd).
0430 BBC: Off The Shelf. This month: "A Glowing Future" (1st); "Sci-Fi Short Stories" (2nd-8th); "The Shepherd's Calendar" (9th-16th); "A Women Of The Pharisees" (19th-30th).
0430 RNZealand Int'l: Mailbox with Tony King and Arthur Cushen or Travel Pacific with Susan Buckland
0431 Radio Moscow: Jazz Show. A jazz music program.
0435 Radio Finland: Compass North. See S 1535.
0445 BBC: Andy Kershaw's World Of Music. New world sounds.

Tuesdays

0400 Radio N Zealand Int'l: Calling Tonga. Rudi Hill greets Tonga.
0407 Radio Canada Int'l: Spectrum. See M 1237.
0411 R Moscow (North America): News And Views. See S 0311.
0411 Radio Moscow (World Service): Update. See T 0111.
0415 BBC: Health Matters. See T 0145.
0430 BBC: Off The Shelf. See M 0430.
0431 Radio Moscow (North America): Music. See S 0531.
0431 R Moscow (World Svce): Yours For The Asking. See M 2331.
0435 Radio Finland: Compass North. See S 1535.
0445 BBC: Talks. See M 2315.

Wednesdays

0400 RN Zealand Int'l: In Touch With New Zealand. See M 0205.
0407 Radio Canada Int'l: Spectrum. See M 1237.
0411 R Moscow (North America): News And Views. See S 0311.
0411 Radio Moscow (World Service): Update. See T 0111.
0415 BBC: Waveguide. Tips on how to hear the BBC better.
0425 BBC: Book Choice. Short review of a recently released book.
0430 BBC: Off The Shelf. See M 0430.
0430 Radio N Zealand Int'l: This Week In Sport. Weekly review.
0431 Radio Moscow (North America): Jazz Show. See M 0431.
0431 R Moscow (World Svce): Music At Your Request. See M 1131.
0435 Radio Finland: Compass North. See S 1535.
0445 BBC: Country Style. See W 0145.

Thursdays

0400 RN Zealand Int'l: Calling The Solomon Islands, Rudi Hill, or In Touch With New Zealand, Wayne Mowat.
0407 Radio Canada Int'l: Spectrum. See M 1237.
0411 R Moscow (North America): News And Views. See S 0311.
0411 Radio Moscow (World Service): Update. See T 0111.
0415 BBC: The Farming World. See H 0145.
0430 BBC: Off The Shelf. See M 0430.
0430 RNZI: Calling The Solomon Islands, Rudi Hill, or feature.
0431 R Moscow (na): Music At Your Request. See M 1131.
0431 Radio Moscow (World Service): Folk Box. See S 2331.
0435 Radio Finland: Compass North. See S 1535.
0445 BBC: From Our Own Correspondent. See S 0330.

Fridays

0400 RN Zealand Int'l: In Touch With New Zealand. See M 0205.
0407 Radio Canada Int'l: Spectrum. See M 1237.
0411 R Moscow (North America): News And Views. See S 0311.
0411 Radio Moscow (World Service): Update. See T 0111.
0415 BBC: Musical Feature. See M 0145.
0430 BBC: Off The Shelf. See M 0430.
0430 RN Zealand Int'l: Feature. Rudi Hill with alternating "Calling Tokelau," "Calling Pitcairn And Norfolk," "Around The World."
0431 Radio Moscow (North America): Jazz Show. See M 0431.
0431 Radio Moscow (World Service): Music. See S 0531.
0435 Radio Finland: Compass North. See S 1535.
0445 BBC: Folk Routes. See T 0130.

Saturdays

0400 RN Zealand Int'l: Nat'l Radio Afternoon or Sport. See S 0100.
0407 Radio Canada Int'l: Spectrum. See M 1237.
0411 R Moscow (North America): News And Views. See S 0311.
0411 Radio Moscow (World Service): Update. See T 0111.
0415 BBC: Good Books. See W 1445.
0430 BBC: Jazz Now And Then. See A 0145.
0431 Radio Moscow (North America): Folk Box. See S 2331.
0431 Radio Moscow (World Service): Music. See S 0531.
0435 Radio Finland: Compass North. See S 1535.
0445 BBC: Worldbrief. See F 2315.

0500 UTC [1:00 AM EDT/10:00 PM PDT]

FREQUENCIES

0500-0600	Australia, ABC Brisbane	4920do	9660do		
0500-0600	Australia, ABC Perth	9610do			
0500-0530	Australia, Radio	15240pa	15320pa	15365pa	17670pa
		17715pa	17795pa	21525as	21595as
		21740pa			
0500-0530	Canada, Can Force Network	6150eu			
0500-0505	Canada, CBC Northern Svc	9625am			
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			
0500-0529 mtwhf	Canada, RCI Montreal	6050eu	6150eu	7295eu	9750eu
		11775eu	17840eu		
0500-0600	Costa Rica,R forPeace Int	7375na	7385na	13630na	15030na
0500-0515	Croatian Radio via WHRI	7315na	9495na		
0500-0600	Cuba, Radio Havana Cuba	6180na	9510na		
0500-0600	Ecuador, HCJB Quito	11925am	21455am		
0500-0550	Germany, Deutsche Welle	5960na	6130na	9515na	9605na
		9670na	11705na	13610na	
0500-0600 irreg	Italy, IRRS Milan	7125eu			
0500-0600	Japan, NHK Tokyo	6085me	7230eu	9725me	11725am
		11740am	15230na	15410am	17860am
		21610am			
0500-0600	Kenya, Kenya BC Corp	4935do			
0500-0600	Lebanon, King of Hope	11530as			
0500-0505	Lesotho, Radio Lesotho	4800do			
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 Intl	9750eu	9765eu	11790eu	12050na
		13650af	15180na	15280na	15410na
		15425na	15470na	15500na	15540af
		15590af	17560as	17570as	17590as
		17605as	17635as	17675as	17830as
		17860af	17880as	21690as	
0500-0600	S Africa, Channel Africa	9695af	11745af		
0500-0553 f	Seychelles, FEBA Radio	17750me			
0500-0600	Singapore, SBC Radio One	5052do	11940do		
0500-0600	Spain, Spanish Natl Radio	9530am			
0500-0515 t	Sri Lanka, SLBC Colombo	9720na	15425na		
0500-0530	Swaziland, Trans World R	5965af	9655af	11740af	
0500-0515 mtwhf	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu	
0500-0600	Thailand, Radio	9655as	11905as		
0500-0530	United Kingdom,BBC London	3255af	3955eu	5975na	6005af
		6180eu	6190af	6195eu	9410va
		9600af	9640na	11760me	12095va
		15070me	15280as	15310va	15360va
		15400af	15420af	15575va	17830va
		17885af	21470va	21715as	
0500-0600	USA, CSMonitor Boston MA	9455na	9840af	13760sa	17780as
0500-0600 sa	USA, CSMonitor Boston MA	17555as			
0500-0600	USA, KCBI Dallas TX	9815am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9785am			
0500-0530	USA, VOA Washington DC	3980eu	5995eu	6040eu	6140eu
		6873eu	7170eu	9530eu	9700eu
		11825eu	11965eu	15205eu	
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	5935am	7435am		
0500-0600	USA, WYFR Okeechobee FL	5985am	11580eu	11725eu	13695eu
0500-0520	Vatican State, Vatican R	6245eu	7250eu	11730af	
0510-0520 mtwhfa	Botswana, Radio	3356af	4830af	7255af	
0510-0600 vl	S Africa, Radio Oranje	7270do			
0524-0600 f	Ghana, GBC Radio 2	3366do			
0525-0600	Ghana, GBC Radio 1	4915do			
0530-0600	Australia, Radio	15240pa	15320pa	15365pa	17670pa
		17715pa	17795pa	21525pa	21740pa
0530-0600	Austria, R Austria Intl	6015na			
0530-0600	Romania, R Romania Intl	15380af	17720af	17745af	17790af
0530-0600	Swaziland, Trans World R	5965af	11740af		
0530-0600	UAE, UAE Radio Dubai	15435as	17830as	21700as	
0530-0600	United Kingdom,BBC London	3255af	3955eu	5975na	6005af
		6180eu	6190af	6195eu	9410va
		9600af	9640na	9750eu	11760me
		12095va	15070me	15280as	15310va
		15360va	15400af	15420af	15575va
		17830va	17885af	21470va	21715as
0530-0600	USA, VOA Washington DC	5995me	6040me	6140me	6873me
		7170me	7200me	11965me	15205me
0530-0600	USA, WEWN Birmingham AL	7425am			

SELECTED PROGRAMS

Sundays

0500 RN Zealand Int'l: Pause For Thought. No details available.
0511 Radio Moscow (North America): Interview. See S 0311.
0511 Radio Moscow (World Service): Science And Engineering. Developments in Russian science and technology.
0531 Radio Moscow (North America): Time Line. See S 0331.
0531 Radio Moscow (World Service): Music. Music as selected by Radio Moscow staff.

Mondays

0505 RN Zealand Int'l: Hymns For Today. No details available.
0507 R Canada Int'l: Info Canada. Current-affairs developments.
0511 R Moscow (na): Science And Engineering. See S 0511.
0511 Radio Moscow (World Service): Mailbag. See S 0611.
0530 Radio New Zealand Int'l: Calling The Cook Islands. Rudi Hill greets the Cook Islands.
0531 RMoscow (North America): Audio Book Club. See S 0031.
0531 Radio Moscow (World Service): Music. See S 0531.

Tuesdays

0505 Radio New Zealand Int'l: Presenting The Pacific. Live reports from capitals around Oceania.
0507 Radio Canada Int'l: Info Canada. See M 0507.
0511 Radio Moscow (North America): Update. See T 0111.
0511 R Moscow (World Svce): Focus On Asia And The Pacific. See T 0011.
0531 R Moscow (North America): Russian By Radio. See S 0631.
0531 Radio Moscow (World Service): Music. See S 0531.

Wednesdays

0505 RN Zealand Int'l: Pacific Beat. Greg Tatere presents music from Oceania.
0507 Radio Canada Int'l: Info Canada. See M 0507.
0511 Radio Moscow (North America): Update. See T 0111.
0511 Radio Moscow (World Service): Focus On Asia And The Pacific. See T 0011.
0530 RN Zealand Int'l: Checkpoint. Developments in the news.
0531 R Moscow (North America): Audio Book Club. See S 0031.
0531 Radio Moscow (World Service): Music. See S 0531.

Thursdays

0505 Radio New Zealand Int'l: On The March. No details available.
0507 Radio Canada Int'l: Info Canada. See M 0507.
0511 Radio Moscow (North America): Update. See T 0111.
0511 RMoscow (World Svce): Focus On Asia And The Pacific. See T 0011.
0530 Radio New Zealand Int'l: Checkpoint. See W 0530.
0531 R Moscow (North America): Russian By Radio. See S 0631.
0531 Radio Moscow (World Service): Music. See S 0531.

Fridays

0505 Radio New Zealand Int'l: New Zealand's Top Pop Singles. The smash singles on the New Zealand pop-music charts.
0507 Radio Canada Int'l: Info Canada. See M 0507.
0511 Radio Moscow (North America): Update. See T 0111.
0511 RMoscow (World Svce): Focus On Asia And The Pacific. See T 0011.
0530 Radio New Zealand Int'l: Checkpoint. See W 0530.
0531 R Moscow (North America): Audio Book Club. See S 0031.
0531 Radio Moscow (World Service): Music. See S 0531.

Saturdays

0500 RN Zealand Int'l: Change Of Pace. A program of jazz music.
0511 Radio Moscow (North America): Update. See T 0111.
0511 R Moscow (World Svce): Focus On Asia And The Pacific. See T 0011.
0531 Radio Moscow (North America): Interview. See S 0311.
0531 Radio Moscow (World Service): Music. See S 0531.

0600 UTC [2:00 AM EDT/11:00 PM PDT]

FREQUENCIES

0600-0700	Australia, ABC Perth	15425pa			
0600-0630	Australia, Radio	15240pa	15320as	15365pa	17715pa
	17760as 17880as	21525as	21595pa	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,R forPeace Int	7375na	7385na	13630am	15030na
0600-0700	Cuba, Radio Havana Cuba	6000na	9510na		
0600-0630	Czech Republic, R Prague	6055eu	7345eu	9505eu	11990eu
0600-0700	Ecuador, HCJB Quito	11925am	15155am	21455am	
0600-0630	Georgia, Georgian Radio	11805.3			
0600-0650	Germany, Deutsche Welle	11780af	13610af	13770af	13790af
		15185af	15205af	17875af	
0600-0700	Ghana, GBC Radio 1	4915do			
0600-0700 f	Ghana, GBC Radio 2	3366do			
0600-0700 irreg	Italy, IRRS Milan	7125eu			
0600-0625	Kenya, Kenya BC Corp	4935do			
0600-0700	Kiribati, Radio	17440do			
0600-0630	Laos,National Radio of	7116as			
0600-0630 s	Latvia, Radio Riga	5935eu			
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, V of Mediterranean	9765eu			
0600-0700	Namibia, Namibia BC Corp	6175af			
0600-0658	New Zealand, R NZ Intl	15120pa			
0600-0700 s	New Zealand, ZLXA	3935do			
0600-0700	Nigeria, Radio	3970do	4770do		
0600-0700	Nigeria, Voice of	7255af			
0600-0650	North Korea, R Pyongyang	15180as	15230as		
0600-0630	Romania, R Romania Intl	7225eu	9510eu	9665eu	11810eu
0600-0700	Russia, Radio Moscow Intl	9750eu	9765eu	11765am	11985na
	12010af 12050af	12055am	12070eu	13650na	15125am
	15140na 15180na	15425na	15470na	15500na	15540am
	17605na 17860am				
0600-0700	S Africa, Channel Africa	17710af			
0600-0700 vl	S Africa, Radio Oranje	9630do			
0600-0608 f	Seychelles, FEBA Radio	17750me			
0600-0700	Singapore, SBC Radio One	5010do	5052do	11940do	
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	South Korea, Radio Korea	7275na	11945na	15155na	
0600-0700	Swaziland, Trans World R	5965af	11740af		
0600-0615	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu	
0600-0630	Switzerland, Swiss R Intl	13635af	15430af	17565af	
0600-0700 sa	Thailand, Radio	9655as	11905as		
0600-0630	United Kingdom,BBC London	3955eu	5975na	6180eu	6195eu
	7150pa 9410eu	9640va	11940af	11955as	12095eu
	15070va 15280as	15310as	15360as	15400af	15575va
	15575me 17790as	17830va	21470me	21715as	
0600-0700	USA, CSMonitor Boston MA	5850eu	9455na	9840eu	17555as
	17780as				
0600-0700	USA, KCBI Dallas TX	13720am			
0600-0700	USA, KTBN Salt Lk City UT	7510na			
0600-0700	USA, KVOH Los Angeles CA	9785na			
0600-0700	USA, VOA Washington DC	3980eu	5995me	6005me	6035af
	040me 6060eu	6095eu	6140eu	6873eu	7170eu
	7325eu 7405af	9530af	9575af	11805eu	11925af
	11965eu 12080af	15600af			
0600-0700	USA, WEWN Birmingham AL	7425na			
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	5935am			
0600-0700	USA, WYFR Okeechobee FL	5985am	7355eu	11580af	11725eu
		15666eu			
0600-0610 mtwhfa	Vatican State, Vatican R	6245eu	7250eu	9645eu	11740eu
		15210eu			
0603-0610	Croatia, Croatian Radio	6145eu	9830eu	13830eu	
0615-0630	United Kingdom,BBC London	9510eu	11680eu	11845eu	13660eu
		15325eu	17695eu		
0625-0700	Kenya, Kenya BC Corp	4935do			
0630-0700	Australia, Radio	11880pa	15240pa	15320as	15365pa
	17670as 17715pa	17880as	21525as	21590as	21595pa
	21740pa				
0630-0700	Austria, R Austria Intl	6015na			
0630-0655	Belgium, R Vlaanderen	5910eu	9925eu		
0630-0700 smtwhf	New Zealand, ZLXA	3935do			
0630-0700	United Kingdom,BBC London	5975na	6180eu	6195eu	7150pa
	9410eu 9640va	11760me	11955as	12095me	15070va
	15280as 15310as	15360as	15400af	15575va	15575me
	17790as 17830pa	17885va	21470me	21715as	
0630-0700	Vatican State, Vatican R	11625af	15090af	17730af	
0640-0700	Monaco, TWR Monte Carlo	9480eu			
0645-0700	Finland, Radio	6120eu	9560eu	11755eu	
0645-0700	Ghana, GBC	6130af			
0645-0715	Romania, R Romania Intl	11775pa	15250pa	15335pa	17720pa
		17805pa			
0650-0700 vl	S Africa, Radio Oranje	9630do			

SELECTED PROGRAMS

Sundays

0611 R Moscow (North America): News And Views. See S 0311.
0611 R Moscow (W Svce): Mailbag. Responses to listener letters.
0615 BBC: Letter From America. Alistair Cooke shares his inimi table view of American life.
0630 BBC: Jazz For The Asking. Digby Fairweather plays listener requests.
0630 Radio New Zealand Int'l: Pasifika Style. No details available.
0631 R Moscow (North America): Moscow Medley. See S 0431.
0631 Radio Moscow (World Service): Russian By Radio. Russian language lessons for English speakers.
0645 Radio Finland: Starting Finnish. Finnish language lessons for English speakers.
0645 Radio New Zealand Int'l: Storytime. No details available.

Mondays

0611 R Moscow (North America): News And Views. See S 0311.
0611 R Moscow (W Svce): Science And Engineering. See S 0511.
0615 BBC: Recording Of The Week. A personal choice of new classical music releases.
0630 BBC: Feature. See S 1401.
0630 Radio New Zealand Int'l: Focus On Women. Developments for women in New Zealand.
0631 Radio Moscow (North America): Jazz Show. See M 0431.
0631 R Moscow (World Service): Russian By Radio. See S 0631.
0650 Radio Finland: Compass North. See S 1535.

Tuesdays

0611 R Moscow (North America): News And Views. See S 0311.
0611 R Moscow (World Service): Adamov's Mailbag. See S 0011.
0615 BBC: The World Today. See M 1645.
0630 BBC: Rock/Pop Music. This month: "Rock Salad" (6th); "The Essential Guide To Music" (through August 3rd).
0630 Radio New Zealand Int'l: Meet The MP. Members of parliament discuss the places and people they represent.
0631 Radio Moscow: Music. See S 0531.
0650 Radio Finland: Compass North. See S 1535.

Wednesdays

0611 R Moscow (North America): News And Views. See S 0311.
0611 Radio Moscow (World Service): Mailbag. See S 0611.
0615 BBC: The World Today. See M 1645.
0630 BBC: Meridian. Events in the world of the arts.
0630 Radio New Zealand Int'l: Talkabout. A topical magazine.
0631 Radio Moscow (North America): Jazz Show. See M 0431.
0631 Radio Moscow (World Service): Music. See S 0531.
0650 Radio Finland: Compass North. See S 1535.

Thursdays

0611 R Moscow (North America): News And Views. See S 0311.
0611 Radio Moscow (World Service): Newmarket. See M 1611.
0615 BBC: The World Today. See M 1645.
0630 BBC: Sports International. See H 0230.
0630 Radio New Zealand Int'l: Meet The MP. See T 0630.
0631 R Moscow (na): Music At Your Request. See M 1131.
0631 Radio Moscow (World Service): Music. See S 0531.
0650 Radio Finland: Compass North. See S 1535.

Fridays

0611 R Moscow (North America): News And Views. See S 0311.
0611 R Moscow (W Svce): Science And Engineering. See S 0511.
0615 BBC: The World Today. See M 1645.
0630 BBC: Meridian. See W 0630.
0630 Radio New Zealand Int'l: Sports Wrap. With Elma MaUa.
0631 Radio Moscow (North America): Jazz Show. See M 0431.
0631 Radio Moscow (World Service): Music. See S 0531.
0650 Radio Finland: Compass North. See S 1535.

Saturdays

0611 R Moscow (North America): News And Views. See S 0311.
0611 RMoscow (World Svce): Culture And The Arts. See S1611.
0615 BBC: The World Today. See M 1645.
0617 R New Zealand Int'l: Pacific Requests. No details available.
0630 BBC: Meridian. See W 0630.
0631 Radio Moscow (North America): Folk Box. See S 2331.
0631 Radio Moscow (World Service): Music. See S 0531.
0650 Radio Finland: Compass North. See S 1535.

0700 UTC [3:00 AM EDT/12:00 AM PDT]

0700-0800	Australia, ABC Perth	15425pa			
0700-0730	Australia, Radio	6020pa	11720va	11880pa	15240pa
		15320va	15365pa	17715pa	17750as
		17795pa	21525pa	21595pa	21740pa
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,R forPeace Int	7375na	7385na	13630na	15030na
0700-0730	Ecuador, HCJB Quito	9600eu	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, NHK Tokyo	6170as	7230au	11740au	15410au
		17860as	21575me	21610me	
0700-0800	Kenya, Kenya BC Corp	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	New Zealand, R NZ Intl	9700pa			
0700-0800 smtwhf	New Zealand, ZLXA	3935do			
0700-0800	Nigeria, Radio	3326do	4990do		
0700-0750	North Korea, R Pyongyang	15350as	17765as		
0700-0715	Romania, R Romania Intl	11810pa	11940pa	15335pa	17720pa
		17805pa	21665pa		
0700-0800	Russia, AWR Russia	11835eu			
0700-0800	Russia, Radio Moscow Intl	7345eu	9750eu	12020af	12070af
		13650me	13705va	15125me	15190va
		15280af	15345af	15420me	15440eu
		15465af	15470af	15520af	15540va
		15550af	17580eu	17655af	
0700-0800 vl	S Africa, Radio Oranje	9630do			
0700-0800	Singapore, SBC Radio One	5010do	5052do	11940do	
0700-0800	Swaziland, Trans World R	7200af	11740af		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800 sa	Thailand, Radio	9655as	11905as		
0700-0730	United Kingdom,BBC London	5975na	6190af	6195eu	7150pa
		7325af	9410eu	9640eu	9760eu
		11760me	11940af	11950eu	11955as
		12095me	15070va	15280as	15310as
		15325eu	15360pa	15400af	15420va
		15575va	17640me	17790va	17830as
		17885af	21470me	21660af	21715as
0700-0800	USA, CSMonitor Boston MA	5850eu	7395am	9445na	9840va
		9870am	17555as	17780as	
0700-0800	USA, KCBI Dallas TX	9815am			
0700-0800	USA, KTBN Salt Lk City UT	7510na			
0700-0800	USA, KVOH Los Angeles CA	9785na			
0700-0800	USA, WHRI Noblesville IN	7315eu	9495am		
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WYFR Okeechobee FL	5985va	7355va	9680va	11915af
		13695eu			
0703-0715	Croatia, Croatian Radio	6145eu	9830eu	13830eu	
0730-0800	Australia, Radio	6020pa	11720pa	11880pa	15240pa
		17750as	17795pa	21525as	21590as
0730-0800	Austria, R Austria Intl	6155eu	13730eu	15450me	17870me
0730-0757	Czech Republic, R Prague	6055eu	11990pa	13600as	17535pa
		17725as	21705pa		
0730-0800	Ecuador, HCJB Quito	9745pa	11835eu	11925pa	15270eu
		21455eu			
0730-0745 mtwhf	Iceland, Natl BC Service	9265om			
0730-0800	Italy, AWR Europe	7210eu			
0730-0800	Netherlands, Radio	9630pa	11895pa		
0730-0800	United Kingdom,BBC London	5975na	6190af	6195eu	7150au
		7325eu	9410eu	9640au	9760eu
		11760me	11955as	12095me	15070va
		15280as	15310as	15360as	15400af
		15420va	15575me	17640me	17790va
		17830as	17885af	21470me	21660af
		21715as			

0800 UTC [4:00 AM EDT/1:00 AM PDT]

0800-0900	Australia, ABC Brisbane	9660do			
0800-0900	Australia, ABC Perth	15425va			
0800-0830	Australia, Radio	5995pa	9560pa	9580pa	15240pa
		17750pa	21595as		
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,R forPeace Int	7375na	7385na	13630am	15030na
0800-0830	Ecuador, HCJB Quito	9600eu	9745pa	11835eu	11925pa
		17490au	21455eu		
0800-0900	Finland, Radio	17800as	21550as		
0800-0900	Ghana, GBC Radio 1	4915do			
0800-0900 f	Ghana, GBC Radio 2	3366do			
0800-0900 asmtwh	Guam, KTWR Agana	15200as			
0800-0900	Indonesia, Voice of	11752as			
0800-0900 irreg	Italy, IRRS Milan	7125eu			
0800-0900	Kenya, Kenya BC Corp	4935do			
0800-0900	Lebanon, King of Hope	6280me			
0800-0900 smtwha	Malaysia, RTM Radio 4	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295as	
0800-0845	Monaco, TWR Monte Carlo	9480eu			
0800-0900	New Zealand, R NZ Intl	9700pa			
0800-0900 smtwhf	New Zealand, ZLXA	3935do			
0800-0900	Nigeria, Radio	3326do	4990do		
0800-0900	Nigeria, Voice of	7255af			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0845	Pakistan, Radio	17900eu	21520eu		
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia, Radio Moscow Intl	11765af	12010as	12020as	12055af
		12070as	13650me	15125me	15190eu
		15225as	15345me	15420as	15440me
		15470as	17675af	17805af	21655af
0800-0900 vl	S Africa, Radio Oranje	9630do			
0800-0900	Singapore, SBC Radio One	5010do	5052do	11940do	
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, Radio Korea	7550eu	13670eu		
0800-0820	Swaziland, Trans World R	7200af	11740af		
0800-0830	United Kingdom,BBC London	6190af	7325eu	9410eu	9640eu
		9660eu	9760eu	11940af	11955as
		12095me	15070va	15280as	15360as
		15420af	15575af	17640me	17705eu
		17790af	17790af	17830as	17885af
		21470af	21660af	21715pa	
0800-0900	USA, CSMonitor Boston MA	9455sa	9840eu	13615pa	15665pa
		17555as			
0800-0900	USA, KCBI Dallas TX	9815am			
0800-0900	USA, KNLS Anchor Point AK	7365as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, WHRI Noblesville IN	7315am	7355am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0803-0805	Croatia, Croatian Radio	6145eu	9830eu	13830eu	
0820-0835 as	Swaziland, Trans World R	7200af	11740af		
0830-0900	Australia, Radio	5995na	9560pa	9580pa	17695pa
		21595pa	25750pa		
0830-0900	Austria, R Austria Intl	6155eu	13730eu		
0830-0900	Ecuador, HCJB Quito	9745pa	11925pa	21455pa	
0830-0900	Netherlands, Radio	11895pa			
0830-0857	Slovakia, Slovak Radio	11990au	15605au	17535au	21705au
0830-0900	United Kingdom,BBC London	6190af	7325eu	9410eu	9600eu
		9760eu	11940af	11955as	12095me
		15070va	15280as	15360pa	15420af
		15575af	17640me	17705eu	17790af
		17790af	17830as	17885af	21470af
		21660af	21715pa		
0830-0845	Vatican State, Vatican R	6245eu	7250eu	9645eu	15210eu
0835-0845 smtwhf	Monaco, TWR Monte Carlo	9480eu			
0840-0850	Greece, Voice of	15650au	17525au		
0850-0900 s	Monaco, TWR Monte Carlo	9480eu			

English language

shortwave guide

0900 UTC [5:00 AM EDT/2:00 AM PDT]

0900-0950	Australia, AAF Radio	20418af	25322af		
0900-1000	Australia, ABC Brisbane	4920do	9660do		
0900-1000	Australia, Radio	5995pa	9510pa	9580pa	13605as
		15170as	21725as		
0900-0925 mtwhf	Belgium, R Vlaanderen	5910eu	9905eu	13675eu	
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	Costa Rica,R forPeace Int	7375am	7385am	13630am	15030am
0900-1000	Ecuador, HCJB Quito	9745pa	11925pa	17490pa	21455pa
0900-0950	Germany, Deutsche Welle	6160as	9565af	11715as	15410af
		17780as	17800af	17820as	21465as
		21600af	21650as	21680as	
0900-0905	Ghana, GBC Radio 1	4915do			
0900-0905 f	Ghana, GBC Radio 2	3366do			
0900-1000	Guam, KTWR Agana	11805pa			
0900-1000 s	Italy, AWR Europe	7230eu			
0900-1000 irreg	Italy, IRRS Milan	7125eu			
0900-1000	Japan, NHK Tokyo	9750pa	11740pa	11815pa	11910pa
		15190pa	17860pa		
0900-1000	Kenya, Kenya BC Corp	4935do			
0900-1000	Lebanon, King of Hope	6280me			
0900-1000	Malaysia, RTM Radio 4	7295do			
0900-0915 s	Monaco, TWR Monte Carlo	9480eu			
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-0930 mtwhf	New Zealand, ZLXA	3935do			
0900-1000	Nigeria, Radio	3326do	4990do		
0900-1000	Nigeria, Voice of	7255af			
0900-0930 mtwtf	Palau, KHBN Voice of Hope	9830as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Philippines, FEBC Manila	11690as			
0900-1000	Russia, Radio Moscow Intl	7130af	9755af	11765af	12010as
		12020as	12055af	12070as	13650as
		15190eu	15345me	15420as	15440af
		15470as	15525as	17675af	17805af
		21655af	21825af		
0900-1000 vl	S Africa, Radio Oranje	9630do			
0900-1000	Singapore, SBC Radio One	5010do	5052do	11940do	
0900-0930	Switzerland, Swiss R Intl	9885au	13685au	17670au	21820au
0900-0930	United Kingdom,BBC London	6190af	6195as	9410eu	9660eu
		9740va	9750eu	9760eu	11750as
		11760me	11940af	12095me	15070me
		15190sa	15310as	15400af	15420af
		15575va	17640me	17705va	17790va
		17830as	17885af	21470af	21660af
		21715pa			
0900-1000	USA, CSMonitor Boston MA	9455sa	9840eu	13615pa	15665pa
		17555as			
0900-1000	USA, KCBI Dallas TX	9815am			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, WHRI Noblesville IN	7315am	7355am		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
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 smha	Mongolia, R Ulaanbaatar	11850as	12015as		
0915-0930 smtwh	Guam, KTWR Agana	15200as			
0930-1000	Netherlands, Radio	9720pa	11895pa	12065as	15470as
0930-1000	United Kingdom,BBC London	6190af	6195as	9410eu	9660eu
		9740va	9750eu	9760eu	11750as
		11760me	11940af	12095me	15070me
		15190sa	15310as	15400af	15420af
		15575va	17640me	17705eu	17790va
		17830va	17885af	21470af	21660af
		21715pa			
0940-0950	Greece, Voice of	17525au			

1000 UTC [6:00 AM EDT/3:00 AM PDT]

1000-1100	Australia, Radio	5995pa	9580pa	9710pa	13605pa
		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 Alajuela	9725ca			
1000-1100	Costa Rica,R forPeace Int	7385na	13630na	15030na	
1000-1100	Ecuador, HCJB Quito	9745pa	11925pa	17490pa	21455pa
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	India, All India Radio	15050as	17387au	17895as	21735au
1000-1030	Israel, Kol Israel	17545eu			
1000-1100	Italy, AWR Europe	7230eu			
1000-1100 irreg	Italy, IRRS Milan	7125eu			
1000-1100	Kenya, Kenya BC Corp	4935do			
1000-1100 mtwh	Malaysia, RTM Radio 4	7295do			
1000-1027	Netherlands, Radio	9720pa	11895pa	12065as	15470as
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 Intl	11630eu	11655eu	11765af	11800na
		11940af	12010eu	12020eu	12070eu
		15125me	15140eu	15225na	15350me
		15355eu	15470eu	15490as	17595as
		17675af	17760na	17775as	17805af
		21655af			
1000-1100	S Africa, Channel Africa	17805af			
1000-1100 vl	S Africa, Radio Oranje	9630do			
1000-1030	Serbia, Radio Yugoslavia	9580eu	11805eu		
1000-1100	Singapore, SBC Radio One	5010do	5052do	11940do	
1000-1045	Switzerland, Swiss R Intl	6165eu	9535eu		
1000-1030	United Kingdom,BBC London	6190af	6195va	9410va	9660eu
		9740va	9750eu	9760eu	11750as
		11760me	11940af	12095eu	15070va
		15190am	15260sa	15310as	15400af
		15420af	15575va	17640va	17705eu
		17790va	17830pa	17885af	21470va
		21660af	21715pa		
1000-1100	USA, CSMonitor Boston MA	9455sa	9495na	13625as	17555as
1000-1100	USA, KCBI Dallas TX	9815am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, VOA Washington DC	5985as	7405am	9590am	11720as
		11735me	11915am	15120am	15160me
		15195eu	15425as	17770eu	21455eu
1000-1100	USA, WHRI Noblesville IN	7315am			
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5835am			
1000-1100	USA, WYFR Okeechobee FL	5950am			
1000-1015 mtwhfa	Vatican State, Vatican R	6245eu	7250eu	11740eu	15210eu
		21665eu			
1000-1030	Vietnam, Voice of	9840as	12020as	15010as	
1003-1006	Croatia, Croatian Radio	6145eu	9830eu	13830eu	
1030-1100	Austria, R Austria Intl	15450au	21490au		
1030-1100	Bulgaria, Radio	13670eu	17760eu	17830eu	
1030-1057	Czech Republic, R Prague	6055eu	7345eu	9505eu	11990eu
		15355eu			
1030-1100	Netherlands, Radio	12065as	15470as		
1030-1100	South Korea, Radio Korea	11715na			
1030-1100	Sri Lanka, SLBC Colombo	11835as	15120as	17850as	
1030-1100	UAE, UAE Radio Dubai	13675eu	15320eu	15435eu	21605eu
1030-1100	United Kingdom,BBC London	6190af	6195va	9410va	9660eu
		9740va	9750eu	9760eu	11750as
		11760me	11940af	12095eu	15070va
		15190am	15260sa	15310as	15400af
		15420af	15575va	17640va	17705eu
		17790va	17885af	21470va	21660af
1040-1050	Greece, Voice of	15650as	17525as		

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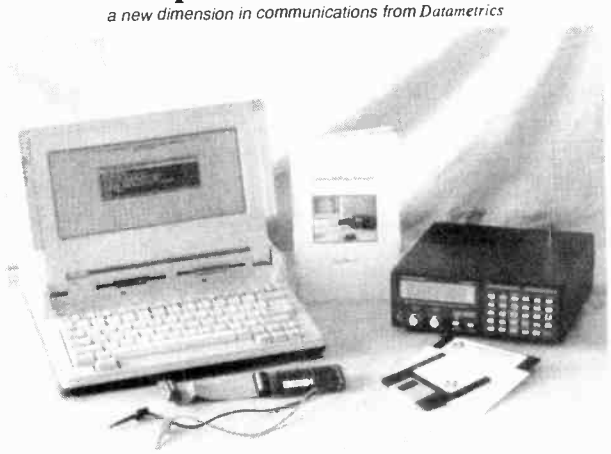

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1100 UTC [7:00 AM EDT/4:00 AM PDT]

FREQUENCIES

1100-1200	Australia, ABC Brisbane	4920do			
1100-1200	Australia, Radio	5995pa	6020pa	6080pa	7240pa
		9510pa	9545pa	9580pa	9710pa
		9910pa	15170pa	21725pa	
1100-1200	Bulgaria, Radio	13670eu	17760eu	17830eu	
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 Alajuela	9722ca	1870ca		
1100-1200	Costa Rica,R forPeace Int	7385na	13630na	15030na	
1100-1130	Ecuador, HCJB Quito	9745pa	11925pa	21455pa	
1100-1150	Germany, Deutsche Welle	15370af	15410af	17715af	17765af
		17800af	17860af	21465af	21600af
1100-1200	Ghana, GBC Radio 1	4915do			
1100-1110 mtwhf	Ghana, GBC Radio 2	7295do			
1100-1200 sa	Ghana, GBC Radio 2	3366do			
1100-1200 irreg	Italy, IRRS Milan	7125eu			
1100-1200	Japan, NHK Tokyo	6120na	11910na	15240na	21610as
1100-1200	Malaysia, RTM Radio 4	7295do			
1100-1130	Mozambique, R Mocambique	11820af	11835af		
1100-1125	Netherlands, Radio	12065as	15470as		
1100-1200	New Zealand, R NZ Intl	9700as			
1100-1150	North Korea, R Pyongyang	6576na	9977na	11335na	
1100-1120	Pakistan, Radio	17595eu	17900eu	21520eu	
1100-1200 vl	Papua New Guinea, NBC	4890pa			
1100-1200	Russia, Radio Moscow Intl	11765me	11785me	11800me	12020na
		13650na	15125as	15130as	15140me
		15225me	15290me	15320as	15355na
		15405as	15420as	15490me	15540as
		17570na	17595me	17675me	17735na
		17755na	17760na	17780me	17815as
		17875as			
1100-1200	S Africa, Channel Africa	9730af			
1100-1200 vl	S Africa, Radio Oranje	9630do			
1100-1200	Singapore, SBC Radio One	5010do	5052do	11940do	
1100-1129	Solomon Islands, SIBC	5020pa	9545pa		
1100-1200	South Korea, Radio Korea	6145na	9650na		
1100-1130	Sri Lanka, SLBC Colombo	11835as	15120as	17850as	
1100-1130	Switzerland, Swiss R Intl	13635as	15505as	17670as	17670as
		21820as			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1130	United Kingdom,BBC London	5965na	6190af	6195va	9410eu
		9515na	9600eu	9700au	9740va
		9750eu	9760eu	11750as	11760me
		11940af	12095eu	15070va	15220na
		15310as	15400eu	15420af	15575me
		17640va	17705eu	17790af	17885va
		21470va	21660af		
1100-1200	USA, CSMonitor Boston MA	9455sa	9495na	13625as	17555as
1100-1200	USA, KCBI Dallas TX	9815am			
1100-1200	USA, KTBN Salt Lk City UT	7510na			
1100-1200	USA, VOA Washington DC	5985as	6110as	7405am	9590am
		9760as	11720as	11915am	15120am
		15160as	15425as		
1100-1200	USA, WHRI Noblesville IN	7315na	9850sa	11790sa	
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	USA, WWCR Nashville TN	5935am			
1100-1200	USA, WYFR Okeechobee FL	5950na	7355na	11830na	
1100-1130	Vietnam, Voice of	7287as	9730as		
1115-1145	Nepal, Radio	3230as	5005as	7165as	
1130-1200	Austria, R Austria Intl	6155eu	13730eu		
1130-1200 s	Belgium, R Vlaanderen	15540as	17540as		
1130-1200	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
1130-1150 mtwhf	Finland, Radio	11735na	15400na		
1130-1200	Iran, VOIRI Tehran	9525me	11715me	11790me	11910as
		11930as			
1130-1200	Netherlands, Radio	5955eu	9860eu		
1130-1200	Serbia, Radio Yugoslavia	21605au			
1130-1200	Thailand, Radio	4830as	9655as	11905as	
1130-1200	United Kingdom,BBC London	5965na	6190af	6195va	9410eu
		9515na	9600eu	9740va	9750eu
		9760eu	11750as	11760me	11940af
		12095eu	15070va	15220na	15310as
		15420af	15575me	17640af	17705eu
		17790af	17885va	21470va	21660af

SELECTED PROGRAMS

Sundays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: The Ken Bruce Show. See S 0030.
1130 Radio New Zealand Int'l: National Radio. Programming from New Zealand domestic radio.
1131 Radio Moscow: Ads. See S 0431.

Mondays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: Composer Of The Month. See M 0230.
1130 Radio New Zealand Int'l: Good Night From RNZI. The personalities of Radio New Zealand Int'l.
1131 Radio Moscow: Music At Your Request. Music as requested by listeners.
1135 Radio Finland: Compass North. See S 1535.

Tuesdays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: Megamix. Music, sports, fashion, health, travel, news, and opinion for young people.
1130 R New Zealand Int'l: Good Night From RNZI. See M 1130.
1131 Radio Moscow: Folk Box. See S 2331.
1135 Radio Finland: Compass North. See S 1535.

Wednesdays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: Meridian. See W 0630.
1130 RN Zealand Int'l: Orient Express. Greetings from Chinese residents in New Zealand to friends and family in Asia.
1131 Radio Moscow: Music. See S 0531.
1135 Radio Finland: Compass North. See S 1535.

Thursdays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: Drama. This month, Ray Marsden stars as Arthur Conan Doyle's "Sherlock Holmes."
1130 R New Zealand Int'l: Good Night From RNZI. See M 1130.
1131 Radio Moscow: Jazz Show. See M 0431.
1135 Radio Finland: Compass North. See S 1535.

Fridays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: Meridian. See W 0630.
1130 R New Zealand Int'l: Good Night From RNZI. See M 1130.
1131 Radio Moscow: Yours For The Asking. See M 2331.
1135 Radio Finland: Compass North. See S 1535.

Saturdays

1111 Radio Moscow: News And Views. See S 0311.
1130 BBC: Meridian. See W 0630.
1130 Radio New Zealand Int'l: National Radio. See S 1130.
1131 Radio Moscow: Music At Your Request. See M 1131.

1200 UTC [8:00 AM EDT/5:00 AM PDT]

FREQUENCIES

1200-1250	Australia, AAF Radio	12070af			
1200-1300	Australia, ABC Brisbane	4920do			
1200-1300	Australia, ABC Katherine	2485do			
1200-1300	Australia, ABC Perth	6140do	9610do		
1200-1230	Australia, Radio	5995pa	6020pa	6080pa	7240pa
		9580pa	9710pa	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			
1200-1259 mtwhf	Canada, RCI Montreal	9635na	11855na	17820na	
1200-1300	China, China Radio Intl	9715as	11660as	11795pa	15210na
		15440pa	15450pa		
1200-1300	Costa Rica, AWR Alajuela	9725ca	11870ca		
1200-1300	Costa Rica,R forPeace Int	7385am	15030na	21465am	
1200-1300	Ecuador, HCJB Quito	11925am	15115am	17490am	17890am
		21455om			
1200-1300	Ghana, GBC Radio 1	4915do			
1200-1225 sa	Ghana, GBC Radio 2	3366do			
1200-1230	Iran, VOIRI Tehran	9525me	11715me	11790me	11910as
		11930as			
1200-1300 irreg	Italy, IRRS Milan	7125eu			
1200-1300	Kenya, Kenya BC Corp	4935do			
1200-1300	Malaysia, RTM Radio 4	7295do			
1200-1230 smwha	Mongolia, R Ulaanbaatar	11850as	12015as		
1200-1206	New Zealand, R NZ Intl	9700as			
1200-1300	Nigeria, Radio	4990do	7285do		
1200-1300	Nigeria, Voice of	7255af			
1200-1230 m	Norway, Radio Norway Intl	17730as	17860as		
1200-1300	Palau, KHBN Voice of Hope	9830as			
1200-1255	Poland, Polish R Warsaw	6135eu	7145eu	9525eu	11815eu
1200-1300	Russia, AWR Russia	11835eu			
1200-1300	Russia, Radio Moscow Intl	11765af	11785af	11800me	15140as
		15155as	15170me	15225as	15280na
		15290as	15320me	15355as	15440me
		15480as	15490na	15540na	15550me
		17590na	17595na	17645na	17670na
		17675af	17735me	17760na	17765me
		17790na	17815me		
1200-1300 vl	S Africa, Radio Oranje	9630do			
1200-1300	Singapore, SBC Radio One	5010do	5052do	11940do	
1200-1300	South Korea, Radio Korea	9640na			
1200-1230	Thailand, Radio	9655as	11905as		
1200-1230	United Kingdom,BBC London	6190af	6195na	9410eu	9515na
		9660eu	9740as	9750eu	9760eu
		11750as	11760me	11940af	12095eu
		15070va	15220na	15260sa	15310as
		15575va	17640af	17705eu	17790af
		17885af	21470af	21660af	
1200-1215	United Kingdom,BBC London	7160as	9605as	11920as	
1200-1300	USA, CSMonitor Boston MA	9425pa	9495na	13625as	13760sa
1200-1300 as	USA, CSMonitor Boston MA	15665eu			
1200-1300	USA, KCBI Dallas TX	9815am			
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, VOA Washington DC	6110as	9760as	11715as	15160as
		15425as			
1200-1300	USA, WEWN Birmingham AL	9350am	15695am		
1200-1300	USA, WHRI Noblesville IN	7315na	9850sa	11790sa	
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300	USA, WWCR Nashville TN	13845am			
1200-1300	USA, WYFR Okeechobee FL	5950am	6015am	11830am	17750am
1200-1230	Uzbekhistan, R Tashkent	7325as	9715as	15295as	17745as
1207-1300 ocasnal	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			
1230-1300	Australia, Radio	5995pa	6020pa	7150pa	7240pa
		9580pa	21725pa		
1230-1300	Bangladesh, Radio	11708eu	13620eu	15200eu	
1230-1259	Canada, RCI Montreal	9660as	15195as		
1230-1300	Finland, Radio	11900na	15400na		
1230-1255	France, Radio France Intl	9805eu	11670eu	15155eu	15195eu
		15365na	21645na		
1230-1300	Netherlands, Radio	5955eu	9860eu		
1230-1300	Sri Lanka, SLBC Colombo	6075as	9720as		
1230-1300	Sweden, Radio	15240pa	21500as		
1230-1300	Turkey, Voice of	9675as			
1230-1300	United Kingdom,BBC London	6190af	6195na	9410eu	9515na
		9660eu	9740as	9750eu	9760eu
		11750as	11760me	11940af	12095eu
		15070va	15220na	15260sa	15310as
		15575va	17640af	17705eu	17790af
		17885af	21470af	21660af	
1230-1300	Vietnam, Voice of	9840as	12020as	15010as	
1235-1245	Greece, Voice of	15635na	15650na	17515na	

SELECTED PROGRAMS

Sundays

1201 BBC: Play Of The Week. See S 0101.
1211 Radio Moscow: Music And Musicians. See S 0111.
1237 Radio Canada Int'l: The Mailbag. Listener letters and musical selections.

Mondays

1207 Radio Canada Int'l (am): As It Happens. A detailed look at the people and events making news in Canada and abroad.
1209 BBC: Words Of Faith. Speakers from various faiths discuss scripture and their beliefs.
1211 Radio Moscow: Top Priority. See S 0411.
1215 BBC: Quiz. Robert Robinson continues the quest to find the "Brain Of Britain" (through September 6th).
1231 Radio Moscow: Russian By Radio. See S 0631.
1235 Radio Finland: Compass North. See S 1535.
1237 Radio Canada Int'l (as): Spectrum. A current-affairs magazine, with reports produced by Canadian domestic radio.
1245 BBC: Sports Roundup. See S 0315.

Tuesdays

1207 Radio Canada Int'l (am): As It Happens. See M 1207.
1209 BBC: Words Of Faith. See M 1209.
1211 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1215 BBC: Multitrack 1. See M 2330.
1231 Radio Moscow: Music. See S 0531.
1235 Radio Finland: Compass North. See S 1535.
1237 Radio Canada Int'l (as): Spectrum. See M 1237.
1245 BBC: Sports Roundup. See S 0315.

Wednesdays

1200 Radio New Zealand Int'l: Orient Express. See W 1130.
1207 Radio Canada Int'l (am): As It Happens. See M 1207.
1209 BBC: Words Of Faith. See M 1209.
1211 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1215 BBC: New Ideas. See M 1615.
1231 Radio Moscow: Music. See S 0531.
1235 BBC: Talks. See M 1635.
1235 Radio Finland: Compass North. See S 1535.
1237 Radio Canada Int'l (as): Spectrum. See M 1237.
1245 BBC: Sports Roundup. See S 0315.

Thursdays

1207 Radio Canada Int'l (am): As It Happens. See M 1207.
1209 BBC: Words Of Faith. See M 1209.
1211 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1215 BBC: Multitrack 2. See W 2330.
1231 Radio Moscow: Music. See S 0531.
1235 Radio Finland: Compass North. See S 1535.
1237 Radio Canada Int'l (as): Spectrum. See M 1237.
1245 BBC: Sports Roundup. See S 0315.

Fridays

1207 Radio Canada Int'l (am): As It Happens. See M 1207.
1209 BBC: Words Of Faith. See M 1209.
1211 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1215 BBC: Feature. This month: "The World That Came In From The Cold" (2nd, 9th); "Setting Up A State" (16th); "The Slavs" (through August 13th).
1231 Radio Moscow: Music. See S 0531.
1235 Radio Finland: Compass North. See S 1535.
1237 Radio Canada Int'l (as): Spectrum. See M 1237.
1245 BBC: Sports Roundup. See S 0315.

Saturdays

1209 BBC: Words Of Faith. See M 1209.
1211 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1215 BBC: Multitrack 3. See F 2330.
1231 Radio Moscow: Your Top Tune. See S 0231.
1237 Radio Canada Int'l: Innovation Canada. See S 0107.
1245 BBC: Sports Roundup. See S 0315.

1300 UTC [9:00 AM EDT/6:00 AM PDT]

FREQUENCIES

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		
1300-1330 mtwtfs	Belgium, R Vlaanderen	15540na	17540as		
1300-1320	Brazil, Radiobras	15445am			
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 s	Canada, RCI Montreal	11955na	17820na		
1300-1400	China, China Radio Intl	9715as	11660pa	15440pa	
1300-1400	Costa Rica,R forPeace Int	7385am	15030na	21465am	
1300-1400	Ecuador, HCJB Quito	11925am	15115am	17490va	17890am
		21455am			
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Finland, Radio	15400na	21550na		
1300-1325	Israel, Kol Israel	11587na	11603na	15640na	15650as
		17575eu	17590eu		
1300-1325	Kenya, Kenya BC Corp	4935do			
1300-1400	Lebanon, Wings of Hope	11530me			
1300-1400	Malaysia, RTM Radio 4	7295do			
1300-1400	Nigeria, Radio	4990do	7285do		
1300-1400	Nigeria, Voice of	7255af			
1300-1350	North Korea, R Pyongyang	9345eu	9640as	13760am	15230as
1300-1330 m	Norway, Radio Norway Intl	9590eu	15230eu		
1300-1400	Palau, KHBN Voice of Hope	9830as			
1300-1400	Philippines, FEBC Manila	11995as			
1300-1400	Romania, R Romania Intl	11940eu	15365eu	17720eu	17850eu
1300-1400	Russia, Radio Moscow Intl	9640na	9755na	9895na	11940eu
		11995na	15140me	15225na	15280as
		15290na	15320as	15355me	15480as
		15550as	17595as	17735me	17760na
		17790na	17860me	21610as	21625me
		21785me			
1300-1400 vl	S Africa, Radio Oranje	9630do			
1300-1400	Singapore, SBC Radio One	5010do	5052do	11940do	
1300-1315	South Korea, Radio Korea	9750na	13670na		
1300-1400	Sri Lanka, SLBC Colombo	6075as	9720as		
1300-1330	Switzerland, Swiss R Intl	7480as	11690as	13635as	15505as
		17670as	21820as		
1300-1330	United Kingdom,BBC London	6190af	6195va	7180pa	9410eu
		9515na	9660eu	9740va	9750eu
		9760eu	11750as	11760me	11820va
		11940af	12095eu	15070va	15105af
		15220am	15310as	15420af	15575me
		17640va	17705eu	17790va	17885af
		21470va	21660af		
1300-1400	USA, CSMonitor Boston MA	9425pa	9495na	13625as	13760sa
1300-1400 as	USA, CSMonitor Boston MA	15665eu			
1300-1400	USA, KCBI Dallas TX	9815am			
1300-1400	USA, KNLS Anchor Point AK	7355as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, VOA Washington DC	6110as	9760as	11715as	15160as
		15425as			
1300-1400	USA, WEWN Birmingham AL	9350na			
1300-1400	USA, WHRI Noblesville IN	9465na	11790na		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400	USA, WWCR Nashville TN	13845am			
1300-1400	USA, WYFR Okeechobee FL	5950na	6015na	11830na	13695na
		17750na			
1302-1400	Taiwan, VOFC via WYFR	11550as			
1320-1400	Jordan, Radio	9560eu			
1325-1400 mtwhf	Kenya, Kenya BC Corp	4935do			
1330-1400	Austria, R Austria Intl	15450as			
1330-1359	Canada, RCI Montreal	9535as	11795as	11935eu	15315eu
		15325eu	17820eu	17895af	21455eu
		21710eu			
1330-1400 mtwhf	Finland, Radio	11900na	15400na	21550na	
1330-1400	India, All India Radio	11760as	15120as		
1330-1400	Laos, National Radio of	7116as			
1330-1400	Netherlands, Radio	9890as	13700as	15150as	17610as
1330-1400	UAE, UAE Radio Dubai	13675eu	15320eu	15435as	21605as
1330-1400	United Kingdom,BBC London	6190af	6195va	7180pa	9410eu
		9515na	9660eu	9740va	9750eu
		9760eu	11750as	11760me	11820va
		11940af	12095eu	15070va	15220am
		15310as	15420af	15575me	17640va
		17705eu	17790va	17885af	21470va
		21660af			
1330-1400	Uzbekhistan, R Tashkent	7325as	9715as	15295as	17745as
1330-1400	Vietnam, Voice of	9840as	15009as		
1335-1345	Greece, Voice of	15635eu	17515eu		
1345-1400	Vatican State, Vatican R	15090as	17525as		

SELECTED PROGRAMS

Sundays

1300 Radio Finland: Good Morning. No details available.
1307 Radio Canada Int'l (am): Sunday Morning. A magazine program covering virtually everything under the sun.
1310 Kol Israel: Israel Sound. The latest pop and rock tunes from Israel.
1311 Radio Moscow: Science And Engineering. See S 0511.
1325 Kol Israel: Postmark. Recent Israeli stamp releases.
1330 Radio Finland: Focus. See S 0145.
1331 Radio Moscow: Your Top Tune. See S 0231.
1337 Radio Canada Int'l (eu, af, as): Arts In Canada. A look at the Canadian arts scene.

Mondays

1310 Kol Israel: Calling All Listeners. A mailbag program.
1311 Radio Moscow: Mailbag. See S 0611.
1325 Kol Israel: DX Corner. Ben Dalfen presents shortwave radio news.
1331 Radio Moscow: Audio Book Club. See S 0031.
1335 Radio Finland: Compass North. See S 1535.
1337 Radio Canada Int'l: Spectrum. See M 1237.

Tuesdays

1310 Kol Israel: Israel Mosaic. A weekly magazine program.
1311 Radio Moscow: Newmarket. See M 1611.
1325 Kol Israel: New From Israel. A look at the worlds of science and technology.
1331 Radio Moscow: Music. See S 0531.
1335 Radio Finland: Compass North. See S 1535.
1337 Radio Canada Int'l: Spectrum. See M 1237.

Wednesdays

1310 Kol Israel: Talking Point. Interviews with guests in the Kol Israel studios.
1311 Radio Moscow: Adamov's Mailbag. See S 0011.
1331 Radio Moscow: Russian By Radio. See S 0631.
1335 Radio Finland: Compass North. See S 1535.
1337 Radio Canada Int'l: Spectrum. See M 1237.

Thursdays

1310 Kol Israel: Jewish News Review. A look at events affecting Jews around the world.
1311 Radio Moscow: Culture And The Arts. See S 1611.
1315 Kol Israel: This Land. Travel and tourism in Israel.
1331 Radio Moscow: Audio Book Club. See S 0031.
1335 Radio Finland: Compass North. See S 1535.
1337 Radio Canada Int'l: Spectrum. See M 1237.

Fridays

1311 Radio Moscow: Mailbag. See S 0611.
1331 Radio Moscow: Russian By Radio. See S 0631.
1335 Radio Finland: Compass North. See S 1535.
1337 Radio Canada Int'l: Spectrum. See M 1237.

Saturdays

1311 Radio Moscow: Newmarket. See M 1611.
1331 Radio Moscow: Audio Book Club. See S 0031.
1335 Radio Finland: Compass North. See S 1535.
1337 Radio Canada Int'l: Innovation Canada. See S 0107.
1345 Radio Finland: Starting Finnish. See S 0645.

1400 UTC [10:00 AM EDT/7:00 AM PDT]

FREQUENCIES

1400-1450	Australia, AAF Radio	13508af			
1400-1500	Australia, ABC Brisbane	4920do			
1400-1500	Australia, ABC Perth	6140do			
1400-1430	Australia, Radio	5995pa	7260pa	9580pa	11800pa
		11855pa	13755pa		
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	11955na	17820na		
1400-1500 mtwhfa	Canada, RCI Montreal	11935eu	15315eu	15325eu	17820eu
		17895eu	21455eu	21710eu	
1400-1500	China, China Radio Intl	11815na	11855as	15135as	
1400-1500	Costa Rica,R forPeace Int	7375na	7385am	13630na	15030am
		21465am			
1400-1430	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
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	India, All India Radio	11760as	15120as		
1400-1500 vl	Iraq, Radio Iraq Intl	15250as			
1400-1500 irreg	Italy, IRRS Milan	7125eu			
1400-1500	Japan, NHK Tokyo	9535am	11815as	11835am	
1400-1500	Jordan, Radio	9560eu			
1400-1500 mtwhf	Kenya, Kenya BC Corp	4935do			
1400-1500	Lebanon, King of Hope	6280me			
1400-1500	Malaysia, RTM Radio 4	4950do	7295do		
1400-1500	Malta, V of Mediterranean	11925eu			
1400-1500	Netherlands, Radio	9890as	13770as	15150as	17610as
1400-1500	Nigeria, Voice of	7255af			
1400-1500	Palau, KHBN Voice of Hope	9830as			
1400-1500	Philippines, FEBC Manila	11995as			
1400-1500	Russia, Radio Moscow Intl	9640na	9755na	9895na	11665me
		11705as	11870as	11995na	15125af
		15140as	15225na	15290na	15320af
		15355as	15480as	17580af	17595af
		17595af	17790na	21785as	
1400-1500 vl	S Africa, Radio Oranje	9630do			
1400-1430	Serbia, Radio Yugoslavia	9505eu			
1400-1500	Singapore, SBC Radio One	5010do	5052do	11940do	
1400-1500	South Korea, Radio Korea	9570as			
1400-1500	Sri Lanka, SLBC Colombo	6075as	9720as		
1400-1500	Taiwan, VOFC via WYFR	11550as			
1400-1430	United Kingdom,BBC London	6195as	7180as	9410eu	9515na
		9660eu	9740as	9750eu	9760eu
		11750as	11820as	11940af	12095eu
		15070va	15260af	15310as	15575me
		17640va	17705eu	17790af	17840am
		17880af	21490va	21660af	
1400-1500	USA, CSMonitor Boston MA	9530as	13625as	13760am	15665eu
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	7125as	9645as	9760as
		15160as	15255as	15395as	15425as
1400-1500	USA, WEWN Birmingham,AL	9350na			
1400-1500	USA, WHRI Noblesville IN	9465na	15105na		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WWCR Nashville TN	13845am			
1400-1500	USA, WYFR Okeechobee FL	6015am	11830am	17750na	
1400-1405	Vatican State, Vatican R	15090au	17525au		
1415-1500	Bhutan, BC Service	5025do			
1415-1425	Nepal, Radio	3230do	5005do	7165do	
1430-1500	Afghanistan, Radio	7200as			
1430-1500	Australia, Radio	7240pa	7260pa	9560pa	9580pa
		9770pa	11800pa	11855pa	13755pa
		21490pa			
1430-1500	Austria, R Austria Intl	6155eu	13730eu	15450eu	21490va
1430-1500	Ecuador, HCJB Quito	11925am	17490va	17890am	21455am
1430-1500 m	Indonesia, RRI Padang	4003pa			
1430-1500	Myanmar, VO Myanmar	5990do			
1430-1500 mtwhf	Portugal, Radio	21515me			
1430-1500	Romania, R Romania Intl	11775as	15335as	17720as	
1430-1500	United Kingdom,BBC London	6190af	6195as	7180as	9410eu
		9515na	9660eu	9740as	9750eu
		9760eu	11750as	11820as	11860me
		11940af	12095eu	15070eu	15260me
		15310as	15575me	17640va	17705eu
		17790af	17840am	17880af	21470va
		21660af			
1445-1500 smha	Mongolia, R Ulaanbaatar	7560as	7780as		

SELECTED PROGRAMS

Sundays

1400 Radio Canada Int'l: Sunday Morning. See S 1307.
1401 BBC: Feature. Changes in Catholicism are the subject of "The Pope's Divisions" (through August 1st) (except 4th: Wimbledon Men's Final, through 1700 UTC).
1411 Radio Moscow: News And Views. See S 0311.
1430 BBC: Anything Goes. Bob Holness presents a variety of musical requests.
1431 Radio Moscow: Russian By Radio. See S 0631.

Mondays

1405 BBC: Outlook. Conversation, controversy, and color from the UK and the world.
1411 Radio Moscow: News And Views. See S 0311.
1430 BBC: Off The Shelf. See M 0430.
1431 Radio Moscow: Folk Box. See S 2331.
1441 Radio Portugal: Welcome To Portugal. A close look at the nation of Portugal.
1445 BBC: Musical Feature. See S 0445.

Tuesdays

1405 BBC: Outlook. See M 1405.
1411 Radio Moscow: News And Views. See S 0311.
1411 Radio Portugal: Music Time. Portugese folk, classical, and modern rock music.
1430 BBC: Off The Shelf. See M 0430.
1431 Radio Moscow: Music. See S 0531.
1445 BBC: Musical Feature. See M 0145.

Wednesdays

1405 BBC: Outlook. See M 1405.
1411 Radio Moscow: News And Views. See S 0311.
1430 BBC: Off The Shelf. See M 0430.
1431 Radio Moscow: Jazz Show. See M 0431.

Radio Netherland's Robert Chesal

1441 Radio Portugal: Challenge Of The '90s. A look at the problems facing the EC with unification.
1445 BBC: Good Books. A personal selection of good books to read.

Thursdays

1405 BBC: Outlook. See M 1405.
1411 Radio Moscow: News And Views. See S 0311.
1430 BBC: Off The Shelf. See M 0430.
1431 Radio Moscow: Yours For The Asking. See M 2331.
1441 Radio Portugal: Portugal Past and Present. A look at historical events and current issues facing Portugal.
1445 BBC: Recording Of The Week. See M 0615.

Fridays

1405 BBC: Outlook. See M 1405.
1411 Radio Moscow: News And Views. See S 0311.
1430 BBC: Off The Shelf. See M 0430.
1431 Radio Moscow: Music At Your Request. See M 1131.
1441 Radio Portugal: Feature. Rotating programs in this time slot include "DX," "Collector's Corner," and "Mailbag."
1445 BBC: Global Concerns. See F 0145.

Saturdays

1401 BBC: Sportsworld. Extensive coverage and results of all the weekend's sports, including "Wimbledon Women's Final" (3rd).
1411 Radio Moscow: News And Views. See S 0311.
1431 Radio Moscow: Ads. See S 0431.

1500 UTC [11:00 AM EDT/8:00 AM PDT]

FREQUENCIES

1500-1600	Australia, ABC Brisbane	6140do			
1500-1530	Australia, Radio	7240pa	7260pa	9540pa	9560pa
		9580pa	9770pa	11800pa	11855pa
		13755pa			
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			
1500-1559 s	Canada, RCI Montreal	11955na	17820na		
1500-1600	China, China Radio Intl	7405as	11815as	15135as	
1500-1600	Costa Rica,R forPeace Int	7375am	7385am	13630am	15030am
		21465am			
1500-1527	Czech Republic, R Prague	6055eu	7345eu	13600me	15535af
		15605af	17535eu		
1500-1600	Ecuador, HCJB Quito	11925am	17490va	17890am	21455am
1500-1550	Germany, Deutsche Welle	7185af	9735af	11965af	13610af
		17735af	21600as		
1500-1600	Guam, KTWR Agana	15610as			
1500-1600 vl	Iraq, Radio Iraq Intl	15250as			
1500-1600	Japan, NHK Tokyo	9750as	11815as	11865na	15355af
1500-1600	Jordan, Radio	9560eu			
1500-1600	Malaysia, RTM Radio 4	4950do	7295do		
1500-1600	Malta, V of Mediterranean	11925eu			
1500-1600 smha	Mongolia, R Ulaanbaatar	7570as	7780as		
1500-1600	Myanmar, VO Myanmar	5990do			
1500-1600	Netherlands, Radio	9890as	13770as	15150as	17610as
1500-1600	Nigeria, Radio	4990do	7285do		
1500-1600	Nigeria, Voice of	7255af			
1500-1600	North Korea, R Pyongyang	9325eu	9640af	9977af	13785eu
1500-1530	Palau, KHBN Voice of Hope	9830as			
1500-1600	Philippines, FEBC Manila	11995as			
1500-1555	Poland, Polish R Warsaw	7285eu	9525eu	11840eu	
1500-1530	Romania, R Romania Intl	11775as	15335as	17720as	
1500-1600	Russia, Radio Moscow Intl	9505na	9755na	9825na	9890na
		9895na	11665me	11995na	12030na
		15125na	15170me	15180na	15290na
		15355as	15425na	15480na	15550na
		17580me	17735me	17760na	17765na
1500-1600 vl	S Africa, Radio Oranje	9630do			
1500-1555 s	Seychelles, FEBA Radio	11710as			
1500-1600	Seychelles, FEBA Radio	9810af	15330af		
1500-1600	Singapore, SBC Radio One	5010do	5052do	11940do	
1500-1600	Sri Lanka, SLBC Colombo	6075as	9720as		
1500-1530	Sweden, Radio	15240na	21500na		
1500-1530	Switzerland, Swiss R Intl	15240af	15270af	21500af	21820me
1500-1530	United Kingdom,BBC London	6190af	6195eu	7180as	9410eu
		9515na	9740va	9760eu	11750as
		11940af	12095eu	15070va	15260na
		15310as	15400eu	17705eu	17840au
		17860af	17880af	21470af	21660af
1500-1600	USA, CSMonitor Boston MA	9530as	13625as	13760am	15665eu
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	9700as
		9760as	15205eu	15255as	15395as
		19379eu			
1500-1600	USA, WEWN Birmingham AL	17510am			
1500-1600	USA, WHRI Noblesville IN	9465sa	15105na		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WRNO New Orleans LA		15420na		
1500-1600	USA, WWCR Nashville TN	13845am			
1500-1600	USA, WYFR Okeechobee FL	6015na	11705na	11830na	17750na
1520-1540 mtwhfa	Greece, Voice of	15630na	15645na	17525na	
1530-1600	Australia, Radio	6060pa	7240pa	7260pa	9560pa
		9580pa	11800pa	11855pa	13755pa
1530-1600	Austria, R Austria Intl	11780as			
1530-1545	Finland, Radio	6120eu	11755eu	11820eu	15240me
		21550af			
1530-1600	United Kingdom,BBC London	6190af	6195eu	7180as	9410eu
		9515na	9740va	9760eu	11750as
		11940af	12095eu	15070va	15260na
		15310as	15400eu	17705eu	17840am
		17860af	17880af	21470af	21660af
1545-1600	Vatican State, Vatican R	15090au	17865as		

SELECTED PROGRAMS

Sundays

1500 Radio Canada Int'l: Sunday Morning. See S 1307.
1511 Radio Moscow: Top Priority. See S 0411.
1515 BBC: Sunday Sportsworld. Extensive coverage and results of all the weekend's sports.
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. Commentary and features on issues and people in Finland.

Mondays

1511 Radio Moscow: Culture And The Arts. See S 1611.
1515 BBC: Feature. See M 0101.
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. See S 1535.

Tuesdays

1511 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1515 BBC: A Jolly Good Show. Dave Lee Travis presents listener rock music requests.
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. See S 1535.

Wednesdays

1511 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1515 BBC: Talks. See M 0415.

Bob Holness presents the BBC's Anything Goes.

1530 BBC: Comedy. This month, Miranda Richardson stars in Evelyn Waugh's "The Loved One" (except 28th: Two Cheers For July, a humorous look at the month just past).
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. See S 1535.

Thursdays

1511 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1515 BBC: Ray On Record. See S 2315.
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. See S 1535.

Fridays

1511 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1515 BBC: Music Review. See H 2315.
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. See S 1535.

Saturdays

1511 Radio Moscow: Focus On Asia And The Pacific. See T 0011.
1515 BBC: Sportsworld. See A 1401.
1531 Radio Moscow: Music. See S 0531.
1535 Radio Finland: Compass North. See S 1535.

1600 UTC [12:00 PM EDT/9:00 AM PDT]

FREQUENCIES

1600-1700	Algeria, Radio Algiers	11715af	15160af		
1600-1630	Australia, Radio	6060pa	7240pa	7260pa	9560pa
		9580pa	11800pa	11855pa	11880pa
		13755pa			
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,R forPeace Int	7375na	7385am	13630na	15030na
1600-1700	Ecuador, HCJB Quito	17790me	21455am	21480me	
1600-1700	France, Radio France Intl	11705af	12015af	15530me	17620af
		17795af	17850af		
1600-1630	Georgia, Georgian Radio	9656eu			
1600-1650	Germany, Deutsche Welle	6170as	7225as	9875as	11785as
		15105as	15595as	17810as	21680as
1600-1700	Ghana, GBC Radio 1	4915do			
1600-1700	Ghana, GBC Radio 2	7295do			
1600-1700	Guam, KSDA Agana	11980as			
1600-1645	Guam, KTWR Agana	15610as			
1600-1700 vl	Iraq, Radio Iraq Intl	15250as			
1600-1630	Italy, AWR Europe	15125eu			
1600-1615 mha	Mongolia, R Ulaanbaatar	7560as	7780as		
1600-1630	Netherlands, Radio	9890as	13700as	15150as	17610as
1600-1700	Nigeria, Radio	4990do			
1600-1700	Nigeria, Voice of	7255af			
1600-1630 s	Norway, Radio Norway Intl	15230eu	17720me		
1600-1630	Pakistan, Radio	11570me	13685af	15555af	17558af
		21495af			
1600-1700	Russia, Radio Moscow Intl	9505na	9660eu	9705eu	9715eu
		9755eu	9825na	9860eu	11705na
		11995na	12030na	12090na	15125as
		15180na	15185am	15225as	15290na
		15355as	15425na	15540af	17700af
		17735na	17760na	17790na	
1600-1700	S Africa, Channel Africa	5960af	17710af		
1600-1700	Saudi Arabia, BSKSA	9705eu	9720eu		
1600-1605	Singapore, SBC Radio One	5010do	5052do	11940do	
1600-1700	South Korea, Radio Korea	5975om	9870af		
1600-1700	Sri Lanka, SLBC Colombo	6075as	9720as		
1600-1700	Swaziland, Trans World R	9500af			
1600-1645	UAE, UAE Radio Dubai	11795af	13675eu	15435eu	21605eu
1600-1630	United Kingdom,BBC London	3915as	6190af	6195eu	9410eu
		9515na	9740va	11750as	12095va
		15070va	15260na	15310as	15400eu
		17840af	17860af	17880af	21470af
		21660af			
1600-1700	USA, CSMonitor Boston MA	11580as	13625va	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	6110as	7125as	9645as	9700as
		9760as	11920af	11995af	13710af
		15255as	15255af	15395as	15445af
		17895af			
1600-1630	USA, VOA Washington DC	9700eu	15205eu	15255eu	19379eu
1600-1700	USA, WEWN Birmingham AL	17535na			
1600-1700	USA, WHRI Noblesville IN	9465na	13760na	15105na	
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WRNO New Orleans LA		15420na		
1600-1700	USA, WWCR Nashville TN	13845am			
1600-1700	USA, WYFR Okeechobee FL	11705na	11830af	15355eu	17750eu
		21525af	21615af		
1600-1630	Vatican State, Vatican R	6245eu	7250eu	15090as	17865as
1600-1630 a	Vatican State, Vatican R	15090af	17730af		
1600-1630	Vietnam, Voice of	9840af	12020af	15010af	
1620-1700 vl	S Africa, Radio Oranje	3230do			
1630-1700	Australia, Radio	5995pa	6060pa	6080pa	7240pa
		7260pa	9560pa	9580pa	11880pa
		11910pa	13755pa		
1630-1657	Canada, RCI Montreal	7150as	9555as		
1630-1700	Ecuador, HCJB Quito	17790me	21455me		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700 mtwhf	Portugal, Radio	21515me			
1630-1700	United Kingdom,BBC London	3915as	5975as	6190af	6195eu
		7160as	9410eu	9515na	9630af
		9740va	11720as	11750as	12095va
		15070va	15260na	15310as	15400eu
		15420af	17860af	17880af	21470af
		21660af			
1630-1700	USA, VOA Washington DC	15255eu	17735eu	19379eu	
1645-1700 s	Guam, KTWR Agana	15610as			
1645-1700	Tajikistan, Radio	7245eu			
1650-1700 mtwhf	New Zealand, R NZ Intl	9675pa			

SELECTED PROGRAMS

Sundays

1611 Radio Moscow: Culture And The Arts. A look at the varied arts and cultures of Russia.
1615 BBC: Feature. See S 0230.
1631 Radio Moscow: Audio Book Club. See S 0031.
1637 Radio Canada Int'l: The Mailbag. See S 1237.
1645 BBC: Letter From America. See S 0615.

Mondays

1611 Radio Moscow: Newmarket. A look at commercial products and opportunities in Russia.
1615 BBC: New Ideas. A look at the latest technology, innovations, and new products.
1631 Radio Moscow: Audio Book Club. See S 0031.
1635 BBC: Talks. This month, hear capsule summaries of famous artists in "Artists In A Nutshell."
1637 Radio Canada Int'l: Spectrum. See M 1237.
1645 BBC: The World Today. A look at a topical aspect of the international scene.

Tuesdays

1611 Radio Moscow: Science And Engineering. See S 0511.
1615 BBC: Megamix. See T 1130.
1631 Radio Moscow: Russian By Radio. See S 0631.
1637 Radio Canada Int'l: Spectrum. See M 1237.
1645 BBC: The World Today. See M 1645.

Wednesdays

1611 Radio Moscow: Culture And The Arts. See S 1611.
1615 BBC: Rock/Pop Music. See T 0630.
1631 Radio Moscow: Music. See S 0531.
1637 Radio Canada Int'l: Spectrum. See M 1237.
1645 BBC: The World Today. See M 1645.

Thursdays

1611 Radio Moscow: Mailbag. See S 0611.
1615 BBC: Network UK. Issues and events affecting people across the UK.
1631 Radio Moscow: Russian By Radio. See S 0631.
1637 Radio Canada Int'l: Spectrum. See M 1237.
1645 BBC: The World Today. See M 1645.

Fridays

1611 Radio Moscow: Newmarket. See M 1611.
1615 BBC: Science In Action. The latest in science and technology.
1631 Radio Moscow: Audio Book Club. See S 0031.
1637 Radio Canada Int'l: Spectrum. See M 1237.
1645 BBC: The World Today. See M 1645.

Saturdays

1611 Radio Moscow: Music And Musicians. See S 0111.
1615 BBC: Sportsworld. See A 1401.
1637 Radio Canada Int'l: Innovation Canada. See S 0107.

English language

shortwave guide

1700 UTC [1:00 PM EDT/10:00 AM PDT]

1700-1800	Algeria, Radio Algiers	9535me	17745af		
1700-1800	Australia, Radio	5995pa	6060pa	6080pa	7240pa
		7260pa	9560pa	9580pa	11880pa
		11910pa	13755pa		
1700-1800	Azerbaijan, Voice of	15240as			
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	6955as	9570as	11575as	15345as
		15370as			
1700-1800	Costa Rica,R forPeace Int	7375na	7385am	13630na	15030na
1700-1727	Czech Republic, R Prague	6055af	7345af	9490af	13600af
		15605af			
1700-1800	Ecuador, HCJB Quito	15270me	17790me	21455me	21480na
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Ghana, GBC Radio 1	4915do			
1700-1800 as	Guam, KSDA Agana	13720as			
1700-1715	Israel, Kol Israel	7465na	11587eu	11675eu	15640eu
1700-1800 irreg	Italy, IRRS Milan	7125eu			
1700-1800	Japan, NHK Tokyo	11815as	11865as	17775na	
1700-1800	Jordan, Radio	9560eu			
1700-1735	Kazakhstan, R Alma Ata	9505eu	11825eu	15155eu	15270eu
		15285eu	15360eu	17605eu	17715eu
		17740eu	17910eu		
1700-1800 mtwhf	New Zealand, R NZ Intl	6035pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9977af	11705eu
1700-1730 s	Norway, Radio Norway Intl	9655eu	15220eu		
1700-1800	Pakistan, Radio	9420eu	11570eu		
1700-1755	Poland, Polish R Warsaw	7270eu	9525eu		
1700-1800	Russia, Radio Moscow Intl	9505na	9540na	9685na	9840na
		9860na	11705af	11960af	11995na
		12050na	12065af	15180as	15290na
		15355af	15385af	15395af	15425na
		15580na	17605na	17735na	17760na
		17790na			
1700-1800	S Africa, Channel Africa	5960af	17710af		
1700-1800	Saudi Arabia, BSKSA	9705eu	9720eu		
1700-1730	Sri Lanka, SLBC Colombo	6075as	9720as		
1700-1730	Switzerland, Swiss R Intl	9885af	13635af	15430af	17635af
1700-1730	United Kingdom,BBC London	3915as	6180eu	6195eu	7325eu
		9410eu	9515na	9740va	12095va
		15070va	15260af	15400af	15420af
		17880af	21660af		
1700-1800	USA, CSMonitor Boston MA	11580as	13625va	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			
1700-1730	USA, VOA Washington DC	11920af	11995af 1	3710af	15445af
		17895af			
1700-1800	USA, WEWN Birmingham AL	13615na			
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, WRNO New Orleans LA		15420na		
1700-1800	USA, WYFR Okeechobee FL	21500af			
1730-1800	Bulgaria, Radio	11720na	13670na		
1730-1800	Netherlands, Radio	6020af	7120af	21515af	21590af
1730-1800	Romania, R Romania Intl	15340af	15365af	17745af	17805af
1730-1800	Sweden, Radio	6065af	9645me	15270af	
1730-1800	United Kingdom,BBC London	6180eu	6195eu	7160me	7325eu
		9410eu	9740va	11720as	12095va
		15070va	15400af	15420af	17780af
		17880af	21660af		
1730-1800	Vatican State, Vatican R	11625af	15090af	17730af	
1745-1800	India, All India Radio	7412eu	9950me	11620eu	11860eu
		11935af	15080af		

1800 UTC [2:00 PM EDT/11:00 AM PDT]

1800-1900	Australia, Radio	6060pa	6080pa	7240pa	7260pa
		9580pa	11855pa	11880pa	11910pa
1800-1830	Belgium, R Vlaanderen	5910af	13685eu		
1800-1900	Brazil, Radiobras	15265eu			
1800-1900	Bulgaria, Radio	11720na	13670na		
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,R forPeace Int	7375am	7385am	13630am	15030am
1800-1900	Ecuador, HCJB Quito	17790eu	21455am		
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Ghana, GBC Radio 1	4915do			
1800-1900	Ghana, GBC Radio 2	7295do			
1800-1900 as	Guam, KSDA Agana	13720as			
1800-1900	India, All India Radio	7412eu	9950me	11620eu	11860eu
		11935af	15080af		
1800-1900 irreg	Italy, IRRS Milan	7125eu			
1800-1900	Kuwait, Radio	13620na			
1800-1900	Netherlands, Radio	6020af	7120af	21515af	21590af
1800-1850 smtwhf	New Zealand, R NZ Intl	11735pa			
1800-1900	Russia, Radio Moscow Intl	9685as	9890eu	11630af	11770as
		11995na	12015af	12050af	15150af
		15185af	15290na	15355me	15385af
		15425as	15580na	17605na	17760af
		17790na	17875as	21670me	
1800-1900	Saudi Arabia, BSKSA	9705eu	9720eu		
1800-1900	South Korea, Radio Korea	15575eu			
1800-1900	Sudan, Radio Omdurman	7200do	9165do		
1800-1900	Swaziland, Trans World R	3200af	9500af		
1800-1830	United Kingdom,BBC London	3255af	6180eu	6195eu	7160va
		7325eu	9410va	9740va	11720as
		11955au	12095va	15070va	15400af
		15420af	17880af		
1800-1900	USA, CSMonitor Boston MA	9455pa	15665eu	17510na	17612af
1800-1900 sa	USA, CSMonitor Boston MA	17555am			
1800-1900	USA, KCBI Dallas TX	15375va			
1800-1900 irreg	USA, KJES Mesquite NM	9510na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, VOA Washington DC	3980me	6040eu	9700eu	9760eu
		11920af	11995af	13710af	15205eu
		15410af	15580af	17800af	17895af
		19379eu			
1800-1900	USA, WEWN Birmingham AL	13615na	15695na		
1800-1900	USA, WHRI Noblesville IN	13760na	17830na		
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, WRNO New Orleans LA		15420na		
1800-1900	USA, WWCR Nashville TN	13845am			
1800-1900	USA, WYFR Okeechobee FL	21500af			
1800-1830	Vietnam, Voice of	9840eu	12020eu	15010eu	
1815-1900	Bangladesh, Radio	9570me	12030eu		
1830-1900	Austria, R Austria Intl	5945eu	6155eu	9880me	13730me
1830-1900	Bulgaria, Radio	15330na			
1830-1855	Finland, Radio	6120eu	9730eu	11755eu	15440eu
1830-1900	Serbia, Radio Yuoslavia	6100eu	17710au		
1830-1900	Slovakia, Slovak Radio	5915eu	7345eu	9605eu	
1830-1900	Sri Lanka, SLBC Colombo	9720eu	15120eu		
1830-1900	United Kingdom,BBC London	3255af	6180eu	6195eu	7325eu
		9410va	9740va	11955au	12095va
		15070va	15400af	15420af	17880af
1835-1900	Kazakhstan, R Alma Ata	9505eu	11825eu	15155eu	15270eu
		15285eu	17605eu	17715eu	17740eu
		17910eu			
1840-1845 mtwhfa	Greece, Voice of	15650af	17525af		
1850-1900 smtwhf	New Zealand, R NZ Intl	11735pa			

1900 UTC [3:00 PM EDT/12:00 PM PDT]

1900-2000	Algeria, Radio Algiers	9535eu	15205eu	17745eu	
1900-2000	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6080pa	7240pa	7260pa	9580pa
		11720pa	11855pa	11880pa	11910pa
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	6955af	9440af		
1900-2000	Costa Rica,R forPeace Int	7385am	15030na	21465am	
1900-2000	Ecuador, HCJB Quito	17490va	17790eu	21455eu	21480eu
1900-1950	Germany, Deutsche Welle	9640af	11740af	11785af	11810af
		13790af	15350af	15390af	17765af
1900-1945	India, All India Radio	7412eu	9950me	11620eu	11860eu
		11935af	15080af		
1900-1930	Israel, Kol Israel	7465eu	9435eu	11587na	11603na
		11675eu	15640na	15650af	17575na
1900-2000	Japan, NHK Tokyo	9640am	11815pa	11865pa	
1900-2000	Kuwait, Radio	13620na			
1900-1930 s	Lebanon, King of Hope	6280me			
1900-2000 s	Morocco, RTV Marocaine	11920as			
1900-1930	Netherlands, Radio	6020af	7120af	21515af	21590af
1900-2000 smtwhf	New Zealand, R NZ Intl	11735pa			
1900-2000	Nigeria, Radio	3326do	4990do		
1900-2000	Nigeria, Voice of	7255af			
1900-1930 s	Norway, Radio Norway Intl	15355pa	15365am		
1900-2000	Romania, R Romania Intl	9750eu	11810eu	11940eu	15365eu
1900-2000	Russia, AWR Russia	9835eu			
1900-2000	Russia, Radio Galaxy	11880eu			
1900-2000	Russia, Radio Moscow Intl	9685af	9725af	9785af	9860eu
		9890eu	11630eu	11760na	11770af
		11840af	11880eu	12015eu	12050eu
		15150af	15180af	15185eu	15290eu
		15355eu	15385af	15405af	15425na
		15535af	15580af	17605af	17760na
1900-2000	Saudi Arabia, BSKSA	9705eu	9720eu		
1900-2000	Spain, Spanish Natl Radio	15375af			
1900-2000	Sri Lanka, SLBC Colombo	9720eu	15120eu		
1900-2000	Swaziland, Trans World R	3200af	3240af		
1900-1930	United Kingdom,BBC London	3255af	6005af	6180eu	6190af
		6195va	7160me	9410va	9630af
		9740as	11955au	12095va	15070va
		15400af	17880af		
1900-2000	USA, CSMonitor Boston MA	9445pa	15665eu	17510na	17612af
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	3980me	6040me	9525as	9700eu
		9760eu	11870as	11920af	11995af
		13710af	15180as	15205eu	15410af
		15495af	15580af	17800af	17895af
		19379eu			
1900-2000	USA, WEWN Birmingham AL	13615na	15695na		
1900-2000	USA, WHRI Noblesville IN	13760na	17830na		
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, WRNO New Orleans LA		15420na		
1900-2000	USA, WWCR Nashville TN	13845va			
1900-2000	USA, WYFR Okeechobee FL	15355eu	21615af		
1900-1930	Vietnam, Voice of	9840eu	12020eu	15010eu	
1905-1915 mtwhfa	Greece, Voice of	7450eu	9375eu	11645eu	
1910-1920	Botswana, Radio	3356af	4830af	7255af	
1930-2000	Iran, VOIRI Tehran	9022eu	15260eu		
1930-2000	Netherlands, Radio	17605af	21590af		
1930-2000	Poland, Polish R Warsaw	6135eu	7270eu	7285eu	9525eu
1930-2000	Saipan, KFBS Marpi	9465as			
1930-2000	United Kingdom,BBC London	3255af	6005af	6180eu	6190af
		6195va	7160me	9410va	9630af
		9740as	11955au	12095va	15070va
		15400af	17880af		
1935-1955	Italy, RAI Rome	7275eu	9710eu	11800eu	
1940-2000 mha	Mongolia, R Ulaanbaatar	11790eu	11850eu		
1950-2000	Vatican State, Vatican R	5885eu	7250eu		
1950-2000	Vatican State, Vatican R	5882eu	7250eu		

2000 UTC [4:00 PM EDT/1:00 PM PDT]

2000-2030	Australia, Radio	6080pa	7240pa	7260pa	9580pa
		11720as	11855pa	11880pa	11910pa
2000-2100	Bulgaria, Radio	11720eu	15330na		
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	Costa Rica,Rfor Peace Int	7385am	15030am	21465am	
2000-2027	Czech Republic, R Prague	6055eu	7300eu	7345eu	9490eu
2000-2100	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
2000-2100	Ghana, GBC Radio 1	4915do			
2000-2100	Ghana, GBC Radio 2	7295do			
2000-2100	Indonesia, Voice of	9675eu	11752eu		
2000-2030	Iran, VOIRI Teheran	9022eu	15260eu		
2000-2010 mtwhf	Kenya, Kenya BC Corp	4935do			
2000-2100	Kuwait, Radio	13620na			
2000-2100	Lebanon, King of Hope	6280me			
2000-2010 smwha	Mongolia, R Ulaanbaatar	11790eu	11850eu		
2000-2030	Netherlands, Radio	17605af	21590af		
2000-2100	New Zealand, R NZ Intl	11735pa			
2000-2100	Nigeria, Radio	3326do	4990do		
2000-2030	Nigeria, Voice of	7255af			
2000-2100	North Korea, R Pyongyang	6576eu	9345eu	9640af	9977af
2000-2100	Russia, Radio Galaxy	11880eu			
2000-2100	Russia, Radio Moscow Intl	9785eu	9870eu	9890eu	11630af
		11675af	11730na	11750na	11760na	11770af
		11995na	12050na	15150na	15180na	15185eu
		15290na	15355as	15405af	15425na	15480af
		15580na	17605na	17690na	17720na	
2000-2100	Saudi Arabia, BSKSA	9705eu	9720eu		
2000-2045	Swaziland, Trans World R	3200af	3240af		
2000-2030	Switzerland, Swiss R Intl	9885af	12035af	13635af	15505af
2000-2100	Turkey, Voice of	9445eu			
2000-2030	United Kingdom,BBC London	5975na	6180eu	6195va	7160as
		7325eu	410va 9	740as	11955au	12095va
		15070va	15260sa	15340au	15400au	17880af
		21660af			
2000-2100	USA, CSMonitor Boston MA	9430as	9455as	15665eu	17510na	
		17555sa			
2000-2100	USA, KCBI Dallas TX	15375va			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2030	USA, VOA Washington DC	11720af	13710af	15160af	15410af
		15495af	15580af	17800af	17895af	21485af
2000-2100	USA, VOA Washington DC	6040me	9700eu	9760eu	15205eu
		19379eu			
2000-2100	USA, WEWN Birmingham AL	13615na			
2000-2100	USA, WHRI Noblesville IN	13760af			
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	13845am			
2000-2100	USA, WYFR Okeechobee FL	15355eu	15566eu	17612af	21525eu
		21615eu			
2000-2030	Vatican State, Vatican R	9645af	11625af	15090af	
2005-2100	Syria, Radio Damascus	12085na	15095na		
2010-2100 sa	Kenya, Kenya BC Corp	4935do			
2025-2045	Italy, RAI Rome	7235me	9575me	11800me	
2030-2100	Australia, Radio	5880pa	5995pa	6060pa	7240pa
		7260pa	9580pa	11720pa	11855pa
2030-2100	Canada, RCI Montreal	5995eu	7235eu	13650eu	13670af
		15325eu	17820af	17850af	17875af
2030-2035	Croatia, Croatian Radio	6145eu	9830eu	13830eu	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2035	Latvia, Radio Riga	5935do			
2030-2100	Palau, KHBN Voice of Hope	9830as			
2030-2057	Slovakia, Slovak Radio	7345eu			
2030-2100	South Korea, Radio Korea	6035af	7550me	15575eu	
2030-2100	United Kingdom,BBC London	5975na	6005af	6180eu	6195va
		7325va	9410va	9630af	11955au	12095va
		15260au	15340au	15400af		
2030-2100	USA, VOA Washington DC	13710af	15410af	15495af	15580af
		17800af	17895af	21485af	
2030-2100	Vietnam, Voice of	9840eu	12020eu	15010eu	
2045-2100	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	15265pa		

English language

shortwave guide

2100 UTC [5:00 PM EDT/2:00 PM PDT]

2100-2130	Australia, Radio	9540pa	9580pa	9645pa	11720pa
		11855as	11880pa		
2100-2130	Belguim, R Vlaanderen	5910eu	9905eu		
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			
2100-2129	Canada, RCI Montreal	5995eu	7235eu	13650eu	13670af
		15325eu	17820af	17850af	17875eu
2100-2130	China, China Radio Intl	11715eu	15110eu		
2100-2200	China, China Radio Intl	9920eu	11715eu	15110eu	
2100-2200	Costa Rica,R forPeace Int	7385am	15030na	21465na	
2100-2200	Cuba, Radio Havana Cuba	17760eu			
2100-2130	Czech Republic, R Prague	6055eu	7300eu	7345eu	9490eu
2100-2130	Ecuador, HCJB Quito	21455va			
2100-2200	Egypt, Radio Cairo	15375af			
2100-2150	Germany, Deutsche Welle	9715af	9760as	9765as	11785as
		13690as	15135af	15350af	15360as
2100-2200	Ghana, GBC Radio 1	4915do			
2100-2200	Ghana, GBC Radio 2	7295do			
2100-2200	Hungary, Radio Budapest	6110eu	9835eu	11910eu	
2100-2200	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	15265pa		
2100-2200	Iraq, Radio Iraq Intl	11805eu			
2100-2200	Japan, NHK Tokyo	6035eu	7140eu	7210as	9640eu
		9750as	17890au		
2100-2130	Lebanon, King of Hope	6280me			
2100-2136 smtwhf	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, Radio	3326do	4990do		
2100-2130 s	Norway, Radio Norway Intl	15165na			
2100-2130 mtwhf	Portugal, Radio	15250af			
2100-2200	Romania, R Romania Intl	7195eu	7225eu	9750eu	11940eu
2100-2200	Russia, Radio Galaxy	11880eu			
2100-2200	Russia, Radio Moscow Intl	9480af	9530na	9685me	9725eu
	9750eu 9820eu	11730na	11750na	11760af	11905af
	12050na 15150as	15180af	15290na	15355as	15405af
	15480as 15580na	17605af	17690af	17720as	
2100-2130	Serbia, Radio Yugoslavia	7200eu	9505eu		
2100-2130	South Korea, Radio Korea	6480af	7550me	15575eu	
2100-2200	Spain, Spanish Natl Radio	6130eu			
2100-2200	Sri Lanka, SLBC Colombo	15120as			
2100-2200	Sweden, Radio	6065af	9655af		
2100-2105	Syria, Radio Damascus	12085na	15095na		
2100-2200	Ukraine, R Ukraine Intl	4825eu	090eu	7150eu	7240eu
	7285eu 9600eu	9640eu	9685eu	15135eu	15195eu
	15570eu 17725eu				
2100-2130	United Kingdom,BBC London	3225af	5975ca	6005af	6180eu
	6195va 7180pa	7325eu	9410eu	9590na	11955pa
	12095va 15070af	15260sa	15340au	15370as	15400af
2100-2200	USA, CSMonitor Boston MA	9430as	9455as	15665eu	17510na
		17555sa			
2100-2200	USA, KCBI Dallas TX	15725am			
2100-2200	USA, KTBN Salt Lk City UT	15590na			
2100-2200	USA, VOA Washington DC	6040me	9700eu	9760eu	11870as
	11960eu 13710af	15185as	15205eu	15495af	15580af
	17735as 17800af	17895af	19379eu	21485af	
2100-2200	USA, WEWN Birmingham AL	13615na			
2100-2200	USA, WHRI Noblesville IN	13760na	17830na		
2100-2200	USA, WINB Red Lion PA	15185eu			
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	13845am			
2100-2200	USA, WYFR Okeechobee FL	15565eu	17612eu	17750af	21525eu
		21615eu			
2100-2110	Vatican State, Vatican R	5885eu	7250eu		
2103-2110	Croatia, Croatian Radio	9830eu	13830eu		
2110-2200	Syria, Radio Damascus	12085na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130 mtwhf	United Kingdom,BBC Carib	15390ca	17715ca		
2130-2200	Australia, Radio	9540pa	9645pa	11720pa	11855pa
		11880pa	11910pa		
2130-2200	Austria, R Austria Intl	5945eu	6155eu	9880eu	13730af
2130-2200	Ecuador, HCJB Quito	17490va	17790eu	21455va	21480eu
2130-2200	Finland, Radio	6120eu	11755eu	15440eu	
2130-2200	Israel, Kol Israel	7465na	9435na	11587na	11603na
		11675eu	15640eu	15650na	17575sa
2130-2200 smtwhf	Lebanon, King of Hope	6280me			
2130-2200	Lithuania, Radio Vilnius	9675eu	9710eu		
2130-2200	Serbia, Radio Yugoslavia	9720au			
2130-2200	Sweden, Radio 6065eu	9655pa	11955as		
2130-2200	United Kingdom,BBC Flk Is	13660sa			
2130-2200	United Kingdom,BBC London	3225af	5975ca	6005af	6180eu
	6195va 7180pa	7325eu	9410eu	9590na	11955pa
	12095va 15070af	15260sa	15340au	15370as	15400af
2139-2200	New Zealand, R NZ Intl	15120pa			
2140-2200 s	Eqt Guinea, Radio Africa	7190af			
2145-2200	Bulgaria, Radio	11720na	15330na		

2200 UTC [6:00 PM EDT/3:00 PM PDT]

2200-2230	Albania, R Tirana Intl	9760eu	11825eu		
2200-2230	Australia, Radio	9540as	9645pa	11720pa	11855as
		11880pa	15320pa	15365as	17795pa
2200-2300	Bulgaria, Radio	11720na	15330na		
2200-2300	Canada, CBC Northern Svc	9625am			
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			
2200-2230	Canada, RCI Montreal	5960na	5995eu	7195eu	9755na
	11705as 11730ca	11875na	13670ca	15305ca	
2200-2230	China, China Radio Intl	3985eu	9740eu		
2200-2300	Costa Rica,R forPeace Int	7385ca	15030ca	21465ca	
2200-2300	Cuba, Radio Havana Cuba	6180va			
2200-2230	Czech Republic, R Prague	5960eu	6055eu	7345eu	9605eu
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2258 s	Eqt Guinea, Radio Africa	7190af			
2200-2245	Finland, Radio	9730eu	11740eu	11810eu	
2200-2300	Ghana, GBC Radio 1	4915do			
2200-2300	Ghana, GBC Radio 2	7295do			
2200-2230	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	15265eu		
2200-2257 vl	Iraq, Radio Iraq Intl	11805eu			
2200-2225	Italy, RAI Rome	5990as	9710as	11800as	
2200-2300 smtwha	Malaysia, RTM Radio 4	7295do			
2200-2300	New Zealand, R NZ Intl	15120pa			
2200-2300	Nigeria, Radio	3326do	4990do		
2200-2300	Palau, KHBN Voice of Hope	9830as			
2200-2300	Russia, Radio Galaxy	9880eu			
2200-2300	Russia, Radio Moscow Intl	7150eu	7300eu	9480af	9530na
	9685eu 9715eu	9725eu	9815eu	9820eu	11705na
	11905af 12050na	15290na	15410na	17560af	17570af
	17720na				
2200-2300	Singapore, SBC Radio One	5010do	5052do	11940do	
2200-2230	Switzerland, Swiss R Intl	5995am	9810am	9885am	12035am
2200-2210	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	17750eu	21720eu		
2200-2300	Turkey, Voice of	7185me	9445na	11895eu	
2200-2300	UAE, Radio Abu Dhabi	11885na	15305na	15315na	
2200-2300	Ukraine, R Ukraine Intl	4795eu	6020eu	7195eu	7240eu
		9710eu	9860eu		
2200-2300	United Kingdom,BBC London	5970eu	5975na	6195va	7325eu
	9410af 9570pa	9590na	9750as	9915sa	11750sa
	11955pa 12095af	15070va	15260sa	15340au	15400af
2200-2300	USA, CSMonitor Boston MA	9465na	13625as	13770eu	15405as
		15665as	17555sa		
2200-2300	USA, KCBI Dallas TX	15725va			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, VOA Washington DC	7120as	7140as	7215as	9770as
	11760as 15185as	15290as	15305as	17735as	17820as
2200-2300	USA, WEWN Birmingham AL	7425am			
2200-2300	USA, WHRI Noblesville IN	13760eu	17830na		
2200-2245	USA, WINB Red Lion PA	15185eu			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA		15420na		
2200-2300	USA, WWCR Nashville TN	13845am			
2200-2300	USA, WYFR Okeechobee FL	17612na	21525eu		
2200-2230 s	USA,KGEI San Francisco CA	15280sa			
2202-2216	Congo, RTV Congolaise	4765af	5985af		
2203-2209	Croatia, Croatian Radio	6145eu	9830eu	13830eu	
2230-2300	Australia, Radio	9645pa	11720pa	11855pa	11880pa
		15320pa	15365pa	17795pa	
2230-2300	Canada, RCI Montreal	5960am	5995am	7195am	9755am
		13670am			
2230-2300	Sweden, Radio	6065pa	11910pa		
2240-2250 smtwhf	Greece, Voice of	11645au			
2245-2300	Armenia, Radio Yerevan	11920na	11945na	15385na	
2245-2300	India, All India Radio	9910as	11745as	11785as	15110as
		15145as			
2245-2300	USA, WINB Red Lion PA	15145eu			
2245-2300	Vatican State, Vatican R	9600as	11830as	15090pa	

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2300 UTC [7:00 PM EDT/4:00 PM PDT]

FREQUENCIES

2300-2400	Australia, Radio	11770pa	11880pa	15240pa	15320pa
		15365pa	17795pa	21740pa	
2300-2315	Bulgaria, Radio	11720na	15330na		
2300-2400	Canada, CBC Northern Svc	9625eu			
2300-2400	Canada, CFCX Montreal	6005do			
2300-2400	Canada, CFRX Toronto	6070do			
2300-2400	Canada, CFVP Calgary	6030do			
2300-2400	Canada, CHNX Halifax	6130do			
2300-2400	Canada, CKZU Vancouver	6160do			
2300-2400 mtwhf	Canada, RCI Montreal	5960na	5995eu	7195eu	9755na
		13650na			
2300-2400 as	Canada, RCI Montreal	5960na	5995eu	7195eu	9755na
		11940na	13670na	15325na	
2300-2400	Costa Rica, AWR Alajuela	9725ca	11870ca		
2300-2400	Costa Rica,R forPeace Int	7375na	7385na	13630na	15030na
2300-2400	Ecuador, HCJB Quito	17790eu	21455am		
2300-2315 a	Eqt Guinea, Radio Africa	7203af			
2300-2305	Ghana, GBC Radio 1	4915do			
2300-2305	Ghana, GBC Radio 2	7295do			
2300-2400	Guam, KSDA Agana	15610as			
2300-2400	India, All India Radio	9910as	11745as	11785as	15110as
		15145as			
2300-2355	Japan, NHK Tokyo	6150eu	7140eu	11815as	15430as
2300-2330	Kazakhstan, R Alma Ata	5915eu	7255eu		
2300-2330	Lithuania, Radio Vilnius	11750na			
2300-2400 smtwha	Malaysia, RTM Radio 4	7295do			
2300-2400	New Zealand, R NZ Intl	15120pa			
2300-2350	North Korea, R Pyongyang	11700am	13650am		
2300-2330 s	Norway, Radio Norway Intl	9655am	11795am		
2300-2400	Palau, KHBN Voice of Hope	9830as			
2300-2400	Russia, Radio Moscow Intl	7300na	9480na	9815eu	11720na
		11805na	11840na	11905na	12050na
		15410na	15425na	15535as	17560as
		17570as	21625as	21670as	21690as
2300-2310	Sierra Leone, SLBS	3316do			
2300-2400	Singapore, SBC Radio One	5010do	5052do	11940do	
2300-2330	Sweden, Radio	6065pa	11910pa		
2300-2400	Thailand, Radio	9655as	11905as		
2300-2400	UAE, Radio Abu Dhabi	11885na	15305na	15315na	
2300-2330	United Kingdom,BBC London	5970eu	5975na	6175na	6195as
		7180as	7325eu	9410na	9570as
		9590na	9915sa	11750sa	11945as
		11955va	12095na	15070am	15260sa
		15280as	15400as		
2300-2400	USA, CSMonitor Boston MA	9465na	13625as	13770eu	15405as
		17555am			
2300-2400	USA, KCBI Dallas TX	15725va			
2300-2400	USA, KTBN Salt Lk City UT	15590na			
2300-2400	USA, VOA Washington DC	7120as	7140as	7215as	9770as
		11760as	15185as	15290as	15305as
		17735as	17820as		
2300-2400	USA, WEWN Birmingham AL	7425am			
2300-2400	USA, WHRI Noblesville IN	13760am			
2300-2400	USA, WINB Red Lion PA	15145eu			
2300-2400	USA, WJCR Upton KY	7490na	13595na		
2300-2400	USA, WRNO New Orleans LA		7355na		
2300-2400	USA, WWCR Nashville TN	13845am			
2300-2315	Vatican State, Vatican R	9600as	11830as	15090pa	
2315-2330	United Kingdom,BBC London	6110sa	9560sa	9825sa	11765sa
		15390sa			
2330-0000	Belgium, R Vlaanderen	9930am	13655am		
2330-2400 a	Colombia, Radio Nacional	11822.5	17865am		
2330-2400	Netherlands, Radio	6020na	6165na		
2330-2400 m	Sri Lanka, SLBC Colombo	15425am			
2330-2400	Sweden, Radio	6065eu	11910eu		
2330-2400	United Kingdom,BBC London	5975na	6175na	6195as	7325eu
		9570as	9590na	9915sa	11750sa
		11945as	11955va	12095na	15070am
		15260sa	15280as		
2330-2400	Vietnam, Voice of	9840as	12020as	15010as	
2335-2345 smtwhf	Greece, Voice of	9425am	11645am		

SELECTED PROGRAMS

Sundays

2300 Radio New Zealand Int'l: National Radio. See S 1130.
2305 BBC: World Business Review. The previous week's news and upcoming events.
2307 Radio Canada Int'l: Open House. The effect of religion on politics, social justice, and personal relations.
2311 Radio Moscow: News And Views. See S 0311.
2315 BBC: Ray On Record. Selections of classical music.
2331 Radio Moscow: Folk Box. A program for lovers of folk music.

Mondays

2300 Radio Canada Int'l: As It Happens. See M 1207.
2300 Radio New Zealand Int'l: National Radio. See S 1130.
2305 BBC: World Business Report. The latest news from the markets worldwide.
2311 Radio Moscow: News And Views. See S 0311.
2315 BBC: Talks. This month: "The Learning World" (5th, 12th); "On Screen" (19th, 26th).
2330 BBC: Multitrack 1. Tim Smith presents the smash singles on the UK pop-music charts.
2331 Radio Moscow: Yours For The Asking. Music as requested by listeners.

Tuesdays

2300 Radio Canada Int'l: As It Happens. See M 1207.
2300 Radio New Zealand Int'l: National Radio. See S 1130.
2305 BBC: World Business Report. See M 2305.
2311 Radio Moscow: News And Views. See S 0311.
2315 BBC: Concert Hall. This month: Corelli's "Concerti Grossi" (6th); C.P.E. Bach (13th); von Dittersdorf's "Metamorphoses Symphonies" (20th); Kraus' "Funeral Cantata" (27th).
2331 Radio Moscow: Jazz Show. See M 0431.

Wednesdays

2300 Radio New Zealand Int'l: National Radio. See S 1130.
2305 BBC: World Business Report. See M 2305.
2311 Radio Moscow: News And Views. See S 0311.
2315 BBC: From Our Own Correspondent. See S 0330.
2330 BBC: Multitrack 2. Graham Bannerman presents new pop records, interviews, news, and competitions.
2331 Radio Moscow: Music At Your Request. See M 1131.

Thursdays

2300 Radio Canada Int'l: As It Happens. See M 1207.

2300 Radio New Zealand Int'l: National Radio. See S 1130.
2305 BBC: World Business Report. See M 2305.
2311 Radio Moscow: News And Views. See S 0311.
2315 BBC: Music Review. News and features from the world of classical music.
2331 Radio Moscow: Jazz Show. See M 0431.

Fridays

2300 Radio Canada Int'l: As It Happens. See M 1207.
2300 Radio New Zealand Int'l: Roundup Of Maori Events. No details available.
2305 BBC: World Business Report. See M 2305.
2311 Radio Moscow: News And Views. See S 0311.
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.
2331 Radio Moscow: Folk Box. See S 2331.

Saturdays

2305 BBC: Words Of Faith. See M 1209.
2305 Radio New Zealand Int'l: Connections. No details available.
2307 Radio Canada Int'l: The Inside Track. See S 0207.
2310 BBC: Book Choice. See W 0425.
2311 Radio Moscow: News And Views. See S 0311.
2315 BBC: A Jolly Good Show. See T 1515.
2331 Radio Moscow: Ads. See S 0431.

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The BC2500XLT features specifications like:

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- Sensitivity: NFM 1.0uV from 25-550MHz, NFM 1.5uV from 760-1100MHz, NFM 3.0uV from 1100-1300MHz, AM 1.0uV from 26-550MHz, and WFM 3.0uV from 54-550MHz.
- Scan Rate: 100 channels/second (turbo), 20 channels/second (normal)
- Scan delay: 2 seconds
- Audio output: 400 milliwatts
- Size: 2-3/4" (W) x 1-1/4" (D) x 7-1/2: (H)
- Weight: 1lb 4oz.
- Power requirements: 12VDC (internal battery, AC adaptor/ charger, or cigarette lighter adaptor).

The BC890XLT features specifications like:

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- Frequency coverage: 29-54, 108-174, 216-512, and 806-956 MHz (less cellular)
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- Scan rate: more than 100 channels/second (Turbo mode) and up to 20 channels/second (Normal mode)
- Scan delay: 2 seconds
- Audio output: 3 watts max.
- Size: 10-1/4" (W) x 3-1/2" (H) x 7-1/2" (D)
- Weight: 3lb. 11oz.

Uniden has done it again! The low cost BC890XLT scanner offers wide frequency coverage (including military aircraft!), 200 memory channels, and 100 channel-per-second TurboScan! The BC2500XLT handheld goes even further with 400 memory channels, a wider frequency range, and it Turbo-scans at 100 channels per second! Both scanners include instant NOAA weather channel access, a high contrast LCD, and much, much more!

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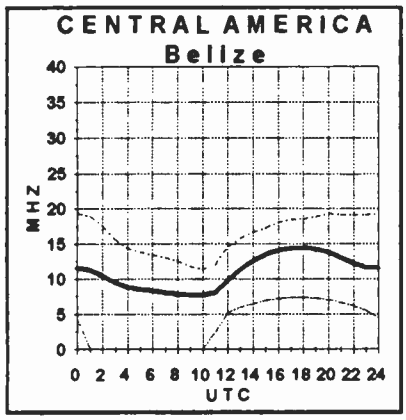
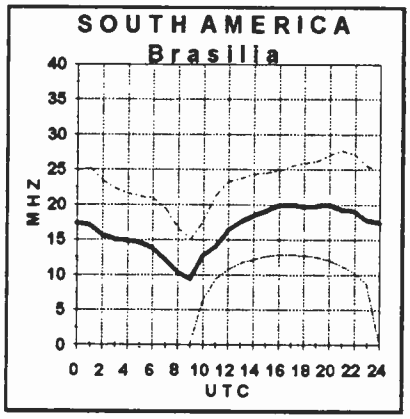
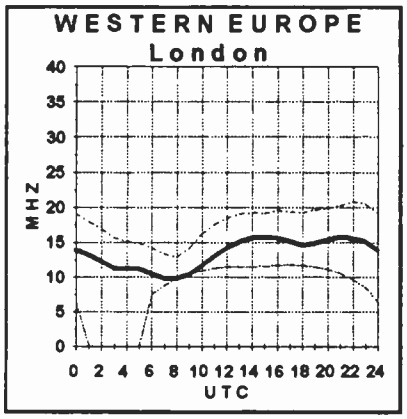
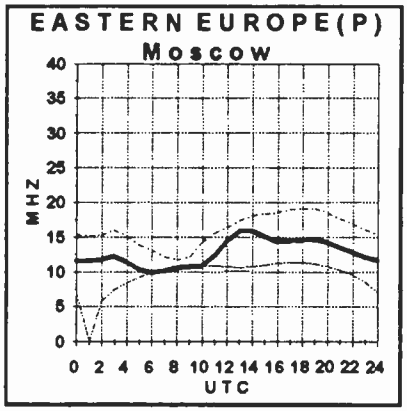
Propagation conditions: Eastern United States

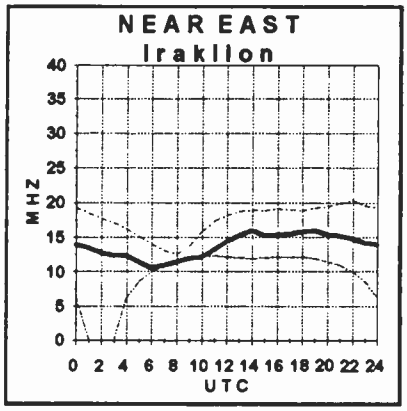
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear.

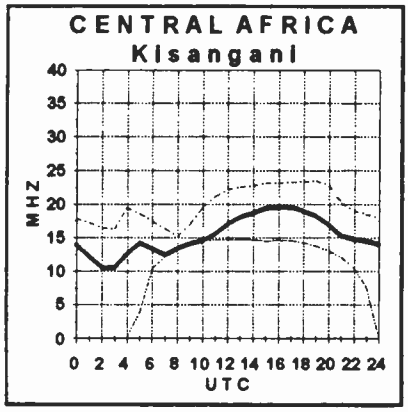


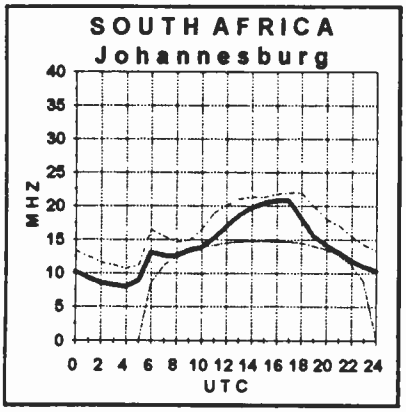


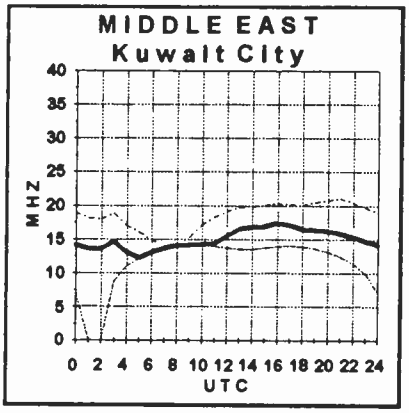


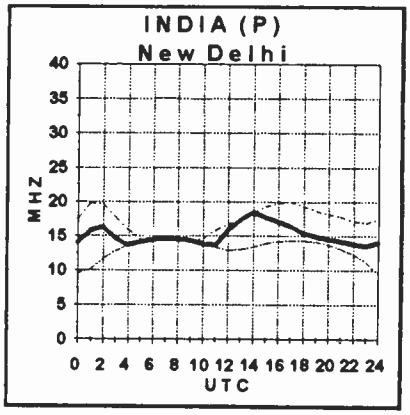


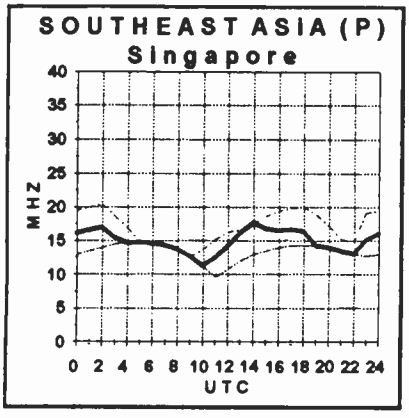


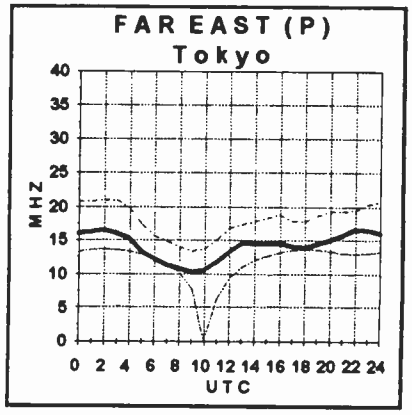


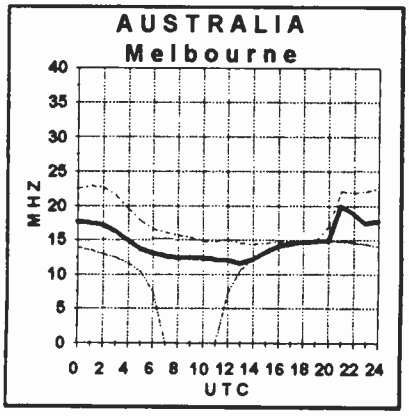






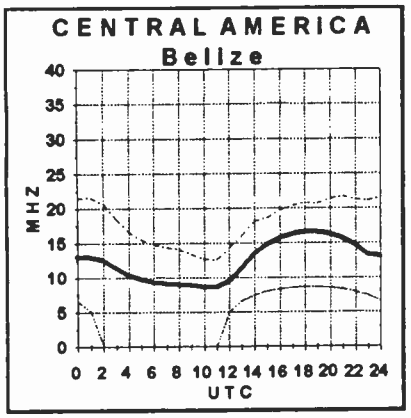


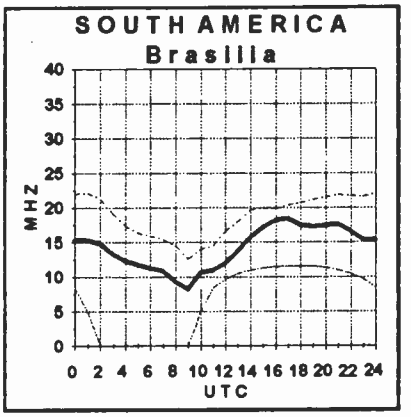


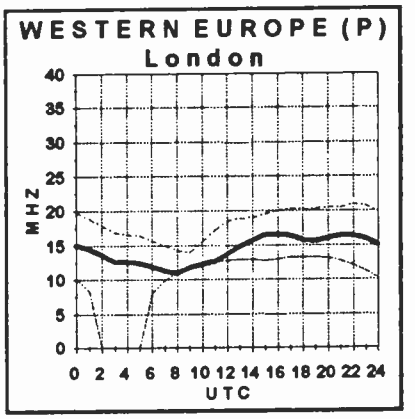


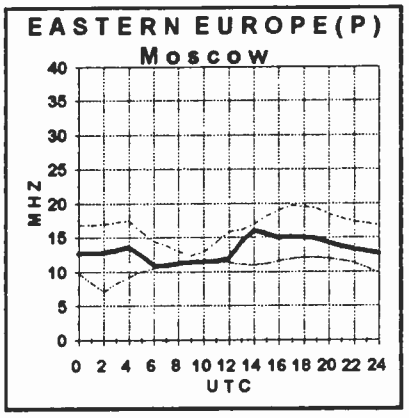
Propagation Conditions: Western United States

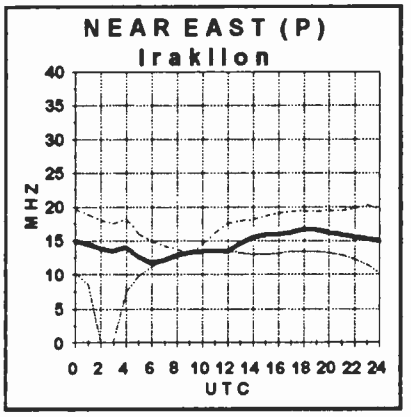
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom 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.

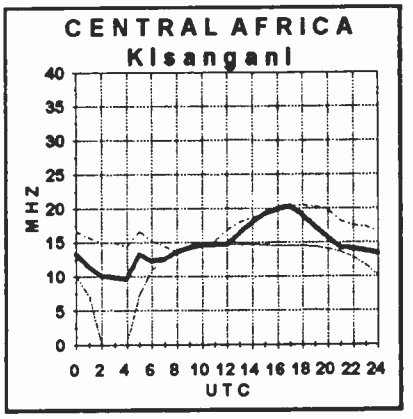


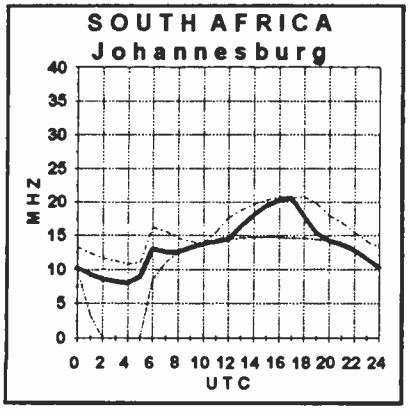


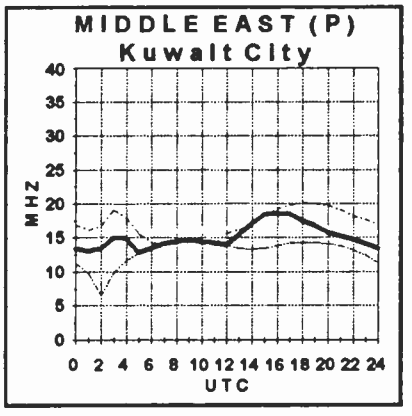


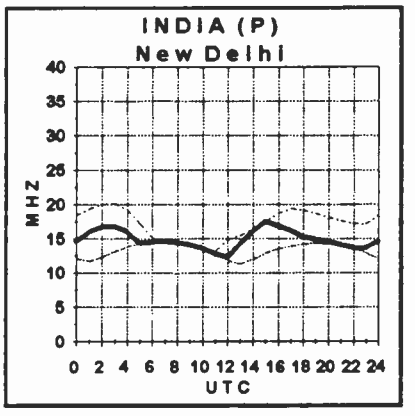


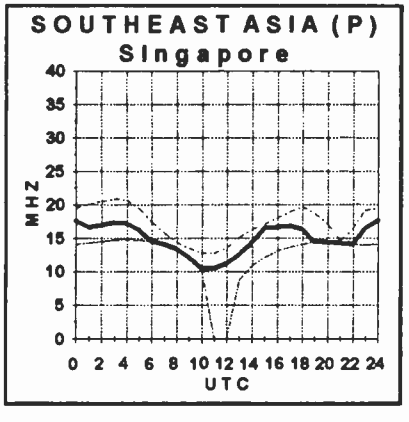


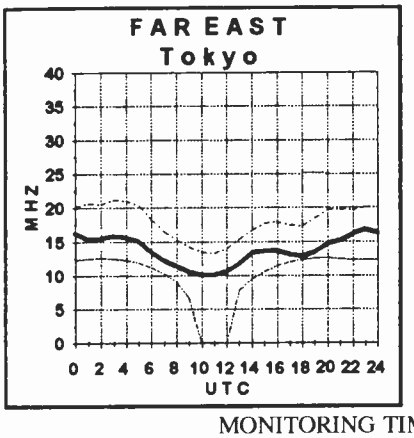


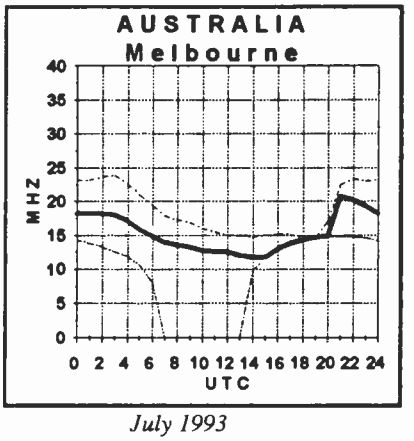






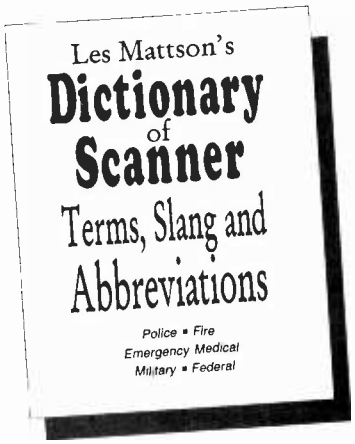






what's new?

Larry Miller



Monitoring Dictionary

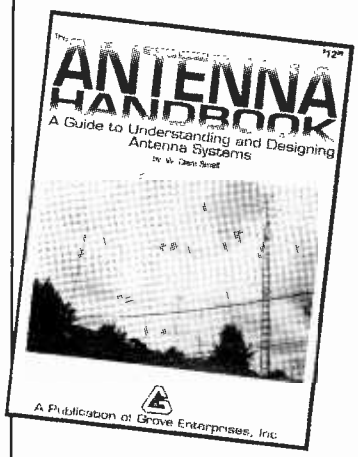
Getting into the radio hobby entails several major steps. You buy a scanner. You find the local frequencies. And then you try to figure out what you're hearing.

Every form of two-way communications has its own language, a kind of verbal "shorthand" used to get the message across efficiently and, in some cases, securely. Knowing the meaning of what you're hearing on your radio can mean the difference between knowing what's happening and sitting there and scratching your head.

Les Mattson, publisher of *Northeast Scanning News*, has assembled and explained an incredible collection containing thousands of terms and abbreviations and their meanings in a new book, *Dictionary of Scanner Terms, Slang and Abbreviations*.

Arranged in alphabetical order, the subjects covered include law enforcement jargon, military slang, medical terms, fire, rescue and even federal. This, says Les, "is the book that will help you learn and improve your comprehension of all types of radio communications."

Les Mattson's *Dictionary of Terms, Slang and Abbreviations* is available from DX Radio Supply for $14.95 plus $2 book rate or $4 UPS shipping. The address is P.O. Box 360, Wagontown, Pennsylvania 19376 or use your Mastercard or Visa and call the 24-hour order recorder at 215-273-7823.



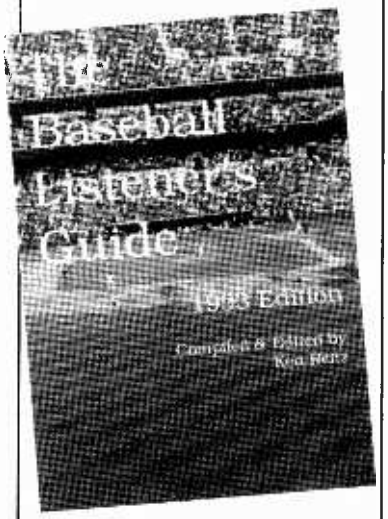
Antenna Handbook

For the past I-don't-know-how-many-years, Clem Small has been monitoring's resident antenna guru. His monthly *Monitoring Times* columns have been a special combination of theory, projects and hands-on wisdom designed to help everyone get the best out of their radios.

Shortwave listeners, scanner monitors, and radio amateurs will be delighted by Clem's new do-it-yourself antenna compendium, a 100+ page book packed with signal-enhancing ideas. There are plans for building wide frequency, direction finding, low profile, and high gain receiving and transmitting antennas.

If you want to extend the reach of your receiver — whether it's a $5,000 hi-tech communications receiver or an efficient $100 wonder — the antenna's the answer.

The Antenna Handbook is available from Grove Enterprises for $12.95 plus $2 bookrate shipping. Send check or money order to P.O. Box 98, Brasstown, NC 28902 or use your Mastercard or Visa and call 1-800-438-8155.



Baseball and the Mystery of Radio

There's something about baseball and radio that makes them the perfect complement to each other. In fact, for many, tuning in a game on radio is preferable to being there in person.

For the millions of baseball fans across the country, *MT's* own Ken Reitz has published the ultimate radio book: *The Baseball Listener's Guide*.

All 28 major league teams and 97 minor league teams are listed on more than 1,300 AM and FM (and even one shortwave) stations. French and Spanish language networks are also included in this handy 85-page 4" x 6" book.

The Baseball Listener's Guide is available for $9.95, free shipping, from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902 or call 1-800-438-8155.

Riding the Rails

You can add a new dimension to travel by rail when you take along M.L. Gibson's *Trak Tables: A Scanner Directory of Amtrak Road Frequencies*.

Trak Tables is a handy pocket guide that lists the frequencies used by train crews across the country. Each entry in this unique book begins by train number and includes the train name, its start and destination location and the frequencies. This would be a really nice — and affordable — booklet to take along if you're planning on traveling the rails this summer or fall.

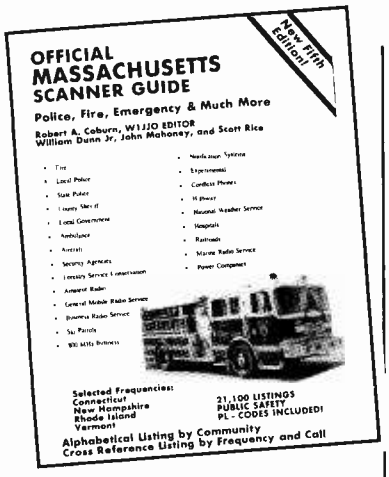
Published by Three Rivers Press, this 84 page booklet lists for $4.95. You can order your copy by calling 1-206-746-1907 or writing P.O. Box 70285-MT, Bellevue, Washington 98007-0285. Add $2.05 shipping and handling.

Scan Rail

Despite its unwieldy title and spartan design, *Heald's Scan Rail* is a 66 page pack of scanning information for rail buffs. Produced by 3rd generation railroad man Bruce Heald, this is the 6th edition of the book.

Scan Rail lists all American railroads and all their frequencies with use designators (where known) in alphabetical order. A cross reference is also included.

The directory also has major sections covering Amtrak, commuter operations, mass transit, tourist operations and more. You can get your copy by sending $9.95 (postpaid) to *Heald's Scan Rail*, 6886 Jefferson St., North Branch, Michigan 48461.



The Best in MA

The good folks at Official Scanner Guides have come out with the new 5th edition of the *Massachusetts Scanner Frequency Guide*. If you've ever owned one of these books, you know how good they are.

The information in Bob Coburn's "Official" guides is renowned for its accuracy, the frequencies coming from both official records and actual monitoring by a pack of the hobby's best.

This edition covers all law enforcement, fire and emergency medical services, as well as business radio, marine, railroads, hospitals, power companies and forestry services.

Listings are alphabetized by community with a cross reference listing by frequency and call sign. As usual, there's also lots of introductory and reference material.

These are the best scanner guides available and the only disappointment is that you can only get "Official" scanner guides for the New England States. Hey, Coburn! What about us!

The Massachusetts book is almost as big as the Manhattan phone directory at 576 pages. The price is $29.95 plus $3.05 shipping from P.O. Box 712-MT, Londonderry, New Hampshire 03053.

Scanning Western PA

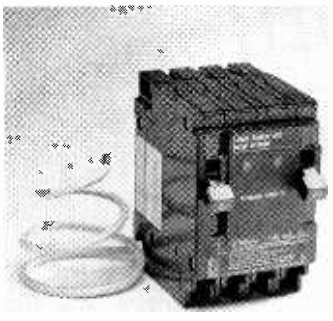
Rich Newbould, who not too many months ago got a very favorable review of his Allegheny County, Pennsylvania, scanner directory, has expanded his coverage to include other titles. In addition to *Scanning the Three Rivers* (Allegheny County), you can now join Newbould in scanning five other counties. What follows is the county name, number of listings and postpaid price:

Beaver	700	$7.00
Fayette	600	$7.00
Greene	200	$4.00
Washington	700	$7.00
Westmoreland	2200	$16.00

If you want the whole pack, including Allegheny county (originally $25.00 postpaid), Newbould offers a $50.00 (postpaid) package deal.

You can't go wrong. Where can you get a county frequency directory for $4.00? And each is of the same high quality as the original Allegheny county book.

Send your check or money order to Rich Newbould, 317 9-A Churchview Avenue, Pittsburgh, Pennsylvania 15227. Tell him *MT* sent you.



Lightning Protection

The average U.S. household contains thousands of dollars worth of electronic goods. And while you might not shed too many tears if a lightning surge puts the toaster out of commission, it would be a tragedy of the highest order if a power surge took out your radio.

Siemens has produced a combination Circuit Breaker/ Surge Arrestor that can protect homeowners from such catastrophes. What's unique about this unit is that it is installed in your residential circuit breaker panel (breaker box) and it provides whole house protection, unlike the units you must plug into every outlet. The price is attractive too; under $100.00. It's worth considering, especially if you're one of those who have a bank of expensive radios.

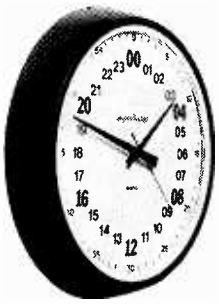
For more information contact Siemens at P.O. Box 2407, Norcross, Georgia 30091 or give them a call at 404-751-2000.

JPS Audio Processing

JPS Communications has introduced a new, digital signal processing, audio filter for the ham and shortwave listening market. The NRF-7 General Purpose Noise Reducer and Filter Unit is designed primarily for CW and data buffs who desire super audio filters for reception of their favorite mode of communication. Sharp-skirted filters eliminate adjacent channel interference from voice communications. The CW and Voice filters feature 1.15:1 shape factors. The Data filter is 500 Hz wide, centered at 2200 Hz and features minimum passband ripple and linear phase in the passband — all requirements for good data reception.

You can order your NRF-7 General Purpose Noise Reducer and Filter Unit for $249.95 from JPS Communications, Inc., 5720 Capital Boulevard, Raleigh, North Carolina 27604. Call 919-790-1048 for more information.

Clocks



Whether you're a shortwave listener who operates on UTC time, a military buff on Zulu, or even a scanner listener who hears a report called in at 22 hundred hours, it's always been a pain to calculate these formats into local time.

Benjamin Michael Industries is offering a 24 hour clock with a 14 inch face for $59.95. Each unit is housed in a black case, has a glass face and is battery operated. Quartz movements are standard.

To order yours, send $59.95 to Benjamin Michael Industries, 202-MT Tully, Prospect Heights, Illinois 60070 or call 708-253-0463.

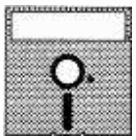
To "make do" in converting local time from your current timepiece to Universal Time, Grove Enterprises has recently acquired a dandy **UTC Conversion Wheel**. Printed in 24-hour format on laminated card stock, this item is only $8.95 postpaid from Grove (800-438-8155). A French-language version is available from Sheldon Harvey, 79 Kipps St., Greenfield Park, Quebec, Canada J4V 3B1.

Radio Freebie!

If you own an NRD 525 and/or NRD-535 communications receiver, you can now get a free software program for your radio. "NRD" by Tom Whiteside is computer control software for these super radios, and it's free if you send a 3.5" floppy disk to Paul Lannuier, Sales Manager, Communications Products, Japan Radio Co., Ltd., 430 Park Avenue, New York, New York 10022. Tell him *MT* sent you.

Avoid Memory Loss

Willco Electronics, established by long-time *MT* columnist Jack Albert, has developed a PC board to protect the memory of your ICOM radio in the case of battery failure or while changing batteries. This board has a number of side benefits as well, such as greatly expanding the number of memory banks and extending the frequency coverage. For more information on the features and receivers covered by this ICOM1024 Memory Module, write Willco Electronics, P.O. Box 788-MT, New Lenox, IL 60451.

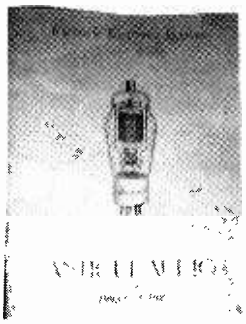


Radio Software

Two other software programs have something unique to offer to radio listeners and ham wanna-be's. **Milestone Logmaster II** is a log-keeping system for amateur radio which is also applicable to shortwave listeners. The reputed features of this program for DOS computers are its nearly limitless capacity, speed, and ease of use. "Anyone who can keep a paper log can use Logmaster II straight out of the box." For more information on this program, which sells for $29.95, contact Milestone Technologies, 3140 South Peoria St., Unit K-156, Aurora, CO 80014-3155; (303) 752-3382.

Amiga Owners! Tired of being ignored? Sensible Software Solutions has a Morse code trainer for you called **CopyCode**. This comprehensive code practice program will even let you run multiple copies so you can practice copying code through real-world congestion. For a free three-page description of this $23.00 program, write, FAX, or call Sensible Software Solutions, 4951-D Clairemont Square, Suite 262-MT, San Diego, CA 92117-2798; (619) 452-1938.

Antique Radio



If you're into old radios, have we got a catalog for you! Antique Audio features thousands of hardware items, audio books on restoring vacuum tube receiving equipment, and books on the history of wireless telegraphy and broadcasting in the U.S. On the lighter side, there are also crystal radio kits, an FCC approved wireless AM transmitter for making your own "pirate" broadcasts and more.

Get your copy by sending $2.00 to Antique Audio, 5555 N. Lamar, Bldg H-105, Austin, Texas 78751 or call 512-467-0304.

Free Catalog

Communications Specialists of Orange, California, has just released its 25th anniversary catalog. The free catalog features aftermarket tone signaling products and includes listings and brief descriptions of CTCSS and digital CTCSS encoders and decoders and more.

To get your copy, write Communications Specialists, Inc., 426 West Taft Avenue, Orange, California 92665-4296 or call 1-800-854-0547.

Updates

New editions just being released include the full-spectrum wall chart sold by Grove Enterprises, which now reflects recent changes in FCC frequency allocations. Also, perhaps in response to our veiled suggestion, Andrew Yoder has teamed up with George Zeller to complete the *Pirate Radio Directory*, which should be available shortly. Contact the Grove Enterprises order line for more information: 1-800-438-8155.

Reviews
By Bob Grove

Realistic® Amplified Shortwave Antenna

It's cute, it's compact (4" x 4-1/2" x 1-1/2") and it's inexpensive ($29.95). It runs off a 9 volt battery or optional AC adaptor (25 mA current consumption), provides up to 20 dB gain, and tunes 3-30 MHz. But does it work? You bet!

We recently compared a sample of the new Realistic® Amplified Shortwave Antenna with both a 75 foot outdoor wire antenna and a 6 foot indoor wire hooked to a Drake R8 receiver.

The realistic device consists of a variable-capacitor-tuned input circuit feeding a cascade of three transistors to provide its flat gain over the HF spectrum.

With its 29 inch telescoping whip extended, signals coming indoors were captured, matched and amplified by the little

Realistic, often equalling the levels from the outside antenna, and always considerably better than the indoor wire.

The telescoping antenna swivels, so the amplified antenna may be operated in any position, standing in a corner or lying on the operating desk or tabletop.

When the outside antenna was connected to the RCA external antenna jack, weak signals were boosted by up to 20 dB with a minimum of hiss as often heard on other amplified preselectors. Intermodulation from strong signal overload was virtually undetectable, even with signals considerably over S9.

Selectivity is razor sharp; the preselector must be fine-tuned often as the receiver is moved off frequency. Since no bypass function was provided, the unit must be physically removed from the antenna circuit for straight-through antenna connections. A 1/8" (3.5 mm) miniplug is provided.

Radio Shack has a winner in the Amplified Shortwave Antenna, ideal for apartment dwellers and travelers who can't erect a large outside antenna, and listeners who wish to prevent front-end receiver overload without sacrificing signal strength.

The Realistic® 20-280 Amplified Shortwave Antenna is $29.95 plus $4.50 shipping from from Grove Enterprises and Radio Shack stores nationwide.

ICOM GP-22 Position Locator

Using the same precision, position-finding satellites that helped our forces win the Gulf War, this new Global Positioning System (GPS) earth station — receiver and antenna — fits in the palm of your hand!

An easy-to-read digital display reveals bearing information from up to five earth-orbiting satellites, providing accurate latitude, longitude and altitude to within 300 feet (limited by the Department of Defense).

The GP-22's display is menu-driven, allowing you to fix your position using known landmarks; track your direction or return to a precise location; create a route; confirm your waypoints; compute estimated time of arrival (ETA); display heading, speed, bearing and range; and compute world and local time.

Weighing barely 12 ounces and measuring a scant 2-1/2" x 5-1/4", the GP-22 is the most compact and inexpensive GPS receiver we've seen to date. It is ideal for campers, hikers, geologists, explorers, boaters, motorists, balloonists, fliers, cyclists, mountain climbers--anyone who needs to know his precise location anywhere.

Powered by rechargeable battery pack or optional AA cells; the GP-22 includes carrying case, cigarette lighter power cord, AC wall adaptor/charger, and illustrated instruction book.

The ICOM GP-22 Global Positioning System is $754.95 plus $7 shipping from Grove Enterprises.

Bob Grove, WA4PYQ

Uniden BC890XLT Scanner

A new series of Bearcat scanners from Uniden is gradually emerging on the market; the BC890XLT is the first—and least expensive—of three new, wide-frequency coverage scanners with continuous tuning dials. The other two, the BC2500XLT handheld and BC8500XLT desktop, are due for release in the near future.

The '890' is a radical departure from the familiar Bearcat legacy. Still easy to operate and with the traditional Bearcat "look," the '890' has a number of new features which are immediately obvious upon opening the package.

Tuning

A finger-indent tuning dial allows general-coverage frequency hunting like on the more expensive ICOM R7100; a starting frequency may be entered directly on the keypad, or any of the 200 memory channels may be tuned up or down in frequency in various bands between 29 and 956 MHz.

Tuning steps are defaulted to the spacings used in any frequency range selected; a step button allows selection of other increments, as well.

Any tuned frequency may be automatically stored in an awaiting memory channel by pressing the "SEND" key. All 200 memory channels may be manually scanned by rotating the tuning dial in the "CHANNEL" mode.

The tuning dial may be deactivated by pressing the "LOCK" key to prevent accidental bumping off frequency. A rear panel "ENTER LOCK" switch can be activated to prevent accidental erasures of memory settings.

Scanning

The 200 memory channels may be scanned at a normal 16-20 per second, or "TurboScanned" at up to 100 channels per second. Entered frequencies are resorted in numerical order for fast-scan efficiency.

The amber-backlit LCD has a dimmer selection, and shows all ten 20-channel banks (lettered A through J on the keypad) which may be scanned in any combination. Other status functions are shown as well.

When "PRIORITY" is selected, up to ten priority channels—the first channel in each 20-channel bank—are sampled repeatedly for activity regardless of other scanning functions in progress.

Any of the 200 channels may be delayed for two seconds to await call-backs, or may be temporarily locked out for faster scanning.

Two favorite features of the long-discontinued, but popular BC250 are reborn in the '890': A "COUNT" function automatically registers the number of times any channel is activated during a listening period; and "AUTO" automatically stores into memory channels active frequencies uncovered during the search.

CTCSS

Commonly called "subaudible tone" or "PL" (Motorola's "Private Line"), a continuous tone-coded squelch system (CTCSS) allows several agencies to share one frequency without interfering with one other. Only when the appropriate subaudible tone for a system radio is detected will a system receiver's squelch open.

CTCSS is widely used across the nation, and can be utilized in the BC890XLT with the use of an optional decoder, available from Uniden dealers.

Search

The search routine is familiar and conventional, with some improvements. Ten 20-channel banks are provided to store frequency, channel number and mode. The "HOLD" key stops the autosearch routine and, if pressed again, permits single stepping higher in frequency.

The "LIMIT" key selects the upper and lower frequency limits for the autosearch routine and, if pressed again, permits single stepping lower in frequency.

Recording

Any number of channels selected by an "AUX" key may be recorded on an optional tape recorder should they become active. A standard 1/8" (3.5 mm) front-panel jack provides line output audio, and a rear-panel RCA phono jack can be used to activate the tape recorder motor.

A separate 1/8" (3.5 mm) front panel jack can be used for external speaker or earphones.

Weather Alert

The standard NOAA weather broadcast channels can be searched by a single keypress. If "ALERT" is pressed in this mode, the audio will be muted, but if the severe weather alert tone is transmitted, a loud siren tone will be heard through the speaker.

Our Lab Tests

First impressions are important. When we removed the new Uniden BC890XLT from its formidable shipping carton, we were impressed by its neat and logical panel layout, its metal case, and its large, contrasty panel legends.

The frequency range (29-54, 108-174, 216-512, 806-956 MHz; less cellular, restorable—see "HINTS," p. 106) is greater than that of previous Bearcats, but not as great as that of the Realistic® PRO-2006 and ICOM R7100 with which it will be compared. But then, the price of the '890' is substantially lower than its competitors.

SPECIFICATIONS

Frequency range: 29-54, 108-174, 216-512, 806-956 MHz (less cellular)
Keypad frequency entry: Yes
Tuning steps: 5/12.5/25 kHz
RIT or fine tuning: Continuous tuning dial
Display: Backlit LCD
Dimmer: No
Receiving modes: AM, NFM
Memory: 200 channels
Scan: 100/20 channels per second
Banks: 10
Lockout: Any channel
Priority: 10 channels
Search: With memory autostore
Delay: 2 seconds, any channel
Squelch: Yes
Clock: No
Audio output power: 2.7 watts
Record audio output: Tape output
Recorder activator: RCA phono jack
Sensitivity (12 dB SINAD): 0.75 uV NFM, 1.1 uV AM (nom.)
Antenna connector: BNC
Dimensions: 10-1/2"W x 3-1/2"H x 7-1/2"D
Weight: 3 lbs. 14 oz.
Power requirements: 12 VDC
Warranty: One year
Accessories included: AC adaptor, telescoping whip, instructions

Options:
Mobile mounting bracket
DC power cord
Cigarette lighter cord
CTCSS tone board

Tuning increments are automatically defaulted to 5, 12.5 or 25 kHz depending upon the frequency range; with cellular frequencies restored, the tuning increment is the proper 30 kHz in that range. Any of the three normal steps may be manually selected for frequencies under 174 MHz; above that, only 12.5 and 25 kHz may be selected.

Adaptive tuning (where larger increments are jumped when the tuning dial rotation is faster) is a mixed blessing. It allows rapid frequency excursions, but the user loses control of where he is on the dial. The adaptive tuning on the '890' begins at fairly slow rotations.

The tuning dial mechanism is detented, giving a "ratchet" feeling which can be tiring to turn using the finger indent. The extra pressure required can also move the lightweight radio around on the table.

Audio is loud and clear, and squelch action is positive with little annoying hysteresis. The top-mounted speaker may be hard to hear in an under-dash mount mobile configuration, but an external speaker will take care of that.

When tuning as far as 15 kHz away from a signal, audio is muted, even with the squelch fully defeated. While we initially thought of this as a disadvantage, it is really a bonus, because it assists exact frequency setting of the tuning dial without the need of a center-tuning indicator; and it does not interfere with adjacent signal reception in the VHF/UHF spectrum where licensees are well separated.

Modes are fixed: AM is used on 108-137 and 225-400 MHz aircraft bands; all other ranges are narrow FM. This means that FM FLTSATCOM communications in the military aircraft band and 800 MHz AM air-to-ground telephones will not be receivable.

Sensitivity is a mixed bag. We compared it with the competitive Realistic® PRO-2006 and with its own specifications. Most scanners have sensitivities on the order of 0.5 microvolts (the lower the number, the better); the '890' is factory specified as 0.7-1.2 microvolts at VHF-HI and UHF.

On the air, the '890' fared better than the 2006 in the 800 MHz band, about equal on high band, but worse on 406-512 MHz. Large clusters of spurious signals ("birdies") could be detected in the cordless phone band (46.8-46.9 MHz); a long list of confirmed birdies is included with the manual.

Grove Enterprises offers a $25 spectrum display option to work with the Grove SDU-100 or other SDUs which can be set for the '890's 10.85 MHz IF. An SDU works well with this scanner, which is one-fourth the cost of the receivers normally used with a spectrum display. There is a noticeable difference in SDU sensitivity between 800 MHz and the lower ranges, but it is certainly usable.

The automatic weather search contains not only the seven NOAA broadcast frequencies, but maritime coastal frequencies 161.650 and 161.775 MHz as well.

Memory channels may be cleared of entries by pressing 0 and E. The keyboard beep is not offensive; its loudness is adjusted by the volume control.

The manual is quite good except for minor errors: the '890' weighs 3 lbs, 11 oz (not 1 lb, 11 oz), and measures 10-1/2"W x 3-1/2"H x 7-1/2"D (not 5-1/5" x 1-5/8" x 6-15/16").

The Bottom Line

The new BC890XLT is a welcome innovation from Uniden. It offers remarkable features at a remarkably low price, and should set a new standard of comparison for the scanner industry.

The BC890XLT scanner is $269.95 with free UPS ground shipping from Grove Enterprises, and is also available from other *MT* advertisers.

MT

magne tests

Lawrence Magne
Editor-in-Chief
Passport to World Band Radio

• Panda Digital Portable
• Nothing further on World Access Radio

Just when you may have thought we'd seen the last in the long parade of Chinese portables, up crops another. This, the Panda, was hand-carried from Beijing by our helpful colleague Harlan Seyfer. In one guise or another it should be appearing within American and European outlets before long. Here's what our tests show you can expect.

Covers 49-19 Meters

The Panda is a typical compact in size and weight. It uses four "AA" batteries, and has a high-contrast LCD that displays frequency and 24-hour World Time—one or the other, but not both at the same time. It covers longwave, useful if you're in Europe; the AM band from 531-1602 kHz, which misses the forthcoming 1605-1705 kHz segment within the Americas; the usual FM band; plus shortwave continuously from 5950-15600 kHz. Outboard features are pretty much limited to a carrying strap and a telescopic antenna which swivels, but does not rotate. This annoying design makes listening unhandy unless the radio is set down on its small, tipsy bottom—which may be why the radio also has no elevation panel on the back of the cabinet.

There are some problems here. First, the AM-band channel spacing is fixed at 9 kHz, which is of little comfort if you're trying to listen in the Americas, where channel spacing is 10 kHz. Presumably, any version sold here would have 10 kHz spacing, which would be fine except during overseas travels. Fortunately, longwave tuning is in increments of 1 kHz, FM in 50 kHz increments and shortwave 5 kHz—all adequate and appropriate.

Second, shortwave coverage misses several bands between 2300-5100 and 17500-26100 kHz, as well as portions of 49 and 19 meters.

Tuning Requires Patience

Although the Panda has 16 buttons and sliders, there is a shortage of useful features.

Take tuning. There are presets, all right, but only five for shortwave. On a 1950s AM car radio, five may have been enough, but on shortwave this is terribly skimpy. There is also a set of single-speed up/down slew buttons and a "signal-seek" (up-frequency only) scan button. What there is not, is a keypad or tuning knob. However, there is a spot built into the cabinet for a tuning knob, which suggests that at least some other version(s) may come with this handy feature.

Meanwhile, this means that to tune the Panda from Point A to Point B requires no small degree of patience, watching the radio chugga-chug along like a jogger on a kilometer route. Using the slew buttons can be maddening, as the radio goes, one channel at a time, through each and every fre-

quency in the shortwave spectrum between where the radio was once tuned and where you wish it to be tuned. This ritual can take *minutes*!

Fortunately, the scan button skips out-of-band regions, making tuning faster—but only if you're tuning upward. It's a one-way carousel, with only the "down" slew button to fall back upon if you wish to tune downward.

What this means is that you'll almost certainly use the presets more as "band buttons" than as channel presets. Given five presets and the fact that the radio covers only six shortwave bands, at least some of the nightmare of tuning this radio is alleviated.

Still, advanced technology is supposed to make life better, not worse. If an old-fashioned analog radio can be tuned faster than the digital Panda, why do manufacturers insist on putting such new models on the market?

Unwanted Interference Aplenty

Performance? Even though the Panda's sensitivity to weak AM-band signals is utterly poor, its sensitivity to weak shortwave signals is actually fairly good on most bands, dropping only a bit elsewhere. Considering what we've encountered on some other models of Chinese digital radios, this is indeed cause for cheer. But while this is welcomed good news, the real test for a shortwave radio is its ability to keep away extraneous racket. Here, our findings are disappointing.

This is one Panda most people won't be able to bear. Adjacent-channel rejection—selectivity—is downright poor. Scarcely any shortwave station comes in free from whistles and chatter from signals one, two or even more channels away. As if that weren't enough, there is the usual problem with image interference found in the single-conversion IF circuitry used in inferior radios. Worse than images, though, is the Panda's propensity to receive grossly distorted spurious signals from FM (87.5-108 MHz) broadcasts while the radio is tuned to the shortwave spectrum (5.9-15.6 MHz). In one shortwave band, for example, we found several channels virtually obliterated by that sort of mess.

Relative to this dreary list of demerits, the Panda's tinny audio quality seems to be almost a virtue. For now-and-again listening to shortwave, it's adequate; on FM, it's hard to tolerate.

Overall: Forget It!

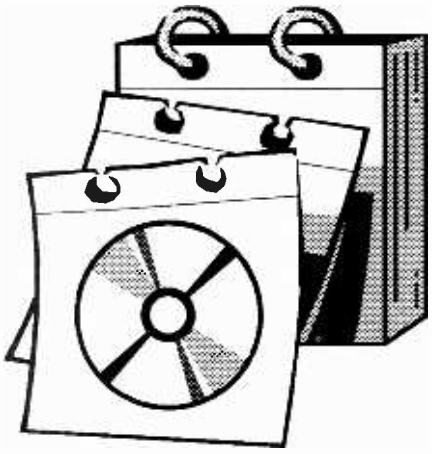
Radios such as the Panda typically sell for $50-100 in North America and Europe. If you insist on purchasing a low-cost receiver and don't want to pay the $150 or so that a truly decent portable costs, go really cheap and get one of the bargain-basement analog models to which we've given a reasonable rating in *MT* or *Passport*. These throwaways cost much less than the Panda and, aside from frequency-readout accuracy, are at least somewhat easier to tune and tend to be modestly less offensive to the ears.

Revised World Access Radio Still Not Released

The revised version of the "World Access Radio" has not yet materialized. According to the populist radio show "For The People," they sold fully 1,000 of the original version, which they market under the "American Electrola" label. As reported last month, they manufactured only 100 units before going back to the drawing board.

MT

John Catalano



The Year of the CD ROM?

Have they added a new one on the Chinese calendar?

Once there was a time before floppy disk drives, when recording tape ruled the (PC) world of file storage. Just the thought of home computing without a floppy disk drive now seems strange and unnatural. Yet in the late seventies the floppy was a rarity at home. Now let's jump to another time; a time when magnetic floppy drives are long forgotten and file storage is done via optical drives. Data is stored in laser readable optical disk, each with a storage capacity of *five hundred*, 1.4 Meg, old-style, magnetic floppy disks. It may sound impossibly futuristic, but it's here today. It's an optical compact disc read only memory: CD-ROM.

In the May issue of *MT*, Bill Grove explored some of the implications of this new technology. This month we'll continue the look at this new media, where it came from, where it is today, some radio related software currently available (yes, already) on this media and where it could evolve in the near future.

Roots

The story starts in the 1960's, in a small town in Holland, called Eindhoven. In an effort to reduce the size of reel to reel tape equipment, the Philips Company invented the Compact Cassette. Today we call it the audio cassette: master of music and the first home computer storage media. In the seventies Philips turned their R&D people from magnetic media to optical, using optically written and read patterns in plastic materials. These patterns could be written closer together than the magnetic tracks on tape. Therefore, more information — a tremendous amount more — could be stored. But the electronics and digital methods needed to be developed in order to take advantage of this new medium.

By the early 1980's, technical developments came together and Philips brought to life the audio compact disc. Within eight years the audio CD would make LP records extinct. Philips, believing in their invention, went on to expand it into the video laser disc. And now we have the CD ROMs for our PCs. Looking just like an audio CD they are "played" in a CD player-like drive.

Today we can only read programs or files which the manufacturer has put on the CD ROM at fabrication — much like LP records. That's the reason they are called CD ROMs: Read Only Memories. The CD ROM drives are not much different than audio CD players, with the exception of their interface and decoding electronics.

CD ROM drives come in two forms: internal — which fit inside the computer's case in the area where a 5-1/4 inch floppy disk drive would go; and external—with its own cabinet and power supply. In either case it is necessary to install an interface card on the computer's mother board. If you check out the May 1993 cover of *MT*, you'll see a computer with an internal CD ROM, an essential for multimedia.

Applications

Okay, John, real good. But the column is called "Computers and Radio." What about the radio part?

Well, I've got a stack of over 60 pages of program titles contained on a CD ROM disc called *World of Ham Radio Shareware - Volume 2*, by Amsoft, and another one called *Ham Radio Ver 3.0* manufactured by Chestnut. The Amsoft product will be the subject of a future column. Chestnut's Ham Radio Ver 3.0 contains over 600 programs: shareware, public domain, demos, and radio related text files. See the included list of directories for a description of the programs they contain. Let's browse a few directories and see what types of things they hold.

A natural for *MT* readers should be the one called SWL. This has 32 files pertaining to shortwave listening, including: ten frequency databases, seven station schedules, two SWL bulletin board lists, one control program for the Drake R8 receiver, a radio wave propagation prediction program and a number of text files concerning SWL topics, such as number stations.

Frankly, I found this section a little disappointing. Due to the nature of our hobby, station schedules are usually obsolete within nine months and most of the ones on this disk are from 1991! Interesting, but not what you'd want to base an evening's worth of listening on. However, the logging programs make the directory worth looking at. Over 600 programs — and this is the best they could offer for us radio listeners?

Calling up the FREQ directory I found 121 files and programs, of which most would be of interest to *MT* readers. The FREQ directory includes over fifty scanner frequency files for specific cities such as Orange County, CA, as well as general nationwide frequency lists for NASA, race car pit crews, the Goodyear blimp and many others. Also included are frequency allocation and spectrum charts covering from .09 to 1300 MHz.

Another twenty or so files cover HF/SWL frequencies, such as shortwave frequencies for the Gulf area, hurricane related radio info frequencies, HF & federal frequency lists and lists of shortwave frequencies collected by listeners. All this plus a number of database programs really makes this the more viable listeners' section.

What about the remaining hundreds of files? The MODS directory is another one that is so extensive, the contents read like a novel. This is one for the radio hardware hackers, since it contains modifications on lots of radios in over 60 files. These are all text files which explain how to make the modifications. Titles include: PRO2004 mods, audio mod to Sony ICF-2010/2001D, ICOM radio mods, frequency mods for many scanners, and an alphabetical listing of many radios and mods. I personally found this section to be very good reading.

Skipping the ANTENNA, DESIGN and SATELLITE directories which contain a huge number of interesting programs, let's look at the MISC directory. This directory with over 150 titles was a pleasant surprise, containing interesting files on subjects such as: History of radio's three letter call signs, BANDAID III — a multi-use ham and

monitoring utility, world clock programs, a database of radio equipment dealers, the equivalent of 15 floppy disks of electronics & ham programs, a number of terminal programs for KAM and PK232, more databases, satellite tracking programs and a graphic program for the AOR 3000, just to name a few!!

In order to pack in the largest number of programs on a CD, most files are in a compressed form that cannot be run directly. Instead they must be copied to the hard drive and decompressed using one of the utilities included on the CD ROM. This is a bother, but it triples the number of programs that can be held on the CD. Still, a directly accessible CD of programs would be ideal.

If you read the column a few months ago, you'll remember my comment that, although interesting, a large percentage of shareware and public domain programs are not very useful to radio monitors. This is still the case; however, with so many more programs on the CD ROM, the number of useful programs is also increased. These discs provide great reading for entertainment, with a number of useful programs thrown in as a bonus. With this attitude you will not be disappointed with Chestnut's Ham Radio Ver 3.0.

If you have a CD ROM drive and are a ham or radio enthusiast, you will find the $19 (plus shipping) very well spent. Make sure you ask for the latest Chestnut Ham Radio Ver 3.0.

Chestnut also makes CD ROMs entitled: *TechnoTools*, which helps hackers control I/O ports and many other computer functions and languages; and *Complete Bookshop*, which contains reference books such as dictionaries and a number of "How-To-Do" manuals on all types of subjects. At $19 (plus shipping) each of these is definitely worth looking into. The Chestnut products can be purchased from ERM Electronic Liquidators (also called Crazy Bob's), 37 Washington St, Melrose MA, 02176 Tel (617) 665-4856.

The Amsoft CD, *World of Ham Radio Shareware*, Volume Two, which in my opinion is an excellent product, will be explored in detail in a future column. It is available at $79.95 plus shipping, from Amsoft Ham Radio Software, P.O. Box 666, Dept. NV, New Cumberland, PA 17070 Tel (717) 938-8249.

What will the future bring?: Writable CDs that can be used in place of floppy disks, but with ten to fifty times the storage; multimedia discs with sound, digitized full motion graphics and programs that will step you through learning exercises. It's like having your own personal expert teacher on any subject; you can delve deeper into areas of interest, or get tutorial assistance in ones you just don't understand.

Philips has not been sleeping and has recently released the CD-I, compact disc - interactive. Although they use special CD-I players and are not "writable" by the users, they already conform to much of the above future daydream. The impact will be felt in many parts of our lives, including publishing and entertainment.

So why should radio monitors be left out? As the commercial says, "Why ask why?" Watch carefully as CD ROM players drop lower in price. They are already below $200 and I'm sure will go lower as the medium becomes more popular. As for myself, I've made the decision to jump in now. Coming from someone who waited until 1989 to buy an audio CD player and curtail his LP collection, I'd say that 1993 is the year of the CD ROM.

Now, let's see here; which magazine — I mean, CD ROM file — was I reading...?

MT

Chestnut's Ham Radio Ver 3.0 CD ROM Directory List

Directory	Description
ANT	Antenna programs
BBS	BBS programs
CLUB	Info on amateur radio clubs
CONTEST	Info on contests
CONTROL	Control
CW	Morse code
DX	DX
EXAM	Exam assistance and study aids
FAX	FAX
FCC	FCC
FREQ	Frequency lists and databases
GLOSS	Glossaries of terms
KENWOOD	Kenwood mods, repair, control, and notes
LAN	LAN
LOG	Logging
MAPS	Maps
MATH	Math and calculations
MISC	Miscellaneous programs
MODS	Equipment modifications
NEWS	News from the FCC (and others)
OSCAR	OSCAR satellite information
PACKET	Packet radio
PK232	PK232
QSL	QSL programs
REGS	Regulations
REVIEWS	Reviews of equipment
RTTY	RTTY
SATEL	Satellite tracking
SPACE	Space
SSTV	Slow-scan television
SWL	Shortwave Listening
TCP	TCP
TECH	Technical programs and notes
TTY	TTY
WORLI	WORLI

Doug Demaw, W1FB

Make Circuit Boards — Ugly Style

Ugly, grotesque or just plain bad looking — who cares? Circuit boards need not reflect the artistic skill of Picasso. After all, the etched side of a PC board is hidden from view after the assembled circuit is mounted on a chassis! Yet, many builders feel that commercial quality is essential in order for a circuit board to serve its purpose properly. This article explains a simple and expedient way to make your own one-shot circuit boards with ordinary materials.

Avoid the Etching Process

Working with photosensitive PC board material and handling messy etching solutions has turned many an experimenter away from creating circuit boards. Although I have used chemicals for years, I find that the method detailed here is my preference when making one-of-a-kind boards. All you nced for making your own boards is a hobby type of motor tool, some carbon paper, a small router bit and a piece of blank circuit board.

Ugliness is a subjective thing (the eyes of the beholder), and I have no qualms about using "Ugly Construction" as coined by Wes Hayward (W7ZOI) in a *QST* article some years ago. Ugly circuit boards do not trouble me, either.

The Process

The first step in the procedure is to gather the parts for your project. Next, they are laid on a piece of paper, unit by unit, to allow you to free-hand sketch the circuit board pattern. Using the parts enables you to know how much board space is needed for each component. Once the circuit pattern is laid out in this manner, it should be checked one or two times for accuracy. Be sure that none of the parts will be in the way of other ones. If you have areas where space is at a premium, simply mount the resistors vertically. Do likewise with capacitors that have axial leads rather than radial ones.

Step number 3 calls for using carbon paper to transfer the sketch onto the copper side of the circuit board. Simple patterns may be drawn directly on the copper by using an ink pen.

Figure 1 shows the motor tool I use. It is a cordless unit that I purchased for $25 at a WalMart store. The NiCd battery was included, along with the charger. All bits for this tool must have 1/8-inch shafts. In the foreground of Figure 1 are three bits for the tool. Two of them are routers that I bought from a shop tools catalog. Hobby stores should also stock these bits. The third unit is a standard no. 60 carbide PC board drill. It is used to make the component holes in the board. Use extreme care when working with these small carbide drills. They will break quickly if lateral stress is applied during the drilling process. It is best to use a small drill press with these bits rather than attempting to drill holes with the motor tool. Carbide bits are available from a number of surplus electronics dealers.

Figure 1: All that is needed for making quick, "ugly" circuit boards are the hand tools seen here. A cordless (or AC operated) motor tool, small router bits and a no. 58 or 60 carbide drill complete the package for routing out unwanted copper from PC board stock (see Fig. 2). A Dremel Minimite tool is shown here.

The Routing Process

The commercial router bits cut rather wide paths in the copper. This is okay for big projects, such as power-supply boards. But, for smaller boards, I prefer finer lines. I found that broken no. 58 or 60 carbide drills work nicely as routers. I grind the remaining twist drill stub to a chisel point. This creates a useful fine-line router.

Practice cutting lines on a scrap piece of PC board, before working on your special board. You will quickly learn the proper motion and pressure to ensure a clean cut. Use the router to form the islands on your board material. The method works best at high drill-motor speeds. I always get ragged lines when using the low motor-tool speed. If the tool should slip and cut through a copper line, simply solder a bridge across the open conductor after the board is completed.

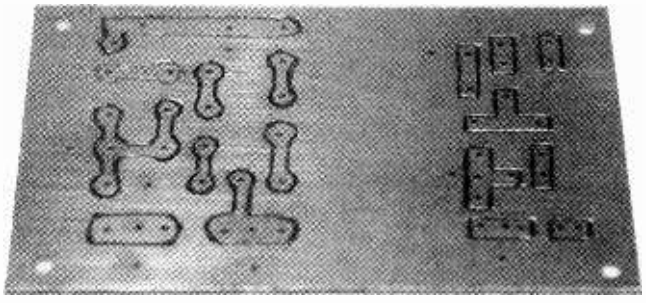
Figure 2 illustrates a board I made while using this technique. Two styles of routing are seen on the board. The choice is yours to make. Rectangular pads are the easiest to create, but I also made circles and lines at one end of the board to show that it can be done — ugly as it may appear!

Use a magnifying glass to inspect your work after you finish routing your board. Look for tiny fragments of copper that were not removed. Use the router again to clean up those areas. A final check of each pad with an ohmmeter is wise. Measure between the ground portion of the copper and each pad to be certain there are no short circuits. In a like manner, measure between adjacent pads.

Closing Remarks

The principal limitation associated with ugly circuit boards is trying to route patterns for ICs and LSIS. A skilled person can do it, but close work and fine lines of that type cannot be made with unsteady hands and weak eyes (me!).

I urge you to try this method. It sure beats the tedious etching process or the use of Perf Board and bus wire.



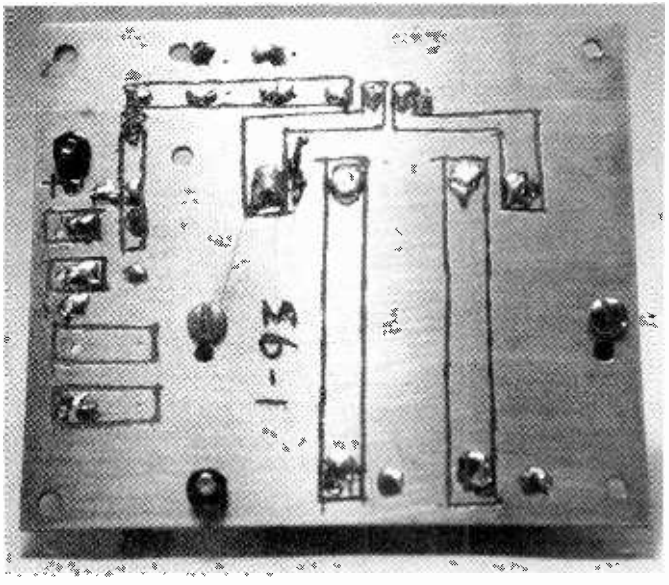


Figure 2: This circuit board was made by using the tools shown in Figure 1. Conventional circles and connecting conductors are seen at the left. The rectangular copper islands at the right as easier to form with a motor tool, and they are entirely adequate for many projects. Shown also in this figure is the bottom side of a 12-volt power supply. The circuit board conductors were formed with a motor tool and a medium-size router bit.

Bill Cheek

Receiver Selectivity and How to Improve It

While there are a number of meaningful specifications of a radio receiver, perhaps the single most important to the hobbyist is that of **selectivity**: the ability of a receiver to admit or tune a desired signal to the exclusion of adjacent or undesired signals.

Generally we think of a receiver's selectivity as a qualitative factor in terms of poor, good, superior, etc., but this is not always proper. A lot depends on the frequencies you are tuning and their applications. Let's briefly consider two extremes.

For example, a voice channel in the crowded shortwave and HF amateur bands can get by with as little as 2.5 kHz of spectrum, but, in the television spectrum, decent video requires a minimum of 4 MHz. Therefore, you can't say that a television receiver with a "selectivity window" of 6 MHz has poor selectivity compared with a shortwave receiver with a 10 kHz window. On the contrary; it is the shortwave receiver in which up to four different signals may be present which has the poorer selectivity.

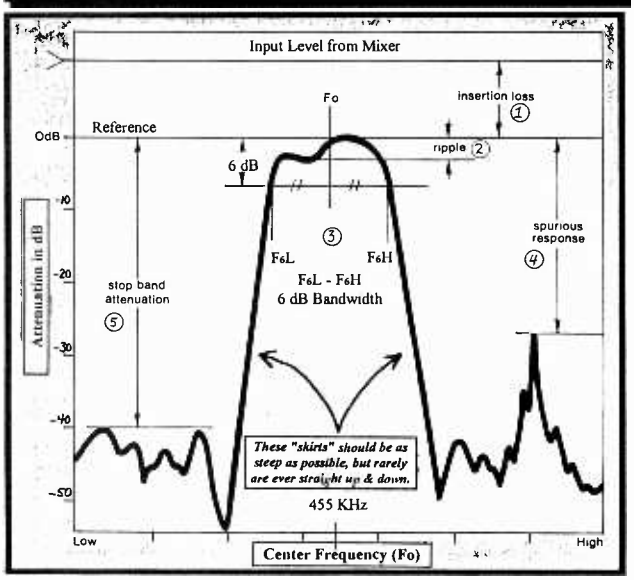
As you see, the measure and assessment of selectivity all depends on the bandwidth of the desired signal. If you're copying Morse Code in a congested band, the desired selectivity might be as sharp as 250-500 Hz, tops. Single sideband voice reception does nicely at 2.1 kHz. Commercial programming on shortwave sounds best with a selectivity of about 6 kHz, but you need 4 kHz or even 2.5 kHz to dig out the weak ones at times of severe congestion.

AM mediumwave broadcasts on 550-1600 kHz need no more than 5 kHz selectivity, but any less means a loss of fidelity. Citizens Band receivers are at their best with selectivity of 5 kHz or less, although 10 kHz is more or less standard. The FM broadcast band of 88-108 MHz requires a selectivity of about 150 kHz in order to receive high fidelity signals inherent in this service. Receivers for weather satellite services need a selectivity of 20 kHz to as wide as 50 kHz for best performance.

Scanner receivers are a different story altogether. The VHF-UHF bands are more subject to controlled frequency assignments. This means that the selectivity specification is not nearly as critical as for the mediumwave and shortwave bands. In fact, VHF-UHF scanner receivers are notoriously a little less selective than their lower frequency counterparts because of two reasons: (1) frequency assignments are made by the FCC with the idea of minimizing local area congestion and (2) allowed tolerances for variations in the frequency of the transmitted signal are greater for VHF-UHF. Receivers need to be less selective to be capable of clearly receiving all signals that are within the allowed tolerances. Even modern 0.001% tolerances can mean a frequency error of as much as 1540 Hz at 154 MHz.

Scanner receivers are designed with these variances in mind, with the result that most selectivity specs are about 15 kHz for those bands where the NFM mode predominates. VHF/UHF aero receiver selectivity may go as high as 25 kHz.

FIGURE 1: CHARACTERISTICS OF AN IF FILTER



NOTES ON FIG-1

1. All IF filters have insertion loss, 2-3 dB typ, relative to the input level; the less, the better, usually
2. All filters have "ripple"; not very important, but the less, the better.
3. The pass band of the filter is considered to be that spectrum between the -6 dB points. The filter is considered to reject frequencies above and below these points. The amount of rejection (dB) depends on the frequency. Outside the passband, the more rejection, the better.
4. All filters have "spurious response" or internally generated pseudo-signals that can interfere with reception of desired signals. The lower, the better. (-dB)
5. Stop Band of a filter is the opposite of pass band. It should be a consistent, highly attenuated level above and below the pass band, the lower, the better, though this level is rarely "flat".
6. ***SUMMARY: Pass Band (3) and Stop Band (5) are the most important specs of an IF filter. Spurious response (4) is also important, but less so.***

Check Out the Curves

There is much more to selectivity specifications than the bandwidths we've discussed up to this moment. Bandwidth alone means little without a companion specification that defines the selectivity curve or pattern of the receiver. As an example: it is possible—even probable—that a receiver with a selectivity of 6 kHz will detect a powerful station that's 10 kHz or more away from the desired frequency. This is because there is no such thing as a perfect bandwidth "window." Therefore, this companion specification is stated in decibels (dB) or the degree to which undesired or off-frequency signals are rejected by the receiver.

This is the clue to most selectivity specifications. A typical selectivity specification for a scanner receiver might read something like this: -6 dB @ 9 kHz and -50 dB @ 15 kHz. Literally interpreted, this means that signals in the center of the designed selectivity "window" are referenced at 0-dB, and at 9 kHz away from that center, signals will be attenuated or reduced by 6-dB (a factor of ½) and at 15 kHz from the center of that window, signals will be attenuated by 50 dB (a factor of 3/1000).

Selectivity specs for a typical shortwave receiver will read something like -6 dB @ 2.7 kHz and -50 dB @ 8 kHz, though this has to be taken loosely, because many shortwave receivers have two or three switchable selectivity settings—typically wide, medium and narrow. The above spec is representative of a narrow selectivity. See Figure 1 for a graphic depiction of how a filter works.

A receiver's selectivity is determined largely by the design of the filter that's located in the last Intermediate Frequency (IF) section. Single-signal selectivity is never established in the front end, or preamplifier section, where a wide range of signals have to be admitted. Likewise, the 1st IF contributes very little to the selectivity specification; neither does the 2nd IF of a triple conversion receiver. It is in the last or 3rd IF section where a special filter, usually ceramic but mechanical in some, is designed to pass the center frequency of that IF and a narrow band of frequencies on either side of center.

Ideally, this "pass band" will be flat on top with steep sides to make the graphed function appear like a square wave. Ideal is one thing; reality is another, with the consequence that the IF pass band will actually form a curve with a rippled top and a sloping pair of sides as shown in Figure 1. Most receivers employ ceramic filters because of good performance at lower cost. The best kind, however, is the mechanical filter, pioneered and still made by the Collins Division of the Rockwell Corp.

Mechanical IF filters are very expensive and rarely used now in any but the most expensive and professional equipment. The old R-390A military receiver uses several of these mechanical filters, which largely accounts for its excellent reputation through the years. The early Tram

Titan and Browning Golden Eagle CB receivers also employed Collins mechanical IF filters for superb rejection of "bleedover." HF receivers with sharp selectivity have always enjoyed immense success, and with good reason, since selectivity is more important than sensitivity below about 30 MHz.

What's Your Upgrade?

The rest of this article will establish ideas for improving the selectivity of your HF receiver. Referencing the previous discussion, you will not want to apply these techniques to television, video and FM broadcast receivers where the selectivity curve is specially designed and should be left as is. Selectivity improvements are desirable primarily for shortwave, CB and amateur HF receivers and, upon occasion, scanners.

Most receivers are designed with a 455 kHz last IF. More ancient and less common types that might be encountered are 262 kHz, 100 kHz, 7.8 MHz, 10.7 MHz and 11.275 MHz. While it's not impossible to improve the selectivity of receivers with oddball IF's, it is impractical to do so because of the difficulty in acquiring the necessary upgrade filters. Our efforts here will focus on sprucing up only those with 455 kHz IF sections.

In general, the best way to improve the selectivity of a receiver is to replace the stock, average performance IF filter with an upgraded model. A variation of this technique involves the addition of a second similar or better IF filter in series with the first, leaving it in place. Another approach is to identify those transistors which make up the 455 kHz IF section and replace all emitter bypass capacitors with 455 kHz bypass resonators.

A sometimes possible method to dramatically improve selectivity is to add a crystal lattice filter to the IF section immediately before the 455 kHz section. This will be the 2nd IF in a triple conversion receiver or the 1st IF in a dual conversion receiver. This technique is easier said than done because of the expense of crystal lattice filters in the first place ($60-$100), not to mention a general unavailability of such filters for just any Brand-X 1st or 2nd IF. Last IF's of 455 kHz are rather standard, but there are no apparent standards for 1st and 2nd IF's.

Still, I have had immense success with this latter method applied to the Cobra 2000-GTL and Cobra 148-GTL CB radios, which use a 7.8000 MHz 1st IF and a 455- kHz 2nd IF. There is a small 7.8 MHz 2-pole crystal filter in the first IF of these fine CB rigs for the purpose of filtering mixer and oscillator noise. This filter literally cries out for removal and replacement with a 6 or 8-pole crystal lattice 7.8 MHz SSB filter. These filters cost upwards of $100, but are free, or nearly so, if cannibalized from another rig. 7.8 MHz is a common transmitter and receiver IF frequency in some older SSB-CB rigs, and I've salvaged many of those large, silvery, crystal lattice filters from decrepit rigs like the Midland 13-893, 13-895, Cobra 138, etc.

If you are lucky enough to find and resurrect one of these old fossils from the bone yard, then locate and remove FT-2 in your Cobra 2000 GTL or Cobra 148-GTL and replace it with one of these larger, more effective filters for greatly enhanced selectivity in the AM-mode. FT-2 looks like an HC-49/u or HC-18/u crystal except that it has three leads: IN, OUT and ground. The much larger crystal lattice filters also have the same three leads, so replace FT-2, pin for pin.

If "bleedover," "splatter," or "wash," as it may be called in different parts of the world, is a problem in your Cobra 2000-GTL or 148-GTL, then this selectivity upgrade will make adjacent channel interference a thing of the past! Crystal lattice filters typically reject undesired signals by 60-dB or more and have a bandwidth of less than 5 kHz.

The rest of you stay tuned until next month when we'll get down to some gory detail for beefing up the selectivity of more receivers. Don't sigh or get impatient now, because you need more information anyway, and this coming month will give you time to acquire it. If you're an expert, there is already enough information in this article to get you moving. If you're a novice, then the wait and accumulation of information will be well worth your time.

See the sidebar for resource data relative to IF filters and contact those companies for their product catalogs and literature. Tell them that *Monitoring Times* and I referred you. Do it right away so you can be ready to go next month. Until then...73.

MT

Sources

IF Filters & Resonators:

Murata-Erie North America, LTD.
2200 Lake Park Drive
Smyrna, GA 30080
404-436-1300; Fax 404-436-3030

NTK Technical Ceramics
1200 Business Ctr. #300
Mt. Prospect, IL 60056
708-824-1133

The Famous Collins Mechanical IF Filter

Collins, Div of Rockwell Int'l
2990 Airway Ave.
Costa Mesa, CA
714-641-5311

IF Filter Upgrades, Improvements, Kits

Kiwa Electronics
612 South 14th Ave.
Yakima, WA 98902
509-453-KIWA

Sherwood Eng. Inc.
1268 S. Ogden St.
Denver, CO 80210
303-722-2257 Fax: 303-744-8876

Datong Electronics, LTD.
Clayton Wood Close
West Park, Leeds
England LS16 6QE

W. Clem Small, KR6A, CET

The Unusual, the Weird, and the Winners!

Recently, Monitoring Times readers were asked to submit candidates for the world's most unusual antennas, or antennas which they felt were quite different from antennas which we ordinarily encounter in the field of radio communications. The differences could be in terms of appearance, type of construction, the job the antenna has to do, an unusual place where the antenna was located or whatever made the antenna strange or unusual. As you will see below there were some rather remarkable entries for the title "the world's most unusual antenna."

In First Place

First place goes to an entry by Dick Sharp for an antenna system which uses a huge wedge-shaped, helium-filled blimp to lift its VLF cable-antenna to almost a mile in height! The antenna handles "hundreds of kilowatts" and its tuning coil is of "3-in. diameter Litz wire." Believe it or not, this monster is a portable antenna, built into tractor-trailer rigs so that it can be moved to strategic locations in times of extreme disaster, such as after a nuclear attack. Assuming that a good ground system could be secured, with its tremendous vertical rise this antenna may be the most efficient VLF antenna ever constructed.

Second Place

The second place goes to an entry sent in by long-time *Monitoring Times* reader Paul Lalli, AA5AN. This one is a good example of what I call a "UFO" antenna (Utilizing Familiar Objects as an antenna). Paul seems to have utilized an entire ladder truck as a vertical antenna! The truck and ladder are metal and comprise a vertical antenna which is insulated from ground at its "base" by the rubber of the truck's tires. Not only is this field-expedient skywire a mobile antenna, it can be tuned for different frequencies by varying the ladder's vertical height, it has its own emergency power generator built-in, and the power-handling capability of the antenna would seem to be in the very high power range! You can get yourself one of these "Pierce Arrow Antennas" for only a half million bucks.

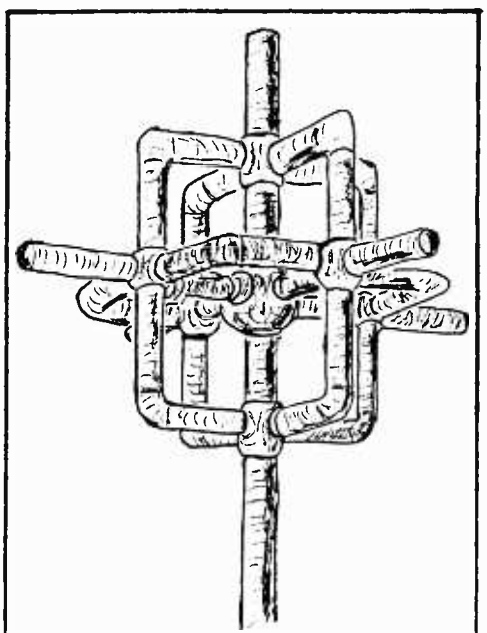


FIG. I. AN UNUSUAL ANTENNA UTILIZING THREE DIPOLES AND THREE LOOPS.

Third Place

Third place goes to reader J. B. who entered the compact HF antenna array shown in fig. 1. This amazing looking skywire uses six antenna elements — 3 loops and 3 dipoles — to produce a nondirectional radiation and reception pattern effective with any signal polarization from 2 to 30 MHz! Its uses include signal interception, direction finding, adaptive interference cancellation, and diversity reception. In case you'd like to have one, this remarkable antenna is available from Flam & Russell Inc. at a cost of $75,000.

Runners Up

Choosing the winners for this contest was difficult because all entries were interesting and unusual in some way. For instance, Eric Forslund's entries were the quadrifilar antenna, which looks more like an egg beater than an antenna, and a radar antenna which looks like a drive-in movie screen and can be used to detect a baseball sized object at 2000 nautical miles!

Jerry Pickard submitted a "stealth" antenna of his own design which is made of a two-conductor wire tape that is sold for wiring doll houses! The antenna is somewhat like stripline RF circuitry on printed circuit boards, and can be hidden in just about any out of the way space you have. Bill Bowers entered his eleven foot long, ferrite rod antenna which was featured in the January 1993 *Lowdown*. He and John Bryant are now working on a 16- ft. model which they will extend to 20 ft. when they can get the ferrite rods to do so!

Back to the UFO antennas, Bernard Maguire entered antennas he has used which utilize metal flashing on a building roof and the aluminum covering of a storage shed. Sandy Clark has also used metal flashing on a roof as an antenna, copying "almost anything I have been interested in" on shortwave with this "instant antenna." While we're on the roof, let's mention David Noell's use of a metal rain gutter as an antenna, a trick which "really increased his reception."

Getting more down to earth, second place winner Paul Lalli also entered his use of rail road tracks as an antenna. He found this unusual antenna to have less noise than the average antenna but to be "terrible" for transmitting. And you've seen those kid's toys called "Slinkys" which are metal coils which can "walk" down the stairs. Well, Thomas Risher recalls for us the fact that many old-timers claimed excellent results using these toys, stretched out to form long, semi-coiled antenna elements.

And, In Addition

I've come across a few unusual antennas which somehow eluded *MT* readers for this contest. One is a superconducting antenna made by Todd Kramer, N4WOR, and utilized by him for possibly the first amateur radio contact with such an antenna. Others include the use of the human body as a transmitting and receiving antenna, the use of trees as antennas, and even the use of an island in the ocean as an antenna!

Every Antenna is Unusual

It seems to me the fact that an antenna can interface a radio to rest of the world, pulling voices, music and code right out of the thin air is nothing short of magic. Yes, I know we have

physical theories and mathematical models to "explain why it works" but they really only describe what happens in a more precise and technical way, they don't explain it. The real reason antennas function or why they work at all is unknown to me, to you, and to the most sophisticated engineers and scientists. Each antenna is indeed a remarkable thing.

RADIO RIDDLES

Last Month

It is commonly reported that horizontal antennas are more quiet than vertical antennas because they receive less noise. Last month I asked "Why is this so?"

Well, when horizontally polarized waves contact the ground, they tend to dissipate into the ground's resistance along their entire length. On the other hand, vertical waves can travel for long distances with their "foot on the ground" and yet remain strong enough for detection.

Thus, when noise (or any other signal) is generated near the ground, its horizontally polarized components are dissipated much more quickly than vertically polarized components. Therefore, since most noise is generated near the ground, the signal level for horizontally polarized noise is less than that for vertically polarized noise.

This Month

Some early attempts at wireless communication utilized audio-frequency signals sent and received by induction rather than utilizing RF signals radiated and received as radio waves. Frequently these old systems employed two large loops as "antennas," one at the transmitter and one at the receiver. These loops essentially comprised the primary and secondary windings of a very large, air core transformer; they did not have RF signals flowing in them and they were not radio communication antennas.

But is it possible that, even with modern radio equipment, at times we still communicate via inductive, or even capacitive coupling, rather than with radiated radio waves? And what is the "near field" and "far field" of an antenna anyhow?

We'll have the answer to this month's riddle in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

MT

***Q.** Can you transmit through the Grove MiniTuner? Jennifer Day-Elgee, Moncton, NB, Canada)*

***A.** No. The MiniTuner is not an impedance matching device; it is a frequency-tunable preselector whose sole purpose is to narrow the swath of frequency spectrum being fed to the receiver. Since it is for reception only, components are much too fragile to handle transmitter-level power.*

Bob's Tip of the Month

Uniden BC890XLT Cellular Modification

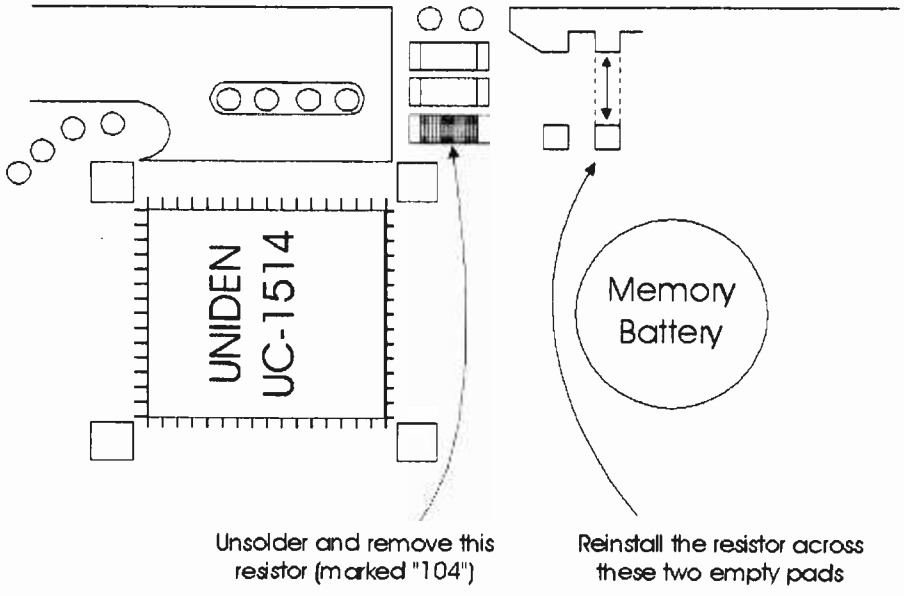
No sooner did the new Uniden BC890XLT scanner hit the streets than our intrepid scanner modifier, Larry Wiland, figured out the cellular restoration—with appropriate 30 kHz steps, to boot!

Although we have validated this procedure in our own labs, *MT* accepts no responsibility for damages resulting from attempting this modification, and we remind our readers that it is unlawful to monitor cellular telephone conversations.

The modification requires delicate manipulation of fragile components; do not attempt it if you are unfamiliar with surface-mount devices and microsoldering techniques.

TOOLS NEEDED: Philips screwdriver, small-tip soldering iron, small gauge rosin-core solder.

1. Remove all ten cabinet screws and carefully separate the halves; carefully unplug the speaker plug and set the cabinet sections aside.
2. Remove the four faceplate screws and one bracket screw at the center of the main board to loosen the faceplate. Carefully depress the outside edges of the metal faceplate shield and tilt the faceplate downward toward you, exposing the logic board.
3. Unplug connectors J4 and J5 (white and blue wires), and ribbon connectors J501, J502 and J503 (CAREFULLY nudge them loose by pulling close to the sockets). Remove the faceplate and logic board together.
4. Position the circuit board as shown below and locate the microprocessor chip (Uniden UC-1514), and the three chip resistors by the chip's upper-right-hand corner. Carefuly unsolder the closest of the three (marked "104") and reinstall it between the two empty pads closest to the memory battery as shown.
5. Reassemble the front panel and all connectors. Test the radio by entering 871.200 MHz, then reassemble the cover. This completes the cellular restoration and 30 kHz tuning step.



***Q.** One of my neighbors has installed an "invisible radio dog fence" which controls pets by transmitting signals to their collars. What frequency does it work on and will it cause interference to my receiver? (Jeffrey Zell, Walton Hills, OH)*

When I push the remote control button on my car alarm, my doors lock; I've been unable to measure anything on my frequency counter. What frequency are these devices on? (George Froberg, Mill Valley, CA)

***A.** Neither device is likely to cause interference because of rigid FCC restrictions against Part 15 (low power) radiation devices like these.*

There are several frequencies throughout the spectrum reserved for industrial, scientific and medical (ISM) radiations; these include 6.78, 13.56, 27.12, 40.68 and 902-928 MHz. Additionally, some frequency ranges near 300 MHz are used by garage door openers.

Up here in the mountains, everyone lets his dogs run loose and leaves his car unlocked, so I've never seen either of these devices up close. Any of our readers know what frequency these things are on?

***Q.** Why do AM broadcast signals fade when you drive under a bridge but FM signals don't? (Ken Greenberg, Skokie, IL)*

***A.** It all has to do with wavelength, the spacing between successive waves of a radio signal. The higher the frequency, the shorter the wavelength.*

Shorter wavelengths (the FM signal) are more easily reflected and scattered by conductive materials like metal and earth than are the longer wavelengths (AM broadcast) which are absorbed.

***Q.** How will mounting an antenna in my attic be different from mounting it at about the same height on the roof? Tom Carroll, Lee's Summit, MO)*

In our May issue, Ricardo Molinar asked for holp locating a simple interface to connect his FAX machine to the FAX input of his computer. Readers James Hubbard and Robert Butts came to the fore, suggesting that Molinar contact Tigersoftware, PO Box 143376, Coral Gables, FL 33114-3376 (ph. 800-883-4437) and ask about the "Worldfax"; or SVA Software, 4401 Ponce de Leon Blvd., Coral Gables, FL 33146 (ph. 305-446-9905) and inquire about the "Fax Scanner".

A. Not at all; modern, non-metallic roofing materials are transparent to radio waves up to the gigahertz (1000 MHz) region. At VHF and UHF scanner bands, you would use a vertical antenna, and the presence of slightly lower metallic obstructions (wires, ducts, etc.) would have little or no effect on reception.

For shortwave reception, however, you will probably use a longer horizontal wire; this will, indeed, suffer from these materials as well as low elevation above ground. Still, attic antennas work better than lower wires strung through rooms.

***Q.** I presently have a 200 foot random wire antenna that runs 25 feet, then turns for 100 feet, then turns again for 75 feet. If I replace it with an Eavesdropper or Alpha Delta sloper, what percent improvement can I expect? (Hanh Pham, Santa Anna, CA)*

A. I haven't the foggiest notion! It would be impossible to predict, because the random wire's zig-zag layout creates a complex pattern which changes with frequency range. Other variables include height above ground as well as the presence of nearby conductors like electrical wiring, fencing, aluminum siding, plumbing, heating/cooling ducts, and the earth itself.

Chances are that you could get better reception by simply cutting the length of your present antenna to about 75 feet and running it as high and straight as possible.

The advantage of the two trap antennas is that they are designed to offer close impedance match in the international broadcast bands; the down side is that they sacrifice performance in the utility bands.

***Q.** Is it possible that I can be hearing 800 MHz cellular phone calls in the 450 MHz range of my scanner? (Many inquiries)*

A. Absolutely. A number of scanner owners have confirmed this phenomenon which results from a mixture of IF imaging and oscillator harmonics. 869-894 MHz cellular phone calls are often clearly audible in the 429-454 MHz range.

One *MT* subscriber gives this formula: 2 x image frequency - IF frequency = cellular frequency. In other words, double the 450 MHz-range frequency on which you hear the bogus cellular signal, then subtract your receiver's IF (10.7 or 10.85 MHz) and you have the original cellular frequency.

Turning this around, to find the 450 MHz-range image frequency on a scanner that has cellular deleted, add your scanner's IF (either 10.7 MHz or 10.85 MHz) to the legitimate cellular frequency, then divide that number in half.

MT

Club Circuit

Welcome to ...

Communications Research Group

This Wisconsin-area scanning club is primarily made up of RCMA (Radio Communications Monitoring Association) members, but they would like to attract anyone in Wisconsin interested in scanning.

The club maintains a frequency database of over 34,000 Wisconsin frequencies, and hopes to start a newsletter and conduct more field trips. Meetings are held in May and September. Contact Scott W. Miller, 122 Greenbriar Drive, Sun Prairie, WI 53590-1706.

The Finnish DX Association

This umbrella organization helps to organize and support the activities of three member clubs: Suomen DX-Kuunelijat (Finnish-speaking members), Finlands DX-Club (Swedish language), and the Friendly DX Clubs (others). Many local branches meet monthly, conduct DXpeditions and publish their own newsletters. However, the Association also publishes a high-quality publication entitled *Radiomaailma* (Radioworld), published mostly in Finnish, but containing news in English.

John Trimmer leads a tour of WCAB/WXYV by the Radio Monitors of Maryland club.

About half of FDXA's 1600 members are under 30 years old. The majority are interested in shortwave listening, tropical band DXing, medium-wave or FM DXing. Interest in utility and satellite DXing is also increasing.

FDXA holds a well-attended summer meeting each August. They hosted the European DX Council conventions in 1987 and 1992, and they conduct an annual DXpedition to Lapland, Finland's northernmost region. To learn more about FDXA and how to join, contact FDXA, Suomen DX-Litto, P.O. Box 454, SF-00101 Helsinki, Finland.

Don't see your club listed? Write in for a listing form today, and let yourselves be known!

Club Listings A-L

All Ohio Scanner Club: Dave Marshall, 50 Villa Rd., Springfield, OH 45503-1036. Ohio and surrounding states; VHF/UHF and some HF and amateur coverage. *American Scannergram.*

American SW Listener's Club: Stewart MacKenzie, WDX6AA, 16182 Ballad Lane, Huntington Beach, CA 92649, (714) 846-1685. Western US, Pacific, Asia, & Middle East; SWBC, utilities, longwave. *SWL.*

Association of Clandestine Enthusiasts (A.C.E.): Kirk Baxter, P.O. Box 11201, Shawnee Mission, KS 66207. US, Europe and Middle East; Pirate and clandestine. *The A.C.E.*

Association of DX Reporters (ADXR): Reuben Dagold, 7008 Plymouth Rd. Baltimore, MD 21208. International; Utilities, ham band, QSLing, MW, LW, and SWBC. *DX Reporter.*

Association of Manitoba DX'ers (AMANDX): Shawn Axelrod, 30 Becontree Bay, Winnipeg, Manitoba, R2N 2X9 Canada, (204) 253-8644. Manitoba; LW, MW, SW, and VHF/UHF

Bay Area Scanner Enthusiasts: Herman Frisch, 4718 Meridian Ave. #265, San Jose, CA 95118. San Francisco Bay area; 30+ MHz. *Listening Post*

Bayonne Emergency Radio Network (BERN): Ray Baron, P.O. Box 1203, Bayonne, NJ 07002, 201-662-2222. NE Jersey; Fire/disaster.

Bearcat Radio Club: Larry Miller, Box 360, Wagontown, PA 19376, 1-800-423-1331. US and Canada; Scanning only. *National Scanning Report.*

Boston Area DXers: Paul Graveline, 9 Stirling St., Andover, MA 01810, (508)470-1971, 50 mile radius Boston; SWBC.

British DX Club: Colin Wright, 54 Birkhall Road, Catford, London, SE6 1TE, United Kingdom. UK and international. SW, MW, AM, FM DXing, pirate and clandestine radio. *Communication.* Sample 3 IRCs or $2 US cash.

Canadian Int'l DX Club: Sheldon Harvey, President, 79 Kipps St., Greenfield Pk., Quebec , Canada J4V 3B1, (514)462-1459. Canada nationwide/membership open to all; General coverage. *The Messenger*

Central Indiana Shortwave Club: Steve Hammer, 2517 E. DePauw Road, Indianapolis, IN 46227-4404. Central Indiana; SW broadcasting, pirates, and the offbeat. *Shortwave Oddities.*

Chicago Area DX Club: Edward G. Stroh, 53 Arrowhead Dr., Thornton, IL 60476. 150 mile radius of Chicago; Dxing all bands. *DX Chicago.*

Chicago Area Radio Monitoring Association (CARMA): Ted & Kim Moran, 6536 N. Francisco 3E, Chicago, IL 60645. Chicago & midwest. Public safety & general coverage. *CARMA Newsletter.*

Cincinnati Area Monitoring Exchange (MONIX): Mark Meece, 7917 Third St., West Chester, OH 45069-2212.. SE Indiana, Kentucky, SW Ohio; SWBC, utility, military, satellites, scanning, BCB.

Communications Research Group: Scott Miller, 122, Greenbriar Drive, Sun Prairie, WI 53590-1706. Wisconsin area. Scanning.

DecalcoMania: Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (206) 356-3927 (Phil). Collecting radio related items.

Drake SPR4 Int'l Club: Rick Sitz, 5210 14th St. W. #11, Bradenton, FL 34207. Worldwide; Drake SPR4 owners.

DX Audio Service (NRC): NRC Publications Center, P.O. Box 164, Mannsville, NY 13661-0164. Worldwide; AM/FM; DXAS Cassette 90-min monthly audio magazine. Sample $3 to above address

DX Club of India: Navin Patel, 809, M.G. Road, 1-Dutt Niwas, Mulund, Bombay-400 080, India. India; SW DXing.

DX Club Paulista: Marcelo Toniolo Dos Anjos, C. Postal 592, Sao Carlos - SP (Brasil), 13560-970. South America. Shortwave, including utilities. Actividade DX (in Portuguese).

European DX Council: Michael Murray, P.O. Box 4, St. Ives, Huntingdon, Cambs PE17 4FE, England. Europe. *Euro DX.*

Finnish DX Association: Mr. Risto Vahakainu, Suomen DX-Liitto, P.O. Box 454, SF-00101 Helsinki, Finland. Finland and worldwide. SW and BCB. *Radiomaailma.*

Friendship DXers Club: Ing. Santiago San Gil Gonzalez, C.DX.A - International, P.O. Box 202, Barinas 5201-a, Estado Barinas, Venezuela. International. DXing all bands. Cadena DX, YV-2-FSW, Sunday 1130-1330 UTC on 7113 and 14113 kHz. Membership free.

Houston Area Scanners & Monitoring Club: 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW.

Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 70223, Riverside, CA 92503. Worldwide; BCB/AM DX. *DX Monitor.*

Long Island Sounds: Ed, 2134 Decker Ave, North Merrick, NY 11566. Public Safety. Net Tues 8pm 147.445. Newsletter.

Longwave Club of America: Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215)945-0543. Worldwide; Longwave only. *The Lowdown.*

New Additions:

Central Florida Listeners Group: David Grubbs, 956 Woodrose Court, Altamonte Springs, FL 32714-1261; (407) 273-5088 Andy Fountain. Central Florida; All bands. Net on 146.73 MHz Sun 8 pm.

Worldwide TV/FM DXers Association (WTFDA): P.O. Box 514, Buffalo, NY 14205-0514. Worldwide membership; TV, FM, NWS.

Looking to Start a Club:

SWLs in Southeast Missouri area—let's get together! Write Scott Cheatham, 510 Yale, Farmington, MO 63640.

SPECIAL EVENT CALENDAR

Date	Location	Club/Contact Person
July 2-4	**St. Petersburg, RUSSIA**	5th Annual Hamvention/St. Petersburg DX Club, Organizing Committee, P.O. Box 376,Russia, 190000, St. Petersburg.
July 10	**Oak Creek, WI**	South Milwaukee ARC Swapfest/P.O. Box 102, South Milwaukee, WI 53172-0102; (414) 764-3235 ext. 58. Location: American Legion Post #434, 9327 S. Shepard Ave.; 7 am to 2 pm, $4 admission. Talk-in on 146.580 simplex.
July 10	**Charleston, SC**	Trident ARC/Scott Chippendale, WB3EFS, c/o TARC, P.O. Box 73, Summerville, SC 29484-0073. Location: Ladson Exchange Park on US-78, 8:30, $5 admission. Talk-in on 147.27/87 repeater.
July 11	**Brewster, NY**	PEARLfest '93/Shirley Dahlgren, N2SKP, P.O. Box 501, Carmel, NY 10512. Location: Brester HS, Foggintown Road, $5 admission. Talk-in on 145.130 MHz.
July 11	**Pittsburgh, PA**	North Hills ARC Hamfest/Don Jackson, N3LAZ, 8 Dale Avenue, Bradford Woods, PA, 15015, 412-935-3343. Location: Northland Public Library, 300 Cumberland Road, 8 am to 3 pm, free admission. Talk-in on 147.09.
July 16-17	**Maplewood, MN**	Electronics Fair '93/North Area Repeater Association P.O. Box 26331, St. Paul, MN 55126, 612-653-9999. Location: Aldrich Arena, 1850 White Bear Avenue, $6 admission, 6pm-10pm Friday, 6am to 3:30 pm Saturday.
July 17-18	**Atlanta, GA**	Southeastern Division Convention/Vern Fowler, W8BLA 4343 Shallford, Suite E-6, Marietta, GA 30062.
July 18	**Washington, MO**	Zero Beaters ARC Hamfest/Ed Southall, WD0ELL, P.O. Box 24, Dutzow, MO 63342; (314) 459-6581 or (314) 239-0060. Location: Bernie H. Hillerman Park (Washington Fairgrounds), 6 am to 3 pm, free admission. Talk-in on 147.240 + repeater.
July 23-25	**Nashville, TN**	Worldwide TV-FM DXers Association Convention/Tob Bryant, K4CDL 849 Todd Preis Drive, Nashville, TN 37221.
July 24	**Manchester, NH**	1993 ARRL New England Convention/New Hampshire ARC P.O. Box 573, Derry, NH 03038.
July 24-26	**Anselmo, NE**	Central Nebraska ARC/Eric Tinkham, KALAJ RR1 Box 155, Sargent, NE 60874.
July 25	**Baltimore, MD**	Maryland Hamfest/Baltimore Radio ATV Society/P.O. Box 5915, Baltimore, MD 21208, 410-467-4634. Location: Timonium Fairgrounds, York Road off I-695, I-83.
July 31-Aug 1	**Jacksonville, FL**	Jacksonville ARC/ARRL Florida State Convention David Phillips, KC4RQF, P.O. Box 9726, Jacksonville, FL 32208. Location: Osborn Convention Center, 9am-5pm Saturday, 9am-3pm Sunday, $6 admission.
Aug 6-8	**Austin, TX**	So Texas Section Convention/Joe Makeever, W5EBJ, 8609 Tallwood Dr., Austin, TX 78759.
Aug 8	**Peotone, IL**	Hamfesters Radio Club,Inc./Robert Truhlar, W9LNQ 1701 W. 101 St., Chicago, IL 60643.
Aug 8	**Frankfort, KY**	Central Kentucky ARRL Hamfest/Bluegrass ARS Bill DeVore, N4DIT, 112 Brigadoon Pkwy, Lexington, KY 40517, 606-257-3343, 606-273-8345. Location: Western Hills HS, Exit 53 off I-64., $6 admission.
Aug 13-15	**Huntsville, AL**	ARRL National Convention/Don Tunstill, WB4HOK 1215 Dale Dr., SE, Huntsville, AL 35801.
Aug 20-22	**Socorro, NM**	National Radio Astronomy Observatory Special Event Station NA5N for the dedication of NRAO's Very Long Baseline Array. Operating on 80,40,20,15 or 10 meters depending on propagation in the lowerportions of the General phone and CW segments. For QSL, send QSL and SASE to NRAO Amateur Radio Club, P.O. Box O, Socorro, NM 87801.
Aug 21-22	**Albuquerque, NM**	Duke City Hamfest/P.O. Box 6552, Albuquerque, NM 87197 Location: New Mexico Army National Guard Armory, 600 Wyoming Blvd., NE. Talk-in on 147.10 MHz.
Aug 21-22	**Vancouver, WA**	Clark County ARC Special Event Station Celebrating the 34th annual fly-in at Evergreen flying field. Operation in lower portion of General phone bands; 40,20,15, with possible operation in the 10 meter Novice band, and 75 meter band at night. For a certificate, send an SASE to: CCARC, P.O. Box 1424, Vancouver, WA 98668. For SWLs, a QSL card or report will do.
Aug 22	**St. Charles, MO**	St. Charles ARC/Eric Koch, NFQ 2805 Westminster, St., Charles, MO 63301.
Aug 28	**Manville, NJ**	Somerset County ARS Hamfest/Ron, N2RPK, 908-685-1191, 6-9 pm, P.O. Box 2, Franklin Park, NJ 08823. Location: Manville Civil Defense Bldg, 60 S. Weiss St., 8 am to 2 pm, $4 admission, free parking. Talk-in on 448.175, 224.88, 146.52 simplex.

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

INDEX OF ADVERTISERS

STOCK EXCHANGE

Ads for Stock Exchange must be received 45 days prior to the publication date. All ads must be paid in advance to *Monitoring Times*. **Ad copy must be typed for legibility.**

Monitoring Times assumes no responsibility for misrepresented merchandise.

NON-COMMERCIAL SUBSCRIBER RATES: $.25 per word - *Subscribers only.* All merchandise must be personal and radio-related.

COMMERCIAL RATES: $1.00 per word. Commercial line ads printed in bold type.

1-3/4" SQUARE DISPLAY AD: $50 per issue. Send camera-ready copy or copy to be typeset. Photo-reduction $5 additional charge. For more information on commercial ads contact Beth Leinbach, 704/389-4007.

PROSCAN FREQUENCY MANAGER. Innovative DOS software. Track 9,999 frequencies. Indispensable for the scanner enthusiast. Fast, easy-to-use. SASE for details. Datafile, Box 20111MT, St. Louis, MO 63123.

"TINY-TENNA" Active Antenna! See "What's New" April 1993, Monitoring Times or SASE for details! DWM Enterprises, 1709 N. West, Dept 103, Jackson, MI 49202.

EARTHQUAKE prediction newsletter using VLF studies, amateur experiments. $1 for sample issue. Geo-Monitor, 65 Washington Street, Santa Clara, CA 95050.

SCANNER FREQUENCY SEARCH SERVICE. Hear all there is to hear! SASE to: Heald, 6886 Jefferson, North Branch, MI 48461.

HOW TO BUY A SHORTWAVE RECEIVER— $6.00 ppd. Complete catalog of Patriot/Right Wing books $1.00. Bohica Concepts, P.O. Box 546-MT, Randle, WA 98377.

SHORTWAVE AND SCANNER Computer Service. ShortWave Paradise—2008 SW 15th Ave., Fort Lauderdale, FL 33315-1871. 6 mo $15, 1 yr $25. Call our Computer system today! (305) 524-1035.

PROPAGANDA BROADCAST TAPES Tokyo Rose, Axis Sally, Lord Haw Haw, others. Authentic, rare recordings of famous broadcasts. Info $1. One Hour Audio Cassette $11.95. Wilson, P.O. Box 37324, Milwaukee, WI 53237.

R-390-A SERVICE: Module repair and alignment to complete remanufacture, new front panels, knob sets, VFO calibration, new filter capacitors, tubes, squelch modification, 20 years expert service, 2-week turnaround, very reasonable, any condition accepted. 419-726-2249.

ICOM R71A (PBT) with EEB HPXF modifications, plus 500 Hz CW filter, FM option, remote, box and manual. Mint ($1290 new) sell for $695. Truitt Rabun, 2029 Sealoft, Hilton Head Isl., SC 29928, (803) 785-4265 weekdays, (803) 363-5059 evenings and weekends.

Are you an SWL? Licensed ham? Have PACKET? Write to me at N0NNI at W0LJF, P.O. Box 22202, Denver, Colorado 80222. Correspondence requested. 73 Rob, N0NNI, SWLer.

R7000 Wanted — W. Clem Small, c/o Monitoring Times or call 406-961-5262.

KENWOOD R-5000 like new with YK88A AM filter. Original box and manual with dust cover. $695. Eves: 201-927-0153.

AOR WEATHER FAX DECODER Model WX1000, bn, $175. John 716-693-5290.

FOR SALE: DRAKE R8 w/spkr MS8, 9 mos old, in perfect cond/original box and owner's manual. $750. Patrick 619-273-6412.

KENWOOD R-5000 with YK88A-1 filter, new condition, with manual, $735. Daytime: 215-657-1191; Eves: 215-789-3938.

AOR 1000XLT near mint, $275. WB9YCJ, 708-690-6330. Serious callers.

ICOM IC-R71 OWNERS: Does your unit have *pass band tuning*? If not, send $10 and an SASE for installation instructions to K. Ross, 6810 7th St. NE, Tacoma, WA 98422.

FOR SALE: MONITORING TIMES mags Jan. 89 to Dec. 92; 4 years complete—$75 includes shipping. First check takes all, others returned. M. Schneider, 1075 Bellevue Way NE, Suite 307, Bellevue, WA 98004.

FOR SALE: Synchronous Detector for 455 kHz IF receivers. Dramatically improves AM: Reduces fading distortion, selectable sideband cuts interference. Kit: $139. Built/Tested: $199. Info: $3. Steve Johnston, P.O. Box 3420, York, PA 17402-0420.

GE SUPERADIO III, custom designed with noise-free SCA, $85. Professional SCA decoder card, excellent tone, $20. Performance guaranteed. (800) 944-0630.

Short Shorts

• "I am writing in regards to 'closing comments' in the April issue. Your cute little parodies struck a nerve. It is obvious that most if not all were fakes. I have not ever written to you for anything and think you are a jerk for saying that you won't respond unless the writer encloses an SASE. How absurd! You charge your subscribers a hefty rate to get your magazine for a year, probably make megabucks off of advertisers, and probably don't pay your writers anything."

Donald Owens, Cleveland, OH

*[And there's more of the same regarding the MT Convention. Sorry, Donald, you couldn't be more wrong, **on every count**. But it's no wonder you've never consulted Bob Grove for advice: anyone who knows that "everything I say is true" already knows it all...ed]*

• Speaking of advice, one puzzled listener is looking for advice from someone in the Toledo, Ohio, area. Azmat Khan used to listen to All India Radio and Pakistan Radio regularly on his R390. Recently he upgraded to a JRC NRD-535, and, unfortunately, sold the R-390. Now he can't receive his favorite stations at all. Mr. Khan uses a longwire and everything seems to be connected correctly. Can anyone in his area provide any insight? If so, he would be happy to accept your call after 4 pm at 419-385-9207.

• Here's another request for help: "I have two 'negative ion generators,' one of which causes a severe static-buzz on my radios no matter where it's plugged in. My directional antennas have no effect, so it's in the AC line. A ferrite RF choke on the ionizer's cord did no good. For three years I've been trying to find out about ionizer interference, especially static voltage buildups with indoor antennas, and no one knows what I'm talking about. I also have a mass of spike and hash filters where my radio equipment is plugged in, and they do no good for this problem. Now comes 'harmonic extra zero crossings on the AC waveform' (April *MT* "Letters")—Good grief! I have a lot of questions for Dick Holbert or anyone who might know something about ionizers!"

Doug Chandler, St. George, Utah

• On the review of the SCA-capable FM radio from FM Atlas in April's issue: "About some 20-30 years ago there was major vendor of electronic equipment with a large mail order operation called Lafayette Radio who produced FM tuners and radios for the general public. One day they started to advertise an FM set under their own name which could produce an audio signal from the then single SCA channel in addition to the main channel. The FCC quickly heard about it and forbid the marketing of the set. This happened so rapidly that I never heard if a single set was sold to the general public. I wonder if it will happen again."

R.L. Ferch, Brick, NJ

• Want to talk about slo-o-o-w mail? The U.S. Postal Office recently returned to Brasstown an issue of *MT* which had been sent to the Space and Astronomy Research Center in Baghdad, Iraq. Here's the interesting part: it was the October 1989 issue (with President Bush on the cover) sent out in January 1990. The reason for the return: "Surface Mail Suspended." In August of 1990, Iraq invaded Kuwait. If that picture of Bush could only talk ...

Have a great month and we'll see you in August for more "Letters," when we hope you'll report in on your favorite monitoring times!

Rachel Baughn
Editor

Closing Comments

Yes, Monitoring Times is a Grove Product

Over the years, we have heard some incredible suspicions generated by the fact that *Monitoring Times* is published by Grove Enterprises, a leading source of radio equipment and publications.

Most recently a disgruntled commercial Stock Exchange advertiser was upset because we wouldn't give him a special discount rate. He went on to say that he had talked to about 500 people who shared his opinion that *MT* was not interested in accepting advertisements because they would be competitive with Grove's own products.

It may seem hard to believe, but *MT* is NOT advertiser-supported! We depend upon our rapidly-growing subscriber list for our survival. That's what makes us so unique; when you read a review in the pages of *MT*, it is objective. The pros and cons of reviewed products are discussed objectively, even if it might cost us an advertiser. Yes, that's even true of Grove products!

A quick glance at the pages of *MT* compared with those of other commercial hobby magazines will reveal the difference in our advertising-to-text ratio. Grove ads, incidentally, occupied only slightly more than 4-1/8 pages out of 112 in last month's issue.

While the complainer's contention is untrue, it did cause me to take a look at other *MT* advertisers. In the first dozen or so pages, there were more than 30 competitive products identical to those sold by Grove in *MT* ads as well as the Grove Buyer's Guide. Some prices were higher, some lower.

It didn't take long to tell that some advertisers play games, advertising products they don't have; showing low prices, but charging high shipping and handling fees; changing model numbers slightly which makes it appear that they are more recent revisions; labelling products "new" that have been available for years; and so on. Misleading, but not illegal.

While buyers do shop around for price, that isn't the only consideration; reputation and service play a large role in the final choice of their suppliers.

While many products reviewed in *MT* are carried in the Grove catalog, this is not promotional "hype"; the decision of whether or not to carry a product comes after it is reviewed. If we decide to carry it, we may add the Grove price to the review so our readers can compare it with other *MT* advertisers.

Does *MT* invite advertisers? You bet! Our low prices are an incentive to mail order companies. We strongly believe in good ol' American competition—it is vital to our economy, it's the only way to be fair to our readers, and it keeps us on our toes!

And if a product proves not to be as advertised or is unlawful, we drop the advertiser and may issue a caveat to our readers.

MT has earned its reputation for editorial objectivity, balance of content, timely reporting, accuracy and fair play. Do we make mistakes? Yes. Do we admit to and correct them? Absolutely.

Yes, *MT* is a Grove product—perhaps our most successful product—and we are proud of it!

Bob Grove
Publisher

JRC NRD-535D

"Best Communications Receiver"

World Radio TV Handbook 1992

"Unsurpassed DX Performance"

Passport to World Band Radio 1992

Setting the industry standard once again for shortwave receivers, the NRD-535D is the most advanced HF communications receiver ever designed for the serious DXer and shortwave listener. Its unparalleled performance in all modes makes it the ultimate receiver for diversified monitoring applications.

Designed for DXers by DXers! The NRD-535D (shown above with optional NVA-319 speaker) strikes the perfect balance between form and function with its professional-grade design and critically acclaimed ergonomics. The NRD-535D is the recipient of the prestigious World Radio TV Handbook Industry Award for "Best Communications Receiver."

- Phase-lock ECSS system for selectable-sideband AM reception.
- Maximum IF bandwidth flexibility! The Variable Bandwidth Control (BWC) adjusts the wide and intermediate IF filter bandwidths from 5.5 to 2.0 kHz and 2.0 to 0.5 kHz—continuously.
- Stock fixed-width IF filters include a 5.5 kHz (wide), a 2.0 kHz (intermediate), and a 1.0 kHz (narrow). Optional JRC filters include 2.4 kHz, 300 Hz, and 500 Hz crystal type.
- All mode 100 kHz – 30 MHz coverage. Tuning accuracy to 1 Hz, using JRC's advanced Direct Digital Synthesis (DDS) PLL system and a high-precision magnetic rotary encoder. The tuning is so smooth you will swear it's analog! An optional high-stability crystal oscillator kit is also available for ±0.5 ppm stability.
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- Memory capacity of 200 channels, each storing frequency, mode, filter, AGC and ATT settings. Scan and sweep functions built in. All memory channels are tunable, making "MEM to VFO" switching unnecessary.
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JRC *Japan Radio Co., Ltd.*

Japan Radio Company, Ltd., New York Branch Office – 430 Park Avenue (2nd Floor), New York, NY 10022, USA Tel: (212) 355-1180 / Fax: (212) 319-5227

Japan Radio Company, Ltd. – Akasaka Twin Tower (Main), 17-22, Akasaka 2-chome, Minato-ku, Tokyo 107, JAPAN Tel: (03) 3584-8836 / Fax: (03) 3584-8878

Actual size

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GROVE

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Grove Systems BBS: 1-704-837-7081
(from 6:30pm-8am EST M-F and 24 hours/day on weekends, 9600 and above).
1-704-837-9200 and 1-704-837-5957
(from 6:30pm-8am EST M-F and 24 hours/day on weekends, 2400 and below).