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The Full-Spectrum Radio Magazine

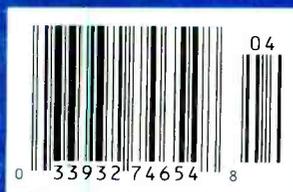
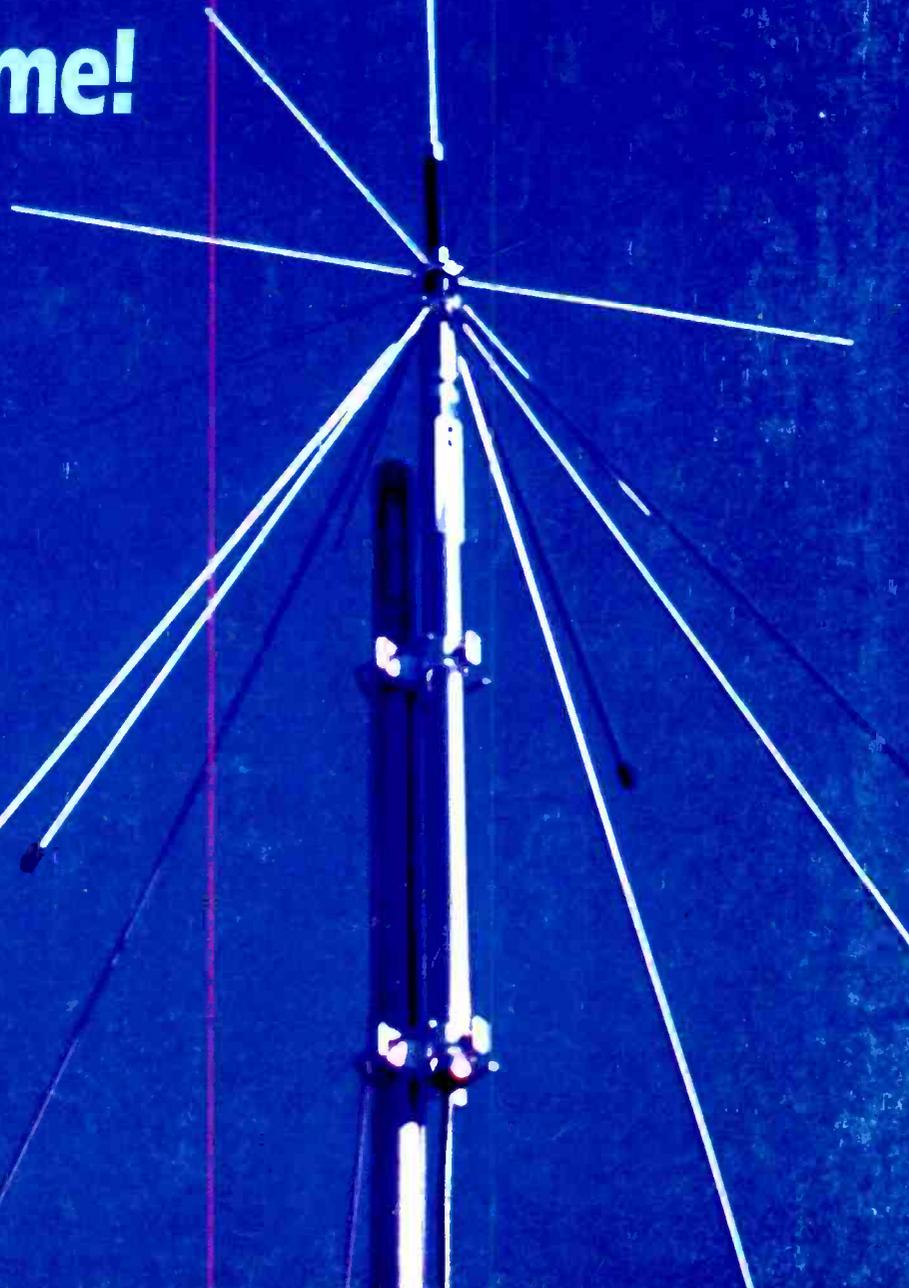
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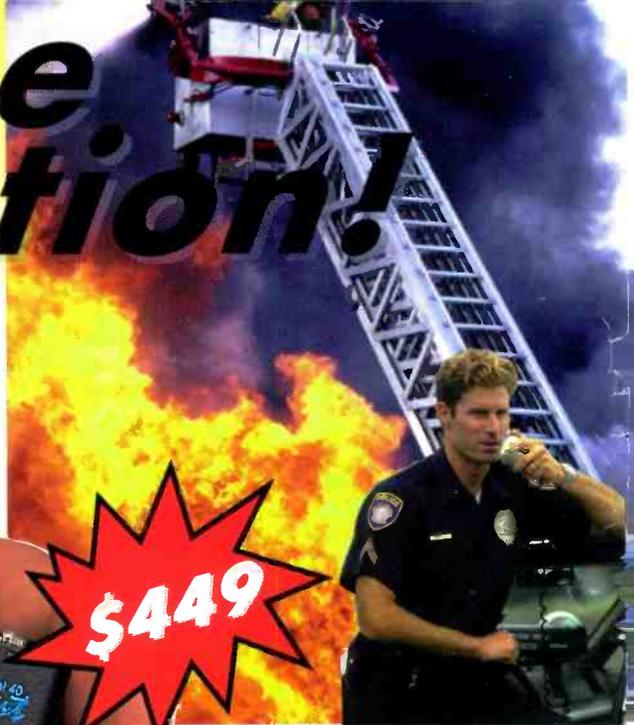
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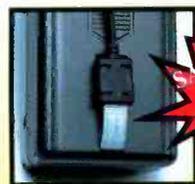
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All-Antenna Issue Lead Story

The Willenweber — War Prize on the Coast of Maine

By Bob Leightner

On the rocky coast of Maine, a huge skeletal structure looms behind the customary, picturesque lighthouse. Dubbed “The Dinosaur Cage” by the locals, the history and function of this singular antenna are as mysterious as its presence here. The folks at the Naval Security Group in Corea don’t talk much: their business is listening. Leightner, a part-time resident of Corea, shares as much of the story as he could discover, beginning on page 9.

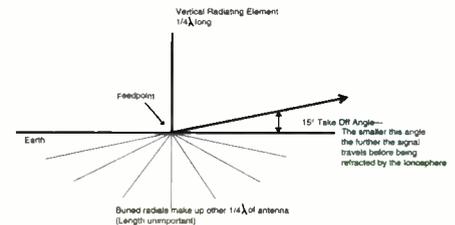
The discone antenna on our cover was photographed by John Bailey.

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Vertical Antennas for SW Listening 12

By Rich Arland

If you’re a ham, chances are you already use a vertical antenna. Convention says, however, that vertical antennas perform poorly for short-wave listening on the broadcast bands because they also pick up vertically-polarized noise. Arland (never one to listen to convention) decides to try it anyway.



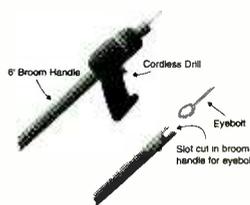
Magic Wand Portable Antenna 15

By Jacques d’Avignon

If you’re looking for a convenient, portable antenna which will tune from LF to about 25 MHz, try your own variation on this Magic Wand (otherwise known as the modified tomato stake antenna)!

Operation Skyhook 16

By Arthur R. Lee



Where there’s a will there’s a way. Here’s how one family, hoping to achieve an unobtrusive installation of a dipole antenna in a new housing development, overcame a series of physical challenges.

Compact, Efficient Antennas 20

By Peter L. Barker

From the “bottom of the propagation pit,” the author addresses how to come up with a longer antenna for the lower frequencies without increasing your real estate. He meets the challenge with coils—easily crafted from materials on hand.

Improved VHF/UHF TV & FM Reception 24

By Ken Reitz

Over the air television reception is back! Whether you want to supplement your cable or satellite system with local channels, or whether TV/FM DXing is your gig, there’s a lot you can do to pull in the signals.



DEPARTMENTS

Reviews:

Even Larry Magne can't quite bring himself to say the words, "world's best receiver." It comes out "arguably the best receiver on the market regardless of price" (p.99), but from Magne that is very high praise. The big question is, will the AR7030 be available in the U.S. market?

Bob Parnass runs the BC220XLT (same as 230XLT) through its paces on p.100, and finds that a product based on the solid BC200XLT has kept its good reputation.

Visitors wonder what that weird sculpture in Ed Muro's bedroom is supposed to be. It's the British SkyScan Desk 1300 antenna, and to Ed, it's a thing of beauty. See p. 96.

Check out Computers & Radio (p.90) for another moderately-priced ACARS decoding program—this one's from AEA.



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Antennamania

Antennas are such a critical part of any monitoring post, that it's no surprise to find at least three departments addressing the subject in almost every issue. When it became apparent, however, that I had accumulated a variety of antenna features as well, it seemed time for our favorite springtime topic: an issue dedicated to antennas!

The articles don't begin to be comprehensive, of course—how could they be? And I still have unpublished features on peripheral issues such as grounding and lightning protection that we'll be running this summer.

Also taking place this summer are, of course, the Olympics and on-going political campaigns. We'll be publishing features on how to monitor them—thanks to avid listeners who know the key to success is being prepared beforehand, and who are willing to share their frequencies and techniques for you to customize to your area.

Now on to your letters ...

MT to the Rescue

On January 3, 1996, a small private plane (Cessna 182) carrying three missionaries on a flight from San Pedro Sula, Honduras, to Trujillo, Honduras, crashed into Calentura Peak about 15 miles west of its intended destination. Near zero visibility and gusty conditions made rescue flights into the area impossible until two days later.

Local pilots first picked up ELT beacon signals in the rugged, mountainous terrain on January 5. Hearing the action on my scanner from my home in Honduras, I dug into back issues of *Monitoring Times* and found an article on ELT direction finding in the December 1990 issue. This was faxed to a group of local pilots who were later assisted by the Honduran Air Force and two U.S. Army "Blackhawk" helicopters in the search. The following day wreckage was spotted and U.S. military personnel recovered three lifeless bodies. Severe weather is believed to be the fatal factor in the crash.

The following frequencies carried the above action:

121.500	ELT
118.500	La Ceiba Airport tower
121.900	La Ceiba ground control
118.100	Loatan Island tower
123.450	US Army helicopters
282.800	US Army helicopters
152.240	Islena Airlines of Honduras

Tom Hines, La Ceiba, Honduras

MT Readers to the Rescue: A Plea for Public Access

I am writing for assistance in a matter concerning the ability to monitor public safety communications. I was thinking about getting a new radio for my grandmother to listen to instead of TV all the time. That is when I discovered all of King County (WA) and various city agencies will be switching over to an 800 MHz trunked radio system from Motorola in early 1996. To the best of my knowledge, the public will not be able to monitor these communications with existing equipment. I feel that this will be a loss not only to the scanner hobbyist but to the public as a whole.

The city of Seattle has implemented a media access plan, where the media can obtain radios from Motorola at the city's cost. Several tactical channels will not be available for obvious reasons. The radios will also be programmed for non-transmit, receiver only.

What is needed is a public access plan like the media's. Your magazine can encourage people to write and call into the various agencies demanding the public be granted access like the media, (at a discount, because of folks on fixed income). A successful compromise in Seattle could set a precedent and serve as a model.

With your readership, more people can be alerted to the major changes coming up and help change policy. I fear that too many people don't know what is about to happen, and once something is set down on paper, it would be difficult to change.

David Doll, Seattle, WA

(Send SASE to *MT* Editor for name, address, and phone number of local officials, compiled by David Doll, if you are interested in lobbying for a public access compromise.)

Reflections on Sony Walkman Models

In reading the somewhat glowing review of the Sony SRF-42 by Karl Zuk in the Jan issue, I was wondering if I had purchased the same radio back in July of 1994. Sure enough, the model numbers are identical.

The first radio of mine was very microphonic—not a good trait for one which comes with a belt clip for portable use. Tapping the case lightly would cause microphonics in the AM stereo mode. After "repair" the problem was still there.

The replacement radio is also somewhat microphonic but not nearly as bad as the

original. Again, only AM stereo is affected; mono AM & FM stereo are fine. ... I was surprised to note no mention of my problems, as it appears to be a somewhat common one.

By the way, a fix for the problem consists of placing a piece of foam rubber between the function switch and the tuning capacitor, which will press against the circuit board when the back of the case is installed.

John Ebeling, Bloomington, MN

The January review hit close to one of my favorite little receivers. Several years ago when the PLL portable radios came out, I bought a Sony SRF-M40W Walkman. This model is AM mono/FM stereo with push button tuning in a shirt-pocket size. I have used it mainly for AM band listening when traveling.

The big surprise was this little radio's selectivity. The adjacent channel rejection left little to be desired. Therefore I was later disappointed when I invested in a bigger Sony CFS-W504 AC powered PLL set for my bedroom for late-night listening. The AM band selectivity of this receiver was definitely inferior.

I have not arrived at the ultimate bedside PLL AC radio at home. I hesitate to buy another without knowing something about it in advance.

I've had AM stereo on my last two car radios and agree about the effects of sky-wave phase shifts. I've heard mono speech sound like stereo during shifts.

Les Cobb W6TEE via email

Quickies

In my view you have the Watkins-Johnson of hobby magazines. Your staff ... is a very good team, unbeatable.

John T. Wagner

This is a first for me to write a publisher of a magazine. I have read and subscribed to many magazines, but have never been impressed with one like I am with yours. I am a beginner in SWL and have been searching for a magazine that could help me understand and learn more about my exciting new hobby. I have never read every article in a magazine from cover to cover before.

Jack Fox via email

Ref photo, p 112, Feb issue, tail no of B-52

Reader Duke Rumley was sharp to pick up the 'MT' on the tail number of the B-52 parked at Seymour Johnson.

(Continued on Page 104)

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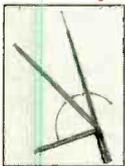


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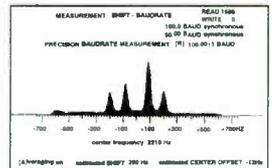
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Gass Case Overturned

The Federal Government, Oklahoma authorities, and Motorola were dealt a blow in February when Federal Judge H. Dale Cook agreed with defense attorneys in the case of Larry Gass and acquitted him of all criminal charges. Gass was convicted last year for programming trunked radios and selling them to various news organizations in Tulsa (see *Monitoring Times* November 1995).

Gass' attorneys, James Lang and Steven Stidham, argued among other things that the conviction was improper, given the language contained in Chapter 119 of Title 18 which specifically authorized the reception of police radio communications. The government in bringing the case has fought for a narrow reading of the law that would have produced conflicts between two statutes and which went against the three other previously decided cases which have dealt with the issue.

The Court, agreeing with Gass and his attorneys, said, "The government's reading of 605(a) contradicts the express language of Chapter 119. If this Court were to give effect to the government's argument, then the governmental radio interception exemption contained in Chapter 119 makes no sense; a person would be permitted under Chapter 119 to intercept police radio transmissions only to be subject to criminal prosecution under 605."

One matter which the Court did not address was whether the trunked radio communications fall under those communications considered "readily accessible to the public."

A decision whether to appeal Judge Cook's ruling will be made by the Appellate Division of the Department of Justice. Immediately unaffected by his ruling is a separate civil lawsuit brought against Larry Gass by Motorola last December. (by Jorge Rodriguez)

Black Jack's Message

It's one of those stories that endears CBers to virtually no one. Black Jack, a Milwaukee 27 MHz operator, is bleeding through all of his neighbors' appliances. That part of the story is all too common. But according to newspaper reports, Black Jack uses this situation to intentionally torment the neighbors.

"Come suck the mud from between my toes," invites Mr. Jack on the CB (and cordless phone, and stereo, and television). Neighbors say that he curses, tells people he's armed, and frightens children. Beverly Echols, who lives nearby, says that her two children run from the room in horror when Black Jack's



voice comes through the TV. They think he's a ghost.

City Councilman Frederick Gordon says that he's "done just about everything [I] can do. I've been cursed out by him and the landlord."

The battle isn't over yet, though. In an innovative approach to resolving the year-long dispute, the city of Milwaukee is planning to declare Black Jack's home a nuisance. That way they can fine his landlord. It is then hoped that the landlord, tiring of the financial burden, will evict the rascal.

Of course, there are always two sides to any story. A reporter who called the Black Jack home was told by the CBer that he doesn't mean any harm and only uses the CB late at night when everyone has gone to bed. "I'm just a poor man paying taxes and going out to work every day in the cold." A pussycat... with mud between his toes.

Teen Corner

It was typical police radio traffic. Burglaries in progress. Domestic disputes. Fender-benders. Then it began. Teen-age voices. Voices that shouted obscenities, called the police "pigs" and imitated officers as they responded to calls. It didn't take officials in Tampa, Florida, long to realize that a police radio had been stolen.

"They were calling us pigs," said Deputy Tom Allen. "They were cursing us and saying, 'Why don't you come find us?'"

Admitting that the communications could not be traced, police endured the barrage of X-rated abuse for eight hours. Soon, though, a pattern emerged. Allen noticed that the teens kept making references to a certain area of town. Then they heard them mention the address 8306.

When police knocked on the door of 8306 June Street, they knew they had hit paydirt. The woman who answered the door said that yes, the voice on the radio sounded like her son. Allen asked the woman to call him when the son returned home.

The woman never called but the radio interruptions stopped. When police later returned to the house, one teen confessed. He and a friend were charged with interception of electronic communications, a third-degree felony. Police were unable to recover the radio. The teens said that it had been stolen from them a day earlier.

Radio Operators Stop Three

The *Kansas City Star* reports that two ham radio operators, Zachary Canright and Beryl Masters, used their radios to assist police in apprehending three burglars. Canright became alarmed when he saw the three running down the street with a shopping cart piled high with boxes.

When the group piled into a pick-up truck with no license plates, Canright tailed them to a Wal-Mart store where they stopped to put the plates back on. He then used his radio to call Masters who telephoned Overland Park police. The trio were arrested and charged with felony theft.

A Kinder, Gentler, FCC

It was a first-rate operation. Strong, high-quality stereo pounded the dial at 91.9. Technically, there was nothing wrong with the station, except that it didn't have a license. That, and the fact that the programming was "lewd." Complaints led to an FCC investigation.



The case was put onto the back burner for a while but eventually FCC field engineer Jud Mansbach hopped into the FCC's radio direction-finding van and headed for Woodside, Queens. Fifteen minutes later he was in front of "Nasty Radio's" studios, a five-story apartment building sporting a tell-tale dipole on a long mast.

Lee Harris of *Radio World* continues the story. "Mansbach, who was taping the station in his van, decided that this would be an opportune time to call the request line number the jocks were giving out. Next thing he knew, he was on the air. Without identifying his official status, the engineer inquired as to whether the pirates knew that what they were doing was illegal. The announcers allowed that it might be, but as they explained it to their caller, the FCC doesn't really care. Mansbach thanked the pirates for setting him straight and hung up."

When he got back to the office, Mansbach fired off a cease and desist order. The station went silent shortly thereafter and hasn't been back on the air since.

"It's no use fining guys like these, because they usually can't pay," says Mansbach. Nasty Radio has posted a few notes on the Internet asking for help returning to the air. Their e-mail address is wjqrrep@aol.com.

Watch Your Mouth

A Dallas school board member who was taped using a variety of obscenities and racial slurs on his cordless phone is now working with the FBI "to find out who did [the taping]—not for any vindication of myself but for all citizens."

Dan Peavy, a 48-year-old businessman used the obscenities and slurs to describe school administrators, students, and teachers. Someone taped the conversations, spliced them together, and mailed copies anonymously to other members of the school board. Peavy resigned his post, apologized, and vowed to make "drastic changes" in his own life. The FBI is now involved in the case, investigating the source of the apparent illegal wiretap.

Even the Best

"Yeah, I've got a little egg on my face," says Robert Hobbs, commander of the county narcotics task force in Beaumont, Texas. Hobbs agreed to spend \$3,250 for a Quadro Tracker, a small hand-held device that the manufacturer said could detect drugs, guns, and explosives. The pocket-sized box with retractable antenna was sold as a technologi-

cal marvel whose claims eventually attracted the attention of the National Institute of Justice. There, investigators opened the box to find "only plastic and air."



Hobbs wasn't the only one fooled. According to investigators, at least a thousand were sold, along with seminars and separate plug-in modules said to uncover cocaine, marijuana, gunpowder, and currency.

The manufacturer of the device says that it matches the molecular emissions of the substance being sought (say marijuana) to the molecular emissions locator card or "chip" inside the device.

When something is detected, the antenna is supposed to point in the direction of the substance. When investigators at the U.S. Energy Department's Scandia National Laboratories pried open one of the Tracker's chips, they found a plastic-coated piece of paper. The only thing on it was pyruvic acid, commonly found in human sweat.

No Worthy Radio

The *World Radio TV Handbook* has announced that because there were so few new radios on the market last year, "we decided not to give awards in the table-top and por-

table classes." Instead the 1995 kudo was given for "innovation" and awarded to the manufacturer of a \$40 portable.

What makes a \$40 radio worthy of an annual award? It's powered by a wind-up generator. "We've been impressed by the enthusiasm and sheer courage displayed by inventor Trevor Baylis for trying to bring the idea on the market," says *WRTH* spokesman Andrew Sennitt. The BayGen Clockwork Radio is manufactured by Baylis' Baygen Power Company in South Africa.

Scholarships Available

Ham radio operators are eligible for one of 57 scholarships being awarded by the Foundation for Amateur Radio. You may compete for the awards if you plan to pursue a full-time course of study beyond high school and are enrolled in or have been accepted for enrollment at an accredited university, college, or technical school. The scholarships range from \$500 to \$2,000. For additional information write FAR Scholarships, 6903 Rhode Island Ave., College Park, MD 20740.

"Communications" is written by Larry Miller with help from Rachel Baughn and the following readers who are members of the National Scanning Communications Monitoring Team: Dave Alpert, New York, NY; Harry Baughn, Brasstown, NC; Kurt Bramstadt, CA; Peter Breggits, Bremerton, WA; Robert Coburn, Londonderry, NH; Larry Fowler, Falmouth, MA; Kevin John Klein, Appleton, WI; Lewis Miller, Reading, PA; Gary Mishler, Ankeny, IA; Jorge Rodriguez, Ocala, FL; Richard Sklar, Seattle, WA; Andy Sennitt; Alan Stoddart, Brooklyn, NY; Daryll Symington, Holland, OH; Walter Szczepaniak, Philadelphia, PA; James Tunnell, CA; John Wolf, Denver, CO, and Alan in New York. We also consulted the following publications and organizations and list their names in appreciation: Associated Press, *National Scanning*, *Radio World* and *WSYI Report*.

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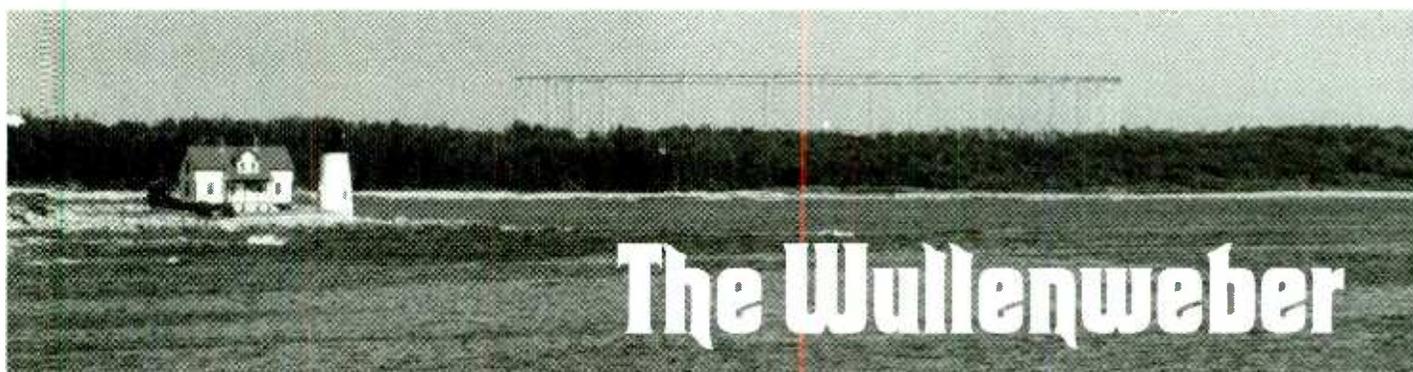


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The Wullenweber—known variously as the “dinosaur cage” or “elephant pen”—has a silhouette which is unmistakable. The Navy built 14 of them around the world.



War Prize on the Coast of Maine

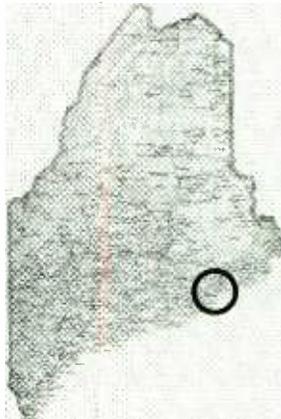
By Bob Leightner N1TDH

On a remote peninsula in Maine, jutting out into that part of the Atlantic coast known as Down East, is a structure which resembles a cage built for dinosaurs. Its strange presence in this unlikely location begs for an explanation of what it is and why it's there. The easy explanation is: the structure is a radio antenna, the work of the U.S. Navy. If you wish to know much beyond that, you're probably out of luck.

The Navy's radio activity on the rocky coast of Maine goes back to a Mr. Alessandro Fabbri and the station NBD on Otter Cliffs, Mount Desert Island. (Contrary to its name, the land is anything but arid in this foggy place.)

The wealthy Mr. Fabbri offered his personal radio station to the government in 1917 in anticipation of gaining a Naval commission. In its early years of use the station became known for its phenomenal radio receiving range. NBD, under Navy operation and Lieutenant Fabbri's direction, grew steadily.

During the course of World War One NBD proved invaluable to the conflict. In these early years of radio the station employed Picard directional loops—90 feet high, called Radio Compasses; barrage re-



The dinosaur cage referred to by the author is adjacent to Acadia National Park on the rugged coast of Maine.

ceiver antennas—over two miles of insulated wire strung through the woods; and rhombic arrays of 600 to 700 feet in each leg. Some of this was designed by Dr. H.H. Beverage, a well-known name today in antenna design.

Many stories can be told of the station operation—the tracking of Kronprinzessin Cecilie's run from French and British warships, the communication of the French munitions ship *Mont Blanc* with 3000 tons of TNT and which was rammed in Halifax harbor, the “Tape Worm” capability to read code at 900 wpm, SOS's from stricken ships—all happenings in these early years.

The first West-East transatlantic aircraft flight was in continuous communication with NBD. The Radio Compass facility prevented the British cruiser *Raleigh*

from running head on into Egg Rock in a dense fog. Even the British dirigible, R-34, in distress over the Atlantic, was aided by this exceptional radio station.

Shortly after the first great war, Fabbri was awarded the Naval Cross for the most dependable and relied-upon communications center then in existence.

At the beginning of 1942 Germany had 91 submarines, 22 of them in the Atlantic. There were 87 Allied merchant ships lost in the first six months of that year from submarine attacks, against which the U.S. had no defense. Since Wolfpack operations required the German subs to transmit back to their naval headquarters frequently, a major importance was placed on our maritime radio listening and direction finding capabilities. With an operational code name of Huff Duff, the directional receivers on the coast of Maine were focused on the underwater war; this, and the development of sonar, turned the tide.

At war's end, Germany had built ten rubber-covered "Schwartz Pantzer" U-boats, but this came too late. When the German U-boat fleet surrendered, despite the loss of 489 to depth charges alone, 377 boats were still in the Atlantic. One can imagine the volume of German naval messages that had been intercepted by our listening station.

■ Booty from Overseas

Among the many prizes our armies gathered up and brought back to this country after the Second World War was a German direction-finding antenna, the Wullenweber. When reassembled and evaluated, it proved to be more sensitive, more accurate in bearings, and more flexible in ranging on many signals simultaneously than ours. Immediately the antenna was "reverse engineered" under the direction of the National Security Agency, and an engineering development unit was built at the University of Wisconsin. U.S. engineers and program managers were sent to Germany to learn from the original designers and operators.

Who was Wullenweber and exactly where did the antenna come from? We are not sure. All leads point to the Hamburg region. One of the persons who was responsible for gathering technical information and evaluating the design over here said that there was no Herr



Photo by Bob Langtner

The dinosaur cage near Corea, Maine is a set of concentric receiving rings over 200 feet in height with a total diameter of 1300 feet. It operates from the very low VLF frequencies up to the VHF bands.



Wullenweber, and that the Germans assigned it that code name from the escaped fiber warps that floated ankle deep in the old woolen mills, akin to the signals heard from the antenna.

However, we have located an Ernst Wullenweber who believes his great uncle could be the designer, as he had a radio laboratory in Hamburg at about the right period in time. All this may never be known for certain. Most of those associated with the original invention are likely deceased.

The Navy purchased 707 acres near the little fishing village of Corea, Maine, and a Wullenweber was constructed there with support buildings and facilities. The antenna—known as the Dinosaur Cage by the local population—is a set of concentric receiving rings over 200 feet in height with a total diameter of 1300 feet. It operates from the very low VLF frequencies up to the VHF bands.

A total of 14 identical antennas were eventually built in strategic Naval locations worldwide.

When the first U.S. Navy sub—the *USS Skate*—surfaced at the North Pole in March 1959, Wullenweber radiomen, from their windowless control building, answered its call. Interception of land station traffic "across the pond" is routine for this sensitive listening device. Today we continuously monitor guarded frequencies with ultra-electronic and computer sophistication.

The mission of the Naval Security Group Activity here is a round-the-clock operation

of listening and direction-finding for security, navigational aid, and air sea rescue. Two net-linked ocean surveillance systems operate around the world: "Crosshair" and "Classic Wizard." Other capabilities associated with this task are cryptanalysis and "Tina" radio fingerprinting, in which coded messages are deciphered and radio signals are identified as to their exact transmitter source.

World War II was probably the heyday of the Naval Security effort with some 35 stations, each manned by 300 to 400 servicemen and women. All these personnel take an oath of secrecy. In addition, Public Law 37 makes it a federal crime to disclose any information obtain by cryptanalysis. Together, these restrictions make it difficult to discover the whole story so that it can be told.

The Naval Security operators, known as CTs (crypto techs) are eligible to join the NACV (US Naval Cryptologic Veterans Association) in Rockville, Maryland. Both active and retired CTs who hold an amateur radio license regularly communicate on their FRU Pac Net, which has been in operation since 1973. FRU Pac is short for Fleet Radio Unit Pacific where the group originally started. Table One is a listing of their operating schedule.

Some very interesting reading material is to be found in these books—if you can find them:

- *The Fabulous Radio NBD* by Brandon Wentworth
- *The American Black Chamber* by Herbert Yardley
- *The Ultra Secret* by Frank Winterbolham
- *Hut 6 Story* by Welchman
- *An Informal History of Mt. Desert Island* by Sargent Collier
- *War Secrets in the Ether* by Wilhelm F. Flicke (which is published by Agean Park Press and tells the story of successes on the German side)

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Vertical Antennas no longer Taboo for Shortwave Listening

By Rich Arland, K7YHA

Although quite popular on the ham bands, vertical antennas have not been widely accepted in shortwave listening circles. However, having acquired two Butternut vertical antennas for use on the HF ham bands, I decided to test their performance on the shortwave broadcast bands.

Vertical antennas are handy when space is limited. Or, used with a horizontal antenna (or two), a vertical will offer polarization diversity which will enhance the overall antenna system versatility.

■ The Vertical in Theory

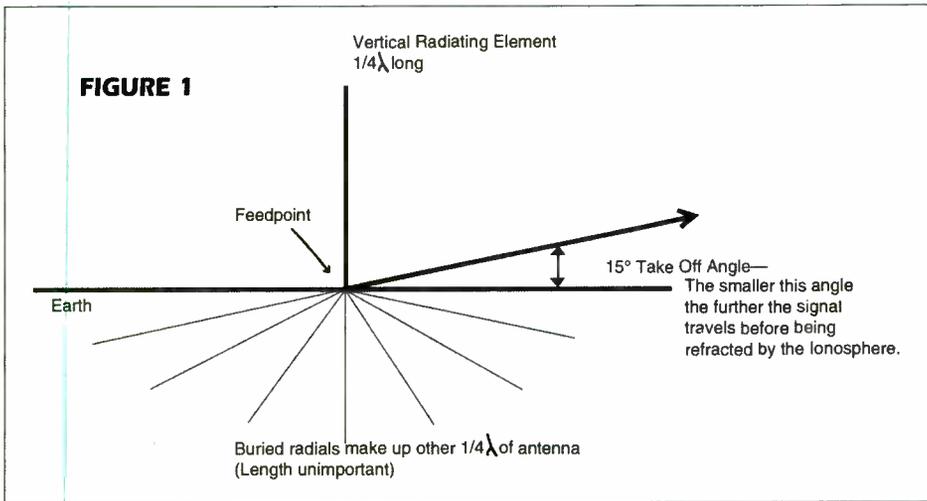
A brief review of quarter-wave vertical antenna characteristics is in order. The vertical portion of the antenna represents one half of a half-wave dipole radiating system. In this case, the dipole is stuck on-end, reaching skyward. The other half is made up of the RF ground currents collected by a network of wires called radials or RF counterpoise (see Fig. 1). Radials may be buried or suspended above ground. In either instance, their primary objective is to capture near-field RF currents and “make up” the other half of the dipole radiating system.

Because the ground is normally a poor conductor (unless you live in a swamp), the more radials that are laid out, the greater the RF currents collected and the more efficiently the vertical antenna performs. Many radio operators buy a vertical antenna and fail to install a proper radial/counterpoise system, and wonder why performance suffers. It’s a fact of physics. In order for the vertical antenna to perform as advertised, it must work against a properly installed RF counterpoise system (despite what some antenna manufacturers claim).

When transmitting with a vertical antenna, the RF wave leaves the antenna at an extremely low angle in relation to the horizon causing the signal to “hug” the curvature of the Earth. This is one of the greatest features of a quarter-wave vertical antenna. The low angle of radiation (expressed as “take off angle”) means the antenna works great on DX stations. The lower the take off angle the further out the RF wave travels before it is refracted by the ionosphere. This means that the skip distance becomes longer as the take off angle decreases.

Ostensibly, vertical antennas are omnidirectional in nature, unless two or more are phased using a complicated mass of tuned coaxial feedlines. Vertical antennas also fare well in wind and ice storms, not to mention the reduction in rain static. In addition, the vertical takes up very little space and can be positioned to reduce the visual impact by those radio operators who must maintain a low profile due to restrictive housing covenants, nosy neighbors, or a spouse who doesn’t appreciate the radio hobby.

There is no reason to believe that the same characteristics exhibited in transmitting on the ham bands won’t hold true for general receiving purposes on the shortwave bands. The one characteristic of vertical antennas which may affect their use for receiving is their susceptibility to noise. It seems that verticals tend to be more sensitive to man-made and atmospheric noise

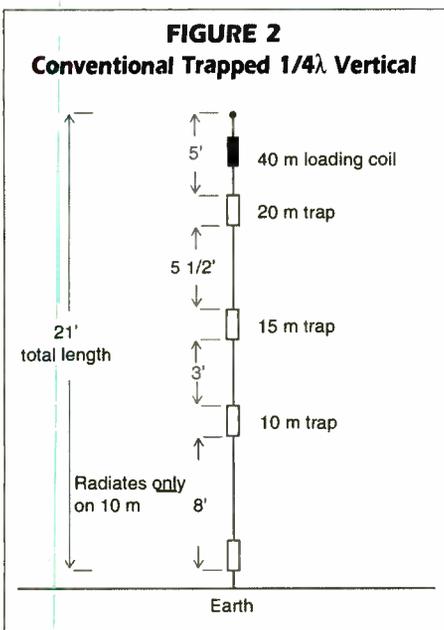


than their horizontal counterparts. (See *DeMaw's column in this issue.*) However, as we'll see a little later, "taint necessarily so."

■ The Vertical in Action

The verticals that I own are the Butternut HF-2V (a thirty-two foot tall antenna covering 80 and 40 meters) and the HF-6V (a twenty-six foot long antenna covering 80-10 meters). They are produced by Butternut Electronics². Both antennas are popular among amateur radio operators because they use L/C (loading coil) resonant circuits in place of the conventional traps found on most other commercial vertical antennas.

The use of L/C resonant circuits insures adjustable resonance over a wide range of frequencies. Conventional quarter-wave vertical antennas use traps as a kind of RF choke to restrict RF currents flowing in the upper portions of the antenna. This means that a conventional quarter-wave vertical operating on 10 meters (28 MHz) has only an eight foot



active element (see Fig.2)! By comparison, the HF-6V employs all of its 26 feet as an active element on 10 meters! (See Fig. 3 on next page.)The only band where a conventional trapped vertical will have comparable radiating performance with the HF-6V is on 40 meters, where both antennas use approximately 21 to 26 feet of vertical radiating element length.

Below 40 meters things get interesting. Trapped verticals traditionally use a massive top loading coil, which is one method of obtaining low frequency performance from

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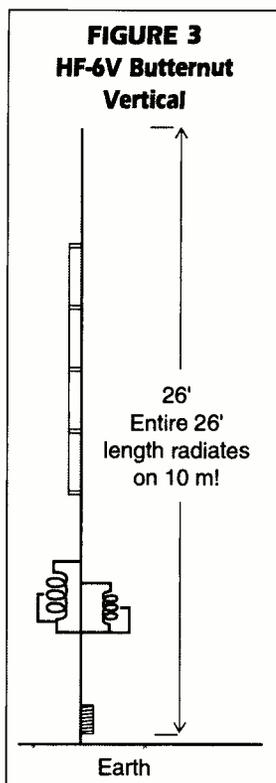
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an electrically short vertical radiator. The 32 foot tall HF-2V, on the other hand, uses an L/C circuit to simulate the missing 30-odd feet of vertical element on 80 meters. This method is much more efficient than conventional loading coils and almost doubles the available bandwidth on the low bands. (Note: bandwidth of any vertical antenna is a combination of efficiency, radiation resistance, and mounting. Using a good radial/counterpoise system and properly feeding the vertical antenna will increase antenna efficiency.)

Having used the HF-6V on the ham bands for several years, I can attest to its superior performance over trapped quarter-wave verticals. I chose the HF-2V for my tests on the shortwave bands because of its extra length: the HF-2V was a low band antenna by design and should work well on the 60 and 90 meter shortwave bands.

The HF-2V was ground mounted in my yard according to Butternut instructions. Sixteen short radials (approximately 15 feet long) were buried and bonded to the base of the vertical. RG-8X coaxial feedline was run underground from the antenna feedpoint into the shack. The antenna was used on the 80/40 meter ham bands prior to the shortwave tests, to insure that the system was functioning properly. A Palomar noise bridge was used to tune the antenna to the middle of the 80 meter CW segment (approximately 3560 kHz). Bandwidth on 40 meters was almost flat from 7.0 to 7.2 MHz.

My test receiver was an ICOM R-70. The reference horizontal wire antenna was the Ant Farm Skyraider (a 51-foot end-fed sloper, with a vertical matching section as part of the feedline). The Skyraider was erected with the feedpoint about 30 feet off the ground with the far end about eight feet high (hence the sloper configuration). This wire antenna works well on the amateur and shortwave bands, so performance was predictable. A Grove TUN-3 antenna tuner was placed in the feedline, ahead of the receiver antenna input, and used to provide impedance matching on both antennas during the tests. A coaxial switch was used to flip between the two antennas during tests.

■ The Results:

I entered the experiment with a few preconceived ideas. But, after evaluating the data, I encountered a few surprises. Tests were conducted over a two month period using various segments of the international shortwave bands. Below 7 MHz the vertical really performed! Most of the time the HF-2V delivered signal strengths at least two S-units higher than the horizontal wire antenna. On several occasions, the difference was as much as 10dB (slightly over 2-1/2 S-units)! Without exception, the horizontal antenna exhibited more noise pickup below 5 MHz than the HF-2V. This was entirely unexpected. The reduced noise encountered when using the HF-2V below 5 MHz was very helpful in DXing the low power Indonesian regionals.

On frequencies above 7 MHz, receive signal levels using the HF-2V were roughly the same or slightly lower than when using the wire antenna. The HF-2V exhibited more noise in several instances, but reception of the target station was not impeded. Switching between the vertical and the horizontal antennas provided a handy polarization diversity, which tended to reduced adjacent channel interference in many instances. Polarization switching was also used to overcome the effects of slow fading (QSB) quite effectively.

One of the goals of this experiment was to investigate the theory about the vertical antenna's low angle of radiation enhancing receive signal levels. I was hoping that the low angle of radiation, unique to the HF-2V, would also mean low angle reception and help me log some low power Indonesian regionals (around 3 to 4 MHz) during the night/day transition on the East coast. As it turned out, reception was unquestionably better on the vertical than on the horizontal wire, during this transitional period.

In some instances, signal strengths on the vertical were two to three S-units *lower* when compared to the wire antenna. Other times signal strengths on the vertical were up to two S-units *higher* than on the wire antenna. But, the big surprise was the noise level encountered when using the wire antenna. In almost all instances the noise on the wire antenna all but masked the target signals. Simply put, the noise on the vertical antenna was so much lower than on the wire antenna, that even

during times of reduced signal levels, the target stations were easily heard on the vertical.

■ Conclusions:

1. Above 7 MHz performance between the vertical and horizontal antennas was about equal, with occasionally higher noise levels encountered when using the vertical.

2. The HF-2V when used in combination with a horizontal antenna is very effective in overcoming the effects of slow fading and, in some cases, adjacent channel interference.

3. Below 5 MHz the signal levels on the vertical were two to three S-units higher than the horizontal wire antenna, while atmospheric noise tended to be higher on the horizontal wire antenna.

4. The vertical seemed to exhibit good signal to noise characteristics when used to DX the low power Indonesian regionals between 3 and 4 MHz. This lends some credence to the theory that a vertical antenna will receive low angle signals better than horizontal wire antenna.

So what is the bottom line? Both the HF-2V and HF-6V are sturdy vertical antennas capable of withstanding the elements. They are a relatively inexpensive way to add versatility to your existing antenna farm. These antennas work great on the ham bands and equally well on the shortwave bands. In particular, the HF-2V, in combination with one or more horizontal wire antennas, will provide the radio amateur/shortwave listener with an extremely flexible antenna system.

My thanks to Don Newcomb of Butternut for providing the antennas and technical support for this article.

¹ P.O. Box 1782, Shavertown, PA 18708 or via the Internet: k7yha@epix.net

² Butternut Manufacturing Company, a subsidiary of Bencher Incorporated, 831 N. Central Avenue, Wood Dale, IL 60191 Tel: (708) 238-1854 or Fax: (708) 238-1186

Amateur Radio Band Equivalents

Band	Freqs in kHz
80 meters	3500 to 4000
40 meters	7000 to 7300
30 meters	10100 to 14150
20 meters	14000 to 14350
17 meters	18068 to 18168
15 meters	21000 to 21450
12 meters	24890 to 24990
10 meters	28000 to 29700

Magic Wand Portable Antenna

You don't have to use any magic to try out this modified tomato stake antenna—but its performance might remind you of pulling rabbits out of hats!

By Jacques d'Avignon

When you live in a city, there are times when you want to get away from the noisy radio environment and really hear what is out there. Portable receivers are easy to carry into a very quiet site, but a portable antenna system is normally not so easy to transport or to install.

Loving to tinker with antennae, I decided to make one that I could transport easily and set up rapidly. Remembering that the vehicle used for these mini DXpeditions is a small Volkswagen Jetta, it was necessary to build a system that would fit inside the car and, hopefully, leave room for at least the driver!

A few years ago, my wife and I grew tomatoes and we had purchased a new type of very rigid molded plastic tomato stake. One end is pointed to insert in the ground. The surface of the stake is festooned with small short ridges on four sides of the stake to stop the ties from slipping down the stake. The stake looked sufficiently promising as a possible antenna skeleton that I immediately pressed it into service. The dimensions of this stake, which would function as my coil form, are as follows: length 72 inches, diameter 3/4 inch with 20 sets of ridges per foot.

Digging into my "treasure box" I picked up a roll of #18 wire and started winding around the stake. Using the ridges as a guide, this produced 20 turns per foot. The complete stake was covered all the way to about 6 inches from the bottom. The total length of wire is 200 inches, more or less — not much of an antenna, judging by the length of the wire!

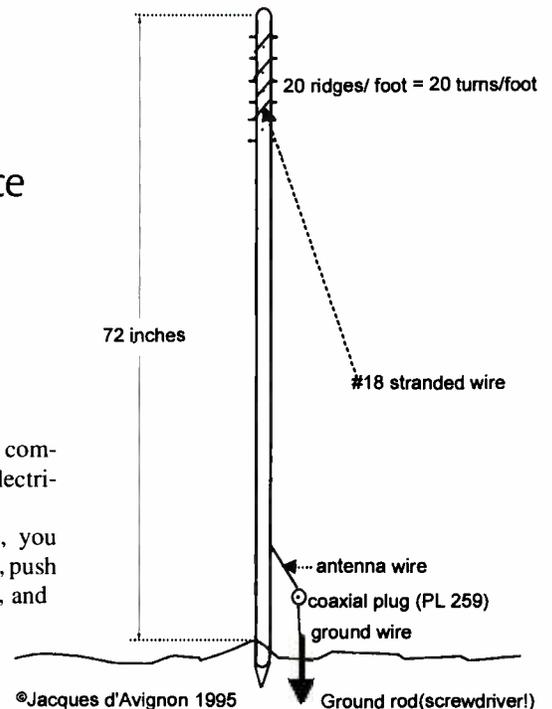
A coaxial plug was installed as a connector at the bottom. The coaxial shield was left floating; if a ground became necessary, it would be possible to use a short ground stake (a screwdriver, perhaps?) and some alligator

clips to provide the connection. The complete assembly was then wrapped in electrical tape for aesthetic reasons.

To use the magic wand antenna, you simply stand it vertically on the ground, push it in as a stake, connect a coaxial feed, and you are in business! To obtain the best results, it is suggested that you run the coax to an antenna tuner ahead of the radio. I presently use a Grove Minituner: it is small and really tunes this stake (sorry — this *antenna*) from LF to about 25 MHz.

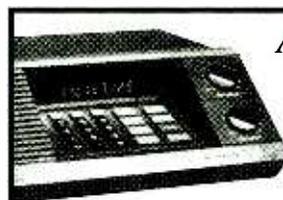
How well does this magic wand antenna work? During the Mohawk Valley Short-wave Listeners DX Camp in the fall of 1995, the antenna was connected to a stock Sony 2010 and it was possible for me to hear the Australian stations on 2.3 MHz and the African stations on 3 MHz. It was a very quiet antenna and compared very well with some long-long wires used during this camp.

I will admit that it is not the ideal antenna for a home station, but for mini-DXpeditions, DX camps, or emergency use, it works very well. I have not analyzed the electrical characteristics, but I intend to keep experiment-



ing to see how it could be improved. It has already been tried with a Kenwood R-5000 during some renovations of the home station antenna system and it was an eye opener: the same signals could be heard with just a slight reduction in the signal strength as indicated on the S meter. The only major drawback to the system was trying to explain what it was to the Customs Officers at the U.S. border on my way to the DX camp!

This antenna is one solution to creating a quickly installed antenna for a DX camp, a cottage setup, or simply on the beach. If anyone tries this antenna, I would be interested in their comments at the MT address or at monitor@limestone.kosone.com.



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Operation Skyhook

Solving the problems of putting up a new antenna can be fun. Are you up to the challenge?

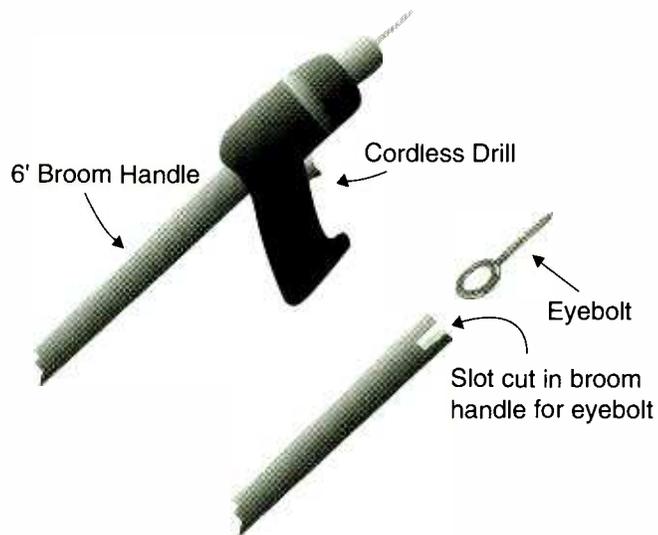
By Arthur R. Lee WF6P
Illustrations by Emily Short

When putting up a simple 40 meter dipole at my daughter's new home, we were faced by the age-old problem of the limited size and layout of the lot. The neighborhood had the customary covenants and restrictions against antennas so we wanted hers to be unobtrusive, and, if possible, not observable from the front of the house or the street. The backyard neighbors, we hoped, would not notice nor complain if we had a "neat" installation.

The back of the house sat quite high, a full three stories above the ground level. The backyard further sloped away from the house so the height of the antenna was very favorable: up about 40' if we suspended it from some part of the roof. The direction of radiation lobes would be almost east-west, which was really 180 degrees away from what we wanted, but lot location determined antenna direction and that was what we had to settle for.

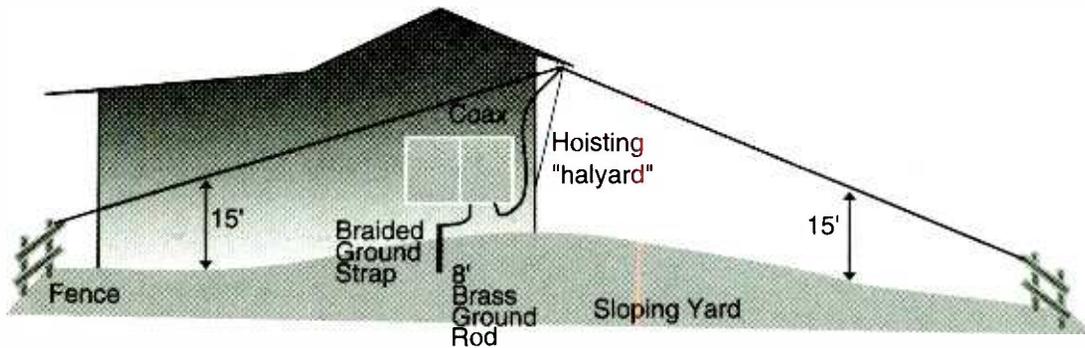
We laid out the complete antenna and coax on the rear lawn, then had to figure a way to raise it. The house, being of new construction, limited our access to the sheer stucco exterior. All windows slid open only half way and were double paned. Access across the tiled roof was too dangerous to consider without professional safety harnesses and equipment.

We searched for possible mounting locations, trying to keep clear of metal roof drain pipes as much as possible. Finally, we elected to put



an eye bolt into the roof overhang, attach a small pulley, and run a nylon cord through the pulley to hoist the antenna from the ground.

Like most innovative plans, this was easy to envision, but hard to put into practice. We had no ladder capable of reaching the desired three-story height — nearly 45 feet above the ground. To complicate matters, the roof overhang extended out about four feet — quite a backward reach if we were high up on the ladder.



After more deliberation, the solution came to us. On the third story, a bedroom window was near the point on the eave where we wanted to place our eye bolt. A hole needed to be drilled, then the eye bolt screwed into the hole. What to do?

Aha! We found a 6-foot push broom handle and securely duct-taped our cordless drill to the end of it. Turning the drill on, my son-in-law comfortably and safely reached out the third floor window and pushed the rotating drill into the roof rafter. After drilling the hole, he removed drill and placed the eye bolt into a notch we had cut in the end of the broom handle. Held in place with additional duct tape, our broom handle tool was easy to rotate, screwing the eye bolt solidly into the beam.

We had previously run two separate 1/8" nylon cords through the eye bolt and pulley to hoist the antenna apex into position. We could use one of the nylon cords to lower and raise the antenna for maintenance. The other would serve as a spare and could be used to pull up new sections of cord for future use. An 8-foot ground rod and braided ground strapping completed the installation. The coax and ground strap were led into the house under a weather stripping seal on the patio door.

We hoisted the antenna into position and secured the ends to guy lines tied to eye bolts in a tall fence. On our first test we got an SWR of nearly 1:1, and worked several midwest states from California. The antenna has been up for over six months without any neighbor complaints. Where there's a will, there's usually a way!

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Tours for the Grove Comm Expo '96 Set

By Larry Van Horn
Expo '96 Publicity Chairman

Have you ever wanted to take a tour of a major metropolitan public service communications facility? How about an inside look at a regional FAA Air Route Traffic Control Center (ARTCC)? These are just a couple of the half dozen tours of broadcast and communications facilities that will be offered at the 7th annual *Grove Communications Expo* that will be held on October 18-20, 1996, in Atlanta, Georgia.

"We are offering more tour sites this year and increasing the number of people that can go on each of them," said Judy Grove, *Expo 96* coordinator. "We took all the information from last year's convention surveys and arranged tours to those facilities attendees most requested." Unfortunately, the most-requested excursion—The Weather Channel—does not conduct public tours.

Transportation to most of the tours will be in comfortable, chartered buses that will pick you up and drop you off at the front door of the convention hotel (the Atlanta Airport Hilton). The cost is \$10.00 per person, per tour, and you must be a full registrant (or spouse of a full registrant) in order to sign up for a tour.

Those of you who are taking the Metro Atlanta Rapid Transit Authority (MARTA) communication facility tour will travel via the MARTA system instead of chartered bus. As part of this tour package, you will receive a three day unlimited pass to ride on the MARTA light rail transportation system anywhere they provide service in the city of Atlanta. Any family member can also use this MARTA pass at any time throughout the three days of the Expo. Three day unlimited MARTA passes will also be sold at the Expo registration booth for \$8.00.

■ Spotlight on Scanning

Of a total of more than 40 seminars, eight will focus on topics of interest to the scanner enthusiast. Bob Grove, publisher of *Monitoring Times*, will kick things off Saturday morning with a forum on *Scanner Equipment and Accessories for the Beginner* at 9:00 a.m. At 10:15



a.m., *MT*'s *Scanning Report* columnist Richard Barnett will give a talk on *Monitoring Public Safety Agencies*.

After lunch, Bob Grove will return to the speaker's podium for a forum on *Exploring the VHF/UHF Scanner Spectrum*. This will give the scanning hobbyist a good overview of who's who and where they can be found on a scanner. At 2:15 p.m., my forum on *Monitoring Big Brother — Government Radio Listening* will introduce several new federal communications systems and some discrete frequencies in the 225-400 MHz UHF military aircraft bands. The final scanner talk on Saturday will be by *MT Federal File* columnist John Fulford. John will cover *Advanced Surveillance Techniques* — a look inside the world of bugs and surveillance devices that the scanner enthusiast can hear.

Doug Graham will kick off the Sunday morning sessions with a forum on *Monitoring 800 MHz Trunking Systems*. At 10:15 a.m., Bob Wyman will discuss what techniques and publications to use when listening for the first time at a new location; his talk is called *Scanning the Unknown*. Finally, *MT*'s

feature writer on legal listening issues — Jorge Rodriguez — will conduct a forum on *Monitoring and the Law*.

■ Show and Tell

Five clubs so far have reserved tables in order to publicize their groups; three of them exhibiting for the first time at a Grove Expo. Returning from last year's Expo is the Radio Amateur Satellite Corporation (AMSAT-NA), and the Bay Area Scanner Club (BASE). Organizations that will be represented for the first time include: The Atlanta Astronomy Club, The Society of Amateur Radio Astronomers (SARA), and the Worldwide Ute News Club (WUN).

Several more commercial vendors have jumped on board since our last Expo report. Be sure to look them up in the exhibit hall: Bearcat Radio Club, Cellular Security Group, Dallas Remote Imaging Group (DRIG), Herald Broadcasting (Christian Science Monitor), Satscan Electronics, Scanner Master Publications, Signal Intelligence (ScanStar software), and Transel Technologies. This brings the total number of exhibitors registered so far to 17. Companies, clubs, and broadcasters can get more information or secure exhibition space by contacting one of the following:

- Beth Leinbach, *Monitoring Times* Advertising Manager, at 704-389-4007 or via e-mail at: beth@grove.net
- Debbie Davis, *Satellite Times* Advertising Manager, at 704-837-6412 or via e-mail at: debbie@grove.net

Complete details on the Expo 96 are available at the Grove Internet home page on the

Internet. Point your web browser to URL address: <http://www.grove.net/hmpgexpo.html> for the latest information and Expo updates. You can also register for the Expo and get additional information by sending e-mail to the following address: expo96@grove.net. To access an automatic Expo information service send e-mail to: expo96-info@grove.net. To register by phone, call the Grove order line at 1-800-438-8155 or fax 1-704-837-2216.

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EXPOTR12	WSB Radio and TV

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



Listening Post!

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

Other knowledgeable and enjoyable speakers include **Bob Grove, Larry Van Horn, Jacques d'Avignon, Rich Arland, Ken Reitz, Richard Barnett, Doug Smith, John Fulford, Bill Grove, Kevin Carey, Jeff Wallach, George Zeller, Keith Stein, John Catalano, T.S. Kelso, Doug Graham, Bob Wyman, Don Dickerson, Bob Evans, Tom Taylor, Jorge Rodriguez, Ian McFarland, Carole Perry, Steve Dye, Donald Dickerson, John Magliacane, and Keith Baker**.

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MEET THE LOW SUNSPOT CHALLENGE

WITH COMPACT, EFFICIENT ANTENNAS

By Peter L. Barker



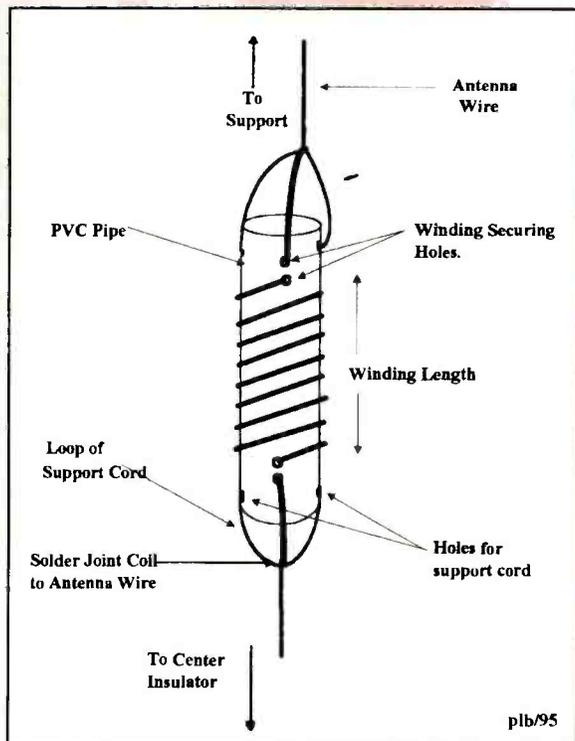
Our ability to receive shortwave signals (3 to 30 megahertz) is largely at the mercy of the refracting ability of the ionosphere. The shell of ionized particles that surrounds the earth enables signals to be refracted (bent) so that they return to earth rather than disappearing out into space. This ability to refract depends largely upon the amount of radiation emitted from sunspots on the sun.

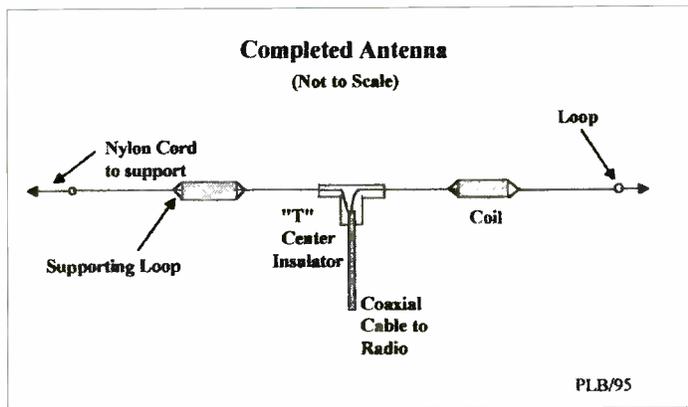
The number of sunspots, and therefore the amount of radiation from the sun, follows an approximately 11 year cycle. At the peak of the cycle transmissions from the other side of the earth can be received on the proverbial "wet noodle" and ham operators can communicate worldwide on the 28 MHz band with, at times, milliwatts of power. At the bottom of the cycle—about now—the higher frequencies are not refracted, and traffic moves to the lower frequencies where, even so, communication is often barely possible.

To combat the loss of "propagation" as it is called, commercial broadcasters, utility stations, as well as hams are crowding into the lower frequencies for long distance communication.

The challenge of effectively receiving at these frequencies is complicated by the fact that the lower the frequency the longer the antenna needed. Even though reasonable reception may still be achieved with a random wire antenna coupled with an antenna tuner and a good radio frequency ground, there is no real substitute for the half-wave dipole for the serious monitor.

A standard dipole has an overall length of one-half of the wavelength of the desired center frequency, and that is exactly the problem for those of us





with restricted space and funds. For 6 MHz (45 meter band), a full size dipole would be roughly 37 feet end to end. 3 MHz would simply be double—a substantial 74 feet of wire to be strung up as high and straight as possible.

The physics of resonance will come to our aid, however. By placing a suitable coil at the mid-point of each arm of the antenna, its overall length can be reduced with very little loss in efficiency or range of frequencies that can be received. This method should not be confused with a trapped antenna, which also uses coils in order to isolate different lengths of antenna to allow it to cover various bands, and which does create some shortening at the lowest frequency.

The shortened antenna is just that—an antenna 50% of the size of a full size antenna. There is a down side, of course: The shortened antenna is most efficient at its design frequency. It can be used on other frequencies

with the aid of an antenna tuner, but this is a compromise. Like all half wave dipoles, for longest range reception it should be mounted at a height of 1/2 wave-length above the ground.

■ Build one to your specs

The magic number for the design of the coil is that it must have an impedance of 950 ohms at the design frequency. If you are not familiar with these terms, a basic text on radio electronics or ham radio would help. If you are not a "techie," that's okay, too! Just use the cook book approach below.

The coil can be wound on almost any insulation material, such as waterproofed wood or plastic. The most convenient and economical material is PVC water pipe. Only short pieces are needed and can often be begged from someone's scrap box. Two identical coils are needed for each antenna.

Apart from the PVC pipe you will need some 1/8 inch nylon cord or something similar and some 16 awg enamel-covered magnet wire. (Note: 14 awg household insulated wire can be substituted. The resulting antenna will be slightly less effective and the coils a little heavier. Be sure to use the data in Table 2 for winding the coils.) The finished coil is shown in Diagram #1.

A hole is drilled at each end of the tube of sufficient size to allow the cord to pass through. A quarter turn of the

Table 1

Coil Winding and Antenna Data

16 awg Magnet Wire	Frequency MHz		
	3.9	6.1	7.2
Approx length of coil wire (")	240	150	135
Number of turns in coil	49	34	30
Length of winding (inches)	2.7	1.9	1.7
Length of antenna section (ft)	15	9.1	7.75
Overall length of antenna (ft)	61.5	40	32

Table 2

Coil Winding and Antenna Data

14 awg Household Wire	Frequency in MHz		
	3.9	6.1	7.1
Approx length of coil wire (")	280	185	170
Number of turns in coil	63	43	37
Length of winding (inches)	5.1	3.5	3
Length of antenna section (ft)	15	9.1	7.75
Overall length of antenna (ft)	62	40.1	42.1

The dimensions and winding data for 14 AWG wire with insulation are approximate as the thickness of the insulation varies somewhat with manufacturer.

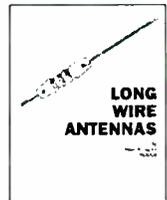
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tube away from. these holes drill two holes 1/2" inch apart, and large enough to clear the coil wire.

Thread one end of the coil wire down through one of the two smaller holes and up through the one closest to the end of the tube. Leave about 6" protruding. Now snugly wind the required number of turns on the PVC tube spacing them as shown. Secure the free end of the winding in the same manner as at the start.

Try to keep the winding as tight and even as possible. Needle-nosed pliers will help with the threading. Two coils, as closely identical as possible, must be made. Pass a short length of the cord through the larger holes and form a loop. This complete the coils themselves.

Our example is for 6.1 MHz. The dimensions for the coils for 7.2 MHz and the 3.9 MHz band are given in the tables below (Tables 1 and 2).

For a 6.1 MHz antenna you will need four pieces of antenna wire (#14 household wire can be used). Pass one end to the wire through the cord loop and secure with a knot or cable tie as shown, then strip the ends of this wire and the coil wire and solder together (the enamel can be removed with sandpaper). If absolutely necessary you can just twist the wires together as tightly as possible and coat with silicon sealant.

Now re-measure the antenna wire from the end of the last turn on the coil to the distant end of the wire and trim to the length given. To the remaining end of the coils do likewise, but leave an additional 3" for the suspension loop at the outer ends of the antenna. To weatherproof the coils and prevent the turns from moving they should be sprayed with a clear urethane coating; they can then be wrapped tightly with PVC tape if desired.

The final assembly step is to construct the center insulator (these are available commercially, but for our purposes a scrap of plywood or plastic will serve) and attach

the feed line. The insulator provides the center point of the antenna and the connection point for the feed line. It must be strong enough to withstand the tension in the mounted antenna. The simplest insulator can be made in the form of a "T" with holes for the strain reliefs (see Diagram #3).

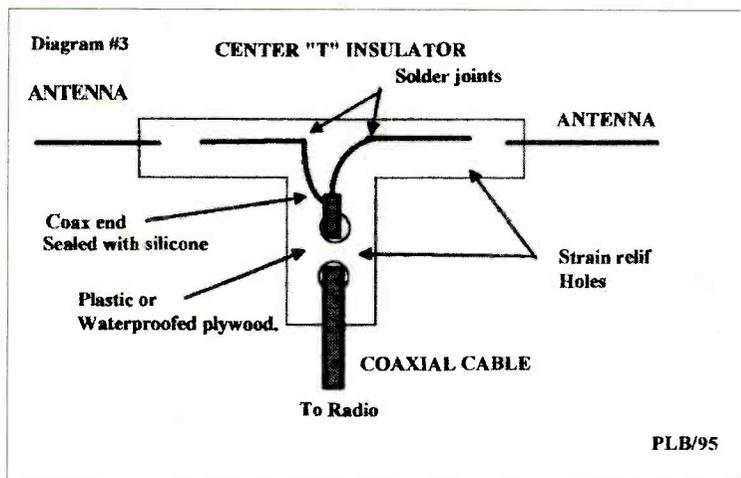
The feed line, which can be any reasonable length, should be coaxial cable as long as it is low-loss. *Do not* use TV ribbon twin lead. Strip the coaxial cable to show the center conductor and outer braid. Tease out the braid with a sewing needle or similar and twist into a pigtail.

Feed the inner ends of the antenna wires through the strain relief holes and strip 1/2" of insulation. Tin the ends of these wires and the prepared coaxial cable, and solder the center conductor to one end of the antenna and the braid pigtail to the other, (it does not matter which way you do this). This junction, when cool, *must* be well sealed with silicone sealer, as any water entering the coax will drastically affect its performance. Use of the so-called "UHF" connectors at the antenna feed point is not recommended as these just add weight, cost, and are *not* waterproof.

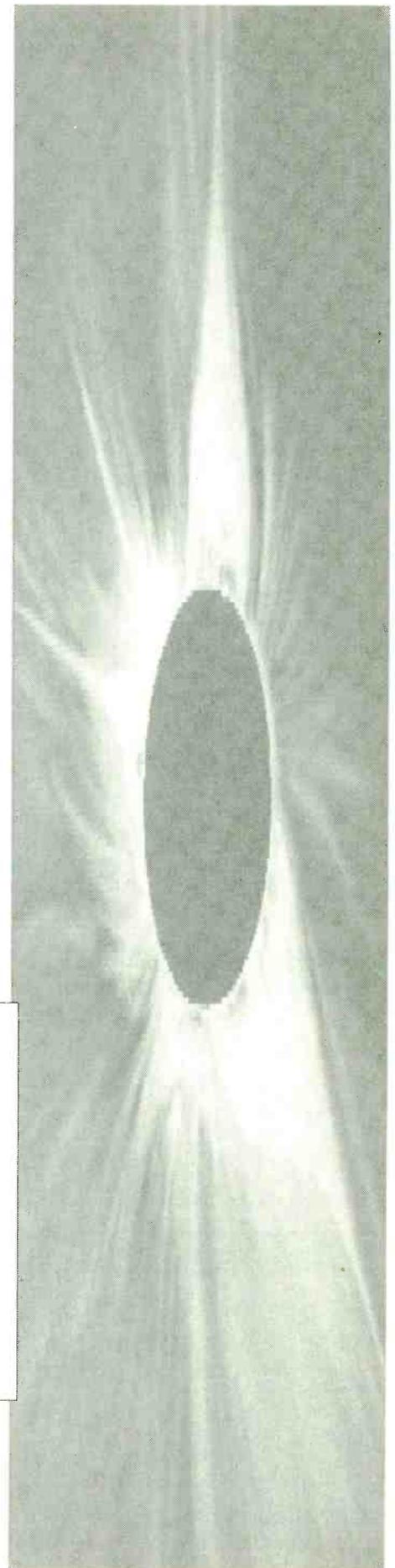
The opposite end of the coax feedline should be fitted with the appropriate connectors for your radio, and the braid connected to an electrical ground.

Form a small loop at the outer ends of the antenna and you are ready to mount it. It can be hung horizontally between two supports with reasonable tension. If this is not possible it can be mounted as an "inverted V" from one central support. The angle between the two "legs" should be greater than 90 degrees and the ends kept at least 3-4 feet above the ground. A short (3 feet or so) length of nylon chord must be used between the end loops of the antenna and supports.

Once you have gathered the material to make this antenna, it will take only a little



longer to make than it does to read this article. Give it a try and experience the thrill of building an effective antenna for a few dollars and enjoy superior reception during these years at the bottom of the propagation pit.



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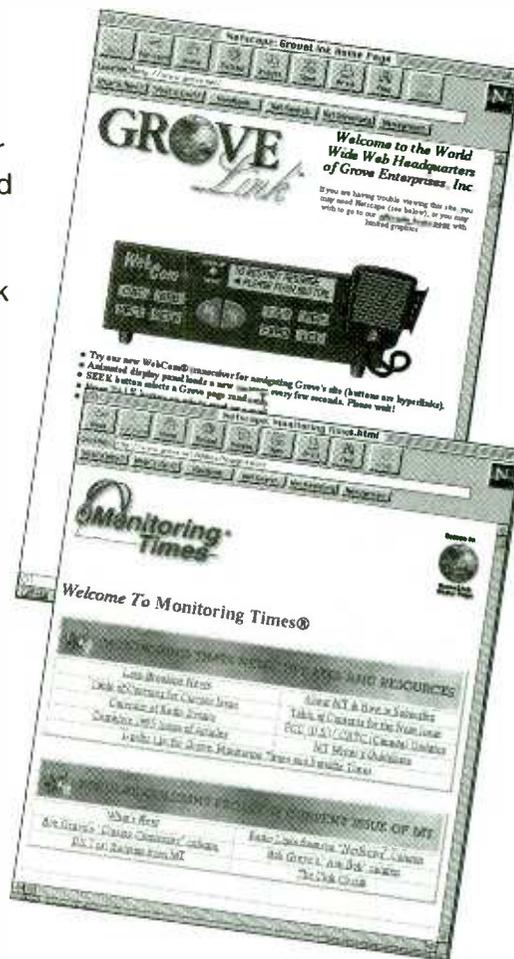
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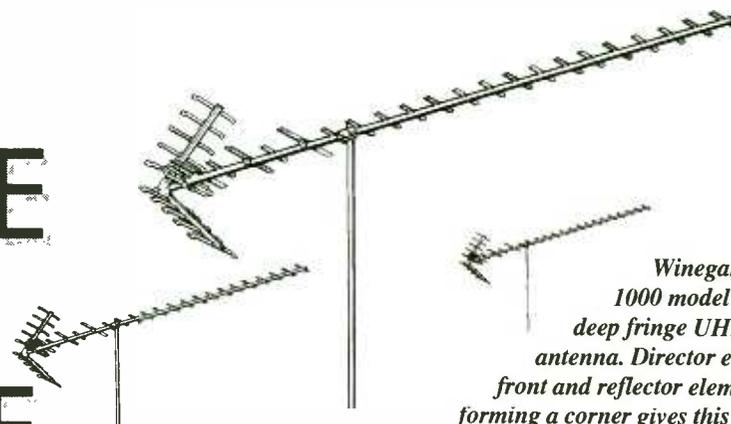
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IMPROVE Your VHF-UHF TV & FM Reception

By Ken Reitz KS4ZR



This nifty installation combines a DSS dish with an active omnidirectional amplified antenna. In some locations this is all you need for total TV reception. (Courtesy Kaul-Tronics, Inc.)



Winegard's Prostar 1000 model PR-9032 is a deep fringe UHF-TV antenna. Director elements in front and reflector elements at rear forming a corner gives this its more common name: corner Yagi antenna. (Courtesy Winegard)

Americans love TV. That's why we buy 23 million new sets a year. That's why we spend nearly as many hours watching TV as we do sleeping. We love TV so much that we have created several separate billion dollar industries to be able to get TV via big dish satellite, little dish satellite, microwave, cable, and—coming soon to a dial tone near you—the phone line.

So, how's your reception? No, I'm not talking about the mythical 500 channel universe: I'm talking about good old fashioned over-the-air TV which celebrates its 55th birthday this year.

■ Up From the Dust

On July 1, 1941, commercial TV operations began in the U.S. By May 1942 there were 10 stations on the air with six continuing to operate during World War II. Twenty years later there were nearly 600. Today there are roughly 1,500 high powered broadcast television stations in the United States with thousands more translators (low power transmitter sites which provide additional regional coverage) and thousands more low power stations (UHF only and limited to between 10 and 1,000 watts output).

The past ten years have seen a technological dust storm sweep through the television industry. The rapid expansion of cable television, the advent of satellite television and the unprecedented success of Direct Broadcast Satellites (DBS) has seriously eroded the power of broadcast television. With 65 percent of the country connected to cable TV, broadcast TV has experienced ever-dwindling audience shares and a growing dread that the worst was yet to come.

It turns out, however, that there's no need to panic. In the first place there are 35 percent of American households which remain, for whatever reason, "un-wired." Secondly, cable interests have turned loose of the one thing they could provide which satellite programmers could not: local programming and major network TV.

Many cable subscribers have been dismayed to learn that their local cable company may no longer be carrying their local broadcast TV channels, and, similarly, many subscribers to DirecTV or Primestar are disappointed when they learn that they cannot pick up local channels on their new dish.

Some cable companies have a cheap solution: subscribers who request it may receive an A-B switch which allows them to switch between the cable and an outdoor antenna (assuming one exists).

Many satellite dealers provide terrestrial antenna hook ups with a satellite TV installation. Others are providing special masts which combine the DSS dish with a terrestrial antenna.

All of this activity has served to re-ignite interest in reception of over-the-air broadcast television signals. In this article we'll look at what's available on the market, ways you can improve your TV reception, and how to do your own installation.

■ VHF-UHF-TV-FM Explained

By April 1952, the FCC expanded television frequencies to add 70 UHF channels between 470 and 890 MHz to the existing VHF frequencies between 54 and 216 MHz, making a total of 82. Channel 1 (44-50 MHz) was deleted in 1948 and assigned to two-way radio service. Still later, the FCC saw fit to chop 84 MHz off the UHF-TV band and give it to the Land Mobile Service, thereby trimming the UHF-TV band to its current number.

Originally, the FM radio band was established by the FCC in 1940 and extended from 42-50 MHz. By 1945 the Commission changed its mind and re-allocated the band to its present location from 88-108 MHz. This puts the band right in between channels six and seven and explains why it's possible to tune the audio of channel six at the very lowest portion of your FM receiver. This also explains why a VHF-TV antenna makes a good FM radio antenna, and why you can experience interference from strong FM stations in your TV set.

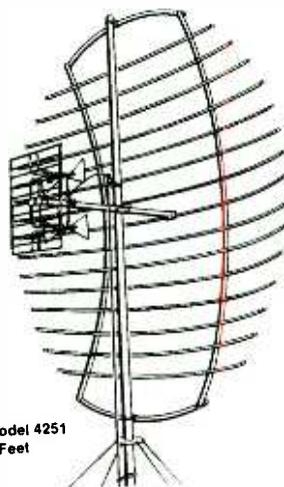
Because of the wide difference in frequency between the bottom of the VHF-TV band and the top of the UHF-TV band, one antenna will not do the job. It's necessary to have both a VHF and a UHF antenna, though the two may be designed into one unit.

■ A Closer Look at Hardware

There are three components to a TV antenna system and it's important to pay attention to all three to maximize your TV reception. These components are the antenna, the feed line, and the amplifier.

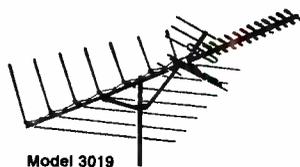
In feed line there are basically two choices. First is the two-conductor flat "ribbon" wire most of us are familiar with. This wire has an impedance of 300 ohms and since most antennas are designed with an impedance of 300 ohms, the wire matches the antenna and, theoretically, will deliver the signal to your TV set with a minimum of signal loss.

Second is coaxial cable, which looks just like the kind your cable company uses to bring in cable TV signals. This cable has an impedance of 75 ohms and presents an impedance mismatch at the antenna. Is this a problem? No, a simple, inexpensive transformer changes the impedance. An additional transformer at the TV set converts the signal back to 300 ohms, or your set may have a coax fitting which eliminates the need for the transformer.



Model 4251
7 Feet

Channel Master's Model 4251 is a UHF-TV antenna using a parabolic reflector to direct signals to the 2 UHF antennas mounted in front. Reflectors behind the "bow ties" help increase gain. Overall length of this antenna is 7 feet. (Courtesy Channel Master)



Model 3019

Channel Master's Model 3019 UHF-VHF-FM antenna. All-in-one antenna based on a Log Periodic Dipole Array with UHF antenna in front. Forward slanting elements increase gain. (Courtesy Channel Master)

Coax weathers the outdoors better, and since the bulk of your cable will be outside the house this is an advantage. Also, coaxial cable is better shielded and thereby less susceptible to stray signals and degradation from being near metal such as roof flashing, rain gutters, and interior electric wiring. Hardware is available for coax which allows you to easily split the signal from the antenna and feed other TV sets without noticeable signal loss.

Use RG/6 cable with F-56 crimp-on connectors for the cable ends. Use a heavy duty crimping tool for mechanically and electrically secure fittings. Use Coax-Seal, a brand-name type of gummy-tape, to protect outdoor fittings from rain.

■ A Forest of Antennas

There are dozens of brand names and designs for television and FM antennas. Your choice should be made according to your circumstances. Urban areas will have less need for sophisticated antenna systems, while residents outside suburban areas and beyond will need all the help they can get.

Antenna designs have come a long way since the "rabbit ears" and simple dipoles of previous decades. Advertisers may want you to think they've gone even farther than they have. Here are some tips to help you through the ad fluff.

Since most consumers don't know about signal strength readings in decibels (dB), manufacturers rate their antennas according to how many miles away they claim they are able to pull in TV signals. You should know, however, that, like gas mileage, your TV mileage may not approach manufacturers' claims. Mileage is often estimated under the most optimistic circumstances: flat terrain, without trees, and preferably with a tail wind! However, your mileage exceed the average, if you can put up with a good deal of noise or "snow" in your picture.

Generally, the more elements on an antenna, the better the performance. If you live in an urban area, though, a small antenna may be all you can use. Anything bigger might overload your TV or FM receiver, causing a distorted picture or the same FM signal showing up in different parts of the FM band. If you experience receiver overload, the signal may be reduced by using an attenuator to limit the signal coming through the feed line.

Most VHF-TV antenna designs are based on the Log Periodic Dipole Array (LPDA) in which a graduated series of "active" elements (all connected together with a separate wire) are placed along a boom with the biggest elements at one end and the shortest elements at the other. The small end is pointed at the target station location. LPDA designs, in which the elements are not perpendicular to the boom but angled forward to the front, are said to enjoy an advantage in signal strength over elements arranged perpendicular to the boom. VHF antennas cost from \$25 to \$200.

Most UHF-TV antennas are based on the Yagi

antenna design in which a single element (the only active element) is cut to the desired frequency band. A number of shorter elements are placed in front and longer ones in back of the active element. The back elements are often arranged in a manner to form a reflective corner to the active element. All other elements are said to be "passive."

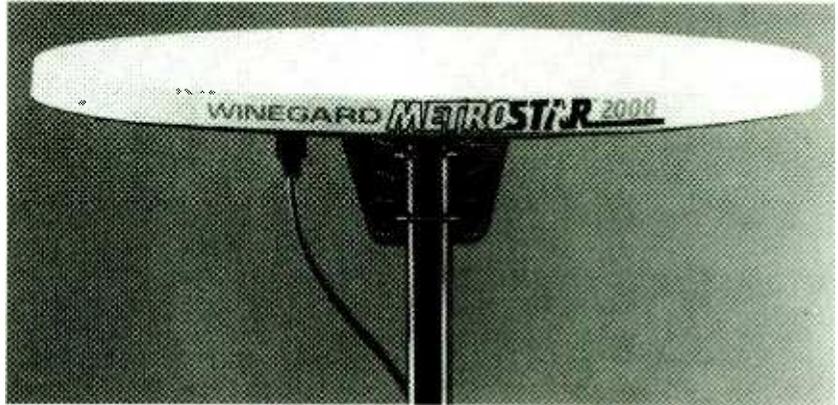
The front elements, called "directors," help guide signals of UHF wavelengths to the active element. The reflector elements attempt to reflect back to the active element to increase the gain. The antenna feed line is connected only to the active element.

It's actually very similar in concept to the satellite "dish," which reflects microwaves into the feedhorn for amplification. In fact, one UHF design features a parabolic reflector able to reflect the 600-800 MHz wavelengths to an active element held out in front of the parabola at the point at which the reflected signals converge. Again, the number of elements used can help determine the general capability of the antenna. UHF antennas cost from \$20 to \$120.

The primary advantage of a combined VHF/UHF TV antenna is simple: one antenna mast to mount and only one feed line. Combined antennas cost from \$30 to \$250.

If you live in a neighborhood or subdivision where outside antennas are frowned upon or even forbidden, you can still enjoy excellent over-the-air TV. The easiest way to put up a "stealth" TV antenna is in your attic. Of course, you'll want to be careful wandering around in there: Watch your step and keep your head down! You can support a nearly full-sized TV antenna in the truss supports or by installing cross piece 2 x 4's on which you can lay the antenna. Unless you have a really big attic you will not be able to rotate the antenna. I've done several such installations with great results. Add an amplifier for even better pictures.

An alternative attic antenna widely available is sometimes referred to as an omnidirectional amplified antenna. These are nearly two-foot, round, plastic enclosures less than three inches tall. Inside the case is



Winegard's MetroStar model MS-2000 features VHF-UHF-TV with an FM trap to attenuate the FM band. Typical gain is 15 to 20 dB. (Courtesy Winegard)

an active receiving element and amplifier circuitry. The amplifier enclosure has hardware which allows it to be attached to roof or truss members and requires 110 voltage to power it. These units can also be used in RV or mobile applications as well. Typical gain is from 15 to 20 dB and cost is between \$100 and \$200.

■ The Amplifier

Antenna amplifiers for TV and FM reception are vitally important outside the suburban area. Within the urban area signals from TV and FM transmitters are so strong that, even with a modest antenna, picture distortion and receiver overload can be a real problem. The most effective place to use an antenna amplifier is in a "fringe" or rural location, particularly if you are located between two cities.

The difference between an unamplified antenna picture and one which is amplified is astounding, sometimes going from marginal to crystal clear. Most amplifiers are broad banded and do a great job from VHF through UHF frequencies. Be realistic in your expectations, however: Amplifiers can't amplify signals which aren't there.

There are two elements to an effective antenna amplifier: the actual amplifier which is outside on the antenna mast, and the power supply which is indoors. The power supply runs on standard wall current and sends a small amount of voltage to power the amplifier. By placing the amplifier directly at the antenna, only the signal is amplified and not other electrical noise which might be picked up by the feed line. Avoid indoor antenna amplifiers: they are not nearly as effective.

Amplifiers typically add 15 to 25 dB of gain to the received signal. Some amplifiers have a built-in FM trap which filters out the FM frequencies and is useful in areas where amplified nearby FM signals could cause interference on TV channels. Amplifiers can cost from \$25 to \$125.

■ Towers, Rotors, and Other Extravagances

Outside of the suburban location the single most-needed accessory, next to the amplifier, is the antenna rotor. This device allows you to rotate the antenna in the true direction of the station transmitter. Being just a few degrees off the transmitter site can have an amazing effect on reception. You may be 50 miles from a large city, but even so, its five or six station transmitters may be scattered 20 or more miles apart. You may have to turn an antenna 30 or more degrees to peak reception of different channels. If you want to receive stations from

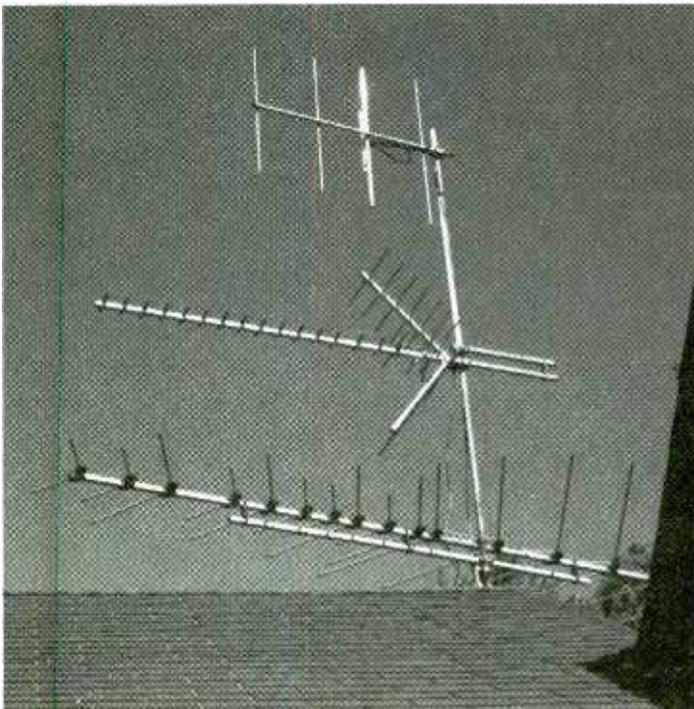


Mast mounted preamplifier amplifies the antenna signal at the antenna before it goes down the feed line. This Chromstar model AP-8783 by Winegard provides 17 dB gain at VHF and 28 dB at UHF frequencies. (Courtesy Winegard)

entirely different directions, a rotor will be a necessity.

Rotors are very standard pieces of equipment and contain basically three parts: The actual DC motor which turns the antenna; the motor controller which is in the house, usually near the TV; and the connecting wire. The rotor and control are always sold together, the wire, usually 3-conductor, is sold separately. Rotors retail for between \$50 and \$100.

If you use an outdoor antenna you may be able to use a simple steel



Typical deep fringe installation features VHF-TV Log Periodic antenna at bottom, UHF-TV corner Yagi in middle, and four-element 2 meter Yagi for amateur VHF-FM at top.

antenna mast. Typically, masts are 1-1/4" to 1-3/4" in diameter and may be built by joining several 5-foot sections, attached to an exterior wall, until the top clears the peak of the roof by several feet. Avoid light gauge steel masts. Avoid "tripod" mounts which require roof penetration. Avoid chimney mounts, because the constant torquing of the antenna in the wind will, over time, literally twist cracks in your brick or block chimney requiring costly repairs. Avoid vent pipe attachments for similar reasons. Never mount or attempt to mount your antenna near any power lines.

In deep fringe areas you may need more height than the above methods provide. Here is where a tower comes in handy. It's said that doubling your tower height can give you a 6 to 12 dB gain in signal strength. Unfortunately, most towers are expensive and require special installation, such as a concrete pad at the base and a system of guy wires to keep the tower from falling. Towers usually require additional lengths of feed line which may, in turn, require additional signal amplifiers. Consult your local TV dealer for complete information on tower installations.

■ Putting It All Together

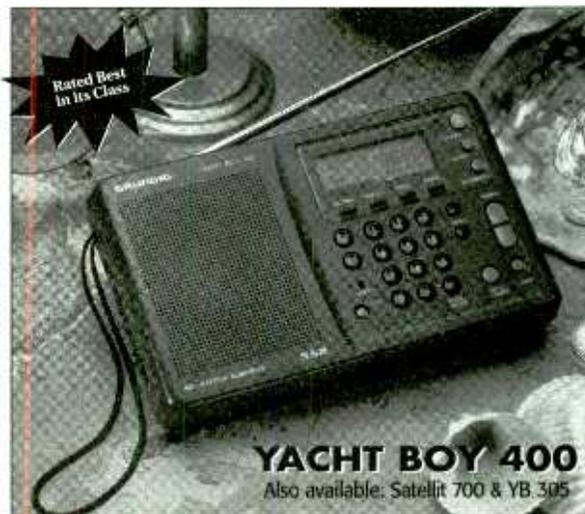
There are even more extravagant lengths to which you can go to

pull in signals from as much as 200 miles away on a regular basis. For instance, it's possible to double antenna gain by stacking two TV antennas and feeding them with a phasing line. An in-depth explanation of setting up such advanced over-the-air TV antenna systems is covered in *Wireless Cable and SMATV* by Frank Baylin and Steve Berkoff (\$30 from Baylin Publications, 1905 Mariposa, Boulder, CO 80302 or call 303-449-4551).

However, whether you're interested in merely improving your TV and FM reception or you're seeking new personal frontiers of your monitoring hobby, you'll find that TV and FM DXing is relatively inexpensive and doesn't require any great background in electronics or antenna theory. For a modest investment you'll see dramatic improvements, and it won't be long before you're waiting eagerly for the start of the FM/TV DX season (which blossoms just as the HF season is winding down).

Because of the frequencies involved and the type of transmitting used, tropospheric ducting is a regular occurrence on the VHF-UHF bands, allowing normally distant stations to come in with astonishing clarity. Look for most DX openings to occur in the morning and evening. Many hams regularly monitor these bands to determine when openings are occurring and where the DX paths are. It's not unusual to pick up FM stations with a stereo signal from over a thousand miles away! Even on VHF I've had perfect TV reception from stations over 300 miles away! It's great fun, and the season's just about to start. So tweak your system and enjoy TV the old fashioned way.

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Amateur Radio Reading

Quite by accident, Old Uncle Skip has developed a tradition over the last few years. For some reason the early spring always brings a stack of books my way, many of which are of particular interest to people getting started in the radio hobby. In previous issues I have showcased the best reading in shortwave and scanner monitoring. So this April I'll take a turn at the best reading in the ham radio world. Topic for topic, amateur radio books probably outnumber every other aspect of the radio hobby. A careful culling through the mass of reading material should turn up several texts that can help anyone grow into the ham radio hobby.

Most folks these days are entering the ham radio world by way of the "No-Code" Technician's class license. For folks choosing this route the first book to look at is . . .

NOW YOU'RE TALKING

Edited by Jim Kearman KR1S,
 Joel P. Kleinman N1BKE and
 Larry D. Wolfgang WA3VIL

\$19.00

The American Radio Relay League
 Newington, CT 06111
 SBN 0-87259-352-5

This book is specifically written to take the readers from a "no knowledge" level straight through to their first amateur radio license. The book details all aspects of sitting for both the Novice and Technician Class licenses including current question pools. But rather than being a simple quiz guide, this book gives real basic knowledge that will serve as the foundation for the rest of your amateur radio career. The book begins with some information about the history and traditions of amateur radio followed by a series of instructive chapters on radio and electronics theory that will serve to help you through the practical aspects of the upcoming tests.

Many people think they are saving some time by skipping over the basic theory in favor of attempting to memorize the question pools. Can you get your first license this way? Possibly, but just wait till you try to sit for a higher class license. Simple memorization won't get you through the General, Advanced, or Extra tests. When I sat for my Extra I was really glad I took

the time to get to know my way around basic radio theory. So take the time to read and learn. You'll not only ace the test, but you'll do a better job when you get on the air.

The book contains several chapters on the practical aspects of choosing equipment, establishing a shack, antennas and safety. You will also get a dose of knowledge about on air procedures and customs so you get off on the right foot from the first time you key down. Throw in a few code tapes or a code training program and you can easily use this book to get started toward those licenses that require code proficiency.

THE BEGINNER'S HANDBOOK OF AMATEUR RADIO

THIRD EDITION

by Clay Laster W5ZPV

\$21.95

Tab Books

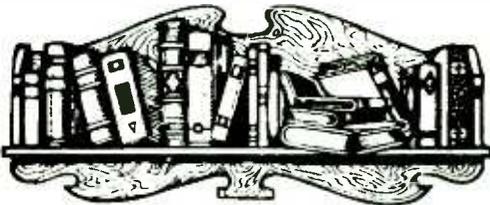
Blue Ridge Summit, PA 17294

ISBN 0-8306-4354-0

Clay Laster is an electronics engineer and college instructor who has been a ham for more than 40 years. This means he has participated directly in most of the major advancements in the amateur radio art. In *The Beginner's Handbook of Amateur Radio*, Clay takes you through all of the theory and learning required to acquire either the Novice or Technician class amateur radio license. This is another book intended to do more than help you memorize the question pools—Mr. Laster wants ham radio to be more than that for you. With this book you will learn the concepts behind the questions so that, when you take your exam, you will walk out with your license and the real knowledge to make use of it.

In addition to chapters on how to become an amateur, there are sections on basic communications theory, principles of electricity, components, circuits, antennas, and operating practices. The third edition includes the most current FCC question pools for the Novice and Technician Class theory tests. Clay also gives the reader some sound advice on learning the Morse Code.

This book is similar in scope to *Now You're Talking*. The main difference appears to be that Mr. Laster takes an even deeper look into the radio and electronics theory behind the amateur radio hobby. If you are intensely curious about how radio works, this book has a lot to offer. Because it has a very strong theoretical base, you'll see a lot of math, but don't let this scare you away. The math as it applies to the Novice and Technician



class tickets is not all that complicated.

If you are a tinkerer or if you intend to build kits or "home brew" some of your own radio gear, this book provides a solid foundation of information. Several of its examples include discussion of popular kit and do-it-yourself circuits. The author walks the reader through the schematics to give a clear understanding of just what is going on.

Okay, the first two books will get you your license and get you on the air. Now let's take a look at a few books to help you enjoy those first experiences.

The ARRL has a great series of inexpensive and informative books in its "Companion" series. Two of these are required reading for anybody who has just achieved their "No-Code" Tech ticket.

YOUR VHF COMPANION

Edited by Steve Ford WB8IMY

\$8.00

The American Radio Relay League

Newington, CT 06111

ISBN 0-87259-387-8

People who come to the ham radio world by way of the "No-Code" Tech route after years of shortwave listening can run into a bit of confusion. After coming to understand how radio propagation and practice works in the world below 30 MHz, they now find themselves in a place where things happen a bit differently. This book helps the newly licensed No-Coder to understand the vast variety of operating possibilities that the VHF spectrum has to offer.

The book covers the essential information on VHF propagation to bring your thinking into the world above 30 MHz. You also get a look at the more common operating methods such as FM, Repeaters, and Packet. The more specialized techniques, such as "weak signal" SSB and CW, satellite, television, and microwave operating are addressed along with sections on contesting, awards, and transmitter hunting. This book should be included with the purchase of any handi-talkie by any newly licensed ham.

YOUR PACKET COMPANION

Edited by Steve Ford WB8IMY

\$8.00

The American Radio Relay League

Newington, CT 06111

ISBN 0-87259-395-9

Packet radio is the preferred digital mode of communication by folks with the "No-Code" Technician's license. A surprising number of computer-oriented hobbyists get involved in ham radio for the specific purpose of playing with packet radio. Also, packet has emerged as an essential tool for amateur radio emergency communications efforts. Packet radio is also a lot of fun! But for the beginner, figuring out how to get your computer and your radio working together can be a bit tricky. Once you get things working, you will also need some knowledge about how to communicate with all those other packeteers out there.

This book is designed to answer all of the basic questions you may have as a newcomer to packet radio. The book takes you through a full explanation of packet radio including complete information on setting up your own packet station. From there you will learn how to connect with other stations over the air directly, through bulletin board stations, digipeaters, and other networks. You will also learn how to

make use of the packet radio transponders that are located in space on satellites and the MIR space station.

Ah, but did you think Old Uncle Skip was going to be content with leaving you a "No-Code" Tech? If you don't upgrade to get your HF privileges you're missing out on half of the fun that Ham radio has to offer. One of the things that scares folks away from upgrading remains the International Morse Code. Though the FCC may eventually make changes to the license structure, for the foreseeable future the code is going to be something you'll need to live with. One way over this hump is to go beyond living with it to learning to love it. That's what got Old Uncle Skip his Extra and the book that helped me learn to love the code was . . .

MORSE CODE: THE ESSENTIAL LANGUAGE

By L. Peter Carron Jr. W3DKV

\$6.00

The American Radio Relay League

Newington, CT 06111

ISBN 0-87259-035-6

True, we live in a world where Morse Code is no longer a necessity. But the code can now be appreciated for what has often been overlooked: CW operating is an art! Carron's book gives the reader the history of this amazing mode of transmission. You learn how it breaks down barriers in communications brought on by everything from propagation to politics.

The book goes on to teach you the correct way to go about learning code. Many myths have formed around this subject. This will help avoid false starts when you set out to learn the code. As you begin to master it and acquire the licenses to make use of this mode, the book also teaches you the techniques of setting up your key (or keyer) and on-the-air operating techniques, including a complete listing of conventional CW abbreviations.

If you want to really get steeped in the CW tradition, the book includes complete instructions for setting up mechanical, semiautomatic keys known as "bugs" to CW operators. With the help of this book, you, too, can keep this tradition alive and achieve additional license privileges along the way.

To get you started along this path I'll close with one more book:

THE ARRL GENERAL CLASS LICENSE MANUAL FOR THE RADIO AMATEUR.

edited by Larry D. Wolfgang WR1B

\$12.00

The American Radio Relay League

Newington, CT 06111

ISBN 0-87259-468-8

Think of this as *Now You're Talking's* big brother. This book gets you into the theory and practice that will take you to your General Class license and the worldwide communication it provides. The book goes into greater depth than those written for folks getting their first license, giving the reader a broader understanding of amateur radio techniques. Theoretical information is followed up by examples that would apply to everyday ham operation. In this way you don't simply get the information to pass the exam, you are also getting information that will make you a better ham right now!

Have fun. I hope to hear you on the air. Keep at it and we'll ragchew on 20 meters someday soon.

Scanning Amplified

Years ago, when I was in high school, my parents finally caved in to my pressure and allowed me to erect my first antenna tower. A contractor who was putting a small addition on our home agreed to dig a 5' ditch, fill it with concrete, and sink into it one 10' section of a Rohn 25 tower. I paid a small two-way radio firm to come to the house and erect the full 50 feet of tower. It was only because my family was one of the first to move into the neighborhood, and we were all well known, that no one put up a stink about the tower. (One neighbor did, however, complain that my receive-only tower was interfering with his cordless phone reception!)

I loaded that tower up with Antenna Specialists' professional two-way antennas, which was complete overkill. I also put up one of the first discone antennas, which outperformed most of the fancy gear I had hanging out on side-arm brackets.

What really impressed me about the tower, though, were the preamplifiers. These little powerhouses really sucked in the signals. While fine preamplifiers are currently available from companies such as Grove, the preamplifiers I used back then are, unfortunately, no longer available.

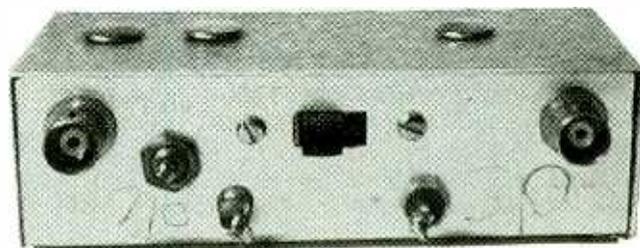
What I used, and still use today, were preamplifiers from Vanguard Electronics of Hollis, New York. Years ago you were able to order these preamps tuned to a specific frequency. They provide 20dB of gain across approximately five to ten MHz either side of that tuned center channel.

To really do it up right, you build a weatherproof housing and mount the preamps on your roof mast or tower, in line with band-specific omnidirectional or beam antennas.

Table 1 outlines the total antenna set-up I most favor for scanning.

Not everyone has the luxury to mount beams on a tower with a rotor, however. Apartment dwellers and others limited by zoning restrictions have to make do with one omnidirectional antenna or just the whip on the back of their sets. If you're located on a hill or in a state such as Florida where terrain is not a problem, this may be quite adequate.

Beam antennas, which I'll discuss in more detail in a later article, can typically provide anywhere from 3 to 10 dB of gain across a narrow segment of bandwidth. When you add this figure to the preamp's gain, you're talking about a whole lot of signal-sucking



Vanguard's custom preamps (this one optimized for 310 MHz), are unfortunately, no longer available.

power. Because of this, it is important to mount the preamps outside: you don't want to amplify additional noise that your coax cable naturally picks up.

Generally, short lengths of coax, no longer than twelve inches, stretch from each antenna to your weatherproof preamp box. From there, you should run the highest quality cable you can buy back to your scanners. By mounting the preamp with the antenna, you only amplify the signals you're seeking.

There are still other concerns of which you should be wary, however. Achieving so much gain can overload the front-end of many receivers, effectively wiping out the gains you so dutifully worked for. Also, if you live in a transmitter-rich environment (i.e., in an urban area or near any TV/radio, pager, cellular, or two-way transmitters), preamps can amplify these already high-powered signals so that they effectively wipe out everything you actually want to hear. Admittedly, I am not a technical expert, but my experience suggests that narrowly-tuned preamps, such as the Vanguard, do reduce this problem.

■ Scanners on TV

How many of us actually became interested in the hobby when we heard radio transmissions, actual or simulated, on TV? I used to love the show *Emergency* when I was a kid. (*Emergency* is currently enjoying re-runs on WOR-TV out of New York. My son now loves to watch it.) There was always lots of great radio chatter on that show. Today, shows such as *Cops* and *Rescue 911* provide actual or re-created two-way traffic that's fun to listen to. I've often wondered why scanner manufacturers and distributors don't advertise on these shows.

What really perks up my attention, though, is the active use of a scanner on a TV show. A number of years back, in an episode of *St. Elsewhere*, there was a story-line about a Boston firefighter who was injured on the job. Friends brought him a scanner so that he could listen to the department while he was on his back in the hospital. I can't remember how it all turned out, but I do remember that it was fun to watch.

On an episode of this season's *Seinfeld*, zany Kramer proudly showed his "emergency band scanner" to Jerry. I couldn't make out whether it was a Radio Shack or Uniden model, but the scanner

TABLE 1: An Ideal Scanning Antenna System

Antenna	Preamp	Type	Function
Discone	None or wide-band	All-band	monitoring
Ground-plane	42 MHz	State Police/39	Police and 45 MHz
155 MHz beam	155 MHz	VHF high-band	monitoring
460 MHz beam	460 MHz	UHF from 450 through 475	monitoring
860 MHz beam	wide-band*	800 MHz	monitoring

* Lacking a Vanguard 800 MHz preamplifier, I use the Grove wide-band preamp on 800 MHz, with excellent results.

played a role throughout the show as Kramer and Jerry both used the radio. Kramer decided he could tell the firefighters of the FDNY the best routes to take to fire scenes. He ended up steering the back of a ladder truck while Jerry listened to his friend scream for help. It was a bit much, but what the heck, it's a great show.

■ Scanners on Film

On the other hand, it really irks me when scanners are shown in a very negative light in mass-media entertainment. TV programming and films which show how criminals use scanners provide the fodder that certain law enforcement officials and two-way equipment manufacturers use to promote the purchase of trunking, DVP, digital, and encrypted digital communications gear. The instances of the public helping the police by monitoring their radios are innumerable and too often forgotten.

At any rate, some criminals do assuredly use scanners on occasion, and in recent films this fact has been stingingly brought to light. In the hit movie *Heat*, with Robert DiNiro and Al Pacino, a band of sophisticated bank robbers terrorize the city of Los Angeles. In one scene, DiNiro's character asks a friend to drive the getaway car at a bank job. DiNiro says something to the effect that he needs someone to "man the radios and listen to the scanners" while the other robbers are in the bank.

In an earlier scene, during which the gang robs an armored car, one of the participants hears the first radio call for assistance on a scanner and begins to count-down the amount of time it should take for a patrol unit to reach the scene. Wonderful.

In the recent movie *Casino*, directed by Martin Scorsese and once again starring the ubiquitous DiNiro, as well as Sharon Stone and Joe Pesci, another, far more interesting scene relating to scanners, appears. The film, about mob-infested casino management in Las Vegas, takes place in the 1970's. In one very memorable scene, Pesci's character is describing how his band of toughs kept tabs on local law enforcement. As Pesci's voice-over informs us that they had scanners with descramblers to listen in on the FBI, the camera pans across a wall full of vintage 60's and 70's era receivers and scanners, including those big, old Regency boxes with the huge red channel indicator lamps. The prop crew did their homework on this one!

Certain manufacturers today have contracts whereby they supply radios, radar detectors, and other gear to movie studios for use in films as needed. The studios receive great props for free, and the radio manufacturer receives free publicity. It's a win-win situation, provided that scanners aren't only shown to be the toys of devious minds. There may be some interesting equipment in the upcoming major motion picture, *Twister*.

Here's a trivia question for you: What was the first known movie production that requested a scanner from a manufacturer for inclusion as a prop in a film? I have a free copy of *Monitor America* for the first person who answers this correctly. Now for some broad hints: The manufacturer that was asked was Electra and the time frame was late 60's/early 70's.

If you know of other examples of scanners on TV, in movies or in major works of fiction, please write in. We'll report the most interesting episodes in upcoming issues.

■ Reading the Mail

Paul L. Varvaro of Bradenton, Florida, writes: "I have been an avid scanner monitor for about 10 years. I have lived in the **Sarasota/Bradenton, Florida**, area for two years now and have narrowed

down the following frequencies as the best, currently active, 5X5 VHF- and UHF-band frequencies:"

460.075	Sarasota City Police F-1 Dispatch
460.125	Sarasota City Police F-2 Information
460.175	Sarasota City Police F-3
154.770	Sarasota County Sheriff F-1 Dispatch
154.875	Sarasota County Sheriff F-4 Tac
154.235	Com-C Sarasota City Fire Dispatch
154.325	ECC Manatee County Emergency Communications Center
154.370	Manatee County Fire Dispatch
150.920	Auto Club South (Bradenton)
150.950	Auto Club South (Sarasota)
453.625	SCAT Sarasota County Area Transit (County Buses)
463.850	Comcast Cable (Sarasota)
464.850	Paragon Cable (Bradenton)
461.3375	Nick Bolletterie Tennis Academy (Bradenton)
461.200	Bradenton Herald
451.100	Florida Power & Light (& 451.250, 451.425, 451.675, 451.750)
121.900	Sarasota Bradenton International Airport - Ground Control
120.100	Sarasota Bradenton International Airport - Tower
119.650	Tampa Approach/Departure Control
132.350	Miami Center Air Route Traffic Control Center (& 132.400, 128.225, 133.900)

"The Manatee County 800 MHz system includes the city of Bradenton, Bradenton Beach, Anna Maria, Holmes Beach, Longboat Key, Palmetto and the Manatee County Sheriff's Office. The system is an 800 MHz trunked system and is pretty much unscannable as far as I'm concerned. I will not bother to include the 18 frequencies as they are in any frequency book. Would you know of any modification or person who could help me obtain a radio that could monitor an 800 MHz system?"

■ Time-out for the Editor's Soapbox

Paul asks the 64 Dollar Question: "How can I monitor a trunked system?" In the case of Manatee County, an Ericsson system is in use. Everyone who lives near one of these systems absolutely dreads them. "Anti-scanning" tones are played after each radio transmission, and buzzsaw sounds and other jingles may be rotated throughout the repeater channels. There are boards available which will eliminate these noxious noises.

Trunking is now quite prevalent throughout the metropolitan areas of our nation and around the world. As a matter of fact, Florida may be the state with the highest percentage of trunked system installations. Counties throughout the Sunshine State (except for the Panhandle) have been setting up these 800 MHz behemoths at an astounding rate. There are a couple of salient reasons for this growth: an exponential increase in population demands large and flexible radio systems; and, being completely flat, good coverage is not difficult to achieve.

Why some counties feel it's in their best interest to use a trunking system which completely inhibits their citizenry from monitoring is beyond me. I doubt many criminals would monitor a basic trunked system: They wouldn't put up with the channel hopping. There's no need for the added accoutrements that require added air-time. Actually, many systems which employ these tones have dropped some of the sinister sounds. Again, I'm no technical whiz. There may be another reason for these tones of which I'm not aware.

If a reader has any information on this, please write in and straighten me out. Anyway, trunking—be it Motorola, Ericsson/GE,

or Johnson—will have to be tabled for discussion in greater detail in future articles.

■ Back to the Mail

A reader from the Twin Cities area was kind enough to write in regarding the January '96 scanner column—the last of the previous editor's reign. Mr. Bob Schultz writes that while the trunked frequencies listed for **Bloomington IN** in the "Frequency Exchange" are correct, he has questions concerning the conventional frequencies that were submitted, as follows:

45.65	Police	The frequencies should be in .020 MHz steps. 45.66 is an intersystem frequency for police, but Bloomington itself is not licensed to use either 45.64 or 45.66.
153.820	Fire	Frequencies in this band are generally in .015 MHz steps. 153.830 is an intersystem/fireground channel for which Bloomington is one of 40-plus licensed users. Bloomington is not licensed to use the other side of that alleged frequency, 153.815.
154.875	Police	Bloomington was licensed to use the frequency, but as of October '95, Apple Valley is the only metro city licensed for the channel.
154.400	Fire	Not listed in any of the common frequency books as being used.
154.050	Fire	Again, this is not a valid frequency. In the metro area, 154.055 is only licensed for use by the city of Minneapolis and Hennepin County.

What was *not* listed was Bloomington Fire, with a call sign of KAI670, operating on 154.070.

■ Back on the Soapbox !

Thanks, Bob. You've pointed out a bone of contention I've had for many years with frequency reports. Because it is very difficult to verify the accuracy of the letters our readers are kind enough to write, everyone should be as careful as possible to ensure that the transmission they're receiving is not an image and is "on frequency." Yes, I know; the FCC is in the process of re-farming the bands, but in almost all cases today, agencies are licensed for pre-determined channels which fall in steps as Bob has outlined in the examples above.

Please don't take this as a scare tactic, but whenever off-frequency reports are submitted, I have to consider the entire letter suspect. One of the best ways to ensure that you're on target and "on frequency" is to utilize any of the frequency books, or scanner how-to guides on the market for novices, which list the FCC-authorized channels.

■ Wrapping It Up

Mark Perniciaro writes: "I've been a scannist for ten years and an EMT. Here is a list from **St. Bernard Parish, Louisiana**, which lies approximately ten miles from downtown New Orleans. St. Bernard is my hometown. Hope your readers enjoy. (All frequencies below are for St. Bernard):"

453.900	Sheriff F-1/F-3
453.650	Sheriff F-2/F-4
453.875	Sheriff F-5
153.950	Fire Department Dispatch
154.385	Fire Department Dispatch
154.010	Fire Department Fireground

154.280	Fire Department Mutual Aid
453.925	Schools
153.800	Civil Defense/Road & Maintenance Department
154.965	Civil Defense/Road & Maintenance Department
155.220	Civil Defense
153.935	Civil Defense
155.055	Water Board
155.145	Levee Board

Mark also writes that during the Mardi Gras season, parade operations for the police in St. Bernard are F-2/F-4 (which generally indicates F-2 is the repeater and F-4 is simplex on the same repeater-out channel). Fire and Civil Defense are also active.

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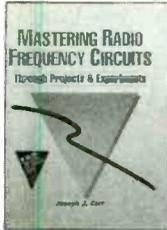
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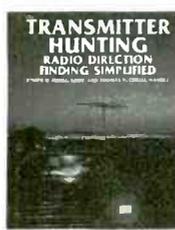
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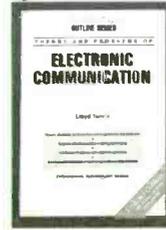
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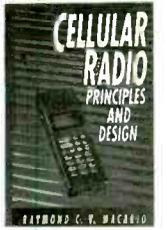
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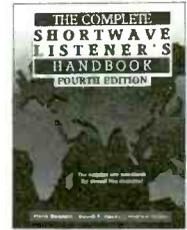
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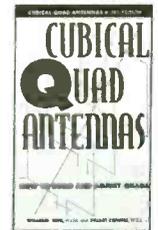
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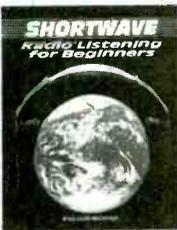
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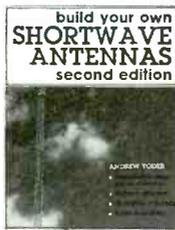
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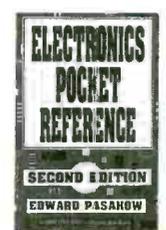
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Air Force MARS: Going, ...Almost Gone

Utility World regular, Paul Swietek, has checked in again with the latest information on the continued downsizing of the U.S. Air Force (USAF) military affiliate radio system (MARS) program. Here is the latest scoop:

"As of right now there are no military or amateur affiliate USAF MARS stations left overseas. Headquarters USAF MARS has given the order to all overseas stations to cease operations.

"This means that the only active stations left are the amateur affiliates located in the United States. That order was issued just after the October 1995 directive which ordered all continental United States (CONUS) military stations to shut down. The operators at all the shutdown stations have been manning those outlets on a voluntary basis until they receive their transfer orders. At this point it appears that all the operators have finally been transferred out.

"The civilian MARS operators are still conducting their usual nighttime affiliate nets, but without any military stations to pass or originate traffic we have spent the last two months listening to static.

"The Army and Navy MARS programs still have 24-hour overseas gateway stations. In fact if we have any transcontinental or CONUS traffic we have to send the messages through them, but the delays are longer.

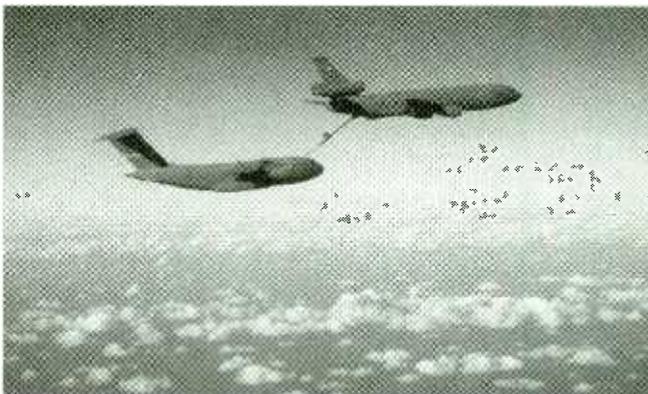
"For example, AGA80S (Osan AB, Korea) is still connected digitally to Army MARS units locally. A message from that station has to go through the Army MARS station in Osan through the Army MARS system then back into the Air Force MARS system stateside for delivery. In addition, USAF MARS headquarters has not issued any new callsigns for overseas use.

"Effective October 1, 1996, the Chief USAF MARS has directed all USAF MARS stations to cease operations using Morse code (CW), radioteletype (RTTY), and voice operations. The sole mode of transmission left for USAF MARS members to use is HF packet. Those affiliate members who can't make the change after that deadline will have their affiliate licenses terminated. Overseas phone-patch stations have also been told to cease operation as well."

Looks like the Air Force MARS program will pretty much cease to exist within the next year. Thanks to Paul for bringing our MT readers up to date.

■ Operation Joint Endeavor Follow-up

Gerbrand Diebels of the European utility group SC-MAC has provided



this column with information on communications associated with Operation Joint Endeavor in Bosnia. This updates what was presented in the February MT feature, "Monitoring Joint Endeavor Communications," page 14.

Now that the operation has started in earnest, some frequencies that had been in use by the United Nations (UN) have disappeared, but new frequencies have been overheard being used by NATO forces. Here is a rundown

of the frequencies that have been cataloged by SC-MAC to date.

The UN airbridge frequency 5462.0 kHz is not in use anymore. Since the UN has been relieved by the IFOR force, the airbridge mission in Sarajevo has ended. Gerbrand reports that this frequency is being used by callsign "Bookshelf." Bookshelf is the callsign used by the USAF EC-130 ABCCC (Airborne Battlefield Command and Control Center) aircraft.

There are several other new "Bookshelf" frequencies in use and these include:

5110.0 kHz	Close Air Support frequency
5462.0 kHz	Aviano 42 ACCS Ops/CAOC Ops
5712.0 kHz	Close Air Support frequency
8046.0 kHz	Aviano 42 ACCS Ops/CAOC Ops

The Deny Flight voice-tell frequencies are still in use, but not as often as they used to be. SC-MAC members assume that they are currently being used by stations monitoring only the skies over Bosnia. Lately the following voice-tell frequencies have become more active.

2839.5 kHz (Channel 18)	2841.5 kHz
2842.5 kHz	4470.0 kHz
6721.5 kHz (Channel 12)	6723.0 kHz (Channel 19)
6939.0 kHz	6940.5 kHz

If you compare this list with the one we ran in the February issue, these frequencies are very close to the ones presented there. Stations working on these frequencies are most likely U.S. Navy ships and some others. The majority of the callsigns heard are single letter calls like those heard on the Navy FT nets and the callsign "Red Crown."

New link coordination frequencies include: 2150.0 kHz (new primary), 5707.5 kHz, and 5828.0 kHz. The old primary of 4763.0 kHz is rarely used anymore.

NATO AWACS aircraft are still using the frequencies with the A, K, and N designators that we reported in the February issue, but they have now added a new series of frequencies and designators. This new HF network uses X designators. The callsign for NATO AWACS



aircraft is "Magic ##." Frequencies and designators identified so far include:

5691.0 kHz (Channel X?)	6754.0 kHz (Channel X?)
8980.0 kHz (Channel XD)	10315.0 kHz (Channel X?)

A new Italian Sector Operation Center (SOC) frequency has been discovered. The callsign associated with this SOC is "Batina" and the frequency is 3050.0 kHz.

Another set of new frequencies that has been discovered is for the 352 SOG at Brindisi. These two new frequencies are 10598.0 and 14511.0 kHz.

There are several unconfirmed frequencies that Gerbrand sent along. Some of these frequencies could be the most interesting to listen to. Any confirmations on this list would be appreciated.

4612.0 kHz	Tuzla air base, callsign "Eagle Base"
7922.0 kHz	J-STARS aircraft flying from Frankfurt
7997.0 kHz	J-STARS aircraft flying from Frankfurt
13208.5 kHz	Tuzla air base, callsign "Eagle Base"

SC-MAC has also been able to put together an impressive list of callsigns associated with Operation Joint Endeavor. Remember that this is a NATO operation and the forces are known as IFOR (Implementation Force).

IFA ##	Belgium Air Force aircraft
IFB ##	CanForce transport aircraft reported flying out of RAF Lyneham (aircraft selcal in parenthesis): C-130 aircraft: tail nos 130310 (FM-GH), 130311 (GH-AD), 130315 (FM-EK), 130316 (GH-BD), 130317 (FM-DL), 130320 (GH-AC), 130328 (FM-DK), 130331 (GJ-BF), 130335 (GJ-BE), 130342 (GJ-BD), and a CC-137 aircraft, registration # 13704 (FM-KL).
IFC ##	French Air Force aircraft
IFD ##	German Air Force aircraft
IFF ##	Greek Air Force aircraft
IFG ##	Italian Air Force aircraft
IFH ##	Unidentified NATO Air Force aircraft
IFI ##	Royal Netherlands Air Force aircraft
IFJ ##	Royal Norwegian Air Force aircraft
IFK ##	Portuguese Air Force aircraft
IFL ##	Spanish Air Force aircraft
IFM ##	Turkish Air Force aircraft
IFN ##	Royal Air Force (UK) aircraft
IFO ##	U.S. Air Force aircraft involved in Bosnia Joint Endeavor Ops
IFO 1-30	U.S. Air Force C-130 transport aircraft
IFO 50-80	U.S. Air Force C-5, C-17, C-141 transport aircraft

I would like to thank Gerbrand Diebels and the entire SC-MAC team for their assistance and information used in this month's column. You can find out more about the SC-MAC group by writing: SC-MAC, Postbus 644, 5700 AP Helmond, The Netherlands.

■ Where is 3E7?

Recently the question has come up on the WUN Internet group about what frequency is associated with the designator 3E7. While I can't answer that question specifically, the frequencies below are possible listening targets for the 3E circuit designator series.

The 3E frequencies are believed to be Coast Guard ship/shore enforcement channels. Coast Guard sources indicate that the majority of the traffic on these frequencies is scrambled. Here is a list of these ship/shore frequencies:

2016 2040 2054 2161 4913.5 5108.5 5217 5223 5266 5272
 5419.5 5942.5 6961 7439 7577 7617 7626 7754.5 7845 7884
 7909 9169 9291 9332 9373 10297.5 10338.5 10354.5 10378
 10675 10759 10788 10929.5 10933.5 11024 11045 11157.5
 13413 13484 13537.7 13950 14506 14518.75 14731 14752
 14919.2 18189 18230 18255 18283 18335 18497 18650 18716
 20095 20137 20518 20639 23373 23575

If you have a frequency update or a 3E designator for any of the Coast Guard frequencies above, we would like to hear from you at: steditor@grove.net.

■ Numbers Stations and the Internet

We have seen an explosive growth in the number of people on the Internet over the last year. That growth has been accompanied by an increase in the number of world wide web sites devoted to utility listening information. If you are a numbers fan here are several sites on the web that might interest you.

IWR's IntelWeb site provides free access to numerous documents on intelligence agencies from around the world. There are several intelligence related documents archived at this site as well as a recommended book list, frequently asked questions (FAQ) list, and research papers. This is the most complete information resource on intelligence agencies in both the private and public sectors. The URL address is: <http://www.awpi.com/IntelWeb/>.

Numbers buffs have three specific web sites they can visit. A multimedia page, complete with numbers stations recordings, can be found on the CONET Project URL at: <http://www.ibmpcug.co.uk/~irdial/conet.htm>. Two individuals with their own private pages are Mike Chace at: <http://itre.uncecs.edu/radio/numbers.html>, and Chris Smolinski's page at: <http://www.access.digex.net/~cps/numbers.html>.

If you want to learn about the Canadian equivalent to our National Security Agency, then a visit to the unofficial Communications Security Establishment home page is a must. There is even a link off this page to the official homepage of the CSE. Point your web browser to URL: <http://watserv1.uwaterloo.ca/~brobino/cse.html>.

If you have a web site with HF utility information on it, we would like to hear from you. You can reach me via email at the email address above.

■ DoD Flight Information Publications

For years, military monitoring buffs have used DoD Flight Information Publications as a valuable resource in their monitoring post. These publications are a true treasure trove of military frequencies and callsigns. Listeners wanting to get copies of these publications used to order them directly from the Defense Mapping Agency (DMA), but that has now changed.

The DMA in St. Louis, Missouri, no longer provides Flight Information Publications. The National Oceanic and Atmospheric Administration (NOAA) now has this duty. You can call them at (301) 436-6990, and request a catalog of all the DoD aeronautical charts and publications they currently sell. You can buy either single copies or get a yearly subscription to your favorite DoD publication or chart. Complete information, including order blanks and pricing, is available in the NOAA catalog.

Now it is time to see what you have been hearing this month in the utility world.

Abbreviations used in this column

ALE	Automatic Link Establishment	GANTSEC	Greater Antilles Section
AM	Amplitude Modulation	GHFS	Global HF System
AMVER	Automated mutual-assistance vessel rescue system	HF	High Frequency
ANDVT	Advanced Narrowband Digital Voice Terminal	HFDL	High Frequency Data Link
ARQ	Synchronous transmission and automatic repetition teleprinter system	ID	Identification
ARQ-E3	Single channel ARQ teleprinter system	JCS	Joint Chiefs of Staff
ASECNA	Agence pour la Securite de la Navigation Aerienne en Afrique et a Madagascar	LSB	Lower Sideband
ATC	Air Traffic Control	MARS	Military Affiliate Radio System
AWACS	Airborne Warning and Control System	Meteo	Meteorology
CanForce	Canadian Forces	MFA	Ministry of Foreign Affairs
CCG	Canadian Coast Guard	M/S	Motor Ship
CG	Coast Guard	M/T	Motor Tanker
COMSTA	Communications Station	M/V	Motor Vessel
CW	Continuous Wave (Morse code)	Ops	Operations
DSN	Defense Switching Network (old Autovon)	Pirap	Pilot Report
EAM	Emergency Action Message	QRG	"Your exact frequency is..."
ETA	Estimated Time of Arrival	Ro/Ro	Roll on/Roll off
FAX	Facsimile	RTTY	Radioteletype
FF	French Forces	SAR	Search and Rescue
		SATCOM	Satellite Communications
		Satcal	Selective Calling
		SITOR-A	Simplex teleprinting over radio system, mode A
		Unid	Unidirectional
		U.S.	United States
		USAF	U.S. Air Force
		USB	Upper Sideband
		USCG	U.S. Coast Guard
		USCGC	U.S. Coast Guard Cutter
		USN	U.S. Navy

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

- 312.0 SN-NDB Saipan, sending callsign in CW at 0145. (Jon Van Allen-underway aboard M/V *President Monroe*)
- 317.0 YP-NDB Yap Island, Micronesia, sending callsign in CW at 0140. (Van Allen)
- 332.0 GRO-Unid Beacon, north of Guam sending callsign in CW at 0150. Unlisted. (Van Allen)
- 385.0 AJA-Guam sending callsign in CW at 0135. (Van Allen)
- 2514.0 VCS-CCG Halifax Radio, NS Canada, at 0505 concluding radiotelephone traffic with 3EKU5-M/V *River Plate* (on 2118). (RD Baker-Austintown, OH)
- 2670.0 NMG-USCG COMSTA New Orleans, LA, at 0056 working WBVV-M/V *Exxon Charleston*, request if they can take the vessel they are assisting in tow until a USCGC can meet up with them and relieve them of the tow. (Baker-OH)
- 3032.0 Uncle Joe working Nighwatch 01 on W-100, but station Infinite doesn't show up. The two station move back to 4742 (X-209) at 0522. (Duke Rumley-Madison, NC)
- 3113.0 Nightwatch 01 working players in his net. ID'ed the frequency as S-301 versus the previously listed S-302 at 0712. Beatback working Deerhorn at 1434. (Haverlah-TX)
- 3123.0 NMG-USCG COMSTA New Orleans at 0337 working Rescue 2122. (Baker-OH)
- 3286.5 CKN-Vancouver Military, BC, Canada, at 0603 using 75/850 RTTY with ID and NAWMS marker. (Baker-OH)
- 3369.0 Deerhorn working Nightwatch 01 on S-303 at 0658. (Haverlah-TX)
- 3494.0 N504M with phone patch to Challenger 094M discussing diversion of flight due to weather at 0152. (Terry Jones-Plankinton, SD)
- 4131.0 C6LG5-M/S *Dreamward* at 2327 (Norwegian Cruise Lines 41,000 GWT cruiseship) working WOM for radiotelephone traffic. (Baker-OH)
- 4154.5 IBH-? unknown Italian navy vessel at 0631 working unid station, possibly ICT-Italian navy Tarento, with RTTY coordination traffic. At 0633, DRKM-FGS *Rhon* (A-1443), German Navy replenishment tanker working DHJ59-Wilhelmshaven naval, with 1 priority msg to send. At 0637, DRAS-FGS *Rheinland-Pfalz* (F-209), German navy frigate working DHJ59 with RTTY coordination traffic. (Baker-OH)
- 4206.0 UTIZ-TKH *Novogorod* at 2320 in SITOR-A with crew telegrams to St Petersburg. (Baker-OH)
- 4212.0 WLC-Rogers City Radio, MI, at 1640 in SITOR-B with MAFOR broadcast for Great Lakes, buoy/ship weather observations, announcement of reduced hours. (Baker-OH)

- 4260.0 TBA-Ankara Naval Radio, Turkey, with CW marker at 2317. (Richard Parker-Amherst, NY)
- 4275.0 HPP-Panama Intelmar Radio, Panama, with CW marker at traffic list at 2324. (Parker-NY)
- 4292.0 IAR-Rome Radio, Italy, with CW traffic list at 2326. (Parker-NY)
- 4300.0 KEJ-Global Wireless, Hawaii, with SITOR-A idler at 1302. (Jack Dix-Yonkers, NY)
- 4369.0 WLO-Mobile Radio, AL, with ship to shore telephone calls at 0503. (Jones-SD)
- 4384.0 VAI-Vancouver Radio, BC, Canada, with marine weather for Bering Sea area at 0700. (Jones-SD)
- 4387.0 EHY-Madrid Radio, Spain, at 0605 with traffic list, announcements in English and Spanish, next list to be 1003. (Baker-OH)
- 4395.0 Charlie Whiskey, Charlie Bravo, Charlie Foxtrot, and others at 0039 "just keeping the circuit open." (Gordon Levine-Anaheim, CA)
- 4421.0 Jolly 11-USAF helo on SAR duty at 1958 working "Command Post" after moving from 6714, advised at 1000 feet, first time heard here on this freq. (Baker-OH)
- 4665.0 C102-Israeli Mossad number station using AM at 0140. (Dix-NY)
- 4724.0 Roadside at 0716 calling Mainsail. Found later in day in the Nightwatch net past 1900. (Haverlah-TX)
- 4742.0 Infinite calls Mainsail and Nightwatch with no reply at 0458. At 0515, Uncle Joe tells Infinite to meet Nightwatch on 3032 (W-100). (Rumley-NC)
- 4982.0 SAM 201-USAF C-20B (tail no 86-0201) at 2045 working Andrews on "197" with radio checks. (Baker-OH)
- 5015.4 UPTI-Ponte Delgada Naval Radio, Azores, with 48/802R RTTY RY's, foxes, and 10 count at 0306. (Robert Hall-Capetown, RSA)
- 5026.0 Nightwatch 01 calling Skytrail on S-305 at 0323. (Haverlah-TX)
- 5320.0 NMN72-USCG Station Oak Island, NC, at 0601 working NORW-USCGC *Jefferson Island* (WPB-1345) regarding a new HFDL frequency. (Baker-OH)
- 5320.5 RETYMR-Guardia Civil, JECOR Ciudad Real, Spain, at 0805 in SITOR-A 100/425, with several telexes sent. (Baker-OH)
- 5696.0 NMR1-GANTSEC, USCG Greater Antilles Section, San Juan, PR, "CG San Juan" at 0705 working Rescue 1713 (HC-130) regarding a distressed vessel attempting communications on VHF Channel 16. (Baker-OH)
- 5700.0 Skytrail working Nightwatch 01 here after being run off of 5800.0 due to cochannel Spanish language communications. Skytrail asked Nightwatch 01 to try P-380, and Nightwatch 01 advised that he was not authorized the use of that frequency. Per MT's OR bandplan list, 5684.0 is authorized for the USAF ALE. (Haverlah-TX) *Fascinating log Jeff. Maybe they are starting to comply with the new bandplan now. I wonder what that does to 5684 status as P-380-Larry.*
- 5800.0 Teamwork working Nightwatch 01 at 1349. (Haverlah-TX)
- 5890.2 RBV78-Tashkent Meteo, Uzbekistan, with a poor fax (60/288) weather chart at 0121. (Hall-RSA)
- 6299.5 SWHT-M/V *Orion* at 2111 in CW calling SVE-Athens Radio, Greece. (Baker-OH)
- 6302.5 EMNT-TKH *Zhitomir* at 2146 in 50/170 RTTY to UUI-Odessa Radio, Russia (ODS/RMP) with crew telegrams. (Baker-OH)
- 6304.2 UHBS-TKH *Olenegorsk* at 2316 in 50/170 RTTY to UAT-Moscow Radio, Russia, no joy. (Baker-OH)
- 6305.5 UUYU-TKH *Georgiy Chicherin* at 2325 in 50/170 RTTY to UUI-Odessa Radio. (Baker-OH)
- 6325.5 WLO-Mobile Radio, AL, with SITOR-A news at 0135. (Hall-RSA)
- 6342.0 'V'-Single Letter HF CW marker at 1129. (Dix-NY)
- 6357.0 SAA-Karlskrona Radio, Sweden, with CQ CW marker at 0118. (John Newby-Jamestown, CA)
- 6421.5 FFL-St. Lys Radio, France, with CW marker at 0013. (Parker-NY)
- 6480.0 9GX-Tema Radio, Ghana, with CW marker at 0632. (Parker-NY)
- 6616.5 Beijing ACC, China, three stations talking in Chinese language at 0659. (Parker-NY)
- 6637.0 Miami Radio working Pioneer 7046, Emory 509, Connie 61 Charlie, and Connie 801 at various times. (Levine-CA)
- 6683.0 SAM 204-USAF C-20B (tail no 86-0204) at 1727 working Andrews VIP for radio checks. (Baker-OH)
- 6691.0 Cablecar at 1721 working Cold Duck with data coordination, aircraft to aircraft chat, on frequency "Charlie Alpha". (Baker-OH)
- 6694.0 CFH-Halifax Military, NS, Canada, at 1956 working NQ67 with phone patch to Sidecar, advised is XAE, request he shift to Golf 7. (Baker-OH)
- 6712.0 Andrews GHFS with a 26-character EAM at its common H+17 transmission time. Andrews went straight into the string without first transmitting the preamble three times. (Haverlah-TX)
- 6715.0 CanForce Vancouver military working LQ 820 at 0050. (Haverlah-TX)
- 6730.0 Executive Foxtrot One working Andrews VIP enroute to Little Rock at 1559. Andrews working Nightwatch 01 at 0301. (Haverlah-TX)
- 6739.0 McClellan GHFS with lead station EAM at 1516. Nothing unusual about this except almost every Saturday there is an EAM from 1515-1520. It'll be quiet for hours then bang, an EAM every Saturday. Reliable calling Mainsail at 0021 then short test count. Reliable might have been a ground station. (Haverlah-TX)

6745.0	CHR, Trenton Military, Ontario, at 0553 in USB working IFB37 (aircraft on Bosnia mission) with weather, advised 4703 secondary. (Baker-OH)	10665.0	Spanish female 4-digit numbers station in USB at 0305, parallel to 11606. (Sumner-IL)
6750.0	Link 11 transmission noted here on a number of days with a pulse count varying between 11 and 12. (Haverlah-TX)	11175.0	USS <i>Defender</i> calling USS <i>Pelican</i> and USS <i>Pelican</i> calling Devastator/ USS <i>Heron</i> at 1609, no one made contact. Camera H.F. with phone patch to Mountain Top via Elmendorf at 1833. "Negative contact via SATCOM, will call back in five mikes." Mountain Top is at Elmendorf. Aspen 33 (SR-71) with a radio check at 1615. (Rick Roop-Sacramento, CA) Reach 017PE (tail number 70005) self ID'ed C-141 with phone patch to McChord CP at 1845. (Cawby-WA) Raider 45 (KC-130) working Offutt GHFS with phone patch to Raider Base Ops (DSN 997-4864, VMGR-352 El Toro, CA) at 1754. (Greg Brazil-Albany, CA)
6761.0	SAM 201-USAF C-20B (tail no 86-0201) at 1650 working Andrews VIP with radio checks. TROUT 99 at 1737 working Andrews with phone patch to AFOC with landing info. (Baker-OH)	11214.0	Dragnet Sierra working Trenton military with a phone patch to Nightwatch 01 (DSN 887-xxxx) getting working frequencies for the net in order to conduct some tests at 1722. (Haverlah-TX)
6796.0	Spanish female 3/2-digit numbers station in AM at 0402. (Rick Sumner-Olney, IL)	11220.0	SAM 200-USAF C-20B (tail # 86-0200) at 2130 working Andrews. (Baker-OH)
6993.0	SAM 201-USAF C-20B (tail no 86-0201) at 2026 working Andrews VIP, inbound to Richmond diverting from Andrews due to snowstorm. At 2047, SAM 787 (apparently a E-4B 74-0787) working Andrews with phone patch Andrews meteo for weather at OOMS at 2230. (Baker-OH) SAM 787 (E-4B) enroute to Europe carrying the Secretary of Defense and the JCS Chairman working Andrews at 2329. Andrews also ID'ed the aircraft as Gordo 15. (Haverlah-TX)	11229.0	Pinetree working Goatpen at 2041. (Haverlah-TX)
7475.0	WAR46-Alternate National Military Communications Center, Raven Rock Mountain, PA, at 2051 working Nightwatch 01 on W-104 with communications checks. (Baker-OH) Teamwork working Nightwatch 01 at 1350. At 1416, the frequency lit up with a waterdripper. (Haverlah-TX)	11244.0	McClellan GHFS at 2110 working Foul Line. Unable to contact station Nightwatch and confirms active frequencies. (Baker-OH) Inlaw 43 (C-130) with a phone patch to Bicycle Lake via McClellan at 2129. (Roop-CA) KKN50-MFA Washington, DC, with CW ID and data at 2059. (Newby-CA) YLEI-TR <i>Ekholots</i> at 1708 in 50/170 RTTY to UQK (old Riga Radio callign). (Baker-OH)
7482.0	Spanish female 5-digit numbers station in AM at 0413. (Sumner-IL)	11455.5	EMPL-BATM <i>Kapitan Buga</i> at 1902 in 50/170 RTTY to UTSW-RTMKS <i>Kapitan Orlikova</i> with administrative traffic. (Baker-OH)
7831.0	Skytrail noted here from 6730 calling Nightwatch 01 at 0235. Rollback working Nightwatch 01 at 1845. (Haverlah-TX)	12566.0	UCE/UGE-Arkhangelsk Radio, Russia with CQ CW marker at 1301. (Dix-NY)
8026.5	Unid Egyptian embassy at 0558 in 100/425 SITOR-A with ATU-80 traffic. (Baker-OH)	12568.0	JCU-Chosi Radio, Japan, with CQ CW marker at 0143. (Newby-CA)
8180.0	Spanish female 5-digit numbers station at 1002 (Friday UTC) in AM. (Newby-CA)	12795.0	HLG-Seoul Radio, South Korea, with CQ CW marker at 0142. (Newby-CA)
8297.0	KZU-Gulf Fleet Marine, Harvey, LA, at 0714 calling the tug WSF2730-EI Falcon Grande, no joy. (Baker-OH)	12878.0	KPH-San Francisco Radio, CA, with CW marker at 1555. (Parker-NY)
8303.0	LOR-Argentine navy, Puerto Belgrano, Argentina, at 0625 in 75/170 RTTY with navigation aids broadcast. (Baker-OH)	12935.0	IAR-Rome Radio, Italy, with CW traffic list at 1613. (Parker-NY)
8303.0	LOR-Argentine navy, Puerto Belgrano, Argentina, at 0625 in 75/170 RTTY with navigation aids broadcast. (Baker-OH)	13002.0	WCC-Chatham Radio, MA, with CQ CW marker at 1851. (Sue Wilden-Columbus, IN)
8396.0	EOYW-RTMS Arabat at 1956 in 50/170 RTTY crew telegrams traffic to Kerch Radio. (Baker-OH)	13011.0	UDK2-Murmansk Radio, Russia, with CW marker at 1617. (Parker-NY)
8408.5	UBRJ-TKH <i>U/banskiy Zaliv</i> at 2238 in 50/170 RTTY RYRY/DE to UIW with admin traffic. (Baker-OH)	13033.5	Wheaties working Thule GHFS with phone patch to VQ4 opcon at common DSN 339-xxxx at 2119. (Haverlah-TX)
8452.0	VIT-Townsville Radio, Australia, with V CW marker at 2100. (Dix-NY)	13050.0	WISE 63 at 1957 working Plantation Ops (Hurlburt Field) with HF radio checks. (Baker-OH)
8466.0	UIW-Kaliningrad Radio, Russia, with CW CQ marker at 1227. (Dix-NY)	13200.0	Roadside calling Nightwatch 01 at 1946. (Haverlah-TX)
8505.0	UFZ-Vladivostok Radio, Russia, (ex-UKA) with DE CW marker at 1248. (Dix-NY)	13211.0	RFQP-FF Djibouti with ARQ-E3 100/389 at 1249. (Hall-RSA)
8527.0	OBY2-Paita Radio, Peru, with CQ CW marker at 1229. (Dix-NY)	13211.0	ZRO3-Pretoria Meteo with 75/386N RTTY weather codes at 1241. (Hall-RSA)
8580.0	RKLM-Arkhangelsk Radio, Russia, with CW message "4LY de RKLM QSX 8367.5K" at 1235. (Dix-NY)	13444.3	RFTJ-FF Libreville, Gabon, with an idling ARQ-E3 192/362 signal at 1245. (Hall-RSA)
8580.0	RKLM-Arkhangelsk Radio, Russia, with CW message "4LY de RKLM QSX 8367.5K" at 1235. (Dix-NY)	13542.0	HBD20-MFA Berne, Switzerland, with SITOR-A 5-letters groups at 1421. (Dix-NY)
8968.0	CanForce Trenton military active on frequency complaining about GHFS interference (a 20-character EAM rotation for Tachometer and Tradex) at 1950. Offutt as lead station with a 26-character EAM at 1515 and 1519 (typical Saturday EAM window). Partway into the transmission of the 1519 string, there was a weak two pulse tone caught by the mike of the operator and within a couple of seconds, the EAM string was disregarded for a Foxtrot broadcast. (Haverlah-TX) Bandsaw Kilo working Steeljaw 02 at 2300. (Don Storck-Hemlock-MI)	13543.8	U.S. Army MARS net at 2155. (Levine-CA)
8968.0	CanForce Trenton military active on frequency complaining about GHFS interference (a 20-character EAM rotation for Tachometer and Tradex) at 1950. Offutt as lead station with a 26-character EAM at 1515 and 1519 (typical Saturday EAM window). Partway into the transmission of the 1519 string, there was a weak two pulse tone caught by the mike of the operator and within a couple of seconds, the EAM string was disregarded for a Foxtrot broadcast. (Haverlah-TX) Bandsaw Kilo working Steeljaw 02 at 2300. (Don Storck-Hemlock-MI)	13965.5	RFVI-French Forces Le Port, Reunion Island, at 1855 in ARQ-E3 idling in 100/425. (Baker-OH)
8992.0	Pearl 61 at 2029 working MacDill GHFS with phone patch to Pearl Ops checking on if runway is open. (Baker-OH)	14402.0	AAA6USA-Fort Sam Houston, TX, central Army MARS gateway, at 1826 in 300 baud Packet working AAA0USA-Fort Lewis, WA, Army MARS western gateway. Note the first "A" in each callign is dropped to conform to packet protocol. (Baker-OH)
9007.0	IFB01-Canadian Forces aircraft on Bosnia IFOR mission at 0551 working Trenton military. (Baker-OH)	14801.3	RFTJ-French Forces Dakar, Senegal, at 1828 in ARQ-E3 idling in 192/425. (Baker-OH)
9013.0	Sidecar working C8H requesting them to move to frequency designator G-22 at 1540. (Haverlah-TX)	14877.5	SLUFF 32 at 2110 working MacDill GHFS with phone patch to Wright-Patterson command post then meteo, Prep IDs aircraft as a C-130 Hercules. (Baker-OH) Bushpilot (<i>This is the tactical call of the station I heard last year passing EAM traffic on 6697 - the old Navy HICOM-Larry</i>) calling Mainsail on 6739, 8968, and finally 15016. Starting at 0125, Bushpilot (simulcast on 8968 and 15016) a MQ4677 EAM repeated at H+25 and H+51 until 0251. This was the exact same minutestamps and length of 'event' heard in September 1995 from station Tiger Ace. (Haverlah-TX) <i>Agree Jeff, looks like Bedspreed pulled the same routine the last weekend in February 1996-Larry.</i> Whiskey Victor 450 (USN C-130T squadron out of Andrews-Larry) working MacDill at 2136. (Levine-CA)
9013.0	Sidecar working C8H requesting them to move to frequency designator G-22 at 1540. (Haverlah-TX)	15016.0	Fireplug working MacDill GHFS in voice and unsuccessful data after moving here from 11175, 11181, and 13242. (Haverlah-TX)
9014.0	Chalice Bravo working Raymond 7 phone patch to radar maintenance at 1658. Tail number of this AWACS aircraft was 005 (probably 81-0005). (Haverlah-TX)	15043.0	VNA Hanoi, Vietnam, with 48/479N RTTY news in French at 0621. Not listed in Klingenfuss guides. (Hall-RSA)
9016.0	McClellan working MacDill in voice and attempted data at 1526. (Haverlah-TX)	15742.8	KEOD-SS <i>Nuevo San Juan</i> at 1614 in SITOR-A with telex for bunkers/ballast status, login 10631 KEOD. (Baker-OH)
9017.0	Nightwatch 02 at 2049 working Nightwatch 01, attempting to relay communications for WAR46, request move to W-104. (Baker-OH) Knapsack working Nightwatch 01 in the clear and ANDVT at 1447. Goatpen with 20-character EAM to his net (picked up by the GHFS a 1701), simulcasting the thing on 9017.0, 8968.0, and 11244.0. Almost all EAM transmissions on the Nightwatch nets are simulcast on the primary net freq, 6739.0, 8968.0, 11244.0, and sometimes 15016.0, or variations of same. (Haverlah-TX) Nightwatch net including: Brown Rat, Pullmotor, Fullback, and Eyetooth. Billybob advising Candyman "HF data has changed to Channel Charlie Alpha" at 1841. (Matthew Cawby-Mountlake Terrace, WA) <i>Charlie Alpha is 6691. Welcome to the column, Matthew-Larry.</i>	16690.5	WGJT-SS <i>Kaimoku</i> (U.S. flagged Ro/Ro container ship) at 1714 in SITOR-A with QRG report via KFS. (Baker-OH)
9057.0	Kiwi bird calling Nightwatch 01 then moving back to 9017 at 2300. (Haverlah-TX)	16706.5	UOIY-TH <i>Kapitan Leontiy Borisenko</i> working Odessa at 1153 using 50/170N RTTY. (Hall-RSA)
9073.0	Loran station Kodiak working Loran station Attu with radio checks every 20 minutes from 2000-2330. (Cawby-WA)	16785.5	YLGA-TN <i>Rumbula</i> working Riga at 1130 using 50/170N RTTY. (Hall-RSA)
9130.2	GYA-Royal Navy London with a standard 75/837R RTTY availability tape at 1750. (Hall-RSA)	16796.5	LYHC-MB <i>Kaliningradets</i> working Kaliningrad at 1222 using 50/170N RTTY. (Hall-RSA)
10131.8	TNL-ASECNA Brazzaville, Congo, with 50/399R RTTY weather codes (used to be ARQ-E3/48 mode) at 1219. (Hall-RSA)	16800.6	KPH-San Francisco Radio, CA, with CW traffic list at 2052. (Wilden-IN) Outface calling Nightwatch 01 at 2107. (Haverlah-TX)
10224.8	WNSX-Unid station calling GFSB, Tiptoe, and Tantrum using RTTY at 1715. (Jerry Johnson-Ozark, MO)	17016.5	
		17992.0	

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AFGHANISTAN [non?] R. Message of Freedom back on 6145 ex-6235 // 7090v (BBC Monitoring)

ANTARCTICA Contrary to last month's info, CPO Brady Bautch at McMurdo says AFAN has been gone for 5 years, and the SW transmitter was returned to US in 1995 (Hans Johnson, *Cumbre DX*)

BAHRAIN Gulf News Agency, now known by Arabic acronym: WAKH for *Wakalat Anba al-Khalij*, broadcasts on RTTY, F1B mode, 75 baud at 0500-1500 in Arabic on 14764, 9197; 1500-1700 English on 14764, 4043, 1700-2100 Arabic on 14764, 4043. Times vary and frequencies actually 14761v, 9195v, 4039v. Address: P O Box 301, Manama; fax: +973-687008 (BBCM)

BOUGAINVILLE R. United Bougainville, P. O. 268, Buku, on 3870 at night, 6010 day with 70 watts, not affiliated with NBC but promotes peace. Controller verified after 16 months apologizing for slow mail, with 2-page letter. Plans for 10 kW station at Buku have not been fulfilled. Now heard on 3875 (Arthur Cushen, *NZ DX Times* and *RNZI Mailbox*) QSL letter from Emilouyse K. Tenoa, Public Awareness Campaign Unit, Box 268, Buka. Phone/fax: 675 968001. Says licensed for 3880/3870 at night, 6010 day, at Loholo, east coast of central Bougainville, on air daily 0900-1100. Owned and funded by Bougainville Transitional Government (John Wright, ARDXC via George Thurman)

CANADA In a late-January cabinet shakeup, Lloyd Axworthy became minister of Foreign Affairs, and Sheila Copps became Heritage Minister and Deputy Prime Minister. Minister Copps subsequently said she "guarantees RCI's survival until 31 March 1997 at the amount of money in the last budget, shared by the federal government and CBC." (RCI *Mailbag* via Diane Mauer) While somewhat relieved, the Coalition to Restore Full RCI Funding urged continuing pressure, emphasizing the need to resume at least the 1990 funding level with seven additional languages. New address for the Coalition website: <http://www.accent.net/csn/RCI.html>. Note that "RCI" must be in caps (via Bill Westenhaber, Wojtek Gwiazda, Doug Dine, Diane Mauer, Rob Peebles)

Juneau Report calls for 7.5% tax on telephone bills, cable, and satellite TV services, to provide CBC with stable funding, but surveys showed only 19% favored this (RCI via BBCM)

CHINA [non?] CRI on new 17690 for English to Australia 0800-1000 //15440, 11755. Excellent modulation, super-strong here, and they ask for reports. New relay site? (Bob Padula, Melbourne, ARDXC *Electronic DX Press* via Thurman)

COLOMBIA CARACOL reactivated, heard as early as 2214 but up on 5077 (Dave Jeffery, NY, *World of Radio*) Seems not nightly, and weaker than before, varies 5075-5077 (Kevin Hecht, PA) R. Católica Nacional, 3580, was raided in December, equipment seized, while the owner was away in Ecuador. They got DX reports from Uruguay to Boston (Henrik Klemetz, HCJB *DX Partyline*)

COSTA RICA R. For Peace International is upgrading the 5 kW transmitter to 10 kW, to use AM daytime on 15 MHz, SSB night on 6 MHz. Dipole antenna for 6205 USB at night has been raised up towards 100 feet high for lower angle of radiation, greater coverage. Plans to build 2-element cubical quad for 6 MHz. Looking for clear channel, in 15250-15400 range (RFPI *Mailbags* & via Diane Mauer) New on RFPI sked: *Disability Radio*, Sat 2200, Sun 0600 (Mauer) with Jean Parker, new on the Advisory Board, from a Denver disability center (Tim Hendel) *The Nation* has new weekly one-hour *Radio Nation* on Pacifica and some other leftish stations; also started on RFPI

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; Z-96 = Summer season*

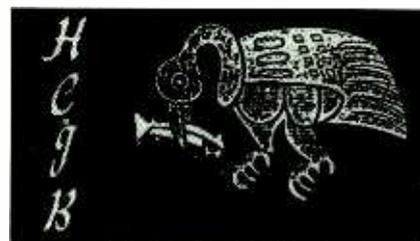
Sat 2100, Sun 0500 (Chet Copeland, DC; *W.O.R.*) Second quarter RFPI revised sked starts April 1.

In early Feb, TIAWR finally got a *Wavescan* on without delay, Sun 2300 on 9725 (Diane Mauer) Identical content on WRMI version, and much better signal; but with TIAWR's track record, we can't depend on it--missing following week, back the next (gh)

REE, Spain relay here on new 3225 evening (Ron Trotto, IL, *W.O.R.*) Until 0400* to return at *1100, and frequency was announced; no question of propriety of this as C.R. is in the tropics (gh)

CUBA R. Rebelde reactivated on 5025 with full 10 kW power, 100% modulation, rebuilt Brown Boveri, high-angle antenna (Arnie Coro, *RHC DXers Unlimited*) RHC also using 6070 at 0000-0500 (BBCM) Despite CFRX

ECUADOR HCJB in USB on 21455 dropped from 30 kW to 500 Watt transmitter on Feb. 7, now more of a DX challenge and special QSL available, 24 hours. While *What in the World* producer on furlough until Nov, *DX Partyline* expands to 50.5 minutes (Rich McVicar, HCJB *DXPL*)



R. Interocéánica, Santa Rosa de los Quijos, run by Swedish Covenant Church, off SW 4840 more than a year due to damaged transmitter, would like to return with new 2 kW if \$20K cost approved in March; also would move up to a hill for better coverage (Anker Petersen, Ecuador, HCJB *DXPL*)

EQUATORIAL GUINEA R. Africa, 15185.7 with US religion on a Sat 1255-1608*, *1648-2300* but missing Sun (Brian Alexander, PA)

ERITREA V. of the Broad Masses of Eritrea, Asmara, on new 7085, alternate to 7020 // 5000 in Tigrigna, others; still in Afar, Arabic on 4000, 7390 (BBCM)

ETHIOPIA Pres. Gidada offered to lease R. Ethiopia transmitters to Deutsche Welle (DW via BBCM) Unclear if that means FM or SW. [non]

V. Of Oromo Liberation [see last month] confirmed on 5960 via Ukraine. ID in Oromifa is *Kun Segalee Bilisumma Oromooti*. Has commentaries on Oromo nationalist themes, address as P O Box 510610, 13366 Berlin, Germany (BBCM)

GERMANY Jülich site of DW, 40th anniversary April 1, will be used for AM digital signal tests on SW in April, comparable to DAB, special receivers needed (Gerd Klawitter, DSWCI)

GREECE V. of Greece to us at 0000-0350 on 6260 ex-6245 //7448, 9420; in the interest of uniformity to keep 6245 a Thessaloniki channel earlier at 1900-2300, especially since 7430 broke down (Demetri Vafeas, ERT. via John Babbis)

GUAM KSDA revised sked in Jan with introduction of 4th transmitter so English is: 1000-1100 on 9540, 1600-1700 on 7400, 2300-2400 on 11980 (Mick Ogrizek, ARDXC *EDXP* via Thurman)

GUATEMALA AWR, nom. 5980, supposedly has English daily 2000-2300 (AWR via BBCM)

La Voz Popular, clandestine on 7000 operates 4 hrs per week Tue & Fri from 2315; located on a humid volcano requiring replacement of equipment and tapes several times a year. Moves around for food supply, not to escape army. Magazine program in-

cludes multi-faith religious elements (Claudio & Domingo, LVP. RN *Radio-Enlace*)

HAWAII Last year we had an unconfirmed report that a group of Seventh Day Adventists were scouting for a new SW site on the Big Island. AWR subsequently denied it, so we assumed it must be the Historic Adventist faction (gh) Pastor John Osborne announced over WVHA that he has a claim to 162 acres here to build another SW station to broadcast the Three Angels Message, depending upon the success of WVHA (Jim Moats, OH, *W.O.R.*)

HONDURAS R. Copán Internacional authorized to test new lower frequencies for evening coverage of N. America--7460 and perhaps 4940, with new transmitter and antenna (Jeff White, WRMI *Viva Miami*) Heard rumors on several US patriot and militia programs that up to five new transmitters are being planned for broadcasts to N. America, from undisclosed locations that are out of reach of the FCC; apparently that includes Copán and another high-power Copán transmitter in future, as announced on Pete Peters' program (Ernie Behr, *W.O.R.*)

HUNGARY MTI press on RTTY in English, F1B 50 baud, 0600-0645 daily to Asia on HGO24, 17468; 1000-1200 exc Sun and 1650-1830 daily to Eu/AF on HGG31, 9114 kHz. Address: Naphegy ter 8, H-1016 Budapest; fax +361-175-5846/1891 (BBCM)

INDONESIA RRI Fak2 had English travel segment on a Tue at 1015-1030, 4789 (Bob Padula, Australia via Thurman) RRI Biak on 6152.9 at 1030-1430* (David Foster, Australia, *NU* via HCJB *TLC*) Both in Irian Jaya

ITALY IRRS Z-96 from 31 Mar to 27 Oct: 3980 at 2000-2200 Fri/Sat/Sun. 3985 at 0500-0930 M-F, 0530-0730 & 1300-2000 daily. 7125 at 0500-0530 Sat/Sun, 0730-1330 daily (A. Controneo, IRRS via WRMI *Viva Miami*)

KARELO FINNISH SSR [non] Those adhering to "historic" country lists may note: (gh) R. Petrozavodsk is active on SW with Mayak relay in Russian on 7330 at 0200-0500 with 20 kW (Alexei Ageenkov via Dan Henderson, HCJB *TLC*)

KOREA, SOUTH RKI has special on the last Wed of each month thru Nov about famous Korean novelists, in this Year of Literature (RKI *SW Feedback*)

LEBANON V. of Hope is in jeopardy: government of Lebanon threatens to shut it down if and when Israel withdraws from south Lebanon (Gary Hull, manager via Piet Conradie, *Cumbre-DX*) English heard at 1830 on 6280 (Arthur Cushen, RNZI *Mailbox*)

MALAWI MBC using 5994.67 evenings, and reactivated 3380.0 ex-3380.8 from *0253 (Chris Greenway, BBCM via *DXing with Cumbre*) 3380.0 from *0248 with cock crow, 0252 anthem, 0253 English opening, choral music (Brian Alexander, PA)

MALTA [non] In wake of DW relay closure, V. of Mediterranean optimistic about returning to SW from elsewhere; tho is joint venture with Libya owning 49%, unknown if Libyan transmitters can be used (Alfred Zarb, VOM, on *KW Panorama*, R. Austria via BBCM)

MALI RTM. Bamako on 4680.5 at 2107 French, drums//4835.4; test or error? (Kevin O'Daly, UKOGBANI, BDXC *Communication*) See next item, and don't confuse

MAURITANIA R. Mauritanie, nom. 4845, drifting again, tune in at 0637 on 4837.3, and by 0700 down to 4835.4 (Brian Alexander, PA, *W.O.R.*)

MEXICO DST to be adopted in all three time zones this year from April until 24 October (DPA via *BC-DX*)

NETHERLANDS *Media Network* celebrates its 750th edition on May 2, with a quiz, unique prize, special QSL, anniversary CD (ARDXC *EDXP* via Thurman)

NICARAGUA R. Miskut 5770 USB running later than usual on a US Sun 0010-0300+ (Brian Alexander)



Radio Miskut

PAPUA NEW GUINEA NBC Port Moresby is on 4890 at 1930-2208 and 0710-1200; 9675 at 2210-0700 (Bob Padula, *Australian DX News*, Jan) Correlates with winter afternoon reception in NE America. See also **BOUGAINVILLE**

PERÚ R. La Voz de Santa Cruz, 2384-0354*, tuned in with anthem, folk music, 2335 ID on 7050.26; at 0354* had drifted up to 7050.34 (Brian Alexander, PA, *W.O.R.*)

Estación 49, new on 6261.14v from *1152 relaying Lima's R. Mar Plus as warmup, own programming from 1200; location unknown but guess in Cajamarca, Amazonas or San Martín dept.

On 5458.71, R. La Voz de Triofoyo (??), at 2252 with Ecuadorian Pasillos. "La frecuencia de su corazón. 5460," town sounded like Conocoto.

R. Paccha reactivated on 5277.02 at 1225 with folk music, very good.

R. 5264, Chiriaco, reactivated actually on 5264.75 at 0135, Ecuadorian folk music.

R. Imagen, Tarapoto, 4969.08 played "Happy Birthday" song in English, common in Latin America.

R. Selva Superior, or just R. Selva, new on 4187v4193, first as unID on 4187.87 at 1209-1252 with frequency as 4200. Then on 4190.92 from Moyobamba giving address which Henrik Klemetz says is Jirón Reyes Guerra 579, Moyobamba, San Martín. Its FM on 93.7 is legal; drifted up to 4193.48, and heard by Dave Valko, PA on 4188v at 1055-1135.

R. La Voz de Sayapullo, new on 4182.56v from southern Cajabamba province, Cajamarca department near La Libertad border, from *1204 with folk music, IDs, greetings. (Rich McVicar, HCJB *DX Partyline & Latest Catch*)

POLAND R. Mayja, renting time from PR, 0730-0825 on 5900, 7285, is run by right-wing extremists, narrow-minded, anti-Semitic with long-winded tirades, organ music, and gregorian chants; focal point for alienated Catholics, and the church leadership is concerned (RNMN) R. Maryja address is ul. Zwirki i Wigury 80, 87-100 Torun. Fax: +48-56-36572 (BBCM)

PORTUGAL Timezone change from UT+1 to UT, affecting R.

RDP / Internacional
RADIO PORTUGAL
P.O. BX 1011
LISBON 1001 PORTUGAL

Portugal sked (Andy Sennit, *WRTH*, RNMN) About time: meridianally, it belongs in UT-1!

RUSSIA V. of Russia announced they have a budget increase of 13% (Edwin Southwell, BDXC) R. Mir (Peace) is a program in Russian on Mayak at 0833-0853 M-F on 11985 with announcements for disappeared people, mainly in former Soviet Central Asian republics, with contact addresses in Minsk and Moscow (Rumen Pankov, Bulgaria, *BC-DX*) Russia Nostalgie heard at 2000 on 9560. R. Chita local program at 2150 on 4860. R. Arkhangel'sk at 0320 on 6160 (Pavel Mikhailov, R. Rossii *DX Klub*, via *BC-DX*)

SARAWAK Kuching on 7270 Iban service, fade in 0330, huge

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signal at 0405 in strange summer daytime mode; also used for evening, fade-in 1015; also other Malaysians around 0400 on 7130, 7145, 7160, 7295 and Singapore on 7170, 7250 (Bob Padula, Victoria via Thurman)

SA'UDI ARABIA Holy Qur'an service on 15227.03 at 1449-1512+, IDed by Hans Johnson (Dave Valko, PA, HCJB *DXPL*) BSKSA using a lot of odd frequencies besides this one at various times: 15277.9, 15377, 9553.6, 9683.8, 11708.2, 11818.5, 17879.8 (Rumen Pankov & Ivo Ivanov, Bulgaria; Wolfgang Büschel, Germany, *BC-DX*)

SIKKIM AIR Gangtok testing 3390 at 1030-1430; QSL letter requests reports (Jose Jacob, India, *AWR Wavescan*)

SINGAPORE RSI English at 1100-1400 on 6015 ex-9530 since Feb. 1. Staff is about 50; half of them produce programs. Schedule from fax +65 259 1380 (via Mick Ogrizek, ARDXC *EDXP*) 6015 is a disaster, with R. Australia on 6020, China on 6015 (Bob Padula, *ibid.*)

SOUTH AFRICA Another station relayed by SENTECH, Meyerton, is R. France Int'l, 0300-0400 250 kW in French on 7135 (Kathy Otto, SENTECH) May have started in Feb, at least thru March.

SRI LANKA [non] Vishwa Vani = TWR now via Russia in Hindi, English, 0000-0300 on 7430 (Y. Kato & S. Aoki, R. Japan *Media Roundup*)

SWEDEN RSI tested to NAm in Jan at 0200-0300 on 7145, 0300-0400 on 7290 due to Russian QRM on 7115, English on the half hour, but the MUF was too low (Tom Sundstrom, NJ, *Cumbre DX*)

TAJIKISTAN [non?] Tajik R., Dushanbe, domestic service strong and regular on new 11895 around 0500-1200 in Tajik/Uzbek with lovely local music. Likely via Russia relay, as VOR, RN and DW use a powerful Tajik site in exchange (Wolfgang Büschel, *BC-DX* via BDXC) At 0500-1500, maybe 500 or 1000 kW (Noel Green, UK, and Büschel via *Cumbre DX* via Thurman)

TURKEY TRT faxes that SSB broadcasts will not start until Z-96 season, March 31, in Turkish, English, German, French. Frequencies may differ from those listed last month (via Benno Klink, *BC-DX* via Thurman)



UGANDA R. Uganda testing 3340 ex-4976 for Red Channel, -0600 & 1300-; last used in the 1970s (BBCM)

URUGUAY R. Monte Carlo & Oriental, 1 kW: 1000-1630 6140, 1630-2300 11735, 2300-0300 9595 (Robert Velo via Gabriel Iván Barrera, RN *Radio-Enlace*)

UKOGBANI BBC WS now claims weekly audience of 140 megapersons, up from 133 the previous year—not including Burma, China, Iran, Iraq, Somalia, Vietnam where research is difficult (Graham Myton, BBC IBAR on *VOA Communications World*, BBC *Waveguide*, Reuter via David Alpert) *Waveguide* cancelled with new sked from April, but in Sept & Oct there will be an 8-part series on listening basics (*Waveguide*) BBC WS can apply some capital spending funds to daily operations instead due to budget cut; and some sites such as Oman may be privatized (Julie Kirkbride, *Electronic Telegraph* via Neill, *NASWA Journal*) Almost a year after multi-streaming, BBC still screws up—one Saturday at 1715, the only American stream frequency, 17840, was carrying African stream instead //17830. Program tapes in London keep stopping, amid embarrassed apologies and fill music (gh, OK)

WYFR started relaying BBC Feb 22, 1300-1600 on 9590, closing with ID. Is on 315° antenna to W. Canada, incidentally covering most of USA (gh, *W.O.R.*)

UKRAINE V. of Russia testing new superpower on 6030 at 0200-0600, 12030 at 1100-1500, 6085 at 1600-2100 (Pavel Mikhailov, *DX Klub*, VOR via Pankov, *NASWA Journal*) Why would they get new ones with tons of old ones lying around unused? So I researched this. The FCC online data listings of frequency registrations show these as Simferopol', Ukraine, not Russia, tho we had assumed there were no longer any relays of Russia by Ukrainian transmitters. They are registered as a megawatt, Golos Rossii at 309 or 312°, and actually used at

0200-0600 on 6030, 1600?-2100 on 6085, 1100-1500 on 12030. It's the high power site in Crimea. Checking 6030 before 0200, there were *no* typically Russian tune-up tones before it blew away R. Martí (Kevin Hecht, PA, *W.O.R.*)

USA WWCN No. 4 began testing Feb 13, inaugurated Feb 19; planned usage for Z-96 from Mar 31 is 1100-2300 on 9475, 2300-1100 on 7435, or if available a 2 MHz channel. But initial sked was 1800-2200 on 9400, 2200-0600 on 7435, partly simulcasting WWCN-1. Remember, all WWCN program times shift one UT hour earlier April 7 to stay at same local time, including *World of Radio*.

Before the Oklahoma City bombing, suspect Timothy McVeigh's first love was on shortwave, *The Hour of the Time*, anti-government show with William Cooper on WWCN. Lacking SW in his cell, he listens to Gordon Liddy, Chuck Harder (Lawrence Myers, *Media Bypass* via *Arizona Republic* via RFPI *Far Right Radio Review*)

Bro. Stair was the original motivation for building WGTG, but he put no money into it except the cost of a tube. When we could not agree to turning operation of WGTG over to him 24 hours a day, he pulled out, but would be welcome back for a limited number of hours. A second transmitter is being built, probably to use a 7-element wide-spaced yagi toward NW. A rotatable 15-MHz yagi is ready for use now instead of rhombic. Would like to try frequencies such as 6910, 6960. WGTG is 100% listener supported, only to meet expenses. Carefully selected programs are broadcast without charge (David Frantz, WGTG, *World of Radio*)

WVHA occasionally is back on 7465 at 2300-0200, blocking Norway (Joe Hanlon, PA, *W.O.R.*) see also HAWAII

Monitor Radio International announced that 30 and 60-second ad time is available again; had been discontinued about three years ago. WSHB airtime for an outside programmer expected in Jan had still not shown up in Feb (Jim Moats, OH) WSHB only frequency at 1600-1800 is 18930, at least until Mar 26, also until 1900// 15665 (MRI via George Thurman)

WRNO has a long, mellow sign-off with Joe Costello waxing poetic about New Orleans, after Bro. Stair at 0700 (Fred Waterer, *DX Ontario*) On 7395, would be at 0600 for summer.

WRMI, 9955, moved up opening weekdays to 1900 for Bro. Stair in English, Spanish, 2100 *Viva Miami* in Spanish. UT Sun 0500-0545 after the first Sat is *Radio Porkopolis*, alternative music from Cincinnati (WRMI via George Thurman) Some or all WRMI programming presumably makes the one-hour-earlier UT time shift for DST (gh) *Onda Mundial* is a new Spanish version of *Wavescan*, Sun 0100, 1245, Thu 0145 (*Wavescan*) As originally scheduled; ones I heard sounded like Jeff White productions, reading radio-related articles in original Spanish, tho giving Indianapolis address (gh)

WINB back on "soon" with new \$180K transmitter, new corner reflector antenna (AWR *Wavescan* via WRMI)

VATICAN VR has ordered new SW transmitters; old ones are too expensive to maintain (RN *Media Network*) The Jan-Feb-Mar sked showed this usage for transmitters in Vatican City itself: 0620-1700 on 5880, 80 kW, 10° in European languages; 1500-1700 on 7250, 30 kW, 4° to Europe. Before and after these times, both these come from Santa Maria di Galeria (Mark Vissers, DX-Antwerp BBS via Thurman)

VENEZUELA R. Nacional not heard on 9540 but terribly distorted at different times on 9510, 9582.9, 9590 (Henrik Klemetz, *Dateline Bogotá* via *Radio Nuevo Mundo*)

ZAMBIA Christian Voice, good on 6065 after WYFR closes 0445, continuous Christian music and IDs past 0520 (Brian Alexander, PA) Has plans for a DX show, QSL over the air, and to use 90 mb (Bill Flynn, *Cumbre DX* via ARDXC *EDXP*)

ZNBC unheard on 4911, 6060, 7220, 7235, irregular on 6165; maybe due to installation of 150-kW Chinese SW transmitters (BBCM) *Until the Next, Best of DX and 73 de Glenn!*

Broadcast Loggings



Gayle Van Horn

0000 UTC on 11750

ASCENSION ISLAND: BBC World Service relay. Big Ben's top of the hour chimes and BBC ID, into international news update. (John Bellovich, Maccleeny, FL) *Network Africa-News Day* at 0600 on 6005. (Terry Jones, Plankinton, SD)

0003 UTC on 15360

UNITED KINGDOM: BBC World Service. News, IDs and features monitored as: 5975//9590//9640//6195; 0218 on 15360; 0301 on 5970//5975//11955; 0530 on 6175; 0640 on 6175//5905; 1351 on 5990//6195; 1428 on 5990//6195//9740//15070; 1541 on 6195//7180; 1600 on 5990 on 15400; 2036 on 7325//11750//11835; 2123 on 5990//6035//6195. (Gerald Brookman, Kenai, AK)

0040 on 9645

ITALY: **Radio Roma/RAI**. Italian service of news topics and easy-listening vocals. "RAI International" intros English service to include news, sports and pop vocals. Brazil's **Radio Bandeirantes** noted on frequency in Portuguese. (Loyd Van Horn, Brasstown, NC) **RAI** noted on 6005 at 0051-0102*. (Jones, SD)

0051 UTC on 5025

CUBA: **Radio Rebelde**. Spanish. Cuban music to station promos, IDs and chat. Cuba's **Radio Havana**, heard on 7240 at 1119 expounding the virtues of communism! Additional broadcast heard on 6000 at 0203, with news that the eastern Europeans also seek the return of communism. (Sue Wilden, Columbus, IN) Station noted on 9505 at 0614. (Jones, SD; Giovanni Serra, Rome, Italy)

0100 UTC on 5895

CROATIA: **Croatian Radio**. War news update on general's visit to troops in the trench's facing Serbian foes. English sign-off 0105. (Bellovich, FL) Croatia's **Hrvatska Radio**, in Croatian heard on 13830 //5894.97 at 1800. (Serra, Italy)

0145 UTC on 7160

ALBANIA: **Radio Tirana**. Station ID and update of death and accident statistics. News on the nation's electrical output to Albanian-European pop music, 0158*. (Bellovich, FL)

0149 UTC on 2460

BRAZIL: **Radio Alvorado**. Portuguese announcer with local news items and chat on Rio Branco. Braz pop vocals with utility interferences. Brazilians logged as; **Nacional Sao Gabriel** heard in Portuguese on 3375 at 0155 with "Nacional" IDs/kHz quotes. Evening time check into national news. Additional Brazilian stations noted as; **Radio Cancao Nova** on 4824.9 at 0312; **Radio Anhanguera** on 4915 at 0316, **Radio Educacao Rural** on 5035.05 at 0328; **Radio Universo** on 6060 //9565 at 0327-0335. (Gayle VH)

0329 UTC on 6090

BRAZIL: **Radio Bandeirantes**. Portuguese. Station promotionals, ad jingles and news items on Sao Paulo. Two Brazilian's audible are; **Radio Cancao Nova** heard on 9675 at 0342; (Gayle VH) **Radio Clube do Para** in Belem on 4885 at 2113. (Serra, Italy)

0414 UTC on 4976.01

UGANDA: **Radio Uganda**. S9+ signal quality for English national news at tune-in. PSA's to a quick Afro pop tune. Health remedy commercial that promises, "a cure for aches and pains." Candy and pain reliever ads to lengthy text on health care. Station ID to chat about Kampala in local dialect. English at 0445 with phone # and ID. Continued morning show to 0500 newscast. Audible to 0530. Just my luck, now that I finally have Uganda verified, they boom in like gangbusters! - (Gayle VH, NC)

0502 UTC on 5030

COSTA RICA: AWR/Voice of Hope. *News Moment* program to religious readings. ID/address info to *Voice of Prosephy* program. (Jones, SD) *Reflections* and *Quiet Hour* program heard on 9725 at 1615. (Wilden, IN; Jones, SD; Serra, Italy)

0610 UTC on 4760

LIBERIA: **Radio ELWA**. Continuous religious programming to pop song presented by male DJ. "Good morning" greeting to "ELWA Monrovia, Liberia" ID. (Serra, Italy; Jones, SD)

1105 UTC on 5905

AUSTRALIA: **Radio Australia**. Sports report with cricket game scores. (Wilden, IN) Station audible as; 1725 on 9580//9615//9860 with sports. (Brookman, AK) Health report update heard on 5995 at 1500. (Jones, SD)

1240 UTC on 11615

FRANCE: **Radio France International**. Report on a Charlie Chaplin film festival in Paris to mark movie's centennial. (Bob Fraser, Cohasset, MA) Heard on 9485//11615 at 1640. (John Hanz, Old Bridge, NJ)

1430 UTC on 13700

NETHERLANDS: **Radio Netherlands**. Time pips to program preview into news bulletin. *Newsline* at 1438, with report on Tamil insurrection in Sri Lanka. Fair to good signal quality. (Jim Moats, Ravenna, OH) Station also heard on; 6020//6115 at 0052; 13700 at 1510. (Brookman, AK)

1440 UTC on 11840

NORWAY: **Radio Denmark International**. Report on Copenhagen, European Culture City of 1996. Fifteen minute English language program with excellent signal; the same at 2240 on 6200 kHz, following **Radio Norway's** weekly English program. (Fraser, MA) **Radio Denmark Intl** audible on 7465 at 0045. (Bellovich, FL)

1445 UTC on 6030

CANADA: **CFVP**-Calgary. Station ID, weather update and time check. Pop music program from simulcast of **CKMX**. Canada's **CKZU**-Vancouver noted on 6160 at 1505 with CBC *World Report*. **Radio Canada Intl** heard on 9755 at 0340. (Jones, SD) **CBC Northern Quebec** Service noted on 9625 at 2302. (Brookman, AK) **CKMX** is on 1060 kHz mediumwave in Calgary, Alberta. - Gayle VH

1625 UTC on 15395

UNITED ARAB EMIRATES: **Radio Dubai**. Easy-listening music to station ID at 1630, heard on //13675. (Hanz, NJ)

1700 UTC on 9885

SWITZERLAND: **Swiss Radio International**. Interval signal to ID, world and national newscast. Feature on how wildlife cope with the Swiss winters. (Hanz, NJ) **SWI** heard on 6135//9905 at 0420. (Jones, SD; Brookman, AK) Noted on 5850 at 1811. (Serra, Italy)

1708 UTC on 6210

ETHIOPIA: **Radio Fana**. Tentative logging for this station in Amharic language. Possible news, music pauses alternating with pop music tunes. Regional music to long speech suffering interferences. (Serra, Italy)

1715 UTC on 6235

MONACO: **Trans World Radio**. Russian. Male announcer with religious news. Interval signal to 1750*. (Jerry Witham, Keaau, HI)

1715 UTC on 4078

MONGOLIA: **Radio Ulanbaatar**. Russian. Male/female announcers alternate dialogue interspersed with far-eastern music. Station ID to 1759*. (Witham, HI)

1718 UTC on 5930

CZECH REPUBLIC: **Radio Prague**. *Magazine 96'* show to pop and jazz tunes. ID to trumpet music pause and into for Czech service. (Serra, Italy) Station heard on 5930 at 0004-0120. (Wilden, IN; Jones, SD)

1826 UTC on 9779.77

YEMEN: Yemeni Rep. **Radio**. U.S. pop songs to musical pause. Time check at 1830 and news promo. ID to local and international news (1830-1837). Address and info to national anthem at 1848, into Arabic program at 1900, with possible newscast. (Serra, Italy)

1828 UTC on 6549.5

LEBANON: **Voice of Lebanon**. French/Arabic. Pop music, pauses for jingles. Arabic advertisements and brief Arabic music. News in Arabic with ID. Station noted on 6280.06 at 1736 in English. (Serra, Italy)

1843 UTC on 15420

UNITED STATES: **WJCR**. Gospel music program in progress, fair signal. Hawaii's **KWHR** heard with ID and religious programming on 13625 at 1900. (Moats, OH)

1930 UTC on 9630

SEYCHELLES: BBC World Service relay. *Surviving the 20th Century*-featuring Harry Young who was in Russia from 1917-1930's. Still an excellent signal. (Fraser, MA)

1934 UTC on 5047.02

TOGO: **Radio Togolaise**. French/English/Vernaculars. Local topical news mixed with Afro pop music. English bulletin to tam-tam sound effect and vernacular program. (Serra, Italy)

1955 UTC on 9605

MADAGASCAR: **Radio Netherlands**. *Sounds Interesting* show on rating airport food, Dutch blues and country singer. Heard on //11655, both very good. (Fraser, MA)

2030 UTC on 9700

BULGARIA: **Radio Bulgaria**. *From School to Campus*-featuring news of youth, //7335. (Fraser, MA)

2129 UTC on 4904.5

CHAD: **Radio Nationale Tchadienne**. French. Afro pops to mentions of N'Djamena during news. Music breaks to ID info and national anthem. Sign-off 2202. (Serra, Italy)

2201 UTC on 15365

AUSTRALIA: **Radio Australia**. News and sports bulletin in progress at tune-in. *Network Asia* at 2211, a news magazine program of regional and international stories. Fair to poor signal quality. (Moats, OH)

2310 UTC on 11700

NORTH KOREA: **Radio Pyongyang**. National news to station ID. Choral music in praise of "the great leader." (Bellovich, FL) Additional monitoring including; 0032 on 15130; 2305 on 11700. (Brookman, AK)

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

CPRV...And Your Future

If you're like me, you have spent endless hours preserving your QSL collection. What began as a single card soon became my QSL *albums*.

Each card has its own tale of intrigue from a special DX session or perhaps more follow-up reports than I'd care to admit. Remember my odyssey with Radio Uganda? Cape Verde's Radio Nacional tested my patience as well as postal endurance!

No doubt you, too, have QSLs from your own listening experiences. Have you considered the long term importance of your QSL collection?

ANARC's Committee to Preserve Radio Verifications (CPRV), headed by shortwave hobbyist Jerry Berg, is a five-



person group whose goal is to preserve QSLs belonging to hobbyists who are no longer active. Many QSL collections are misplaced or discarded when their owners pass away or leave the hobby.

The Committee actively promotes its activities through articles in radio club bulletins, through being featured in programs by international broadcasters, and by advertising in publications such as the *World Radio TV Handbook*.

If you are leaving or have left the hobby, CPRV urges you to make arrangements for your QSLs so that they will not be lost and that your involvement in the hobby will be memorialized.

For additional CPRV information and the future of your collection, contact Jerry Berg, 38 Eastern Avenue, Lexington, MA 02173.

AIRCRAFT TRAFFIC

Air Force Rescue 5.0981, 5.696 MHz USB. (Aircraft Type: HC-130D) Full data prepared QSL card signed by Mark E. Sheehy MAJ-Aircraft Commander. Received for an English utility report. Squadron address: 129th Rescue Group, Bldg. 680 Stop 28, Moffett Federal Airfield, CA 94035-5006. (Gordon Levin, Anaheim, CA)

BELARUS

Radio Minsk, 7360 kHz. Full data *Floral Arrangement* QSL card unsigned. Received in 142 days for an English report. Station address: ul. Chyrvonaya 4, 220807 Minsk, Belarus. (Kevin Hecht, Devon, PA; Darren R. White, Hattiesburg, MS)

CANADA

VRF-Resolute Coast Guard Radio, NWT, 2.182 MHz USB. Full data prepared QSL card signed and stamped with station's seal. Personal letter and antenna-tx diagram enclosed. Received in 18 days for an English utility report. Station address: Cerant De Station Radio, Garde Cotiere Candienne, C.P. 148, Resolute Bay, T.N.W. Canada XOA OYO. (Steve McDonald, Port Coquitlam, BC Canada)

CHINA

China Radio International, 7405 kHz. Full data QSL card signed by Shang Chunyan. Personal note and schedule enclosed. Received in 15 days for an English report, letter and newspaper clippings. Station address: 2 Fuxingmenwaidajie Street, Beijing, 100866 China. (Eric M. Walton, Vancouver BC Canada)

CUBA

Radio Havana Cuba, 11270 kHz. Full data RHC card unsigned. Personal letter, postcard and contest info enclosed. Received in 83 days for an English report, no return postage. Station address: P.O. Box 7026, Havana, Cuba. (Harold Frodge, Midland, MI)

GERMANY

Bayerischer Rundfunk, 6085 kHz. Partial data logo-sticker card with illegible signature. Received in 14 days for an English report. Station address: Rundfunkplatz 1, D-80300 Munich, Germany. (White, MS)

JAPAN

JFZ-Kushiro Fisheries Radio, 16.942.8 MHz USB. Full data prepared QSL card stamped with station's seal. Personal letter and 8 color photos of antennas and various operating positions. Received in 37 days for an English utility report of CW traffic. Station address: Kushiro Fisheries Radio, 1-5-15 Yonemachi, Kushiro-City, Hokkaido 085, Japan. (McDonald, Canada)

JFC-Misaki Fisheries Radio, 12.832.5 MHz USB. Full data prepared QSL card signed and stamped with station's seal. Received in 36 days for an English utility report of CW traffic. Station address: Misaki Gyogyo, 1-7 Harumi Miura, Japan 238-02. (McDonald, Canada)

MEDIUMWAVE

WGMP, 1210 AM kHz. Full data station verification letter, signed by Sam A. Virgillo-Tech. Supervisor. Received in 49 days for an English AM report and cassette tape of programming. Photo of original station WCAU tower from 1930's enclosed. Station address: City Line & Monument Road, Philadelphia, PA 19131. (R. George Knight, Garfield, NJ)

WWWE, 1100 AM kHz. Full data station verification letter, signed by Ray Davis-Asst. Program Director. 3WE bumper sticker enclosed. Received in 43 days for an English AM report and cassette tape of programming. Station address: 1468 W. 9th Street, Eighth Floor, Cleveland, OH 44113. (Ph: 216-696-4444) (Knight, NJ)

NORWAY

Radio Norway, 7480 kHz. Full data QSL card signed by Ingrid Dahle. Received in 56 days for an English report and postcard. Station address: N-0340, Oslo, Norway. (Walton, Canada)

PAPUA NEW GUINEA

NBC, 4890 kHz. Full data map/logo QSL card with illegible signature. Received in 72 days for an English report, one U.S. dollar, two IRCs and souvenir postcard. Station address: P.O. Box 1359, Boroko, Papua New Guinea. (Patrick M. Griffith, Denver, CO)

Radio Sandaun, 3205 kHz. No data letter signed by Paia Ottawa. Received in 27 days for an English report. Station address: P.O. Box 37, Vanimo, West Sepik, Papua New Guinea. (Frodge, MI)

SHIP TRAFFIC

S/S John G. Munson WE3806, 4.077 MHz USB. (Iron-Ore Carrier). Full data prepared QSL card signed and stamped with ship's seal. Color photo of vessel and decals enclosed. Received in 18 days for an English utility report. Ship address: c/o Detroit Marine Post Office, River Station, Detroit, MI 48222. (McDonald, Canada)

Global Link WWDY, 500 kHz. (Cable Ship). Full data prepared QSL signed. Photos of ship and calendar enclosed. Received in 49 days for an English utility report and U.S. mint stamps. Ship address: c/o Transoceanic Cable Ship Co., Inc., 340 Mount Kemble Ave., Morristown, NJ 07960. (Hank Holbrook, Dunkirk, MD)

Cristoforo Colombo ICYS, 500 kHz. (Cargo Ship). Full data Verification Letter and photo of ship. Received in 52 days for an English utility report and one U.S. dollar. Ship address: c/o Italia Di Navigazione S/P.A., WTC Tower, Via de Marini, 1 16149 Genova, Italy. (Holbrook, MD)

UNITED STATES

WWV, 10000 kHz. Full data Native-American card, signed by John B. Milton-Engineer. Received in 16 days for an English report of 31 December 1996 "Leap-Second," 2359:60 UTC. Station address: 2000 East County Rd. 58, Fort Collins, CO 80524. (Mike Hardester, Jacksonville, NC)

Radio Telefis'Eireane (RTE) via WWCN Nashville, TN, 12160 kHz. Full data *Cliffs of Moher* QSL postcard, signed by Bernie Pope. Received in 22 days for an English report and one IRC. Station address: Donnybrook, Dublin 4, Ireland. (White, MS) *St. Patrick's Street* QSL postcard received in 14 days. (Paul McDonough, Somerville, MA)

VENEZUELA

Ecos del Torbes, 4980 kHz. No data map card signed by Albertina. Received in 105 days for a Spanish report and one U.S. dollar. Station address: Apartado 152, San Cristobal, 5001-A, Tachira, Venezuela. (Hecht, PA)

HOW TO USE THE SHORTWAVE GUIDE

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Daylight Time) 4,5,6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (8:30 pm Eastern, 5:30 pm Pacific).

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

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings except for the "Newline" listing, which begins on the next page.

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

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

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

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

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

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

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

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

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

HOT NEWS

BBC Drops Waveguide

After 14 years, the weekly program which provided news about the BBC and the World Service, investigated what's new in the shortwave radio marketplace, kept you abreast of developments in international broadcasting, and answered your questions about the reception of BBC programs, went off the air at the end of March. Replacing it in September will be an 8-part series of programs that looks at the basics of listening.

BBC Begins WYFR Relay

The BBC added 9590 to its Americas stream in late February for the 1300-1600 UTC time frame via WYFR's facilities in Okeechobee, Florida. Other frequency changes included the dropping of 11955 from 0500-0900. Since 11955 was the only frequency in use during the

0800-0900 period, listeners to the Americas Stream will have to use other BBC streams during that late night hour.

WWCR Adds Transmitter

Worldwide Christian Radio of Nashville, Tennessee, put its fourth transmitter into service on February 19th. Programming was not finalized at this writing but appears to be heavily weighted with programs purchased by the

American Freedom Network such as *The Preparedness Hour* and *The Norm Resnick Show*.

Media Network Milestone

This very popular DX/Media program heard on Radio Netherlands has begun a countdown to its 750th show to be aired on Thursday, May 2nd.

A special QSL card will be issued for this broadcast as

well as an anniversary "Gold Label Compact Disk." In addition, listeners should tune in now for details about a special quiz which could earn

them a unique prize. See p. 47 of the Feb 96 *MT* for exact program times or tune in RN on UTC Thu (Fri to NAM).

Malta Relay Station Closed

Deutsche Welle, Germany's official radio and TV broadcaster, recently closed its relay station in Malta. This move followed the end of its contract with the Maltese authorities. Deutsche Welle's chief engineer commented that the closure of the station was because it was now easier to lease airtime on the many spare transmitters that are now available elsewhere in Europe. Rumors have it that the equipment will be sold, and the site possibly developed as a park or resort.

The closure has also meant an end to broadcasts by the joint Libyan-Maltese station, Voice of the Mediterranean. (News item via Gayle Van Horn)



Radio Netherlands

PROGRAMMING TIPS BY JIM FRIMMEL

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

Dave Datko California
Jeff Demers New Hampshire

MT MONITORING TEAM

Next Reporting Deadline
April 19, 1996

Many schedules shift this month. Your favorite program may be one hour earlier.

Jim Frimmel, Program Manager
Texas DXComp@aol.com

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

NEWSLINE

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

0000 UTC

(8:00 PM EDT, 5:00 PM PDT)

BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (south as)
Canada (North-Quebec)
China Radio Intl
Croatian Radio
KWHR (Hawaii) [T-A]
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Exterior de Espana
Radio New Zealand Intl
Radio Prague
Radio Thailand
Radio Ukraine Intl
Radio Yugoslavia [M-A]
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WHRI (Angel 2) [T-A]
0003
Radio Pyongyang
0010
China Radio Intl*
Voice of America (ca) [T-A]*
0015
Radio Cairo
0030
All India Radio
Radio Netherlands Intl
Radio Sweden [T-A]
Radio Thailand [T-S]
Radio Vilnius
Voice of America (am) [T-S]
(Special English)
Voice of America (as) (Special English)
Voice of Russia
0035
Voice of Iran
0045
BBC (am)*
BBC (as pac)*
BBC (south as)*
0050
RAI Italy

0100 UTC

(9:00 PM EDT, 6:00 PM PDT)

BBC (am) (Newsdesk)
BBC (as pac)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [S]
Croatian Radio
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-A]
R Slovakia Intl [A]*
R Slovakia Intl [S/T-F]
Radio Australia

Radio Budapest
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [M]
Radio Prague
Radio Yugoslavia
Swiss Radio Intl
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Indonesia [F]
Voice of Russia
Voice of Vietnam
0110
Radio Australia [M-F]*
0113
Radio Havana Cuba [T-S]*
0130
Radio Austria Intl
Radio Havana Cuba [W-S]
Radio Netherlands Intl
Radio Portugal Intl [T-A]
Radio Sweden [T-A]
Voice of Greece
Voice of Russia [T-A]
Voice of Vietnam
0132
Radio Havana Cuba [T]
0145
Radio Tirana
0152
Vatican Radio
0155
Voice of Indonesia [F]

0200 UTC

(10:00 PM EDT, 7:00 PM PDT)

BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as) (Newsday)
Canada (North-Quebec)
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio New Zealand Intl [T-A]
Radio Romania Intl
RAE Argentina [T-A]
Voice of America (as)
Voice of Myanmar (Burma)
Voice of Russia
Voice of Vietnam
WWCR #3 (Tennessee) [T-A]
0203
Voice of Free China
0213

Radio Havana Cuba [T-S]*
0215
Radio Cairo
Radio Nepal
0228
Radio Havana Cuba [S]
0230
Radio Austria Intl
Radio Budapest
Radio Havana Cuba [T-A]
Radio Netherlands Intl
Radio Pakistan
Radio Sweden [T-A]
Radio Tirana
Voice of Russia
Voice of Vietnam
0255
Radio Canada Intl [T-A]

0300 UTC

(11:00 PM EDT, 8:00 PM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [S-F]
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [M-A]
Radio Prague
Radio Thailand
Radio Ukraine Intl
Voice of America (af) [A-S]
Voice of Russia
Voice of Turkey
WHRI (Angel 2) [T-A]
WWCR #3 (Tennessee) [T-A]
0301
Voice of America (af) [M-F]*
0303
Voice of Free China
0310
China Radio Intl*
0313
Radio Havana Cuba [T-S]*
0315
Radio Cairo
0320
Radio Philipinas [M-A]
Vatican Radio
0330
BBC (eu) [A]
Radio Dubai
Radio Havana Cuba [T-S]
Radio Prague

Radio Sweden [T-A]
Voice of America (af) [M-F]
(Special English)
Voice of Russia
0340
BBC (af) [S]*
Voice of Greece
0355
Radio Japan [W-M]

0400 UTC

(12:00 AM EDT, 9:00 PM PDT)

BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac)
BBC (eu) [S-F] (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Bulgaria
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio New Zealand Intl [A]
Radio New Zealand Intl [M-F]*
Radio Norway Intl [M]
Radio Romania Intl
Radio Tanzania
Swiss Radio Intl
Voice of America (af)
Voice of America (me)
Voice of Israel
Voice of Russia
WHRI (Angel 2) [T-A]
WYFR (Satellite Network) [A]
ZBC Zimbabwe
0403
Radio Pyongyang
0410
China Radio Intl*
0413
Radio Havana Cuba [T-S]*
0425
RAI Italy
0430
BBC (af) [A-S]*
BBC (eu) [A] (Newsdesk)
Radio Havana Cuba [T-A]
Radio Netherlands Intl
Voice of Russia
0431
Voice of America (af) [M-F]*

0500 UTC

(1:00 AM EDT, 10:00 PM PDT)

AWR Latin America [T-F]*
BBC (af) (Newsday)
BBC (am) (Newsday)

BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-F]
Radio Australia
Radio Cameroon
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [S-F]
Vatican Radio [T/F]
Voice of America (af)
Voice of America (me)
Voice of Russia
WWCR #1 (Tennessee) [T-A]
0510
China Radio Intl*
Radio Australia [M-F]*
0513
Radio Havana Cuba [T-S]*
0515
Swiss Radio Intl (eu)
0530
BBC (af) [A-S]*
Radio Havana Cuba [T-A]
Radio Romania Intl
Voice of Nigeria
Voice of Russia
0555
Radio Japan [A]

0600 UTC

(2:00 AM EDT, 11:00 PM PDT)

BBC (af)
BBC (am) (Newsday)
BBC (as pac)
BBC (eu) (Newsday)
BBC (south as)
Deutsche Welle
Monitor Radio Intl [T-F]
Radio Australia
Radio Canada Intl [M-F]
Radio Havana Cuba [T-S]
Radio Japan
Radio Korea
Radio New Zealand Intl [M-A]
Radio Norway Intl [S]
Swiss Radio Intl
Voice of America (af) [A-S]
Voice of America (me)
Voice of Kenya
Voice of Russia
WWCR #1 (Tennessee) [S]
WWCR #3 (Tennessee) [S-F]
0601
Voice of America (af) [M-F]*
0603

Croatian Radio
Radio Pyongyang
0613
Radio Havana Cuba [T-S]*
0615
Swiss Radio Intl (eu)
0630
BBC (af) [A-S]*
Radio Austria Intl
Radio Havana Cuba [T-S]
Radio Vlaanderen Intl
Vatican Radio [H]
Voice of Nigeria [M-F]
Voice of Russia
0631
Radio Romania Intl
0645
Radio Romania Intl
Voice of Nigeria [T-F]*
0655
Radio Japan [W-M]
Voice of Med. (Malta) [M-F]

0700 UTC (3:00 AM EDT, 12:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
KWHR (Hawaii) [M-F]
Monitor Radio Intl [T-F]
Papua New Guinea
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Voice of Malaysia
Voice of Myanmar (Burma)
Voice of Russia
WWCR #3 (Tennessee) [M-F]
0703
Radio Pyongyang
Voice of Free China
0710
Radio Australia [M-F]*
0717
Radio New Zealand Intl [H]*
0730
HCJB (eu)
Radio Austria Intl
Radio Netherlands Intl
Voice of Greece
Voice of Russia [T-A]
0755
Radio Japan

0800 UTC (4:00 AM EDT, 1:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
KNLS (Alaska)
Monitor Radio Intl [M-A]
Radio Australia
Radio Korea
Radio New Zealand Intl
Radio Pakistan
Radio Prague
Voice of Indonesia [A-H]
Voice of Malaysia
Voice of Russia
0803
Croatian Radio
Radio Pyongyang
0810
Radio New Zealand Intl [M-F]*
0830

R Slovakia Intl
Radio Netherlands Intl
Voice of Armenia [S]
Voice of Russia
0855
Voice of Indonesia [A-H]

0900 UTC (5:00 AM EDT, 2:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
China Radio Intl
Deutsche Welle
HCJB (pac)
Monitor Radio Intl [M-A]
Papua New Guinea [M]*
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Radio Vlaanderen Intl [M-A]
Swiss Radio Intl
Voice of Russia
WWCR #1 (Tennessee) [M-F]
WYFR (Satellite Network) [M-A]
0910
China Radio Intl*
Radio Australia [M-F]*
0930
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Netherlands Intl
Voice of Russia
0945
Deutsche Welle [M-F]*
0950
Russia (Radio Pacific Ocean)
[A]
0955
Radio Japan

1000 UTC (6:00 AM EDT, 3:00 AM PDT)

All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
China Radio Intl
Monitor Radio Intl
Papua New Guinea
Radio Australia
Radio New Zealand Intl [S-F]
Radio Prague
Radio Tanzania
Swiss Radio Intl (eu)
Voice of America (as)
Voice of America (ca)
Voice of Israel
Voice of Kenya
Voice of Russia
Voice of Vietnam
WYFR (Satellite Network) [M-A]
1010
China Radio Intl*
1015
Radio New Zealand Intl [M-F]*
1020
Radio New Zealand Intl [H]*
1030
FEBC (Philippines) [M-F]*
Radio Austria Intl [M-A]
Radio Dubai
Radio Korea
Radio Netherlands Intl
Voice of Nigeria
Voice of Russia

1045
Voice of Nigeria [A-S]*

1100 UTC (7:00 AM EDT, 4:00 AM PDT)

BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [A-S]
Deutsche Welle
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Ghana [A-S]
Radio Japan
Radio New Zealand Intl
(Newsdesk)
Radio Pakistan
Radio Singapore Intl
Swiss Radio Intl
Voice of America (as)
Voice of America (ca)
Voice of Russia
WHRI (Angel 2) [A]
WWCR #1 (Tennessee) [A]
WYFR (Satellite Network) [M-F]
1102
Radio Mozambique
1103
Radio Pyongyang
1110
Radio Australia*
1120
Vatican Radio [M-A]
1130
Radio Austria Intl
Radio Bulgaria
Radio Finland [M-F]
Radio Netherlands Intl
Radio Prague
Radio Singapore Intl
Radio Sweden [M-F]
Voice of Asia
Voice of Russia
WYFR (Satellite Network) [M-F]
1135
Voice of Iran
1145
Deutsche Welle [M-F]*
1155
Radio Japan [S-F]

1200 UTC (8:00 AM EDT, 5:00 AM PDT)

BBC (af) [M-A]
BBC (am)
BBC (as pac) [M-A]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Croatian Radio
Monitor Radio Intl [M-A]
Papua New Guinea
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio France Intl
Radio Jordan
Radio Korea
Radio New Zealand Intl [H-T]
Radio Singapore Intl
Radio Tashkent
Swiss Radio Intl (eu)
Voice of America (as)
Voice of Russia
WHRI (Angel 1) [A]

WHRI (Angel 2) [A]
WYFR (Satellite Network) [M-F]
1203
Voice of Free China
1204
HCJB (am) [M-F]
1210
China Radio Intl*
1215
BBC (af) [M-A]*
BBC (as pac) [M-F]*
BBC (eu)*
BBC (south as) [M-A]*
1230
HCJB (am) [M-F]*
Radio Austria Intl
Radio Bangladesh [S-M]
Radio Cairo
Radio Canada Intl
Radio Finland
Radio Korea [S-W/A]
Radio Netherlands Intl
Radio Singapore Intl
Radio Vlaanderen Intl [S]
Radio Yugoslavia
Voice of Russia [M-A]
Voice of Turkey
Voice of Vietnam
WYFR (Satellite Network) [M-F]
1231
Radio France Intl [T]*
1240
Voice of Greece

1300 UTC (9:00 AM EDT, 6:00 AM PDT)

BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
BBC (south as) (Newshour)
Canada (North-Quebec) [A-S]
China Radio Intl
KNLS (Alaska)
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Canada Intl
Radio Ghana
Radio Norway Intl [S]
Radio Romania Intl
Radio Singapore Intl
Radio Tanzania [A-S]
Swiss Radio Intl
Voice of America (as)
Voice of Kenya
Voice of Russia
WYFR (Satellite Network) [M-F]
1303
Radio Pyongyang
1310
China Radio Intl*
Radiobras [M-F]*
1324
HCJB (am) [M-F]
1328
Radio Cairo
1330
All India Radio
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Canada Intl
Radio Dubai
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Radio Tashkent
Voice of America (as) (Special

English)
Voice of Russia
Voice of Vietnam
1335
FEBC (Philippines) [M-F]*
1355
Radio Singapore Intl [A]
Radio Singapore Intl [M-F]*

1400 UTC (10:00 AM EDT, 7:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio Canada Intl [S-F]
Radio France Intl
Radio Ghana
Radio Japan
Radio Pakistan
Radio Prague
Radio Vlaanderen Intl [M-A]
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
WWCR #1 (Tennessee) [M-F]
WWCR #3 (Tennessee) [M-F]
1410
China Radio Intl*
1415
Radio Nepal
1424
HCJB (am) [M-F]
1430
FEBC (Philippines) [M-A]
Radio Canada Intl
Radio Netherlands Intl
Radio Portugal Intl [M-F]
Radio Romania Intl
Radio Sweden [M-F]
RTM Morocco [S]
Voice of Myanmar (Burma)
Voice of Russia
WYFR (Satellite Network) [M-F]
1431
Radio France Intl [T]*
1435
Voice of Greece
1445
All India Radio
Voice of Myanmar (Burma)
1455
Radio Japan [A]
Voice of Med. (Malta) [M-F]

1500 UTC (11:00 AM EDT, 8:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac) [A-S]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
Channel Africa
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl [S]
Radio Japan
Radio Norway Intl [S]
Swiss Radio Intl

Voice of America (as)
 Voice of America (me)
 Voice of Russia
 WWCR #1 (Tennessee) [M-F]
 WWCR #3 (Tennessee) [M-F]
 WYFR (Satellite Network) [A]
 1503
 Radio Pyongyang
 1510
 China Radio Intl*
 1530
 All India Radio*
 FEBA (Seychelles)
 FEBC (Philippines) [M-A]
 Radio Austria Intl
 Radio Netherlands Intl
 Voice of Nigeria [M-F]
 Voice of Russia
 1535
 Voice of Iran
 1555
 Radio Japan [A]

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

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)
 BBC (af)
 BBC (am)
 BBC (as pac)
 BBC (eu) [A]
 BBC (south as)
 Canada (North-Quebec) [A]
 Channel Africa
 China Radio Intl
 Monitor Radio Intl [M-A]
 Polish Radio [A]
 Polish Radio [M-F]*
 Radio Australia
 Radio France Intl
 Radio Japan
 Radio Jordan
 Radio New Zealand Intl [M-F]*
 Radio Pakistan
 Radio Prague
 Swiss Radio Intl
 Swiss Radio Intl (eu)
 Voice of America (af)
 Voice of America (as)
 Voice of America (me)
 Voice of Russia
 WHRI (Angel 1) [M-F]
 WHRI (Angel 2) [A]
 WRNO (Louisiana) [M-F]
 1703
 Radio Pyongyang
 1710
 China Radio Intl*
 Radio Australia*
 1715
 Vatican Radio
 1730
 Radio Netherlands Intl
 Radio New Zealand Intl [M-F]*
 Radio Romania Intl
 Voice of Russia
 1740
 BBC (af)*
 1745
 Radio Canada Intl [M-F]
 Voice of Armenia [M-F]

1800 UTC
(2:00 PM EDT, 11:00 AM PDT)
 All India Radio
 BBC (af) (Newsdesk)
 BBC (am) (Newsdesk)
 BBC (eu) (Newsdesk)
 BBC (south as) (Newsdesk)
 Monitor Radio Intl [M-A]
 Radio Australia
 Radio Cameroon
 Radio New Zealand Intl [M-F]*
 Radio Norway Intl [S]
 Radio Omdurman
 Radio Prague
 Radio Tanzania
 Radio Vlaanderen Intl
 Radio Yemen
 Voice of America (af) [A-S]
 Voice of America (af) [M-F]*
 Voice of America (me)
 Voice of Kenya
 Voice of Russia
 Voice of Vietnam
 1802
 Radio Mozambique
 1830
 BBC (af) [A-S]*
 Radio Bangladesh
 Radio Korea [S-W/A]
 Radio Kuwait
 Radio Netherlands Intl
 Radio New Zealand Intl [M-F]*

Radio Sweden [M-F]
 Radio Tirana
 Radio Yemen
 Radio Yugoslavia
 Voice of America (af) [A-S]
 (Special English)
 Voice of America (me) (Special English)
 Voice of Russia
 Voice of Turkey
 1840
 Voice of Greece [M-A]
 1855
 Radio New Zealand Intl [M]*

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

2000 UTC
(4:00 PM EDT, 1:00 PM PDT)
 BBC (af) (Newshour)
 BBC (am) (Newshour)
 BBC (as pac) [M-A] (Newshour)
 BBC (eu) (Newshour)
 China Radio Intl
 Deutsche Welle
 Estonian Radio [M/H]
 Monitor Radio Intl [M-A]
 Radio Australia
 Radio Korea
 Radio New Zealand Intl
 Radio Vilnius
 Swiss Radio Intl
 Swiss Radio Intl (eu)
 Voice of America (af) [A-S]
 Voice of America (af) [M-F]*
 Voice of America (me)
 Voice of Indonesia
 Voice of Nigeria [M-F]

Voice of Russia
 WHRI (Angel 1) [M-F]
 2003
 Radio Pyongyang
 2007
 Radio Damascus [M-F]
 2010
 China Radio Intl*
 2025
 RAI Italy
 2030
 Radio Netherlands Intl
 Radio New Zealand Intl [S-H]*
 Radio Sweden [M-F]
 Radio Thailand
 Voice of Armenia
 Voice of Russia
 Voice of Vietnam
 2055
 Voice of Indonesia [M]
 2057
 Radio Kuwait

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

Voice of Iran
 2145
 Radio Damascus [W]
 2155
 Radio Canada Intl [M-F]

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

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

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FREQUENCIES

0000-0030	Australia, Radio	9610as	13605pa	13745as	17750as	0000-0030	Thailand, Radio	9680af				
0000-0100 vl	Australia, VL8A Alice Spg	2310do				0000-0100	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na	
0000-0100 vl	Australia, VL8K Katherine	5025do						6055na	7205na			
0000-0100 vl	Australia, VL8T Tent Crk	4910do				0000-0100	United Kingdom, BBC WS	5965as	5970sa	5975va	6175na	
0000-0015	Cambodia, Natl Voice of	11940as						6195as	7110as	7265as	7325va	
0000-0100	Canada, CBC N Quebec Svc	9625do						9590va	9915sa	11750sa	11955as	
0000-0100	Canada, CFCX Montreal	6005do				0000-0030	United Kingdom, BBC WS	9580as	11945as			
0000-0100	Canada, CFRX Toronto	6070do				0000-0100	USA, KAIJ Dallas TX	5810am				
0000-0100	Canada, CFVP Calgary	6030do				0000-0100	USA, KTNB Salt Lk City UT	7510am				
0000-0100	Canada, CHNX Halifax	6130do				0000-0100	USA, KVOH Los Angeles CA	9975am				
0000-0100	Canada, CKZN St John's	6160do				0000-0100	USA, KWHR Naalehu HI	17510au				
0000-0100	Canada, CKZU Vancouver	6160do				0000-0100	USA, Monitor Radio Intl	7535am	9430ca			
0000-0030 mtwtf	Canada, R Canada Intl	6040am	9535am	11940am		0000-0100	USA, Voice of America	5995na	6130am	7215va	7405na	
0000-0100	Canada, R Canada Intl	5960na	9755na					9455am	9775na	9890as	11695am	
0000-0100	China, China Radio Intl	9710na	11655na	11715na				11760va	13740na	15185va	15290va	
0000-0100 vl	Costa Rica, Adv World R	5030am	6150am	7375am	9725am			17735va	17820va			
		13750am	15460am			0000-0100	USA, WEWN Birmingham AL	5825eu	7425na			
0000-0100	Costa Rica, RF Peace Intl	6205am	7385am			0000-0100	USA, WHRI Noblesville IN	5745am				
0000-0010	Croatia, Croatian Radio	5895eu	7370eu	13830eu		0000-0100	USA, WJCR Upton KY	7490na	13595na			
0000-0027	Czech Rep, Radio Prague	5930na	7345na			0000-0100 m	USA, WRM/R Miami Intl	9955am				
0000-0030	Egypt, Radio Cairo	9900na				0000-0100	USA, WRNO New Orleans LA	7355am				
0000-0015	Ghana, Ghana Broadc Corp	3366do	4915do			0000-0100	USA, WWCN Nashville TN	3315am	5065am	5935am	7425am	
0000-0045	India, All India Radio	9705as	9950as	11620as	13700as	0000-0100	USA, WYFR Okeechobee FL	6065na	9505na			
		15145as				0000-0030 mtwtf	Yugoslavia, Radio	6195af	7115na			
0000-0100	Lebanon, Voice of Hope	6280va				0030-0100	Australia, Radio	9580pa	9660pa	11795as	13605pa	
0000-0100	Lebanon, Wings of Hope	9960va						13755as	15240pa	15365pa	15415as	
0000-0100	Malaysia, Radio	7295do						15510as	17795pa	17860pa		
0000-0100	Malaysia, RTM Kuching	7160do				0030-0100	Ecuador, HCJB	9745am	21455va			
0000-0100	Netherlands, Radio	6020na	6165na			0030-0100	Iran, VOIRI	6015na	9022na			
0000-0100	New Zealand, R NZ Intl	15115pa				0030-0100	Netherlands, Radio	5905as	7305as	9860as	11655as	
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na		0030-0100	Sri Lanka, Sri Lanka BC	15425as				
0000-0100	Palau, KHBN/Voice of Hope	9965as				0030-0100	Sweden, Radio	6065am	9850am			
0000-0100 vl	Papua New Guinea, NBC	9675do				0030-0100	Thailand, Radio	11905na	15370as			
0000-0100	Philippines, FEBC/R Intl	15450as				0038-0055 m	Denmark, Radio	5905am	7275am	7465am		
0000-0100	Russia, Voice of Russia WS	7105na	7125na	7180na		0040-0050 f	Greece, Voice of	6260na	7448na	9420na		
0000-0100	Spain, R Exterior Espana	9540na				0050-0100	Italy, RAI Intl	6005na	9645na	11800na		

SELECTED PROGRAMS

Sundays

- 0000 Egypt, Radio Cairo: Egyptian Songs.
- 0000 North Korea, R Pyongyang: Anthem.
- 0010 Australia, Radio: Charting Australia. A program intended to strengthen Australia's links with the Indian subcontinent.
- 0010 New Zealand, R NZ Intl: Focus on Politics. Developments on the New Zealand political scene.
- 0011 Russia, Voice of: Moscow Mailbag. Joe Adamov answers listener questions.
- 0025 New Zealand, R NZ Intl: NZ Long Range Weather Forecast. Five-day weather forecast with warnings for mariners.
- 0030 Australia, Radio: Correspondents' Report. A round-up of global stories with Hamish Robertson.
- 0031 North Korea, R Pyongyang: Listeners' Newsletter.
- 0032 Russia, Voice of: Audio Book Club. The best of Russian classic and contemporary literature.

Mondays

- 0000 North Korea, R Pyongyang: Anthem.
- 0007 New Zealand, R NZ Intl: Correspondence School. No information available.
- 0011 Australia, Radio: Network Asia. See S 2320.
- 0011 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0032 Russia, Voice of: Russian by Radio. See S 0632.
- 0038 Radio Denmark: Magazine Program. See S 1138.

Tuesdays

- 0000 North Korea, R Pyongyang: Anthem.
- 0007 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0011 Australia, Radio: Network Asia. See S 2320.
- 0011 Russia, Voice of: Focus on Asia and the Pacific. News and comments on events in the region.
- 0012 North Korea, R Pyongyang: Commentary.
- 0016 North Korea, R Pyongyang: Under the Banner of Korea.
- 0032 Russia, Voice of: This is Russia. See S 0532.

Wednesdays

- 0000 North Korea, R Pyongyang: Anthem.
- 0007 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0011 Australia, Radio: Network Asia. See S 2320.
- 0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0013 North Korea, R Pyongyang: Commentary.
- 0020 North Korea, R Pyongyang: Music.
- 0030 North Korea, R Pyongyang: Feature Report.
- 0032 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

Thursdays

- 0000 North Korea, R Pyongyang: Anthem.
- 0007 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0011 Australia, Radio: Network Asia. See S 2320.
- 0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0012 North Korea, R Pyongyang: Commentary.
- 0015 North Korea, R Pyongyang: The Great Man of the Century.
- 0020 North Korea, R Pyongyang: Music.
- 0032 Russia, Voice of: This is Russia. See S 0532.

Fridays

- 0000 North Korea, R Pyongyang: Anthem.
- 0007 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0011 Australia, Radio: Network Asia. See S 2320.
- 0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0013 North Korea, R Pyongyang: Commentary.
- 0032 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

Saturdays

- 0000 North Korea, R Pyongyang: Anthem.
- 0010 Australia, Radio: Feedback. See S 0410.
- 0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0013 North Korea, R Pyongyang: Music.
- 0021 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
- 0030 Australia, Radio: Indian Pacific. Peter Mares with news and analysis from across the Pacific and Asia.
- 0031 North Korea, R Pyongyang: Music.
- 0032 Russia, Voice of: This is Russia. See S 0532.
- 0038 North Korea, R Pyongyang: The Great Man of the Country.
- 0044 North Korea, R Pyongyang: Frequency Announcements.



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FREQUENCIES

0100-0200	Australia, Radio	9580pa 13755as 15415as 17795pa	9660pa 15240pa 15510as 17860pa	13605pa 15245as 17715as 17880as	13745as 15365pa 17750as	0100-0200	Philippines, FEBC/R Intl	15450as 5950na	6030na	7105na	7345na
0100-0200 vl	Australia, VLBA Alice Spg	2310do				0100-0200	Russia, Voice of Russia WS	9580na 12030na 7300na	12030na	13640na	15425na
0100-0200 vl	Australia, VL8K Katherine	5025do				0100-0127	Slovakia, R Slovakia Intl	5930na 9540na			
0100-0200 vl	Australia, VL8T Tent Crk	4910do				0100-0200	Spain, R Exterior Espana	15425as			
0100-0200	Australia, Defense Forces R	13525as				0100-0130	Sri Lanka, Sri Lanka BC	6135na	9885na	9905na	
0100-0200 vl	Canada, CBC N Quebec Svc	9625do				0100-0200	Switzerland, Swiss R Intl	5970sa 7325va 11955as	5975va	6175na	6195as
0100-0200	Canada, CFCX Montreal	6005do				0100-0200	United Kingdom, BBC WS	9300am 9300am 9300am	9300am	9300am	9300am
0100-0200	Canada, CFRX Toronto	6070do				0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	Canada, CFVP Calgary	6030do				0100-0200	USA, KTVH Salt Lk City UT	7510am			
0100-0200	Canada, CHNX Halifax	6130do				0100-0200	USA, KVOH Los Angeles CA	9975am			
0100-0200	Canada, CKZN St John's	6160do				0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	Canada, CKZU Vancouver	6160do				0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	Costa Rica, RF Peace Intl	6205am	7385am			0100-0200	USA, Voice of America	5995na 9775na 15370as	6130na	7405na	9455na
0100-0110	Croatia, Croatian Radio	5895eu	7370eu	13830eu		0100-0200	USA, WEWN Birmingham AL	5825eu			
0100-0200	Cuba, Radio Havana	6000na 6200na	9820na 7345na	9830na		0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0127	Czech Rep, Radio Prague	6200na	7345na			0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0200	Ecuador, HCJB	9745am	21455va			0100-0130 m	USA, WRMI/R Miami Intl	9955am			
0100-C150	Germany, Deutsche Welle	9555na 3366do 6190na 9525na	9640na 4915do 9850na	9670na	6145na	0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do			0100-0200	USA, WWCR Nashville TN	3315am	5065am	5935am	7425am
0100-0130	Hungary, Radio Budapest	6190na	9850na	11870na		0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0200	Indonesia, Voice of	9525na				0100-0130	Uzbekistan, R Tashkent	5955eu	5975eu	7285eu	
0100-0127	Iran, VOIRI	6015na	6175na	9022na		0100-0200	Vietnam, Voice of	5940na	9840na	15010na	
0100-0110	Italy, RAI Intl	6005na	9645na	11800na		0100-0130	Yugoslavia, Radio	6195na	7115na		
0100-0200	Japan, NHK/Radio	9605as 11910as	11840as 17810as	11860as 17845as	11890as	0130-0200	Austria, R Austria Intl	9655na			
0100-0200	Lebanon, Wings of Hope	9960va				0130-0150	Greece, Voice of	6260na	7448na	9420na	
0100-0200 smtwh	Malaysia, Radio	7295do				0130-0200	Netherlands, Radio	9860as			
0100-0200	Netherlands, Radio	5905as	7305as			0130-0200	Sweden, Radio	7120as			
0100-0125	Netherlands, Radio	6020na	6165na			0138-0155 m	Denmark, Radio	6120am	7465am		
0100-0200	New Zealand, R NZ Intl	15115pa				0140-0200	Vatican State, Vatican R	5980as	7335as		
0100-0130 m	Norway, Radio Norway Intl	6010na				0145-0200	Albania, R Tirana Intl	6140na	7160na		
0100-0200 vl	Papua New Guinea, NBC	9675do									

SELECTED PROGRAMS

Sundays

- 0108 Germany, Deutsche Welle: Inside Europe. A radio magazine offering a European perspective on events of the week.
- 0110 Australia, Radio: Book Reading. Serialized readings of the best Australian novels.
- 0111 Russia, Voice of: Music and Musicians. World-famous performers and composers play for you.
- 0119 Cuba, Radio Havana Cuba: Feature Report. In-depth coverage of a news item from another country of the hemisphere.
- 0130 Australia, Radio: The Europeans. Maria Zijlstra presents reports and features on aspects of European politics, culture and society.
- 0136 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0138 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.

Mondays

- 0100 Cuba, Radio Havana Cuba: Sunday Edition. RHC's two-hour magazine of features, reports, and music.
- 0108 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.
- 0110 Australia, Radio: Sports Headlines. A one-minute sports update.
- 0111 Russia, Voice of: Music and Musicians. See S 0111.
- 0114 Cuba, Radio Havana Cuba: The Mailbag Show. Listener letters and E-mail are reviewed and answered.
- 0118 Australia, Radio: Sports Summary. A two-minute wrap-up of Australian sport.
- 0118 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.
- 0120 Australia, Radio: Network Asia. See S 2320.
- 0131 Cuba, Radio Havana Cuba: The Jazz Place. A half-hour of the best of Cuban jazz.
- 0133 Germany, Deutsche Welle: German by Radio. See S 1133.
- 0138 Radio Denmark: Magazine Program. See S 1138.

Tuesdays

- 0105 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0109 Germany, Deutsche Welle: European Journal. See S 2324.
- 0110 Australia, Radio: Sports Headlines. See M 0110.
- 0111 Russia, Voice of: Commonwealth Update. Commonwealth of Independent States (CIS) developments.
- 0118 Australia, Radio: Sports Summary. See M 0118.
- 0120 Australia, Radio: Network Asia. See S 2320.

- 0120 Cuba, Radio Havana Cuba: Spotlight on the Americas. Comments by the RHC editorial desk.
- 0130 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0132 Germany, Deutsche Welle: German Tribune. News and views from the Federal Republic.
- 0132 Russia, Voice of: Folk Box. See S 2332.
- 0137 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Wednesdays

- 0105 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0109 Germany, Deutsche Welle: European Journal. See S 2324.
- 0110 Australia, Radio: Sports Headlines. See M 0110.
- 0111 Russia, Voice of: Commonwealth Update. See T 0111.
- 0118 Australia, Radio: Sports Summary. See M 0118.
- 0118 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0120 Australia, Radio: Network Asia. See S 2320.
- 0130 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0132 Russia, Voice of: Music at Your Request. See M 1132.
- 0133 Germany, Deutsche Welle: Come to Germany. Focus on a seasonal event, festival, or attraction.
- 0135 Cuba, Radio Havana Cuba: DXers Unlimited. See S 0234.
- 0150 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

- 0105 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0109 Germany, Deutsche Welle: European Journal. See S 2324.
- 0110 Australia, Radio: Sports Headlines. See M 0110.
- 0111 Russia, Voice of: Commonwealth Update. See T 0111.
- 0118 Australia, Radio: Sports Summary. See M 0118.
- 0118 Cuba, Radio Havana Cuba: USA Report. Events such as strikes, crime, and unrest are played up.
- 0120 Australia, Radio: Network Asia. See S 2320.
- 0130 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0132 Russia, Voice of: The Jazz Show. See M 0432.
- 0133 Germany, Deutsche Welle: German Tribune. See T 0132.
- 0136 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Fridays

- 0105 New Zealand, R NZ Intl: Correspondence School. See M 0007.
- 0109 Germany, Deutsche Welle: European Journal. See S 2324.
- 0110 Australia, Radio: Sports Headlines. See M 0110.
- 0111 Russia, Voice of: Commonwealth Update. See T 0111.

- 0118 Australia, Radio: Sports Summary. See M 0118.
- 0119 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0120 Australia, Radio: Network Asia. See S 2320.
- 0130 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0132 Russia, Voice of: Music at Your Request. See M 1132.
- 0133 Germany, Deutsche Welle: Arts on the Air. See S 1109.
- 0135 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Saturdays

- 0108 Germany, Deutsche Welle: European Journal. See S 2324.
- 0110 Australia, Radio: Oz Sounds. See S 1310.
- 0111 Russia, Voice of: Commonwealth Update. See T 0111.
- 0116 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0130 Australia, Radio: The Australian Scene. A state by state look at life in Australia presented by Denis Gibbons.
- 0131 Germany, Deutsche Welle: Through German Eyes. See S 1629.
- 0132 Russia, Voice of: The Jazz Show. See M 0432.
- 0135 Cuba, Radio Havana Cuba: Feature Report. See S 0119.



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FREQUENCIES

0200-0300 twhfa	Argentina, RAE	11710am				0200-0300	South Korea, R Korea Intl	7275am	11725am	11810am	15575am
0200-0300	Australia, Radio	9580pa	9660pa	13605pa	15240pa	0200-0230	Sri Lanka, Sri Lanka BC	15425as			
		15365pa	15415as	15510as	17715as	0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		17750as	17795pa	17860pa				11825as	15345as		
0200-0300 vl	Australia, VL8A Alice Spg	2310do				0200-0300	United Kingdom, BBC WS	5970sa	5975va	6135af	6175na
0200-0300 vl	Australia, VL8K Katherine	5025do						7235va	7325va	9590va	9605as
0200-0300 vl	Australia, VL8T Tent Crk	4910do						9915sa	11955as	15360as	
0200-0300	Australia, Defense Forces R	13525as				0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300 vl	Canada, CBC N Quebec Svc	9625do				0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	Canada, CFCX Montreal	6005do				0200-0300	USA, KVOH Los Angeles CA	9975am			
0200-0300	Canada, CFRX Toronto	6070do				0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	Canada, CFVP Calgary	6030do				0200-0300	USA, Monitor Radio Intl	5850na	9430am		
0200-0300	Canada, CHNX Halifax	6130do				0200-0300	USA, Voice of America	7115as	7205as	7215as	7651as
0200-0300	Canada, CKZN St John's	6160do						9740as	11705as	15205as	17740as
0200-0300	Canada, CKZU Vancouver	6160do						17820as			
0200-0300	Canada, R Canada Intl	5905na	6010na	9535am	9755na	0200-0300	USA, WEWN Birmingham AL	5825eu	7425na		
		11725am				0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	Costa Rica, RF Peace Intl	6205am	7385am			0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0210	Croatia, Croatian Radio	5895eu	7370eu	13830eu		0200-0300	USA, WRNO New Orleans LA	7395am			
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na		0200-0300	USA, WWCR Nashville TN	3315am	5065am	5935am	7425am
0200-0300	Ecuador, HCJB	9745am	21455va			0200-0300	USA, WYFR Okeechobee FL	6065na	7355eu	9505na	
0200-0300	Egypt, Radio Cairo	9475na				0200-0300	Vietnam, Voice of	5940na	9840na	15010na	
0200-0250	Germany, Deutsche Welle	6035as	6130na	7265as	7285as	0215-0225	Nepal, Radio	5005do			
		7355as	9515as			0230-0300	Albania, R Tirana Intl	6140na	7160na		
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do				0230-0300	Austria, R Austria Intl	9655na	9870ca	13730sa	
0200-0300	Lebanon, Wings of Hope	9960va				0230-0300	Hungary, Radio Budapest	5965na	9850na	11870na	
0200-0300 smtwh	Malaysia, Radio	7295do				0230-0255	Moldova, R Moldova Intl	7500na			
0200-0230	Netherlands, Radio	5905as	7305as	9860as	11655as	0230-0245	Pakistan, Radio	7290as	15190as	17705as	17725as
0200-0300	New Zealand, R NZ Intl	15115pa						21730as			
0200-0300 vl	Papua New Guinea, NBC	9675do				0230-0300	Philippines, R Pilipinas	17760me	17865me	21580me	
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0230-0300 twhfa	Portugal, R Portugal Intl	6095am	9570am		
		11940na				0230-0300	Sweden, Radio	7115na			
0200-0300	Russia, Voice of Russia WS	5920na	5940na	6030na	7105na	0238-0255 m	Denmark, Radio	6120am	7465am		
		7175na	7270na	7330na	7345na	0250-0300	Vatican State, Vatican R	6095na	7305na		
		9580na									

SELECTED PROGRAMS

Sundays

- 0200 New Zealand, R NZ Intl: National Radio or Sport. Regular programming is preempted for sports events.
- 0208 Germany, Deutsche Welle: Commentary. Guest commentary about a current event.
- 0210 Australia, Radio: Charting Australia. See S 0010.
- 0211 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0212 Germany, Deutsche Welle: Sports Report. The latest news from the world of sports.
- 0216 Germany, Deutsche Welle: Mailbag Asia. Listener mail from Asia is answered.
- 0217 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0230 Australia, Radio: Correspondents' Report. See S 0030.
- 0232 Russia, Voice of: Your Top Tune. Win a prize by guessing which song of the three is the most popular.
- 0234 Cuba, Radio Havana Cuba: DXers Unlimited. Arnie Coro discusses the technical aspects of shortwave listening and amateur radio.
- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.
- 0240 Albania, R Tirana Intl: Reality. Current events and popular Albanian music.
- 0246 Russia, Voice of: You Write to Us. Listener letters are read and program announcements are given.

Mondays

- 0200 Cuba, Radio Havana Cuba: Sunday Edition (from 0100). The second hour of RHC's two-hour magazine of features, reports, and music.
- 0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 0210 Australia, Radio: Sports Headlines. See M 0110.
- 0211 Australia, Radio: Network Asia. See S 2320.
- 0211 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0224 Germany, Deutsche Welle: European Journal. See S 2324.
- 0225 Egypt, Radio Cairo: Commentary.
- 0230 Cuba, Radio Havana Cuba: Breakthrough. See S 2330.
- 0230 Egypt, Radio Cairo: Music.
- 0230 New Zealand, R NZ Intl: In Touch with New Zealand. Wayne Mowat hosts this variety program.
- 0232 Russia, Voice of: Timelines. See S 1632.
- 0235 Cuba, Radio Havana Cuba: From Havana. A showcase of Cuban music.
- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.
- 0238 Radio Denmark: Magazine Program. See S 1138.
- 0243 Albania, R Tirana Intl: Music at Your Request. Selections of Albania popular music.

Tuesdays

- 0205 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 0210 Australia, Radio: Sports Headlines. See M 0110.
- 0211 Australia, Radio: Network Asia. See S 2320.
- 0211 Russia, Voice of: Newmarket. See M 1211.
- 0213 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0224 Germany, Deutsche Welle: European Journal. See S 2324.
- 0232 Russia, Voice of: Kaleidoscope. See S 1432.
- 0235 Cuba, Radio Havana Cuba: Timeout. Five minutes of Cuban sports coverage.
- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.
- 0239 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Wednesdays

- 0205 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 0210 Australia, Radio: Sports Headlines. See M 0110.
- 0211 Australia, Radio: Network Asia. See S 2320.
- 0211 Russia, Voice of: Science and Engineering in the CIS. See S 0511.
- 0217 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0224 Germany, Deutsche Welle: European Journal. See S 2324.
- 0232 Russia, Voice of: Russian by Radio. See S 0632.
- 0235 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.
- 0241 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0243 Albania, R Tirana Intl: PO Box Radio Tirana. Radio Tirana's mailbag program.

Thursdays

- 0205 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 0210 Australia, Radio: Sports Headlines. See M 0110.
- 0211 Australia, Radio: Network Asia. See S 2320.
- 0211 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0218 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0224 Germany, Deutsche Welle: European Journal. See S 2324.
- 0232 Russia, Voice of: Audio Book Club. See S 0032.
- 0235 Cuba, Radio Havana Cuba: Timeout. See T 0235.

- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.

Fridays

- 0205 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 0210 Australia, Radio: Sports Headlines. See M 0110.
- 0211 Australia, Radio: Network Asia. See S 2320.
- 0211 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0217 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0224 Germany, Deutsche Welle: European Journal. See S 2324.
- 0232 Russia, Voice of: Russian by Radio. See S 0632.
- 0235 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.
- 0241 Cuba, Radio Havana Cuba: Cuba Today. See T 0640.
- 0246 Albania, R Tirana Intl: Tourism in Albania. Where to visit and what to see.

Saturdays

- 0208 Germany, Deutsche Welle: Commentary. See S 0208.
- 0210 Australia, Radio: Feedback. See S 0410.
- 0211 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0212 Germany, Deutsche Welle: The Week in Germany. See S 1609.
- 0220 Cuba, Radio Havana Cuba: Latin America Newslite. News from the countries of Central and South America.
- 0222 Germany, Deutsche Welle: Economic Notebook. See T 0333.
- 0230 Australia, Radio: Indian Pacific. See A 0030.
- 0232 Russia, Voice of: Audio Book Club. See S 0032.
- 0235 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0237 Albania, R Tirana Intl: Press Review. A daily look at items in the Bulgarian press.
- 0237 Germany, Deutsche Welle: The Jazz Corner. See F 2333.
- 0240 Albania, R Tirana Intl: Horizon.
- 0240 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

FREQUENCIES

0300-0400	Australia, Radio	9580pa 15245as 17795pa	9660pa 15365pa 17860pa	13605pa 15510as	15240pa 17750pa	0300-0400	Taiwan, VO Free China	5950na 15345as	9680na	11745as	11825as
0300-0400 vl	Australia, VL8A Alice Spg	2310do				0300-0330	Thailand, Radio	9655na	11890na		
0300-0400 vl	Australia, VL8K Katherine	5025do				0300-0400	Turkey, Voice of	9445na 9760au	9560as	9655na	9685eu
0300-0400 vl	Australia, VL8T Tent Crk	4910do				0300-0315	Uganda, Radio	3340do			
0300-0400 vl	Canada, CBC N Quebec Svc	9625do				0300-0400	Ukraine, R Ukraine Intl	5905na 6055na	5915na 7205na	6010na	6020na
0300-0400	Canada, CFCX Montreal	6005do				0300-0330	United Kingdom, BBC WS	5970sa 15360as	6135af 15380as	7235va	7325sa
0300-0400	Canada, CFRX Toronto	6070do				0300-0400	United Kingdom, BBC WS	3255af 6175na 9600af	3955eu 7325na 9605as	5975va 9410va 11760va	6005af 9590va 12095af
0300-0400	Canada, CFVP Calgary	6030do				0300-0400	USA, KAIJ Dallas TX	5810am			
0300-0400	Canada, CHNX Halifax	6130do				0300-0400	USA, KTVN Salt Lk City UT	7510am			
0300-0400	Canada, CKZN St John's	6160do				0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	Canada, CKZU Vancouver	6160do				0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0330 twhfa	Canada, R Canada Intl	6010na	9755na			0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400 sm	Canada, R Canada Intl	6010na	9755na			0300-0400	USA, Voice of America	6035af 7405af	7105af 7415af	7280af 9575af	7340af 9885af
0300-0400	China, China Radio Intl	9690na	9710na	11715na		0300-0400	USA, WEWN Birmingham AL	5825eu			
0300-0400 vl	Costa Rica, Faro del Carib	5055do				0300-0400	USA, WHRI Noblesville IN	5760am			
0300-0400	Costa Rica, RF Peace Intl	6205am	7385am			0300-0400	USA, WJCR Upton KY	7490na			
0300-0310	Croatia, Croatian Radio	5895eu	7370eu	13830eu		0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na		0300-0400	USA, WWCR Nashville TN	3315am	5065am	5935am	7425am
0300-0327	Czech Rep, Radio Prague	5930na	7345na			0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0400	Ecuador, HCJB	9745am	21455va			0300-0400	USA, WYFR Okeechobee FL	9355eu			
0300-0330	Egypt, Radio Cairo	9475na				0300-0315	Vatican State, Vatican R	6095na	7305na		
0300-0350	Germany, Deutsche Welle	6045na 9650na	6085na	6120na	9530na	0300-0400	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
0300-0400	Guatemala, Radio Cultural	3300do				0320-0350	Vatican State, Vatican R	7360af			
0300-0400 vl	Italy, IRRS	7100va				0330-0357	Czech Rep, Radio Prague	6200as			
0300-0400	Japan, NHK/Radio	5960na	9605na	11840as		0330-0355	Moldova, R Moldova Intl	7500na			
0300-0330	Japan, NHK/Radio	11885na	11895ca	11960na		0330-0400	Sweden, Radio	7115na			
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0330-0400 vl	Tanzania, Radio	5050af			
0300-0400	Lebanon, Wings of Hope	9960va				0330-0400	UAE, Radio Dubai	13675na	15395eu	21605na	
0300-0330	Mongolia, R Ulan Bator	9960na	12000na			0330-0400	United Kingdom, BBC WS	9610af	11730af	11955as	15280as
0300-0325	Netherlands, Radio	5905as	7305as	9860as	11655as	0338-0355 m	Denmark, Radio	5965am	7165am	7465am	
0300-0400	New Zealand, R NZ Intl	15115pa				0340-0350	Greece, Voice of	6260na	7448na	9420na	
0300-0330 m	Norway, Radio Norway Intl	6030na				0345-0400 irreg	Burundi, Radio Nationale	6140do			
0300-0400 vl	Papua New Guinea, NBC	9675do				0345-0400	Tajikistan, Tajik Radio	7245as			
0300-0330	Philippines, R Pilipinas	17760me	17865me	21580me							
0300-0400	Russia, Voice of Russia WS	5920na 7180na 9580na	6030na 7105na 7330na	7175na 7345na							
0300-0400	S Africa, Channel Africa	5955af	9585af								

SELECTED PROGRAMS

Sundays

- 0300 New Zealand, R NZ Intl: National Radio or Sport. See S 0200.
- 0308 Germany, Deutsche Welle: Inside Europe. See S 0108.
- 0310 Australia, Radio: Book Reading. See S 0110.
- 0311 Russia, Voice of: News and Views. Russian views on news developments.
- 0319 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0330 Australia, Radio: At Your Request. Dick Paterson plays favorite music.
- 0332 Russia, Voice of: Culture and the Arts. An overview of a Russian cultural activity.
- 0336 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0337 Germany, Deutsche Welle: Religion and Society. See S 0138.
- 0340 UAE, Radio Dubai: Variable Feature.

Mondays

- 0300 Cuba, Radio Havana Cuba: Sunday Edition. See M 0100.
- 0306 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0308 Germany, Deutsche Welle: Mailbag. See M 0108.
- 0310 Australia, Radio: Sports Bulletin. See S 1120.
- 0311 Russia, Voice of: News and Views. See S 0311.
- 0314 Cuba, Radio Havana Cuba: The Mailbag Show. See M 0114.
- 0319 Germany, Deutsche Welle: Living in Germany. See M 0118.
- 0320 Australia, Radio: Network Asia. See S 2320.
- 0331 Cuba, Radio Havana Cuba: The Jazz Place. See M 0131.
- 0332 Russia, Voice of: Audio Book Club. See S 0032.
- 0334 Germany, Deutsche Welle: German by Radio. See S 1133.
- 0338 Radio Denmark: Magazine Program. See S 1138.
- 0340 UAE, Radio Dubai: Variable Feature.

Tuesdays

- 0306 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0309 Germany, Deutsche Welle: European Journal. See S 2324.
- 0310 Australia, Radio: Sports Bulletin. See S 1120.
- 0311 Russia, Voice of: News and Views. See S 0311.
- 0318 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0320 Australia, Radio: Network Asia. See S 2320.
- 0332 Russia, Voice of: Our Treasure Chest. The heritage of Russia.

- 0333 Germany, Deutsche Welle: Economic Notebook. The economic scene in Germany and around the world.
- 0336 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0340 UAE, Radio Dubai: Variable Feature.

Wednesdays

- 0306 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0309 Germany, Deutsche Welle: European Journal. See S 2324.
- 0310 Australia, Radio: Sports Bulletin. See S 1120.
- 0311 Russia, Voice of: News and Views. See S 0311.
- 0318 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0320 Australia, Radio: Network Asia. See S 2320.
- 0332 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0333 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the international scene.
- 0335 Cuba, Radio Havana Cuba: DXers Unlimited. See S 0234.
- 0340 UAE, Radio Dubai: Variable Feature.
- 0350 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

- 0306 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0309 Germany, Deutsche Welle: European Journal. See S 2324.
- 0310 Australia, Radio: Sports Bulletin. See S 1120.
- 0311 Russia, Voice of: News and Views. See S 0311.
- 0318 Cuba, Radio Havana Cuba: USA Report. See H 0118.
- 0320 Australia, Radio: Network Asia. See S 2320.
- 0332 Russia, Voice of: Audio Book Club. See S 0032.
- 0333 Germany, Deutsche Welle: German by Radio. See S 1133.
- 0336 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0340 UAE, Radio Dubai: Variable Feature.

Fridays

- 0306 New Zealand, R NZ Intl: In Touch with New Zealand. See M 0230.
- 0309 Germany, Deutsche Welle: European Journal. See S 2324.
- 0310 Australia, Radio: Sports Bulletin. See S 1120.
- 0311 Russia, Voice of: News and Views. See S 0311.
- 0319 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.

- 0320 Australia, Radio: Network Asia. See S 2320.
- 0332 Russia, Voice of: Our Treasure Chest. See T 0332.
- 0333 Germany, Deutsche Welle: Science and Technology. See M 1633.
- 0335 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0340 UAE, Radio Dubai: Variable Feature.

Saturdays

- 0308 Germany, Deutsche Welle: European Journal. See S 2324.
- 0310 Australia, Radio: Soundabout. Kim Taylor and friends bring top new releases, a weekly chart countdown, and rock news from around the world.
- 0311 Russia, Voice of: News and Views. See S 0311.
- 0316 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0332 Germany, Deutsche Welle: Through German Eyes. See S 1629.
- 0332 Russia, Voice of: Music. See M 1632.
- 0335 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0340 UAE, Radio Dubai: Variable Feature.

THANK YOU ...

Additional contributors to this month's Shortwave Guide:

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FREQUENCIES

0400-0500	Australia, Radio	9580pa 15240pa 17715pa	9660pa 15365pa 17750as	11880pa 15415pa 17795pa	13605as 15510pa	0400-0500	Slovakia, Adv World Radio	9450af	9465af	9905na
0400-0500 vl	Australia, VL8A Alice Spg	2310do				0400-0430	Switzerland, Swiss R Intl	6135na	9885na	
0400-0500 vl	Australia, VL8K Katherine	5025do				0400-0500	Switzerland, Swiss R Intl	9905na		
0400-0500 vl	Australia, VL8T Tent Crk	4910do				0400-0430	Tanzania, Radio	5050af		
0400-0500	Bulgaria, Radio	7480na	9700na			0400-0415	Uganda, Radio	3340do		
0400-0500 vl	Canada, CBC N Quebec Svc	9625do				0400-0500	United Kingdom, BBC WS	3255af	6005af	6175na
0400-0500	Canada, CFCX Montreal	6005do						9410va	9600af	11730af
0400-0500	Canada, CFRX Toronto	6070do						11955as	12095af	15280as
0400-0500	Canada, CFVP Calgary	6030do						15575va		15310as
0400-0500	Canada, CHNX Halifax	6130do				0400-0430	United Kingdom, BBC WS	3955eu	5975va	6180eu
0400-0500	Canada, CKZN St John's	6160do						9610af		6195eu
0400-0500	Canada, CKZU Vancouver	6160do				0400-0500	USA, KAIJ Dallas TX	5810am		
0400-0430	Canada, R Canada Intl	6150me	9505me	9645me		0400-0500	USA, KTBN Salt Lk City UT	7510am		
0400-0500	China, China Radio Intl	9730na				0400-0500	USA, KVOH Los Angeles CA	9975am		
0400-0500	Costa Rica, RF Peace Intl	6205am	7385am			0400-0500	USA, KWHR Naalehu HI	17510as		
0400-0410	Croatia, Croatian Radio	5895eu	7370eu	13830eu		0400-0500	USA, Monitor Radio Intl	7535eu	9840af	
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na	0400-0500	USA, Voice of America	6035af	6110af	6145af
0400-0500	Ecuador, HCJB	9745am	21455va					7170va	7280af	7340af
0400-0450	Germany, Deutsche Welle	6015af	6045af	6065af	7225af			7415af	9575af	9630af
		7265af	9565af			0400-0500	USA, WHRI Noblesville IN	15300af		
0400-0500 twfta	Guatemala, Radio Cultural	3300do						5760am	7315am	
0400-0415	Israel, Kol Israel	5885na	7465na	17545na		0400-0500	USA, WJCR Upton KY	7490na	13595na	
0400-0500 vl	Italy, IRRS	7100va				0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu		
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0400-0500	USA, WRNO New Orleans LA	7395am		
0400-0500	Lebanon, Wings of Hope	9960va				0400-0500	USA, WWCR Nashville TN	3315am	5065am	5935am
0400-0458	New Zealand, R NZ Intl	15115pa				0400-0500	USA, WYFR Okeechobee FL	5985na	9885af	7425am
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as		0400-0430	Vietnam, Voice of	7360na	9840na	12020na
0400-0500 vl	Papua New Guinea, NBC	9675do				0400-0500	Zambia, Christian Voice	6065af		
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0400-0500	Zimbabwe, ZBC/Radio 3	3306do	3396do	
		11940na				0425-0440	Italy, RAI Intl	5990eu	7275eu	
0400-0500	Russia, Voice of Russia WS	5905na	5920na	5930na	6030na	0425-0500	Nigeria, FRCN/Radio	3326do	4990do	
		7105na	7175na	7180na	7270na	0430-0500	Australia, Defense Forces R	13525as		
		7330na				0430-0500	Netherlands, Radio	5995na	6165na	
0400-0500	S Africa, Channel Africa	5955af	9585af			0430-0500	Swaziland, Trans World R	3200af	5055af	6070af
0400-0427	S Africa, Trans World R	7165af				0430-0500	United Kingdom, BBC WS	7150eu		
						0438-0455 m	Denmark, Radio	5965af	6040am	6195am
						0455-0500	Nigeria, Voice of	7255af		7305am
						0459-0500	New Zealand, R NZ Intl	9570pa		

SELECTED PROGRAMS

Sundays

- 0400 New Zealand, R NZ Intl: National Radio or Sport. See S 0200.
- 0408 Germany, Deutsche Welle: Commentary. See S 0208.
- 0410 Australia, Radio: Feedback. Dennis Gibbons answers letters and discusses new programs, reception problems, and questions about Australia.
- 0411 Russia, Voice of: Program Preview. A review of programs to be featured in the coming week.
- 0412 Germany, Deutsche Welle: Sports Report. See S 0212.
- 0416 Germany, Deutsche Welle: International Talking Point. Journalists discuss major trends and events.
- 0417 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0430 Australia, Radio: Correspondents' Report. See S 0030.
- 0432 Russia, Voice of: Moscow Yesterday and Today. Sit back and enjoy a great program about Russian history with magnificent sound effects.
- 0434 Cuba, Radio Havana Cuba: DXers Unlimited. See S 0234.
- 0436 Germany, Deutsche Welle: Feature of the Month (1). A special feature on important developmental issues of our time.
- 0436 Germany, Deutsche Welle: People and Places. Interviews, stories and music for Africa listeners.

Mondays

- 0400 Cuba, Radio Havana Cuba: Sunday Edition (from 0300). See M 0200.
- 0400 New Zealand, R NZ Intl: Pacific Regional News. News about the Pacific Islands.
- 0405 New Zealand, R NZ Intl: Calling Cook Islands. Birthday Calls, dedications, and requests for Cook Islands listeners.
- 0408 Germany, Deutsche Welle: Africa Highlight. A weekly feature on an important topic concerning Africa.
- 0410 Australia, Radio: Sports Headlines. See M 0110.
- 0411 Australia, Radio: Pacific Beat. A magazine which provides a focus on the people and issues of the region.
- 0411 Russia, Voice of: Program Preview. See S 0411.
- 0424 Germany, Deutsche Welle: European Journal. See S 2324.
- 0430 Australia, Radio: International Report. Overseas and local correspondents analyze regional and global issues and events.
- 0430 Cuba, Radio Havana Cuba: Breakthrough. See S 2330.
- 0430 New Zealand, R NZ Intl: Travel Pacific (biweekly). A comprehensive look at tourism in the South Pacific from Air New Zealand and RNZl.
- 0432 Russia, Voice of: The Jazz Show. The world of Russian jazz.
- 0435 Cuba, Radio Havana Cuba: From Havana. See M 0235.
- 0438 Radio Denmark: Magazine Program. See S 1138.

Tuesdays

- 0400 New Zealand, R NZ Intl: Pacific Regional News. See M 0400.
- 0405 New Zealand, R NZ Intl: Calling Tonga. Regional news and topical programming for Tonga.
- 0408 Germany, Deutsche Welle: Africa Report. Reports and background to the news from Africa by Deutsche Welle correspondents.
- 0410 Australia, Radio: Sports Headlines. See M 0110.
- 0411 Australia, Radio: Pacific Beat. See M 0411.
- 0411 Russia, Voice of: Commonwealth Update. See T 0111.
- 0413 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0424 Germany, Deutsche Welle: European Journal. See S 2324.
- 0430 Australia, Radio: International Report. See M 0430.
- 0430 New Zealand, R NZ Intl: Tagata Atu Motu. No details available.
- 0432 Russia, Voice of: Yours for the Asking. See M 2332.
- 0433 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0439 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Wednesdays

- 0400 New Zealand, R NZ Intl: Pacific Regional News. See M 0400.
- 0408 Germany, Deutsche Welle: Africa Report. See T 0408.
- 0410 Australia, Radio: Sports Headlines. See M 0110.
- 0411 Australia, Radio: Pacific Beat. See M 0411.
- 0411 Russia, Voice of: Commonwealth Update. See T 0111.
- 0417 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0424 Germany, Deutsche Welle: European Journal. See S 2324.
- 0430 Australia, Radio: International Report. See M 0430.
- 0430 New Zealand, R NZ Intl: Te Puna Wai Korero. See S 0530.
- 0432 Russia, Voice of: Music at Your Request. See M 1132.
- 0436 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0441 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

- 0400 New Zealand, R NZ Intl: Pacific Regional News. See M 0400.
- 0405 New Zealand, R NZ Intl: Calling the Solomon Islands (biweekly). A program for the Solomon Islands.
- 0408 Germany, Deutsche Welle: Africa Report. See T 0408.
- 0410 Australia, Radio: Sports Headlines. See M 0110.
- 0411 Australia, Radio: Pacific Beat. See M 0411.
- 0411 Russia, Voice of: Commonwealth Update. See T 0111.
- 0418 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0424 Germany, Deutsche Welle: European Journal. See S 2324.
- 0430 Australia, Radio: International Report. See M 0430.
- 0432 Russia, Voice of: Folk Box. See S 2332.
- 0435 Cuba, Radio Havana Cuba: Timeout. See T 0235.

Fridays

- 0400 New Zealand, R NZ Intl: Pacific Regional News. See M 0400.
- 0405 New Zealand, R NZ Intl: Calling Niue. Regional news and topical programming for Niue.
- 0408 Germany, Deutsche Welle: Africa Report. See T 0408.
- 0410 Australia, Radio: Sports Headlines. See M 0110.
- 0411 Australia, Radio: Pacific Beat. See M 0411.
- 0411 Russia, Voice of: Commonwealth Update. See T 0111.
- 0417 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0424 Germany, Deutsche Welle: European Journal. See S 2324.
- 0430 Australia, Radio: International Report. See M 0430.
- 0430 New Zealand, R NZ Intl: Calling Pitcairn and Norfolk (in rotation). A program for Pitcairn and Norfolk Islands listeners.
- 0430 New Zealand, R NZ Intl: Calling Tokelau (in rotation). A program for Tokelau listeners.
- 0430 New Zealand, R NZ Intl: Feature (in rotation). Variable feature program.
- 0432 Russia, Voice of: Kaleidoscope. See S 1432.
- 0436 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0441 Cuba, Radio Havana Cuba: Cuba Today. See T 0640.

Saturdays

- 0406 New Zealand, R NZ Intl: Tagata Atu Motu. See T 0430.
- 0408 Germany, Deutsche Welle: Commentary. See S 0208.
- 0410 Australia, Radio: Book Reading. See S 0110.
- 0411 Russia, Voice of: Commonwealth Update. See T 0111.
- 0412 Germany, Deutsche Welle: Africa This Week. A weekly review of trends and events on the African continent.
- 0413 North Korea, R Pyongyang: Music.
- 0420 Cuba, Radio Havana Cuba: Latin America Newslines. See A 0220.
- 0421 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
- 0430 Australia, Radio: Indian Pacific. See A 0030.
- 0430 New Zealand, R NZ Intl: Change of Pace. A light mixture of jazz, polka, and other musical forms.
- 0431 North Korea, R Pyongyang: Music.
- 0432 Germany, Deutsche Welle: Man and Environment. See T 1633.
- 0432 Russia, Voice of: Timelines. See S 1632.
- 0435 Cuba, Radio Havana Cuba: Timeout. See T 0235.
- 0438 North Korea, R Pyongyang: The Great Man of the Country.
- 0440 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0444 North Korea, R Pyongyang: Frequency Announcements.

FREQUENCIES

0500-0600	Australia, Radio	9580pa 15240pa 17715pa	9660pa 15245as 17795pa	11880pa 15365pa	13605as 15415as	0500-0600	United Kingdom, BBC WS	3255af 6175va 7160af 9740as 15280as 17640af	3955eu 6180eu 9410va 11760va 15310as 17885af	5975va 6195af 9600af 11955va 15360va	6005af 7150eu 9640sa 12095af 15420af
0500-0600 vl	Australia, VL8A Alice Spg	2310do				0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600 vl	Australia, VL8K Katherine	5025do				0500-0600	USA, KATN Salt Lk City UT	7510am			
0500-0600 vl	Australia, VL8T Tent Crk	4910do				0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	Australia, Defense Forces R	13525as				0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	Canada, CFCX Montreal	6005do				0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	Canada, CFRX Toronto	6070do				0500-0600	USA, Voice of America	5975af 7295af 11825va	6035af 9630af 11965va	6873va 9700va 15205va	7170va 9885af
0500-0600	Canada, CFVP Calgary	6030do				0500-0600	USA, WEWN Birmingham AL	5825eu			
0500-0600	Canada, CHNX Halifax	6130do				0500-0600	USA, WHRI Noblesville IN	5760am			
0500-0600	Canada, CKZU Vancouver	6160do				0500-0600	USA, WJCR Upton KY	7490na			
0500-0500	China, China Radio Intl	9560na				0500-0600 mtwha	USA, WMLK Bethel PA	9465eu			
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca		0500-0600	USA, WWCR Nashville TN	3315am	5065am	5935am	7425am
0500-0600	Costa Rica, RF Peace Intl	6205am	7385am			0500-0600	USA, WYFR Okeechobee FL	5985na	7355eu		
0500-0510	Croatia, Croatian Radio	5895eu	7370eu	13830eu		0500-0530	Vatican State, Vatican R	7360af		11625af	
0500-0600	Cuba, Radio Havana	9505na	9830na			0500-0520	Vatican State, Vatican R	4005va	5880eu		
0500-0600	Ecuador, HCJB	9745am	21455va			0500-0530	Vietnam, Voice of	7360na	9840na	12030na	
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6185na	0500-0600	Zambia, Christian Voice	6065af			
0500-0600 vl	Italy, IRRS	3985va				0500-0600	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0500-0530 vl	Italy, IRRS	7125va				0505-0600	Swaziland, Trans World R	3200af	5055af	9500af	
0500-0600	Japan, NHK/Radio	5975eu 11725as	6110na 11740as	6150eu 11885na	9605na 17810as	0515-0530	Switzerland, Swiss R Intl	6165eu	7410eu		
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0500-0600	Lebanon, Wings of Hope	9960va				0530-0600	Australia, Radio	15510as	15565as	17880as	
0500-0525	Netherlands, Radio	5995na	6165na			0530-0600	Austria, R Austria Intl	6015na	6155eu	13730eu	
0500-0600	New Zealand, R NZ Intl	9570pa				0530-0600	Kazakhstan, Radio Almaty	5985eu 7235eu 9705eu	6060eu 7280eu	6075eu 9560eu	7115eu 9690eu
0500-0505	Nigeria, FRCN/Radio	3326do	4990do			0530-0600	Romania, R Romania Intl	11940af 17790af	15250af	15365af	17745af
0500-0600	Nigeria, Voice of	7255af				0530-0600	Swaziland, Trans World R	6070af			
0500-0600 vl	Papua New Guinea, NBC	9675do				0538-0555 m	Denmark, Radio	5965af	7180af	9590af	11735afam
0500-0600	Russia, Adv World Radio	9895me				0555-0600	Malaysia, Voice of	6175as	9750as	15295au	
0500-0600	Russia, Voice of Russia WS	5905na 7270na	5920na 7330na	5930na 12025na	7175na						
0500-0600	S Africa, Channel Africa	7185af	11900af								
0500-0600	Slovakia, Adv World Radio	5905eu									
0500-0556	Spain, R Exterior Espana	9540na									
0500-0530	Swaziland, Trans World R	6070af									

SELECTED PROGRAMS

Sundays

- 0508 Germany, Deutsche Welle: Inside Europe. See S 0108.
- 0510 Australia, Radio: Beat of the Pacific. Conversations with and music by indigenous Pacific music-makers.
- 0511 Russia, Voice of: Science and Engineering in the CIS. The latest developments in science and technology.
- 0519 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0530 Australia, Radio: The Australian Music Show. Kim Taylor presents the music, people, and issues of the Australian contemporary music industry.
- 0530 New Zealand, R NZ Intl: Te Reo o Te Pipiwharaura. A program for Maori listeners.
- 0532 Russia, Voice of: This is Russia. A program which helps you to get to know Russia and the Russians better.
- 0536 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- 0537 Germany, Deutsche Welle: Religion and Society. See S 0138.

Mondays

- 0530 Cuba, Radio Havana Cuba: Sunday Edition. See M 0100.
- 0507 New Zealand, R NZ Intl: Checkpoint. Ninety minutes of NZ current affairs, sports news, business news, news about Australia, and English language Maori news from National Radio.
- 0508 Germany, Deutsche Welle: Mailbag. See M 0108.
- 0511 Russia, Voice of: Moscow Mailbag. See S 0011.
- 0514 Cuba, Radio Havana Cuba: The Mailbag Show. See M 0114.
- 0518 Australia, Radio: Sports Summary. See M 0118.
- 0518 Germany, Deutsche Welle: Living in Germany. See M 0118.
- 0520 Australia, Radio: Pacific Beat. See M 0411.
- 0531 Cuba, Radio Havana Cuba: The Jazz Place. See M 0131.
- 0532 Russia, Voice of: This is Russia. See S 0532.
- 0533 Germany, Deutsche Welle: German by Radio. See S 1133.
- 0538 Radio Denmark: Magazine Program. See S 1138.

Tuesdays

- 0506 New Zealand, R NZ Intl: Checkpoint. See M 0507.
- 0509 Germany, Deutsche Welle: European Journal. See S 2324.
- 0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0518 Australia, Radio: Sports Summary. See M 0118.
- 0518 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0520 Australia, Radio: Pacific Beat. See M 0411.
- 0530 Australia, Radio: Indigenous News. News for and about the aboriginal people of Australia.
- 0532 Germany, Deutsche Welle: German Tribune. See T 0132.

- 0532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
- 0536 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Wednesdays

- 0506 New Zealand, R NZ Intl: Checkpoint. See M 0507.
- 0509 Germany, Deutsche Welle: European Journal. See S 2324.
- 0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0518 Australia, Radio: Sports Summary. See M 0118.
- 0520 Australia, Radio: Pacific Beat. See M 0411.
- 0528 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0530 Australia, Radio: Pacific Women. Patti Orofino looks at issues of concern to women of the Pacific.
- 0532 Russia, Voice of: This is Russia. See S 0532.
- 0533 Germany, Deutsche Welle: Backdrop. A program of culture and the arts in Germany.
- 0535 Cuba, Radio Havana Cuba: DXers Unlimited. See S 0234.
- 0539 Germany, Deutsche Welle: Come to Germany. See W 0133.
- 0540 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

- 0506 New Zealand, R NZ Intl: Checkpoint. See M 0507.
- 0509 Germany, Deutsche Welle: European Journal. See S 2324.
- 0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0518 Australia, Radio: Sports Summary. See M 0118.
- 0520 Australia, Radio: Pacific Beat. See M 0411.
- 0528 Cuba, Radio Havana Cuba: USA Report. See H 0118.
- 0530 Australia, Radio: Pacific Religion. Coverage of religious issues of relevance to people of the Pacific region.
- 0532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
- 0533 Germany, Deutsche Welle: German Tribune. See T 0132.
- 0536 Cuba, Radio Havana Cuba: Feature Report. See S 0119.

Fridays

- 0506 New Zealand, R NZ Intl: Checkpoint. See M 0507.
- 0509 Germany, Deutsche Welle: European Journal. See S 2324.
- 0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 0518 Australia, Radio: Sports Summary. See M 0118.
- 0519 Cuba, Radio Havana Cuba: Spotlight on the Americas. See T 0120.
- 0520 Australia, Radio: Pacific Beat. See M 0411.
- 0530 Australia, Radio: Beat of the Pacific. See S 0510.

- 0532 Russia, Voice of: This is Russia. See S 0532.
 - 0533 Germany, Deutsche Welle: Arts on the Air. See S 1109.
 - 0536 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
- ### Saturdays
- 0509 Germany, Deutsche Welle: European Journal. See S 2324.
 - 0510 Australia, Radio: Oz Sounds. See S 1310.
 - 0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
 - 0512 New Zealand, R NZ Intl: Pacific Requests. Music request and dedications.
 - 0516 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
 - 0530 Australia, Radio: One World. Carolyn Court reports on environmental issues important to the Pacific.
 - 0532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
 - 0533 Germany, Deutsche Welle: Through German Eyes. See S 1629.
 - 0535 Cuba, Radio Havana Cuba: Feature Report. See S 0119.
 - 0545 New Zealand, R NZ Intl: Story Time. See S 0645.

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FREQUENCIES

0700-0800	Australia, Radio	5995pa 9710pa 17695as	6020pa 9860pa	6080pa 15240pa	9580pa 15565as
0700-0730	Australia, Radio	13605as	15415as	17795as	
0700-0800 vl	Australia, VLBA Alice Spg	4835do			
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica, RF Peace Intl	6205am	7385am		
0700-0727	Czech Rep., Radio Prague	5930eu	7345eu		
0700-0800	Ecuador, HCJB	5900pa	6050eu		
0700-0800 as	Eqf Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqf Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0730 vl	Italy, IRRS	3985va			
0700-0800	Japan, NHK/Radio	5975eu 11850pa 21610as	7230eu 15165me	11725as 17810va	11740as 17815af
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Wings of Hope	9960va			
0700-0800 vl	Liberia, Radio ELBC	7275do			
0700-0800	Liberia, Radio ELWA	4760do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	9750as	15295au		
0700-0710	Malaysia, Voice of	6175as			
0700-0800	Monaco, Trans World Radio	7115eu			
0700-0715	New Zealand, R NZ Intl	9570pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0730 s	Norway, Radio Norway Intl	7180au			
0700-0800	Russia, Voice of Russia WS	9685as 17860va	12005va	12025va	15160va
0700-0710	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	3955eu 7145pa 9640sa 12095va 15360va 17830af	5975va 7325va 11760va 15070va 15575va	6175na 9410va 11940af 15280as 17640af	6195va 9600af 11955va 15310as 17790as
0700-0730	United Kingdom, BBC WS	6180eu	11780va		
0700-0715	United Kingdom, BBC WS	6005af	7160af	11860af	
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KWHR Naalehu HI	9930as			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	7425na	7465na	
0700-0800	USA, WHRI Noblesville IN	5760am	7315am		
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	3315am	5065am	5935am	7425am
0700-0800	Zambia, Christian Voice	6065af			
0700-0800	Zimbabwe, ZBC/Radio 3	5975do	6045do		
0705-0800	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0710-0800 vl	Papua New Guinea, NBC	4890do			
0716-0800	New Zealand, R NZ Intl	6100pa			
0730-0800	Australia, Radio	9660pa	17880as		
0730-0745 s	Greece, Voice of	7450eu	9425eu	11645au	
0730-0800 vl	Italy, IRRS	7125va			
0730-0800	Netherlands, Radio	9720au	11895pa		
0738-0755 m	Denmark, Radio	5905am	7275am	7465am	
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7450eu	9425eu	11645au	
0755-0800	Guam, AWR/KTWR	15200as			

0800-0900	Ecuador, HCJB	5900pa			
0800-0900 as	Eqf Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqf Guinea, Radio Africa	15186af			
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Indonesia, Voice of	9525as			
0800-0900 vl	Italy, IRRS	7125va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Wings of Hope	9960va			
0800-0830	Liberia, Radio ELWA	4760do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0805 a	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9720au	11895pa		
0800-0900	New Zealand, R NZ Intl	6100pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0850	Pakistan, Radio	15470eu	15475eu	17895eu	
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia, Voice of Russia WS	7305as 12025va	9450as 17860va	9685as	12005va
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670eu		
0800-0900	United Kingdom, BBC WS	3955eu 9410va 12095va 15400va 17830af	6190af 11760va 15070va 15575va	6195va 11940af 15280as 17640va	7325as 11955va 15310as 17790as
0800-0815	United Kingdom, BBC WS	7145pa			
0800-0830	United Kingdom, BBC WS	3955eu	9640sa		
0800-0900	USA, KNLS Anchor Point AK	6150as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	13615pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	5975na	7425na	
0800-0900	USA, WHRI Noblesville IN	5760am	7315am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5065am	5935am	7425am	7435am
0800-0900	Zambia, Christian Voice	6065af			
0800-0900	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0805-0820 smtwhf	Monaco, Trans World Radio	7115eu			
0805-0835 mtwhf	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0815-0900 mtwhf	Nigeria, FRCN/Radio	3326do	4990do		
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900	Austria, R Austria Intl	6155eu	13730eu	17870pa	
0830-0900	Georgia, Georgian Radio	11910eu			
0830-0900	Netherlands, Radio	9720au	11895pa	13700pa	
0830-0857	Slovakia, R Slovakia Intl	11990au	17485au	21705au	
0838-0855 m	Denmark, Radio	5905am	7275am	7465am	
0855-0900	Guam, TWR/KTWR	11830pa			



Ingird Dahle of Radio Norway International signed this QSL for Eric Walton, Vancouver, BC.

0800 UTC

0800-0900	Australia, Radio	5995pa 9710pa	6020pa 9860pa	6080pa 17715as	9580pa 21725as
0800-0900 vl	Australia, VL8A Alice Spg	2310do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0900 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Australia, Defense Forces R	15607af	18194af		
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	China, China Radio Intl	11755pa	15440pa	17690pa	
0800-0900	Costa Rica, RF Peace Intl	6205am	7385am		
0800-0830	Ecuador, HCJB	6050eu			

FREQUENCIES

0900-1000	Australia, Radio	5995as 9860pa	7240as 13605as	9510as 15170as	9580pa 21725as
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	4910do			
0900-1000	Australia, Defense Forces R	15607af	18194af		
0900-0925 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15510af	17595af	
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755pa	15440pa	17690pa	
0900-1000	Costa Rica, RF Peace Intl	6205am	7385am		
0900-1000	Ecuador, HCJB	5900pa			
0900-1000 as	Eq Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eq Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160pa 15410af 21680as	7380as 17780pa	11725af 17820as	15145af 21600af
0900-0915 mtwft	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000	Guam, TWR/KTWR	11830pa			
0900-1000 vl	Italy, IRRS	7125va			
0900-1000	Japan, NHK/Radio	6090as	11850au	15190as	
0900-0948 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	6280va			
0900-1000	Lebanon, Wings of Hope	9960va			
0900-1000	Malaysia, Radio	7295do			
0900-0930	Netherlands, Radio	9720au	13700pa		
0900-1000	New Zealand, R NZ Intl	6100pa			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia, Voice of Russia WS	7305as 15560va 15620af	9685as 17755as	13785as 17860va	15490va
0900-1000	Slovakia, Adv World Radio	9885au	11640au	13685au	
0900-0930	Switzerland, Swiss R Intl	6190af	6195va	9410va	9740as
0900-1000	United Kingdom, BBC WS	11750as 15190sa 15280va 15575va 17885af	11940af 15280va 17640va	12095va 15380as 17705eu	15070va 15400va 17830va
0900-0915	United Kingdom, BBC WS	7180as 11955va 5810am	7325af 15310as 9815am	9580as 15360va	11760va 17790as
0900-1000	USA, KAIJ Dallas TX	7510am			
0900-1000	USA, KTBN Salt Lk City UT	7395sa	7535eu	9430as	
0900-1000	USA, Monitor Radio Intl	13615va			
0900-0930	USA, WEWN Birmingham AL	5825eu	7425na	7465na	
0900-1000	USA, WHRI Noblesville IN	5760am	7315am		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwfhf	USA, WMLK Bethel PA	9465eu			
0900-1000	USA, WWCR Nashville TN	5065am	5935am	7425am	7435am
0900-1000	USA, WYFR Okeechobee FL	5950na			
0900-1000	Zambia, Christian Voice	6065af			
0900-1000	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0910-0940	Mongolia, R Ulan Bator	9960au	12000au		
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-1000 s	Armenia, Voice of	15270va			
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Georgia, Georgian Radio	11910eu			
0930-1000	Netherlands, Radio	7260pa 13700pa	9720au	9810pa	11895pa
0930-1000	Philippines, FEBC/R Intl	11635as			
0938-0955 s	Denmark, Radio	15175as	15230as		

1000-1100	Australia, Radio	5995as 13605as	7240as 15170as	9580pa 21725as	9860pa
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	4910do			
1000-1100	Australia, Defense Forces R	13525as			
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755pa	15440pa		
1000-1100	Costa Rica, RF Peace Intl	6205am	7385am		
1000-1030	Czech Rep, Radio Prague	15640as	17845af		
1000-1100	Ecuador, HCJB	5900pa			
1000-1100 as	Eq Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eq Guinea, Radio Africa	15186af			
1000-1100	Guam, AWR/KSDA	9540as			
1000-1100	India, All India Radio	13700as	15050as	17387au	17890as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1005	Israel, Kol Israel	11605eu			
1000-1100 vl	Italy, IRRS	7125va			
1000-1100	Lebanon, Voice of Hope	6280va			
1000-1100	Lebanon, Wings of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia, RTM KotaKinabalu	5980do			
1000-1100	Netherlands, Radio	7260as	9720pa	9810pa	
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100	Nigeria, Voice of	7255af			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia, Voice of Russia WS	12030na 17755va	13785as 17860va	15490va	15560va
1000-1100	Singapore, SBC Radio One	6155do			
1000-1100	United Kingdom, BBC WS	6190af 6195va 9410va 9740as 15070va 15190sa 15280va 15575va 17830va	6195va 9410va 9740as 15070va 15190sa 15310as 15400af 17705va	9410va 12095va 15400af 17790as	
1000-1030	United Kingdom, BBC WS	15280as	15280va		
1000-1100	USA, KAIJ Dallas TX	5810am	9815am		
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13625as
1000-1100	USA, Voice of America	5985va 11720va	6165am 15425va	7405am	9590am
1000-1100	USA, WEWN Birmingham AL	7425na	7465eu		
1000-1100	USA, WHRI Noblesville IN	6040am	6185am		
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5065am	5935am	9475am	15685am
1000-1100	USA, WYFR Okeechobee FL	5950na	7355na		
1000-1030	Vietnam, Voice of	7360na	9840as	12020as	15010as
1000-1100	Zambia, Christian Voice	6065af			
1030-1100 mtwhfa	Austria, R Austria Intl	6155eu	13730pa	17870pa	
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1030	Switzerland, Swiss R Intl	6165eu	9535eu		
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1038-1055 s	Denmark, Radio	7295eu	11830eu		

HAUSER'S HIGHLIGHTS
ICELAND: RIKISUTVARPIÐ

In Icelandic on USB

1215-1300	13860, 11402
1410-1440	13860, 11402
1855-1930	9275, 7740
1935-2010	13860, 11402
2300-2335	11402, 9275



China Radio International QSL from Eric Walton

FREQUENCIES

1100-1200	Australia, Radio	5995as	7240as	9510pa	9580pa	1100-1200	Singapore, R Singapore Int	6015as			
		9710pa	9860pa	13605as	15170as	1100-1130	Sri Lanka, Sri Lanka BC	11835as	15120as	17850au	
		15530as	15565as			1100-1130	Switzerland, Swiss R Intl	9885as	11640es	13635as	
1100-1200 vl	Australia, VL8A Alice Spg	2310do				1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200 vl	Australia, VL8K Katherine	2485do				1100-1200	United Kingdom, BBC WS	5965na	6065va	6190af	6195va
1100-1200 vl	Australia, VL8T Tent Crk	4910do						7180as	9410va	9580as	9740va
1100-1200	Australia, Defense Forces R	13525as						11750va	11760va	11940af	11955as
1100-1200	Canada, CFCX Montreal	6005do						12095va	15070va	15220am	15310as
1100-1200	Canada, CFRX Toronto	6070do						15575va	17640va	17750va	17830af
1100-1200	Canada, CFVP Calgary	6030do						17885af	21660af		
1100-1200	Canada, CHNX Halifax	6130do				1100-1130	United Kingdom, BBC WS	15190sa	15400eu	17790as	
1100-1200	Canada, CKZN St John's	6160do				1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	Canada, CKZU Vancouver	6160do				1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	Costa Rica, Adv World R	5030am	7375am	9725am	13750am	1100-1200	USA, Monitor Radio Intl	6095na	7395ca	9355as	9430au
1100-1200	Costa Rica, RF Peace Intl	6205am	7385am			1100-1200	USA, Voice of America	5985va	6110va	6165am	7405am
1100-1130	Ecuador, HCJB	5900pa						9590am	9645va	9760va	11720va
1100-1200	Ecuador, HCJB	12005am	15115am					15160va	15425va		
1100-1200 as	Eq Guinea, R East Africa	15186af				1100-1200	USA, WHRI Noblesville IN	6040am	6185am		
1100-1200	Eq Guinea, Radio Africa	9530as				1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af	1100-1200	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1100-1200	Iraq, Radio Iraq Intl	13680eu				1100-1200	USA, WYFR Okeechobee FL	5950na	7355na	11830na	11970na
1100-1200 vl	Italy, IRRS	7125va				1100-1200	Zambia, Christian Voice	6065af			
1100-1200	Japan, NHK/Radio	6090as	6120na	15350as		1120-1130	Vatican State, Vatican R	5880va	11740eu	15570af	17550af
1100-1200	Malaysia, Radio	7295do				1130-1200	Austria, R Austria Intl	13730eu			
1100-1200 vl	Malaysia, RTM Kuching	7160do				1130-1200	Bulgaria, Radio	9810as	11605as		
1100-1200 vl	Malaysia, RTM KotaKinabalu	5980do				1130-1200 vl	China, China Radio Intl	8660as	11445as	11700as	
1100-1200	Nepal, Radio	5005do				1130-1200	Iran, VOIRI	11745as	11790as	11875me	11930me
1100-1200	New Zealand, R NZ Intl	6100pa						15260af	17750me		
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na		1130-1200 a	Monaco, Trans World Radio	7115eu			
1100-1115	Pakistan, Radio	15470as	17895as			1130-1155 s	Monaco, Trans World Radio	7115eu			
1100-1200 vl	Papua New Guinea, NBC	4890do				1130-1200	Myanmar, Voice of	5990do			
1100-1200	Russia, Voice of Russia WS	4740as	9725as	9820as	12030na	1130-1200	Netherlands, Radio	6045eu	7190eu		
		13785va	17755as	17860as		1130-1200	Russia, Voice of Russia WS	9755as	9875as		
1100-1200	Singapore, SBC Radio One	6155do				1130-1200	South Korea, R Korea Intl	9650eu			
						1138-1155s	Denmark, Radio	7295eu	15270eu		

SELECTED PROGRAMS

Sundays

- 1100 New Zealand, R NZ Intl: Newsdesk. Rebroadcast of the BBC World Service's quality news program.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: Arts on the Air. Reports and interviews on major cultural events and developments.
- 1111 Russia, Voice of: News and Views. See S 0311.
- 1113 North Korea, R Pyongyang: Music.
- 1120 Australia, Radio: Sports Bulletin. Ten-minute reports on Australian, regional and international sport.
- 1130 Australia, Radio: Fine Music Australia. The best Australian fine music performances and compositions are presented by Ivan Lloyd.
- 1130 New Zealand, R NZ Intl: Good Night from Wellington. National Radio.
- 1132 Russia, Voice of: This is Russia. See S 0532.
- 1133 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.
- 1138 Radio Denmark: Magazine Program. NEW! Broadcast only on the first weekend of the month.

Mondays

- 1100 New Zealand, R NZ Intl: Newsdesk. See S 1100.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: Newline Cologne. Worldwide current affairs program with a review of the German or European press.
- 1111 Russia, Voice of: News and Views. See S 0311.
- 1113 North Korea, R Pyongyang: Music/Commentary.
- 1120 Australia, Radio: Sports Bulletin. See S 1120.
- 1130 Australia, Radio: Innovations. Desley Blanch reports on Australian inventions and innovative practices.
- 1130 New Zealand, R NZ Intl: Good Night from Wellington. See S 1130.
- 1132 Russia, Voice of: Music at Your Request. Music as requested by listeners.
- 1133 Germany, Deutsche Welle: Hallo Africa. A program with musical requests and greetings to friends.

Tuesdays

- 1100 New Zealand, R NZ Intl: Newsdesk. See S 1100.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1111 Russia, Voice of: News and Views. See S 0311.
- 1115 North Korea, R Pyongyang: Music.
- 1120 Australia, Radio: Sports Bulletin. See S 1120.
- 1121 North Korea, R Pyongyang: The Immortal Story.

- 1126 North Korea, R Pyongyang: Truth Idea.
- 1130 Australia, Radio: Arts Australia. Amanda Smith presents reviews and comment on current events within the Australian arts scene.
- 1130 New Zealand, R NZ Intl: Good Night from Wellington. See S 1130.
- 1132 Russia, Voice of: Folk Box. See S 2332.
- 1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
- 1145 North Korea, R Pyongyang: Frequency Announcements.

Wednesdays

- 1100 New Zealand, R NZ Intl: Newsdesk. See S 1100.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1111 Russia, Voice of: News and Views. See S 0311.
- 1115 North Korea, R Pyongyang: Music.
- 1120 Australia, Radio: Sports Bulletin. See S 1120.
- 1120 North Korea, R Pyongyang: The Reminiscences of the Great Leader.
- 1130 Australia, Radio: Science File. Ian Wood examines the world of science, medicine and technology.
- 1130 New Zealand, R NZ Intl: Orient Express. Live music request program for Chinese listeners. Recommended.
- 1132 Russia, Voice of: Folk Box. See S 2332.
- 1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
- 1139 North Korea, R Pyongyang: The Great Man of the Century.
- 1144 North Korea, R Pyongyang: Frequency Announcements.

Thursdays

- 1100 New Zealand, R NZ Intl: Newsdesk. See S 1100.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1111 Russia, Voice of: News and Views. See S 0311.
- 1113 North Korea, R Pyongyang: Music/Commentary.
- 1120 Australia, Radio: Sports Bulletin. See S 1120.
- 1130 Australia, Radio: Couchman. Peter Couchman in conversation with people from all walks of life.
- 1130 New Zealand, R NZ Intl: Good Night from Wellington. See S 1130.
- 1132 Russia, Voice of: The Jazz Show. See M 0432.
- 1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
- 1143 North Korea, R Pyongyang: Announcements.

Fridays

- 1100 New Zealand, R NZ Intl: Newsdesk. See S 1100.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: Newline Cologne. See M 1109.

- 1111 Russia, Voice of: News and Views. See S 0311.
- 1113 North Korea, R Pyongyang: Music.
- 1120 Australia, Radio: Sports Bulletin. See S 1120.
- 1121 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
- 1130 Australia, Radio: The Parliament Program. A roundup of events in the Australian Parliament.
- 1130 New Zealand, R NZ Intl: Good Night from Wellington. See S 1130.
- 1131 North Korea, R Pyongyang: Music.
- 1132 Russia, Voice of: Yours for the Asking. See M 2332.
- 1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
- 1138 North Korea, R Pyongyang: The Great Man of the Century.
- 1144 North Korea, R Pyongyang: Frequency Announcements.

Saturdays

- 1100 New Zealand, R NZ Intl: Newsdesk. See S 1100.
- 1100 North Korea, R Pyongyang: Anthem.
- 1109 Germany, Deutsche Welle: The Week in Germany. See S 1609.
- 1111 Russia, Voice of: News and Views. See S 0311.
- 1113 North Korea, R Pyongyang: Music/Commentary.
- 1120 Australia, Radio: Sports Bulletin. See S 1120.
- 1120 Germany, Deutsche Welle: Mailbag Africa. Listener mail from Africa is answered.
- 1130 Australia, Radio: Business Weekly. See S 1610.
- 1130 New Zealand, R NZ Intl: Good Night from Wellington. See S 1130.
- 1132 Russia, Voice of: Music at Your Request. See M 1132.
- 1134 Germany, Deutsche Welle: Saturday Special. Information unavailable.

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FREQUENCIES

1300-1400	Australia, Radio	5995pa 9610as	7240as 11800pa	9560pa 9580pa		1300-1400	Singapore, R Singapore Int	6015as			
1300-1330	Australia, Radio	6060pa	6080as	9510pa		1300-1330	Switzerland, Swiss R Intl	7230as	7480as	11640as	13625as
1300-1330 mtwhfa	Belgium, R Vlaanderen Int	13670na				1300-1330	Turkey, Voice of	9445eu	9630as		
1300-1320	Brazil, Radio Bras	15445na				1300-1400	United Kingdom, BBC WS	5965na	5990as	6190af	6195va
1300-1400 vl	Canada, CBC N Quebec Svc	9625do						9410va	9515na	9590na	9740as
1300-1400	Canada, CFCX Montreal	6005do						11750as	11760va	11940af	12095va
1300-1400	Canada, CFRX Toronto	6070do						15070va	15220va	15310as	15420af
1300-1400	Canada, CFVP Calgary	6030do						15575va	17640va	17705va	17830af
1300-1400	Canada, CHNX Halifax	6130do				1300-1400	USA, KJES Mesquite NM	17885af	21470af	21660af	
1300-1400	Canada, CKNX St John's	6160do				1300-1400	USA, KNLS Anchor Point AK	11715na			
1300-1400	Canada, CKZU Vancouver	6160do				1300-1400	USA, KTNB Salt Lk City UT	7365as			
1200-1400	Canada, R Canada Intl	9640na	11855na			1300-1400	USA, Monitor Radio Intl	7510am			
1300-1400	China, China Radio Intl	7385na	9715as	11660pa		1300-1400	USA, Voice of America	6095na	9355as	9455na	13625au
1300-1330	China, China Radio Intl	7410as				1300-1400	USA, WEWN Birmingham AL	6110va	9645va	9760va	11715va
1300-1400	Costa Rica, RF Peace Intl	6200am	7385am	15050am		1300-1400	USA, WGTG McCaysville GA	15160va	15425va		
1200-1400	Ecuador, HCJB	12005am	15115am			1300-1400 fas	USA, WHRI Noblesville IN	7425na	11875na	15115na	15375na
1300-1330	Egypt, Radio Cairo	17595as				1300-1400	USA, WJCR Upton KY	9370am			
1300-1400 as	Eqt Guinea, R East Africa	15186af				1300-1400	USA, WRMI/R Miami Int	6040am	15105am		
1300-1400	Eqt Guinea, Radio Africa	9530as				1300-1400 s	USA, WRNO New Orleans LA	7490na	13595na		
1300-1400	Iraq, Radio Iraq Intl	13680as				1300-1400	USA, WVHA Greenbush ME	9955am			
1300-1330 vl	Italy, IRRS	7125va				1300-1400 a	USA, WWCR Nashville TN	15420am			
1300-1400	Lebanon, Wings of Hope	9960va				1300-1400	USA, WYFR Okkeehobee FL	15745eu			
1300-1400	Malaysia, Radio	7295do				1300-1400	Zambia, Christian Voice	9475am	12160am	13845am	15685am
1300-1400 vl	Malaysia, RTM Kuching	7160do				1300-1400	Bhutan, Bhutan BC Service	9560na	9705na	11830na	17760eu
1300-1400 vl	Malaysia, RTM KotaKinabalu	5980do				1315-1400	Austria, R Austria Intl	6065af			
1300-1325	Netherlands, Radio	6045eu	7190eu			1300-1400	Canada, R Canada Intl	5030do			
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa				1315-1400	Austria, R Austria Intl	15450as			
1300-1350	North Korea, R Pyongyang	9345as 15430as	9640eu	11740as	15230as	1330-1357	India, All India Radio	6150as	9535as		
1300-1330 s	Norway, Radio Norway Intl	7315as	9590eu	9795as	15605as	1330-1400 vl	Italy, IRRS	11620as	13750as		
1300-1400 vl	Palau, KHBN/Voice of Hope	9965as				1330-1400	Netherlands, Radio	3985va			
1300-1400	Philippines, FEBC/R Intl	11995as				1330-1400	Sweden, Radio	9895as	13700as	15150as	
1300-1400	Romania, R Romania Intl	11940eu	15390eu	17745eu		1330-1355	UAE, Radio Dubai	11650na	15240na		
1300-1400	Russia, Voice of Russia WS	7130as	7165as	9470va	12030na	1330-1400	Uzbekistan, R Tashkent	13675eu	15395eu	17825eu	21605me
		12065me	17880as			1330-1400	Vietnam, Voice of	5060as	5975as	6025as	9715as
1300-1400	Singapore, SBC Radio One	6155do				1338-1355 m	Denmark, Radio	7360as	9840as	12030as	
						1345-1400	Vatican State, Vatican R	9590na	9795na	11840na	15605na
								9500as	11625as	15585as	

SELECTED PROGRAMS

Sundays

- 1300 North Korea, R Pyongyang: Anthem.
- 1310 Australia, Radio: Oz Sounds. Twenty minutes of music selections by Radio Australia announcers.
- 1311 Russia, Voice of: Science and Engineering in the CIS. See S 0511.
- 1330 Australia, Radio: The Europeans. See S 0130.
- 1332 Russia, Voice of: Your Top Tune. See S 0232.
- 1338 Radio Denmark: Magazine Program. See S 1138.
- 1340 UAE, Radio Dubai: Variable Feature.
- 1346 Russia, Voice of: You Write to Us. See S 0246.

Mondays

- 1300 North Korea, R Pyongyang: Anthem.
- 1310 Australia, Radio: Asia Focus. Reporting on the commercial interrelationships of the Asia/Pacific Region.
- 1310 Egypt, Radio Cairo: Arabic by Radio.
- 1311 Russia, Voice of: Moscow Mailbag. See S 0011.
- 1318 North Korea, R Pyongyang: Music.
- 1329 North Korea, R Pyongyang: Korea Today.
- 1330 Australia, Radio: The Australian Music Show. See S 0530.
- 1332 Russia, Voice of: Audio Book Club. See S 0032.
- 1340 UAE, Radio Dubai: Variable Feature.
- 1343 North Korea, R Pyongyang: Program/Frequency Announcements.

Tuesdays

- 1300 North Korea, R Pyongyang: Anthem.
- 1310 Australia, Radio: Asia Focus. See M 1310.
- 1311 Russia, Voice of: Newmarket. See M 1211.
- 1330 Australia, Radio: Jazz Notes. The best of Australian jazz introduced by Ivan Lloyd.
- 1332 Russia, Voice of: Kaleidoscope. See S 1432.
- 1340 UAE, Radio Dubai: Variable Feature.

Wednesdays

- 1300 North Korea, R Pyongyang: Anthem.
- 1310 Australia, Radio: Asia Focus. See M 1310.
- 1311 Russia, Voice of: Moscow Mailbag. See S 0011.
- 1316 North Korea, R Pyongyang: Music.
- 1328 North Korea, R Pyongyang: The Reminiscences of the Great Leader.
- 1330 Australia, Radio: Blacktracker. Mal Honess with traditional and contemporary aboriginal music.
- 1332 Russia, Voice of: Russian by Radio. See S 0632.

- 1339 North Korea, R Pyongyang: The Great Man of the Century.
- 1340 UAE, Radio Dubai: Variable Feature.
- 1344 North Korea, R Pyongyang: Frequency Announcements.

Thursdays

- 1300 North Korea, R Pyongyang: Anthem; Announcements.
- 1310 Australia, Radio: Asia Focus. See M 1310.
- 1311 Russia, Voice of: Moscow Mailbag. See S 0011.
- 1316 North Korea, R Pyongyang: Science and Technology.
- 1330 Australia, Radio: Australian Country Style. Graham Bell goes up country.
- 1332 Russia, Voice of: Kaleidoscope. See S 1432.
- 1340 UAE, Radio Dubai: Variable Feature.

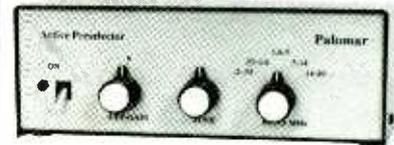
Fridays

- 1300 North Korea, R Pyongyang: Anthem.
- 1310 Australia, Radio: Asia Focus. See M 1310.
- 1311 Russia, Voice of: Moscow Mailbag. See S 0011.
- 1313 North Korea, R Pyongyang: Music.
- 1321 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
- 1330 Australia, Radio: Music Deli. Paul Petran present music from a variety of cultures.
- 1331 North Korea, R Pyongyang: Music.
- 1332 Russia, Voice of: Russian by Radio. See S 0632.
- 1338 North Korea, R Pyongyang: The Great Man of the Country.
- 1340 UAE, Radio Dubai: Variable Feature.
- 1344 North Korea, R Pyongyang: Frequency Announcements.

Saturdays

- 1300 North Korea, R Pyongyang: Anthem; Frequency Announcements.
- 1310 Australia, Radio: Business Weekly. See S 1610.
- 1311 Russia, Voice of: Program Preview. See S 0411.
- 1319 North Korea, R Pyongyang: Music.
- 1330 Australia, Radio: The Australian Scene. See A 0130.
- 1332 Russia, Voice of: Audio Book Club. See S 0032.
- 1340 UAE, Radio Dubai: Variable Feature.

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FREQUENCIES

1500-1600	Australia, Radio	5995pa 7260as 11660as	6060pa 9580pa 11695pa 10623af	6080pa 9615as 11800pa	6090as 9710pa	1500-1600	Russia, Voice of Russia WS	4740va 7115va 9470va 11945as 7155af	4940va 7180as 9490va 13670as 9530af	4975va 7325eu 9635as 13625as	6085va 7330eu 9905as
1500-1600	Australia, Defense Forces R	8743af				1500-1600	S Africa, Channel Africa	9810as			
1500-1600 vl	Canada, CBC N Quebec Svc	9625do				1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as			
1500-1600	Canada, CFCX Montreal	6005do				1500-1530 s	Seychelles, FEBA Radio	11870as			
1500-1600	Canada, CFRX Toronto	6070do				1500-1600	Singapore, SBC Radio One	6155do			
1500-1600	Canada, CFVP Calgary	6030do				1500-1600	Sri Lanka, Sri Lanka BC	9720as	15425as		
1500-1600	Canada, CHNX Halifax	6130do				1500-1530	Switzerland, Swiss R Intl	9885as	12075as	13625as	
1500-1600	Canada, CKZN St John's	6160do				1500-1600	United Kingdom, BBC WS	5965as	5990as	6190af	6195va
1500-1600	Canada, CKZU Vancouver	6160do						7205as	9410va	9515na	9590na
1500-1600 s	Canada, R Canada Intl	9640na	11855na					9740as	11750as	12095va	15070va
1500-1600	China, China Radio Intl	7405na	9535as	9785as				15260na	15400va	17705va	17830af
1500-1600	Costa Rica, RF Peace Intl	6200am	7385am	15050am				17840va	21470af	21660af	
1500-1600	Ecuador, HCJB	12005am	15115sa	21455va		1500-1530	United Kingdom, BBC WS	11860af	11940af	15400eu	15420af
1500-1600 as	Eq Guinea, R East Africa	15186af						17880af	21490af		
1500-1600	Finland, YLE/R Finland	11785na	15400na			1500-1600	USA, KTVN Salt Lk City UT	15590am			
1500-1600	Guam, TWR/KTWR	11580as				1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600	Italy, Adv World Radio	7230eu				1500-1600	USA, Monitor Radio Intl	9355as	18930af		
1500-1600 vl	Italy, IRRS	3985va				1500-1600	USA, Voice of America	6110as	7215as	9575as	
1500-1600	Japan, NHK/Radio	7240as	9535na	9695as	15355af			9645as	9700as	9760va	15205as
1500-1600	Jordan, Radio	11940va	11970va					15255as	15395as		
1500-1600	Lebanon, Wings of Hope	9960va				1500-1600	USA, WEWN Birmingham AL	9455na	11875na	15665na	
1500-1600	Malaysia, Radio	7295do				1500-1600 fas	USA, WGTG McCaysville GA	9370am			
1500-1600 vl	Malaysia, RTM Kuching	7160do				1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1600 vl	Malaysia, RTM Kota Kinabalu	5980do				1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1515	Mongolia, R Ulan Bator	7530as	9950as			1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1515 s	Myanmar, Voice of	5990do				1500-1600 a	USA, WVHA Greenbush ME	15745eu			
1500-1525	Netherlands, Radio	9895as	13700as	15150as		1500-1600	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa				1500-1600	USA, WYFR Okeechobee FL	9560am	11830na	15215na	15566eu
1500-1600	Nigeria, Voice of	7255af						17760eu	21525af	21745eu	
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me	1500-1600	Zambia, Christian Voice	6065af			
1500-1530 s	Norway, Radio Norway Intl	9520me	11730me			1530-1600	Iran, VOIRI	11875as	15260as	17750as	
1500-1600 vl	Palau, KHBN/Voice of Hope	9965as				1530-1600	Netherlands, Radio	9895as	15150as		
1500-1600	Philippines, FEBC/R Intl	11995as				1530-1600	United Kingdom, BBC WS	7180as	11720as		
1500-1530	Romania, R Romania Intl	11740as	11810as	15335as		1538-1555 s	Denmark, Radio	9485na	9520na	11730na	

SELECTED PROGRAMS

Sundays

- 1520 Jordan, Radio: Program Announcements. The program line-up for today is outlined, but in Jordan time.
- 1500 North Korea, R Pyongyang: Anthem.
- 1502 Jordan, Radio: Listeners' Choice. Popular music selections requested by listeners.
- 1510 Australia, Radio: Oz Sounds. See S 1310.
- 1511 Russia, Voice of: Program Preview. See S 0411.
- 1530 Australia, Radio: Fine Music Australia. See S 1130.
- 1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
- 1538 Radio Denmark: Magazine Program. See S 1138.

Mondays

- 1500 Jordan, Radio: On the Air if You Dare. A live, two-hour quiz program during which listeners call in and win prizes.
- 1500 North Korea, R Pyongyang: Anthem.
- 1510 Australia, Radio: Asia Focus. See M 1310.
- 1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 1530 Australia, Radio: Innovations. See M 1130.
- 1532 Russia, Voice of: This is Russia. See S 0532.

Tuesdays

- 1500 Jordan, Radio: Program Announcements. See S 1500.
- 1500 North Korea, R Pyongyang: Anthem.
- 1502 Jordan, Radio: Variable Feature Program. A different topic each week.
- 1510 Australia, Radio: Asia Focus. See M 1310.
- 1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 1530 Australia, Radio: Arts Australia. See T 1130.
- 1530 Jordan, Radio: Pop Session. Nonstop pop music.
- 1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

Wednesdays

- 1500 Jordan, Radio: Program Announcements. See S 1500.
- 1500 North Korea, R Pyongyang: Anthem.
- 1502 Jordan, Radio: Jordan Weekly. See T 1215.
- 1510 Australia, Radio: Asia Focus. See M 1310.
- 1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 1530 Australia, Radio: Science File. See W 1130.
- 1531 Jordan, Radio: Feature Series. A series of quarter-hour programs dealing with a variety of subjects ("Plants" featured in Jun 95).
- 1532 Russia, Voice of: This is Russia. See S 0532.
- 1545 Jordan, Radio: Pop Session. See T 1530.

Thursdays

- 1500 Jordan, Radio: Program Announcements. See S 1500.
- 1500 North Korea, R Pyongyang: Anthem.
- 1502 Jordan, Radio: Art World. Interview with a prominent figure in music or the arts.
- 1510 Australia, Radio: Asia Focus. See M 1310.
- 1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 1530 Australia, Radio: Couchman. See H 1130.
- 1531 Jordan, Radio: Pop Session. See T 1530.
- 1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

Fridays

- 1500 Jordan, Radio: On the Air if You Dare. See M 1500.
- 1500 North Korea, R Pyongyang: Anthem.
- 1510 Australia, Radio: Asia Focus. See M 1310.
- 1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 1513 North Korea, R Pyongyang: Music.
- 1521 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
- 1530 Australia, Radio: The Parliament Program. See F 1130.
- 1531 North Korea, R Pyongyang: Music.
- 1532 Russia, Voice of: This is Russia. See S 0532.
- 1538 North Korea, R Pyongyang: The Great Man of the Country.
- 1544 North Korea, R Pyongyang: Frequency Announcements.

Saturdays

- 1500 Jordan, Radio: Program Announcements. See S 1500.
- 1500 North Korea, R Pyongyang: Anthem.
- 1502 Jordan, Radio: Jordan Weekly. See T 1215.
- 1510 Australia, Radio: Oz Sounds. See S 1310.
- 1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
- 1530 Australia, Radio: Business Weekly. See S 1610.
- 1530 Jordan, Radio: Music. See S 1215.
- 1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

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(Wolfgang Büschel, Germany, HCJB TLC)

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FREQUENCIES

1600-1700	Australia, Radio	5995pa 7260as 11660pa	6060pa 9580pa 11695pa	6080pa 9710pa 11800pa	6090pa 9770as	1600-1700	Singapore, SBC Radio One	6155do			
1600-1613	Bangladesh, Radio	7185as	9568as			1600-1700	South Korea, R Korea Intl	5975eu	9515eu	9870af	15575me
1600-1700 vl	Canada, CBC N Quebec Svc	9625do				1600-1630	Sri Lanka, Sri Lanka BC	9720as	15425as		
1600-1700	Canada, CFCX Montreal	6005do				1600-1700	Swaziland, Trans World R	9500af			
1600-1700	Canada, CFRX Toronto	6070do				1600-1640	UAE, Radio Dubai	13675eu	15395me	17825me	21605me
1600-1700	Canada, CFVP Calgary	6030do				1600-1700	United Kingdom, BBC WS	3915as	5965as	6190af	6195va
1600-1700	Canada, CHNX Halifax	6130do						7135as	7205af	9410va	9515na
1600-1700	Canada, CKZN St John's	6160do						9740va	11750as	11780eu	12095va
1600-1700	Canada, CKZU Vancouver	6160do						15070va	15260na	15400va	17830af
1600-1700 s	Canada, R Canada Intl	9640na	11955na			1600-1615	United Kingdom, BBC WS	5990as	7180as	17705va	
1600-1700	China, China Radio Intl	11575as		15130af		1600-1700	USA, KTVN Salt Lk City UT	15590am			
1600-1700	Costa Rica, RF Peace Intl	6200am	15050am			1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1627	Czech Rep, Radio Prague	5930eu	9430eu			1600-1700	USA, Monitor Radio Intl	9355af	11550eu	18930af	
1600-1630	Ethiopia, Radio	7165af				1600-1700	USA, Voice of America	3970af	6110as	7125as	7215as
1600-1700	France, Radio France Intl	6175eu	9485eu	11615af	11700af			9575as	9645as	9700as	9760as
		12015af	15210af	15460af	15530af			11920af	12040af	13710af	15205as
1600-1650	Germany, Deutsche Welle	6170as	7225as	7305as	9585as			15225af	15395as	15410af	15445af
1600-1700	Germany, Deutsche Welle	7195af	9735af	11965af				17895af			
1600-1700	Guam, AWR/KSDA	7400as				1600-1700 fas	USA, WEWN Birmingham AL	11580na	13615na	15340na	
1600-1615 mt	Guam, TWR/KTWR	11580as				1600-1700	USA, WGTG McCaysville GA	9370am			
1600-1630 whfas	Guam, TWR/KTWR	11580as				1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1630	Iran, VOIRI	11875as	15260as	17750as		1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700 vl	Italy, IRRS	3985va				1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700	Jordan, Radio	11940va	11970va			1600-1700 a	USA, WVHA Greenbush ME	15745eu			
1600-1630	Kazakhstan, Radio Almaty	5940eu	5970eu	9505eu		1600-1700	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1600-1700	Lebanon, Voice of Hope	6280va				1600-1700	USA, WYFR Okeechobee FL	15566eu	17760eu		
1600-1700	Malaysia, Radio	7295do				1600-1620	Vatican State, Vatican R	9940as	11640as		
1600-1625	Netherlands, Radio	9895as	13700as	15150as		1600-1630	Vietnam, Voice of	7360na	9840eu	12030as	
1600-1650 occsnal	New Zealand, R NZ Intl	6100am				1600-1700	Zambia, Christian Voice	6065af			
1600-1700	Nigeria, Voice of	7255af				1615-1630	Albania, R Tirana Intl	7155eu	9740eu		
1600-1700	Pakistan, Radio	9485af	9785af	11570af	11745af	1615-1625	Egypt, Radio Cairo	11874af			
		13590af	15555af			1615-1700	United Kingdom, BBC WS	9630af	11860af	15420af	
1600-1700 vl	Palau, KHBN/Voice of Hope	9965as				1630-1700	Austria, R Austria Intl	11780as			
1600-1700	Russia, Voice of Russia WS	5940va	5995va	6055va	6085va	1630-1657	Canada, R Canada Intl	7150as	9550as		
		7115va	7130va	7205va	7255va	1630-1700	Egypt, Radio Cairo	15255af			
		7325va	7330eu	9470va	9490va	1630-1700	Georgia, Georgian Radio	5990eu			
		13670af				1630-1700	Russia, Voice of Russia WS	9585eu			
1600-1700	S Africa, Channel Africa	7155af	9530af	15240af		1638-1655 s	Denmark, Radio	9590af	11840af		
1600-1700	S Africa, Trans World R	9500af				1645-1700 mtwhf	Canada, R Canada Intl	9555eu	11935eu	15325eu	17820eu
						1650-1700	Eqt Guinea, Radio Africa	15186af			
						1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa			

SELECTED PROGRAMS

Sundays

- 1609 Germany, Deutsche Welle: Arts on the Air. See S 1109.
- 1609 Germany, Deutsche Welle: The Week in Germany. The week's events in Germany by DW's Bonn correspondents.
- 1610 Australia, Radio: Business Weekly. Business and finance developments in the Asia/Pacific region.
- 1611 Russia, Voice of: Moscow Mailbag. See S 0011.
- 1619 France, R France Intl: Everywoman (biweekly). See S 1228.
- 1619 France, R France Intl: Health Concerns (biweekly). Reports on medicine, fitness, and ecology.
- 1619 Germany, Deutsche Welle: Religion and Society. See S 0138.
- 1622 France, R France Intl: Paris Promenade. See S 1223.
- 1626 France, R France Intl: African Analysis (biweekly). See S 1216.
- 1626 France, R F I: Echoes from Africa (biweekly). African music.
- 1629 Germany, Deutsche Welle: Through German Eyes. In-depth interviews with prominent German journalists.
- 1630 Australia, Radio: Report from Asia. See S 1230.
- 1632 France, R France Intl: Club 9516. See S 1234.
- 1632 Russia, Voice of: Timelines. A variety program with an upbeat flair and an insight into Moscow life.
- 1633 Germany, Deutsche Welle: Germany by Radio. See S 1133.
- 1634 Germany, DW: The German pop scene for listeners in Africa.
- 1638 Radio Denmark: Magazine Program. See S 1138.

Mondays

- 1604 Jordan, Radio: On the Air if You Dare. See M 1500.
- 1609 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1610 Australia, Radio: Australiana. See M 1210.
- 1611 Russia, Voice of: Newmarket. See M 1211.
- 1630 Australia, Radio: International Report. See M 0430.
- 1631 France, R France Intl: RFI Europe. See M 1231.
- 1632 Russia, Voice of: Music selected by Radio Moscow staff.
- 1633 Germany, Deutsche Welle: Science and Technology. Magazine program presenting new developments in science.
- 1640 France, R France Intl: Sports. See M 1241.
- 1643 Germany, DW: Science and Technology. See M 1633.
- 1647 France, R France Intl: Arts in France. See M 1247.
- 1650 New Zealand, R NZ Intl: Bellbird. RNZI's famous interval signal.
- 1655 New Zealand, R NZ Intl: Karanga/Reading/Hymn. Vespers at the beginning of transmission.

Tuesdays

- 1604 Jordan, Radio: On Stage. Jordan's arts program.

- 1609 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1610 Australia, Radio: Australiana. See M 1210.
- 1611 Russia, Voice of: Science and Engineering in the CIS.
- 1630 Australia, Radio: International Report. See M 0430.
- 1632 Russia, Voice of: Music. See M 1632.
- 1633 France, R France Intl: RFI Europe. See M 1231.
- 1633 Germany, Deutsche Welle: Man and Environment. Topics on environment in industrial and developing countries.
- 1642 France, R France Intl: Books. See T 1243.
- 1644 Germany, Deutsche Welle: Man and Environment. See T 1633.
- 1647 France, R France Intl: Drumbeat. African feature.
- 1650 New Zealand, R NZ Intl: Bellbird. See M 1650.
- 1655 New Zealand, R NZ Intl: Karanga/Reading/Hymn. See M 1655.

Wednesdays

- 1604 Jordan, Radio: The Mix. The latest pop music news.
- 1609 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1610 Australia, Radio: Australiana. See M 1210.
- 1611 Russia, Voice of: Science and Engineering in the CIS.
- 1630 Australia, Radio: International Report. See M 0430.
- 1631 France, R France Intl: RFI Europe. See M 1231.
- 1632 Russia, Voice of: Music. See M 1632.
- 1633 Germany, Deutsche Welle: Insight. See W 0333.
- 1641 France, R France Intl: The Bottom Line. See W 1242.
- 1643 Germany, Deutsche Welle: Insight. See W 0333.
- 1646 France, R France Intl: Land of France. See W 1247.
- 1650 New Zealand, R NZ Intl: Bellbird. See M 1650.
- 1655 New Zealand, R NZ Intl: Karanga/Reading/Hymn. See M 1655.

Thursdays

- 1605 Jordan, Radio: Top 20. western pop music.
- 1609 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1610 Australia, Radio: Australiana. See M 1210.
- 1611 Russia, Voice of: Moscow Mailbag. See S 0011.
- 1630 Australia, Radio: International Report. See M 0430.
- 1630 France, R France Intl: Sports. See M 1241.
- 1632 France, R France Intl: RFI Europe. See M 1231.
- 1632 Russia, Voice of: Music. See M 1632.
- 1633 Germany, Deutsche Welle: Living in Germany. See M 0118.
- 1641 France, R France Intl: North/South (biweekly). See H 1249.
- 1641 France, R France Intl: Planet Earth (biweekly). See H 1249.
- 1643 Germany, Deutsche Welle: Living in Germany. See M 0118.
- 1646 France, R France Intl: Science Probe. See T 1250.

- 1650 New Zealand, R NZ Intl: Bellbird. See M 1650.
- 1655 New Zealand, R NZ Intl: Karanga/Reading/Hymn. See M 1655.

Fridays

- 1604 Jordan, Radio: Country Music. The best of country & western.
- 1609 Germany, Deutsche Welle: Newline Cologne. See M 1109.
- 1610 Australia, Radio: Australiana. See M 1210.
- 1611 Russia, Voice of: This is Russia. See S 0532.
- 1630 Australia, Radio: International Report. See M 0430.
- 1631 France, R France Intl: RFI Europe. See M 1231.
- 1632 Russia, Voice of: Music. See M 1632.
- 1633 Germany, Deutsche Welle: Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.
- 1641 France, R France Intl: Film Reel. See F 1241.
- 1643 Germany, Deutsche Welle: Spotlight on Sport. See F 1633.
- 1646 France, R France Intl: Made in France. See H 1448.
- 1650 New Zealand, R NZ Intl: Bellbird. See M 1650.
- 1655 New Zealand, R NZ Intl: Karanga/Reading/Hymn. See M 1655.

Saturdays

- 1603 Jordan, Radio: Music. See S 1215.
- 1609 Germany, Deutsche Welle: Africa in the German Press. What German newspapers and weeklies say about Africa.
- 1609 Germany, Deutsche Welle: Feature of the Month (1). See S 0436.
- 1609 Germany, DW: International Talking Point. See S 0416.
- 1610 Australia, Radio: Asia Focus. See M 1310.
- 1611 Russia, Voice of: Music and Musicians. See S 0111.
- 1614 France, R France Intl: Focus on France. See A 1425.
- 1618 Germany, Deutsche Welle: Focus on Development (biweekly). Projects and progress in Africa and Asia.
- 1618 Germany, Deutsche Welle: Women on the Move (biweekly). A magazine promoting intercultural understanding and portraying the role of women in society.
- 1623 Germany, Deutsche Welle: Development Forum. See A 1618.
- 1630 Australia, Radio: Background Report. See A 1230.
- 1630 Egypt, Radio Cairo: Egyptian Music.
- 1631 France, R France Intl: Spotlight on Africa. See A 1228.
- 1633 Germany, Deutsche Welle: Economic Notebook. See T 0333.
- 1640 Germany, Deutsche Welle: Religion and Society. See S 0138.
- 1645 France, R France Intl: French Lesson. See A 1247.
- 1648 Germany, Deutsche Welle: The Jazz Corner. See F 2333.

FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345va				1951-2000	New Zealand, R NZ Intl	11735pa			
1900-2000	Australia, Radio	6060pa	6080pa	6150as	7240pa	2000-2100	Algeria, R Algiers Intl	11715me	15160eu		
		7260as	9560as	9580pa	9860pa	2000-2100	Angola, Radio Nacional	3355do	9535do		
		11660pa	11695pa	11880pa		2000-2100	Australia, Radio	6060pa	6080pa	6150pa	7260as
1900-1930	Azerbaijan, Voice of	4957eu						9580pa	9860pa	11660pa	11695pa
1900-1920	Brazil, Radio Bras	15265eu						11855as	11880pa		
1900-2000	Bulgaria, Radio	7335eu	9700eu			2000-2100	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFCX Montreal	6005do				2000-2100	Canada, CFCX Toronto	6070do			
1900-2000	Canada, CFRX Toronto	6070do				2000-2100	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CFVP Calgary	6030do				2000-2100	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CHNX Halifax	6130do				2000-2100	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZN St John's	6160do				2000-2100	Canada, CKZU Vancouver	6160do			
1900-2000	Canada, CKZU Vancouver	6160do				2000-2100	China, China Radio Intl	6950eu	9440af	9920eu	11715af
1900-2000	China, China Radio Intl	6955me	9440af					15110af			
1900-2000	Costa Rica, Adv World R	13750am	15460am			2000-2100	Costa Rica, RF Peace Intl	6200am	15050am		
1900-2000	Costa Rica, RF Peace Intl	6200am	15050am			2000-2100	Ecuador, HCJB	11960eu			
1900-1930	Cote D' Ivoire, RDTV	11920do				2000-2100	Eq Guinea, Radio Africa	15186af			
1900-2000	Ecuador, HCJB	11960eu				2000-2050	Germany, Deutsche Welle	5960eu	7285eu		
1900-2000	Eq Guinea, Radio Africa	15186af				2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
1900-1950	Germany, Deutsche Welle	9670af	9765af	11785af	11810af	2000-2100	Guatemala, Adv World R	5980am			
		11865af	13790as	15145af	15425af	2000-2100	Indonesia, Voice of	9525as			
		9380eu				2000-2030	Iran, VOIRI	7260af	9022eu		
1900-1910	Greece, Voice of	5980am				2000-2100 vl	Italy, IRRS	3980va			
1900-2000	Guatemala, Adv World R	3975eu	5970eu	7250eu	9835eu	2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-1930	Hungary, Radio Budapest	7410eu	9650eu	9950me	11620eu	2000-2100	Kuwait, Radio	11990eu			
1900-1945	India, All India Radio	11935af	13750as	15075as		2000-2100	Lebanon, Wings of Hope	9960va			
		7410na	7465na	9435eu	9845ca	2000-2100	Liberia, Radio ELBC	7275do			
		13750sa				2000-2100	Liberia, Radio ELWA	4760do			
1900-2000 vl	Italy, IRRS	3985va	7140pa	9535na	9580as	2000-2025	Netherlands, Radio	4945af	6020af	9605af	9860af
1900-2000	Japan, NHK/Radio	6150as						9895af	11655af	15315af	17605af
		11850pa				2000-2100	New Zealand, R NZ Intl	11735pa			
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
1900-2000	Kuwait, Radio	11990eu				2000-2100	Nigeria, Voice of	7255af			
1900-1930 as	Latvia, Radio	5935eu				2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
1900-2000	Lebanon, Wings of Hope	9960va				2000-2100 vl	Papua New Guinea, NBC	4890do			
1900-2000	Liberia, Radio ELBC	7275do				2000-2025	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
1900-2000	Liberia, Radio ELWA	4760do				2000-2030 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815af	15515af
1900-1930	Lithuania, Radio Vilnius	9675eu	9710eu			2000-2100	Russia, Voice of Russia WS	5940eu	5995eu	6055eu	7180eu
1900-2000	Netherlands, Radio	4945af	6015af	6020af	9605af			7205eu			
		9860af	9895af	11655af	15315af	2000-2015	Sierra Leone, SLBS	3316do			
		17605af				2000-2030	South Korea, R Korea Intl	3970eu			
1900-1950	New Zealand, R NZ Intl	9810pa				2000-2015	Swaziland, Trans World R	3200af			
1900-2000	Nigeria, Voice of	7255af				2000-2030	Switzerland, Swiss R Intl	9770af	9885af	11640af	
1900-1930 s	Norway, Radio Norway Intl	5960eu	6195eu	7485af	9590af	2000-2100	Turkey, Voice of	9445eu			
1900-2000	Romania, R Romania Intl	6105eu	7105eu	7195eu	9510eu	2000-2015	Uganda, Radio	3340do			
1900-2000	Russia, Voice of Russia WS	5940eu	5995eu	6030va	6055eu	2000-2100	United Kingdom, BBC WS	3255af	3955eu	6005af	6180eu
		7180eu	7205eu	9470va	9490va			6195va	6195va	9630af	9740as
		9585af	13670af					11780eu	11835va	11955va	15400af
		5975eu	7275as					17830af			
1900-2000	South Korea, R Korea Intl	3200af				2000-2100	USA, KAIJ Dallas TX	13815am	15725na		
1900-2000	Swaziland, Trans World R	6165eu				2000-2100	USA, KATN Salt Lk City UT	15590am			
1900-1930	Switzerland, Swiss R Intl	9655eu	11805eu			2000-2100 s	USA, KVOH Los Angeles CA	17775am			
1900-2000	Thailand, Radio	9445eu				2000-2100	USA, KWHR Naalehu HI	11980as			
1900-1930	Turkey, Voice of	3255af	3955eu	5975va	6005af	2000-2100	USA, Monitor Radio Intl	11550eu	11860pa	13770eu	
1900-2000	United Kingdom, BBC WS	6180eu	6190af	6195va	7325af	2000-2100	USA, Voice of America	6040af	7415af	9760af	9770va
		9410va	9630af	9740as	11780eu			11855af	13710af	15205af	15410af
		12095eu	15070eu	15400af	17830af			15580af	17725af	17755af	19379va
1900-1915	United Kingdom, BBC WS	15105af	17880af			2000-2100	USA, WEWN Birmingham AL	7425na			
1900-2000	USA, KAIJ Dallas TX	13815af	15725am			2000-2100 fas	USA, WGTG McCaysville GA	9370am			
1900-2000	USA, KATN Salt Lk City UT	15590am				2000-2100	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, KWHR Naalehu HI	13625au				2000-2100	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, Monitor Radio Intl	9355eu	9385af	15665eu	17510af	2000-2100	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, Voice of America	6040af	7415af	9525va	9760af	2000-2100 mtwhf	USA, WRMI/R Miami Intl	9955am			
		11870va	11920af	12040af	13710af	2000-2100	USA, WRNO New Orleans LA	15420am			
		15180va	15205af	15410af	15580af	2000-2100 ths	USA, WVHA Greenbush ME	15745af			
		19379va				2000-2100 mwfta	USA, WVHA Greenbush ME	5850eu			
1900-2000	USA, WEWN Birmingham AL	11580na	13615na	13695af		2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-2000 fas	USA, WGTG McCaysville GA	9370am				2000-2100	USA, WYFR Okeechobee FL	7355eu	15566eu	21525af	
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu			2000-2030	Vatican State, Vatican R	7365af	9645af		
1900-2000	USA, WJCR Upton KY	7490na	13595na			2000-2030	Zambia, Christian Voice	4965af			
1900-2000	USA, WMLK Bethel PA	9465eu				2000-2100	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
1900-2000 mtwhf	USA, WRMI/R Miami Intl	9925am				2005-2100	Syria, Radio Damascus	15095na			
1900-2000	USA, WRNO New Orleans LA	15420am				2015-2045 as	Swaziland, Trans World R	3200af			
1900-2000 ths	USA, WVHA Greenbush ME	15745af				2020-2030 mh	Estonia, Estonian Radio	5925eu			
1900-2000 mwfta	USA, WVHA Greenbush ME	9930eu				2025-2045	Italy, RAI Intl	5990af	7110af	9710af	
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am	2030-2100	Egypt, Radio Cairo	15375af			
1900-2000	USA, WYFR Okeechobee FL	7355eu	15566eu	21525af		2030-2035 mtwhf	Latvia, Radio	5935eu			
1900-1930	Vietnam, Voice of	7360na	9840eu	12030as		2030-2100 mwh	Moldova, R Dniester Intl	6205na			
1900-2000	Zambia, Christian Voice	4965af				2030-2100	Russia, Voice of Russia WS	7170eu	7400eu		
1900-2000	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do		2030-2045	Thailand, Radio	9655eu	11805eu		
1930-2000	Austria, R Austria Intl	5945eu	6155eu	9655me	13730af	2030-2100	Vietnam, Voice of	7360as	9840eu	12020eu	
1930-2000	Iran, VOIRI	7260af	9022eu			2038-2055 m	Denmark, Radio	7520na	9480na		
1930-2000	Mongolia, R Ulan Bator	4080as	7530as			2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
1930-2000 vl	Papua New Guinea, NBC	4890do						11715pa	15225pa		
1930-2000	Poland, Polish R Warsaw	6035eu	6095eu	7285eu		2050-2100	Vatican State, Vatican R	4055eu	5880eu	7250eu	
1935-1955	Italy, RAI Intl	6030eu	7235eu								
1938-1955 m	Denmark, Radio	5930af	5960af	7485af	9590af						
1945-2000	Togo, Radio	5047do									

FREQUENCIES

2100-2200	Australia, Radio	6060pa 9580pa 11880pa	6080pa 9660pa 11955pa	7240pa 11660pa	7260as 11855as
2100-2110	Bahrain, Radio	6010do			
2100-2130	Belgium, R Vlaanderen Int	5910eu	7250eu		
2100-2200	Bulgaria, Radio	7105eu	9700eu		
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2200	Canada, R Canada Intl	5925eu 9805eu 15150eu	5995eu 11945eu 17820eu	7260eu 13650eu	9755eu 13690eu
2100-2200	China, China Radio Intl	5220eu	6950eu	9920eu	
2100-2130	China, China Radio Intl	3985eu	11715af	15110af	
2100-2200	Costa Rica, RF Peace Intl	6200am	15050am		
2100-2200	Cuba, Radio Havana	9550eu			
2100-2127	Czech Rep, Radio Prague	5930na	7345na		
2100-2200	Ecuador, HCJB	11960na			
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eq Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	6185as 9765as 15270af 5980am	7225af 11785as	9670as 11810af	9690af 11905af
2100-2200	Guatemala, Adv World R	5980am			
2100-2130	Hungary, Radio Budapest	3975eu	5935eu	7250eu	9835eu
2100-2200	India, All India Radio	7410eu 11715au 3980va	9910eu 15225au	9950eu	11620au
2100-2200 vl	Italy, IRRS	3980va			
2100-2200	Japan, NHK/Radio	6035as 11865eu	7125as	7140as	11850pa
2100-2115	Japan, NHK/Radio	7190as	7280as		
2100-2105 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	6280va			
2100-2200	Lebanon, Wings of Hope	9960va			
2100-2200 mtwhfa	Liberia, Radio ELWA	4760do			
2100-2125 mtwhf	Moldova, R Moldova Intl	7500eu			
2100-2200	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2200	Romania, R Romania Intl	5955eu 9510eu	5990eu	7105eu	7195eu
2100-2200	Russia, Voice of Russia WS	5940eu 7205eu 9440eu	6055eu 7360eu 9465af	7140eu 7400eu	7180eu
2100-2200	Slovakia, Adv World Radio	6480eu	15575eu		
2100-2200	South Korea, R Korea Intl	6125eu			
2100-2200	Spain, R Exterior Espana	3340do			
2100-2110	Uganda, Radio	4795eu	4820eu	5905eu	5940eu
2100-2200	Ukraine, R Ukraine Intl	6010eu 6130eu 9620eu	6020eu 7135eu	6055eu 7205eu	6080eu 7240eu
2100-2200	United Kingdom, BBC WS	3255af 6005af 6195va 11750sa	3915as 6120as 7325va	3955eu 6180eu 9410va	5975am 6190as 9740as 11955va
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, Monitor Radio Intl	11550va	13770eu	13840au	
2100-2200	USA, Voice of America	6040af 9760af 15205af 17725af 5825am 9495am	6070va 11870va 15375sa 18275va 7425na 13760am	7415af 13710af 15410af 19379va 13615na	9595va 15185va 15580af
2100-2200	USA, WEWN Birmingham AL	5825am			
2100-2200	USA, WHRI Noblesville IN	9495am			
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200 s	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200 w	USA, WVHA Greenbush ME	9852eu			
2100-2200 s	USA, WVHA Greenbush ME	15745af			
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2100-2145	USA, WYFR Okeechobee FL	11580eu	15566af		
2100-2130	Yugoslavia, Radio	6100eu	6185eu		
2100-2200	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
2105-2200	Syria, Radio Damascus	1208na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130 mtwhf	United Kingdom, BBC WS	15390ca	17715ca		
2130-2200	Armenia, Voice of	7480na	9965na		
2130-2200	Australia, Radio	9610as 17860pa	9645as	15365pa	17795pa

2130-2200	Iran, VOIRI	6175au			
2130-2200	Liberia, Radio ELWA	4760do			
2130-2200	Lithuania, Radio Vilnius	9675eu	9710eu		
2130-2200	Russia, Voice of Russia WS	7105eu			
2130-2200	Sweden, Radio	6065eu	7230af		
2138-2155 s	Denmark, Radio	5960as	7315as	9480as	
2145-2200 s	Greece, Voice of	9425au			
2145-2200	United Kingdom, BBC WS	5990as	7160as	9580as	

2200 UTC					
2200-2300	Australia, Radio	9475as 9660pa 11880pa 17795pa	9580pa 11660pa 11955pa 17860pa	9610as 11695pa 13755as 15365pa	9645as 11855as
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, R Canada Intl	5925am 9755am 13690eu	5960am 9805eu	5995eu 11705as	7260eu 11945eu
2200-2300	China, China Radio Intl	7170eu			
2200-2300	Costa Rica, RF Peace Intl	7385am	15050am		
2200-2210	Croatia, Croatian Radio	5895eu	7370eu	11635eu	13830eu
2200-2300	Cuba, Radio Havana	6180na	9505na		
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eq Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2300	Guatemala, Adv World R	5980am			
2200-2230	India, All India Radio	7410eu 11715au	9910eu 15225au	9950eu	11620au
2200-2230	Iran, VOIRI	6175au			
2200-2225	Italy, RAI Intl	5990as	9710as	11815as	
2200-2300	Lebanon, Voice of Hope	6280va			
2200-2300	Lebanon, Wings of Hope	9960va			
2200-2300	Malaysia, Radio	7295do			
2200-2225 mtwhf	Moldova, R Moldova Intl	7500eu			
2200-2215	New Zealand, R NZ Intl	11735pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4990do		
2200-2230 s	Norway, Radio Norway Intl	6170as	6200na		
2200-2208 vl	Papua New Guinea, NBC	4890do			
2200-2300	Russia, Voice of Russia WS	5940na 7180na	7105na 7205na	7125na 7330na	7170na 9550na
2200-2215	Sierra Leone, SLBS	3316do			
2200-2230	South Korea, R Korea Intl	5965eu			
2200-2300	Spain, R Exterior Espana	11775af			
2200-2205	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	5810eu	9985eu		
2200-2300	Turkey, Voice of	7280eu	9560as	9655na	
2200-2300	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2200-2300	United Kingdom, BBC WS	3955eu 7110as 11750sa	5975am 9410va 11835va	5975am 9590na 11955va	6195va 9915sa 11965pa
2200-2230	United Kingdom, BBC WS	11780eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	9430as	13770sa	13840va
2200-2300	USA, Voice of America	7215va 15185va 17820va	9770va 15290va 18275va	9890af 15305va	11760va 17735va
2200-2230 mtwhf	USA, Voice of America	7415af	12080af	13710af	
2200-2300	USA, WEWN Birmingham AL	5825am	7425na	13615na	
2200-2300	USA, WHRI Noblesville IN	9495am			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA	7355am			
2200-2300 w	USA, WVHA Greenbush ME	9852eu			
2200-2300	USA, WWCR Nashville TN	7435am	9475am	12160am	13845am
2210-2300 vl	Papua New Guinea, NBC	9675do			
2216-2300	New Zealand, R NZ Intl	15115pa			
2230-2300	Austria, R Austria Intl	5945eu	6155eu	9870ca	
2230-2257	Czech Rep, Radio Prague	5930na	7345na		
2230-2300	Sweden, Radio	6065eu			
2238-2255 s	Denmark, Radio	5960as	6200as	7115as	
2240-2250	Greece, Voice of	9425au			
2240-2255 s	Norway, R Denmark Intl	6200na			
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	9705as 15145as	9950as	11620as	13700as
2245-2300	Vatican State, Vatican R	7305au	9600au	11830au	

FREQUENCIES

2300-0000	Australia, Radio	9610as	9660pa	11645as	11660pa	2300-0000	United Kingdom,BBC WS	5975am	6175na	6195va	7110as	
		11695as	11855as	13755as	15365pa				7180as	7250as	7325va	9580as
		17795pa	17860pa						9590na	11750sa	11945as	11955va
2300-0000	Bulgaria, Radio	7480na	9700na			2300-2330	United Kingdom,BBC WS	9915sa				
2300-0000	Canada, CBC N Quebec Svc	9625do				2300-2315	United Kingdom,BBC WS	9410af	11835va			
2300-0000	Canada, CFCX Montreal	6005do				2300-0000	USA, KAJJ Dallas TX	5810am				
2300-0000	Canada, CFRX Toronto	6070do				2300-0000	USA, KTVN Salt Lk City UT	7510am				
2300-0000	Canada, CFPV Calgary	6030do				2300-0000	USA, KWHR Naalehu HI	17510as				
2300-0000	Canada, CHNX Halifax	6130do				2300-0000	USA, Monitor Radio Intl	7510va	9430as	13625as	13770sa	
2300-0000	Canada, CKZU Vancouver	6160do										
2300-0000	Canada, R Canada Intl	5960am	6040am	9535am	9755am							
		11940am										
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am	2300-0000	USA, Voice of America	7215va	9705va	9770va	9890af	
		13750am	15460am									
		7385am	15050am						11760va	15185va	15290va	15305va
2300-0000	Costa Rica,RF Peace Intl	5895eu	7370eu	13830eu								
2300-2310	Croatia, Croatian Radio	9900na				2300-0000	USA, WEWN Birmingham AL	17735va	17820va	18275va		
2300-0000	Egypt, Radio Cairo	6000as	6160as	7250as		2300-0000	USA, WHRI Noblesville IN	5825eu	7425na	13615na		
2300-2350	Germany, Deutsche Welle	11980as				2300-0000	USA, WJCR Upton KY	7490na	13595na			
2300-0000	Guam, AWR/KSDA	5980am				2300-0000	USA, WRMI/R Miami Intl	9955am				
2300-0000	Guatemala, Adv World R	9705as	9950as	11620as	13700as	2300-0000	USA, WRNO New Orleans LA	7355am				
2300-0000	India, All India Radio	15145as				2300-0000	USA, WWCR Nashville TN	5065am	7425am	9475am	13845am	
2300-0000	Japan, NHK/Radio	6055eu	6155eu	7125as	7140as	2300-2344	USA, WYFR Okeechobee FL	6085na				
		11850pa				2330-0000	Australia, Radio	9645as	9850as	13605as	15240pa	
2300-0000	Lebanon, Voice of Hope	6280va				2330-2355	Belgium, R Vlaanderen Int	6030na	9925sa			
2300-0000	Lebanon, Wings of Hope	9960va				2330-0000	Lithuania, Radio Vilnius	5910na				
2300-0000	Malaysia, Radio	7295do				2330-0000	Netherlands, Radio	6020na	6165na			
2300-0000	New Zealand, R NZ Intl	15115pa				2330-0000	Palau, KHBN/Voice of Hope	15140as				
2300-2315	Nigeria, FRCN/Radio	3326do	4990do			2335-2345	Greece, Voice of	7450sa	9395sa	11640sa		
2300-2350	North Korea, R Pyongyang	11700na	13650na			2338-2355 s	Denmark, Radio	5905am	7275am	7465am		
2300-0000 vl	Papua New Guinea, NBC	9675do				2345-0000	USA, WYFR Okeechobee FL	6065na				
2300-0000	Russia,Voice of Russia WS	7105na	7125na	7180na								
2300-0000	UAE, Radio Abu Dhabi	9605na	9695na	9770na								

SELECTED PROGRAMS

Sundays

- 2300 Egypt, Radio Cairo: Egyptian Music.
- 2305 Egypt, Radio Cairo: The Holy Koran and It's Meaning.
- 2309 Germany, Deutsche Welle: Asia-Pacific Report. Correspondent reports, interviews and background news from the Asia-Pacific region.
- 2310 Australia, Radio: Sports Bulletin. See S 1120.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2320 Australia, Radio: Network Asia. John Westland hosts this program of in-depth interviews and information about world, regional and Australian issues (Sun-Thu). The best from the broadcast week and the domestic network on Sat-Sun.
- 2324 Germany, Deutsche Welle: European Journal. A review of major events in Europe and Germany through interviews, analyses and background reports.
- 2330 Egypt, Radio Cairo: Egyptian Songs.
- 2332 Russia, Voice of: Folk Box. One of the top ten entertainment programs (Passport to World Band Radio).
- 2335 Egypt, Radio Cairo: Interview.
- 2335 New Zealand, R NZ Intl: NZ Long Range Weather Forecast. See S 0025.
- 2338 Radio Denmark: Magazine Program. See S 1138.
- 2340 New Zealand, R NZ Intl: Rural Report. Farming and agricultural news.
- 2345 Egypt, Radio Cairo: Business Radio.
- 2355 New Zealand, R NZ Intl: International Business News. Five minutes of commercial news.

Mondays

- 2300 Egypt, Radio Cairo: Program Preview.
- 2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 2310 Australia, Radio: Sports Bulletin. See S 1120.
- 2310 New Zealand, R NZ Intl: National Radio or Sport. See S 0200.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2320 Australia, Radio: Network Asia. See S 2320.
- 2324 Germany, Deutsche Welle: European Journal. See S 2324.
- 2332 Russia, Voice of: Yours for the Asking. A 30-minute musical request program.
- 2335 New Zealand, R NZ Intl: NZ Long Range Weather Forecast. See S 0025.
- 2340 New Zealand, R NZ Intl: Rural Report. See S 2340.
- 2355 New Zealand, R NZ Intl: International Business News. See S 2355.

Tuesdays

- 2300 Egypt, Radio Cairo: Program Preview.
- 2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 2310 Australia, Radio: Sports Bulletin. See S 1120.
- 2310 New Zealand, R NZ Intl: National Radio or Sport. See S 0200.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2320 Australia, Radio: Network Asia. See S 2320.
- 2324 Germany, Deutsche Welle: European Journal. See S 2324.
- 2332 Russia, Voice of: The Jazz Show. See M 0432.
- 2335 New Zealand, R NZ Intl: NZ Long Range Weather Forecast. See S 0025.
- 2340 New Zealand, R NZ Intl: Rural Report. See S 2340.
- 2355 New Zealand, R NZ Intl: International Business News. See S 2355.

Wednesdays

- 2300 Egypt, Radio Cairo: Program Preview.
- 2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 2310 Australia, Radio: Sports Bulletin. See S 1120.
- 2310 New Zealand, R NZ Intl: National Radio or Sport. See S 0200.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2320 Australia, Radio: Network Asia. See S 2320.
- 2324 Germany, Deutsche Welle: European Journal. See S 2324.
- 2332 Russia, Voice of: Music at Your Request. See M 1132.
- 2335 New Zealand, R NZ Intl: NZ Long Range Weather Forecast. See S 0025.
- 2340 New Zealand, R NZ Intl: Rural Report. See S 2340.
- 2355 New Zealand, R NZ Intl: International Business News. See S 2355.

Thursdays

- 2300 Egypt, Radio Cairo: Program Preview.
- 2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
- 2310 Australia, Radio: Sports Bulletin. See S 1120.
- 2310 New Zealand, R NZ Intl: National Radio or Sport. See S 0200.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2320 Australia, Radio: Network Asia. See S 2320.

- 2324 Germany, Deutsche Welle: European Journal. See S 2324.
- 2330 Egypt, Radio Cairo: Arabic Music.
- 2332 Russia, Voice of: The Jazz Show. See M 0432.
- 2335 New Zealand, R NZ Intl: NZ Long Range Weather Forecast. See S 0025.
- 2340 New Zealand, R NZ Intl: Rural Report. See S 2340.
- 2355 New Zealand, R NZ Intl: International Business News. See S 2355.

Fridays

- 2300 Egypt, Radio Cairo: Program Preview.
- 2309 Germany, Deutsche Welle: Commentary. See S 0208.
- 2310 Australia, Radio: Asia Focus. See M 1310.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2312 Germany, Deutsche Welle: The Week in Germany. See S 1609.
- 2313 North Korea, R Pyongyang: Music.
- 2321 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
- 2323 Germany, Deutsche Welle: Economic Notebook. See T 0333.
- 2330 Australia, Radio: At Your Request. See S 0330.
- 2331 North Korea, R Pyongyang: Music.
- 2332 Russia, Voice of: Folk Box. See S 2332.
- 2333 Germany, Deutsche Welle: The Jazz Corner. A musical change-of-pace from the world of jazz.
- 2338 North Korea, R Pyongyang: The Great Man of the Country.
- 2344 North Korea, R Pyongyang: Frequency Announcements.

Saturdays

- 2306 New Zealand, R NZ Intl: Connexions. See M 0007.
- 2309 Germany, Deutsche Welle: Commentary. See S 0208.
- 2310 Australia, Radio: That's History. Interpretations of past events by Bill Bunbury/Steven Rapley.
- 2311 Russia, Voice of: News and Views. See S 0311.
- 2312 Germany, Deutsche Welle: Sports Report. See S 0212.
- 2323 Germany, Deutsche Welle: Mailbag Asia. See S 0216.
- 2332 Russia, Voice of: This is Russia. See S 0532.
- 2345 New Zealand, R NZ Intl: Sunday Supplement. A mix of personal opinion and comment.

All Ohio Scanner Club: Dave Marshall, 50 Villa Rd., Springfield, OH 45503-1036. U.S. northeast of the Mississippi; VHF/UHF/HF utilities. Net Mon 9:30pm 146.940. *American Scannergram*. \$18 U.S., \$21 Can/Mex, \$28 ww. \$3 sample. Annual summer meeting.

American SW Listener's Club: Stewart MacKenzie, WDX6AA, 16182 Ballad Lane, Huntington Beach, CA 92649, (714) 846-1685; wdx6aa@aol.com. Western US, Pacific, Asia. SWBC, utilities, longwave, clandestine. SWL \$24 US, \$25 Can/Mex. \$2 sample (\$3 ww). Meets 1st Sats 10am address above.

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.* \$20 US, US\$21 Can/Mex, US\$27 ww.

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. Meets monthly. \$2.

Bay Area Scanner Enthusiasts: Bruce Ames, P.A.O., 105 Serra Way #363, Milpitas, CA 95035, (408)267-3244. Western U.S.; 25+ MHz. *Listening Post* (bi-monthly). Meets 2nd Mons. 7:30 Milpitas Police Admin Bldg. \$25 US, \$2 sample, or SASE for info.

Bayonne Emergency Radio Network (BERN): Ray Baron/Bob Frasca, P.O. Box 1203, Bayonne, NJ 07002-6203, 1-800-286-2876. Metro NJ, NY; Fire/disaster, pub safety.

Boston Area DXers: Paul Graveline, 9 Stirling St., Andover, MA 01810-1408, (508)470-1971, 50 mile radius Boston; 3-30 MHz. Meets 3rd Fris 7:30pm, The Lexington Club, Rte 4/225 1/4 mi W of Rte 128.

Canadian Int'l DX Club: Sheldon Harvey, 79 Kipps St., Greenfield Park., Quebec, Canada J4V 3B1, (514)462-1459. Canada nationwide/ membership open to all; General coverage. *The Messenger*. \$26 Can, \$25 US, \$US28 or \$Can35 ww. \$2 sample. Meets 2nd Tues 7pm Montreal; several annual events.

Capitol Hill Monitors: Alan Henney, 6912 Prince Georges Ave, Takoma Park, MD 20912-5414, (301) 270-2531/5774 fax. DC, MD, No.VA, So.DE. Scanner bands. Frequency Forum BBS (703)207-9622 (8-N-1) Net 1st & 3rd Mons 7:30pm 146.91. *Capitol Hill Monitor*. \$8. Meets irregularly.

Central Florida Listeners Group: Andy Fountain KD4OKJ, (407)898-6784. Central Florida; All bands. Net on 146.73 MHz Sun 8 pm. Meets 2nd Sats 12 noon. Conf#10 on Laser BBS (407)647-0031.

Central Indiana Shortwave Club: SteveHammer, 2517 E. DePauw Road,

Indianapolis, IN 46227-4404. Central Indiana; SW broadcasting, pirates, and the offbeat.

Shortwave Oddities.

Central VA Radio Enthusiasts: Richard Rowland, POB 34832, Richmond, VA 23234-0832. Metro Richmond and vicinity. VHF/UHF. SASE. No newsletter, no dues. Meets quarterly in Richmond.

Chicago Area DX Club: Edward G. Stroh, 53 Arrowhead Dr., Thornton, IL 60476. 300 mile radius of Chicago; DXing all bands. *DX Chicago*. \$17, \$1 sample. Meets irregularly.

Chicago Area Radio Monitoring Association (CARMA): Ted & Kim Moran, 6219 N. Greenview, Chicago, IL 60660-1815. Chicago & midwest. Public safety & general coverage. SCUG/CARMA BBS (708)852-1292. *CARMA Newsletter*. Meetings (Sats) and newsletter bi-monthly on alternate months.

Colorado Shortwave Listeners Club: Rob Harrington N0NNI, P.O. Box 370593, Denver, CO 80237-0593, 303-756-9455. Colorado residents. Longwave, shortwave. *Colorado Shortwave Listener* (4x) 50 cents or 10 cents plus SASE for info and latest newsletter or Internet YABX92A@prodigy.com. Meetings cancelled remainder of '95.

Communications Research Group: Scott Miller, 122, Greenbriar Drive, Sun Prairie, WI 53590-1706. Wisconsin area. Scanning.

MONITORING CLUBS OUTSIDE NORTH AMERICA

Associazione Italiana Radioascioto (AIR): C.P. 873, 34100 Trieste, Italy. Broadcasting all bands, utilities, pirates. *Radiorama* (Italian) 70,000 lira. April 25 annual mtg.

Australian Radio DX Club Inc: P.O. Box 227, Box Hill, Victoria 3128, Australia. SW, MW, Utilities. *Australian DX News*. Sample 2 IRCs or \$2US cash.

British DX Club: Colin Wright, 126 Bargery Road, Calford, London, SE6 2LR, United Kingdom. UK and international. SW, MW, AM, FM DXing, pirate and clandestine. *Communication*. L10 UK, L12 Eur, L16 ww. Sample 3 IRCs or \$2 US cash. Meets monthly in Twickenham (London).

Club d'ondes courtes du Quebec: Denis Pronovost, C.P. 61, Anjou, Quebec, Canada H1K 4G5. E-mail: papineau@msn.com. Exclusively shortwave. Annual \$40 Canadian. *L'Onde*, monthly (French). Sample US\$2.

DX Australia: P.O. Box 422, Moonee Ponds, Victoria 3039, Australia. MW, SW. *DXers Calling*.

DX Club of India: Navin Patel, 1-Dutt Niwas, 809 - M.G. Road, Mulund, Bombay-400 080, India. India; MW/SW/Ham. DX World (quarterly) Rs 50/-, 30 IRCs outside India. 3 IRCs sample.

DX Club Paulista: Marcelo Toniolo Dos Anjos, C. Postal 592, Sao Carlos - SP (Brasil), 13560-970. South America. Shortwave, including utilities. *Actividade DX* (in Portuguese).

Finnish DX Association: Mr. Heikki Aarrevaara, Suomen DX-Liitto, P.O. Box 454, FIN-00101 Helsinki, Finland; +358-0-6949017 fax. Finland and worldwide. SW and BCB. *Radiomaailma*.

Friendship DXers Club: Ing. Santiago San Gil Gonzalez, C.DX.A - International, P.O. Box 202, Barinas 5201-a, Estado Barinas, Venezuela. Venezuela and Caribbean. DXing all bands. Cadena DX, YV-2-FSW, Sunday 1130-1330 UTC on 7113 kHz. Venezuelan membership free.

International DX Association: Bedanta Das, 1 - No. Galiapati, Near Night School, Barpeta - 781301, Assam, India.

International DX Organization: Radio Juel Club, c/o Ranjit Kr. Nath, G.C. Lana Galiapati, Barpeta, India. Ham/DX/SWL. Annual 60/-rs or 22 IRCs. *DX Around* (quarterly) sample plus club info 14 IRCs.

International Listeners Organization: Kalab Abbas, St. No. 1, H. No.231 Waris Rd, Sheikhupura, Pakistan 39350 South Asia. Broadcasting. *Listener Times*.

International Radio Youth Club: G.M. Mostafa Kamal, Amla Wapda Colony-1, Kushtia-7032, Bangladesh

National Society of Pakistani DXers: Mr. Liaqat Ali, E-161/1, Iqbal Park, Opposite Adil Hospital Defence Housing Society Road, Lahore Cantt., Pakistan. Worldwide. All wave. Has library, meets fortnightly 1400-1800 UTC at library. 4 IRCs for more info.

New Zealand Radio DX League: P.O. Box 3011, Auckland, New Zealand. MW, SW, FM, TV, utilities. *New Zealand DX Times*. Sample 2 IRCs. Branches meet monthly.

New Zealand DX Radio Association: Mr. R. Dickson, 88 Cockerell St., Brookville, Dunedin, New Zealand. MW, SW, amateur and utilities. *Tune-In*.

North Ontago Radio Listener's Club: P.O. Box 179, Oamaru, New Zealand.

Pakistan SW Listeners Club: Mrs. Fatima Naseem, Sultanpura, Sheikhupura, 39350 Pakistan; Pakistan; SWBC.

QSL Club de France: Patrick Frigerio, 40 Rue de Haguenu, 67700 Saverne, France. SWBC, pirates, CB-DX, hams, etc. *Courrier* (in French). 6 bulletins, 72 FF, EEC=16 IRCs, elsewhere 20 IRCs.

Shortwave Radio Communications Club: Atiqur Rehman, Dawood Street, Khalid Road, Sheikhupura, P.C. 39350 Pakistan. South Asia; MW/SW. *The Amateur* (Urdu language). Meets 1st Fri on SW Complex, S.K.P.

South African DX Club (SADXC): P.O. Box 18008, Hillbrow 2038, South Africa; MW, SW, utilities. \$60 annual airmail to US; *The South*

African Shortwave Listener.

Southern Cross DX Club Inc.: Stephen Newlyn, G.P.O. Box 1487, Adelaide, SA 5001, Australia. Worldwide and Pacific. All bands. *DX Post*. \$25 annual in Australia. Meets last Fridays, 8pm, Thebarton.

Swedish DX Federation (SDXF): Box 3108, S-103 62 Stockholm, Sweden. 10 issues *Eter-Aktuellt*. Membership in Sweden 160 SC annual. SweDX BBS +46-(0)8-53034727; Fidonet 2:201/339; Internet sysop@sweddx.ct.se

Stichting ScanSearch Military Aircraft Communications (SC-MAC): Gerbrand Diebels, Roer 29, 5751 TJ Deurne, Netherlands. Military aviation NW Eur (VHF/UHF) and worldwide (HF). *Airlift* (Dutch) bi-monthly. FL 35, up to FL 45 outside Netherlands.

Universal DX League: Mr. Kanwarjit Sandhu, 408, Krishna nagar, Ludhiana 141 001. India. India and Int'l; SW/MW/AM/FM/TV DXing/Pirate and Clandestine. *DX Post* bi-monthly, sample 4 IRCs. Annual 24 IRCs or US\$10. SWL net: Sun 0300 UTC on 7080 / 1600 on 14150 SSB, VU3SIO net control.

Viamão DX-Club: Alencar Aldo Fossá, P.O. Box 101, Cunhas Road 1286, Jaguaribe Residential Park, 94400-970 Viamão, Rio Grande Do Sul, Brazil, South America. SWBC. Meets occasionally; multi-lingual.

UMBRELLA ORGANIZATIONS (no individual memberships)

Association of North American Radio Clubs (ANARC): Richard d'Angelo, 2216, Burkey Drive, Wyomissing, PA 19610. 18 member clubs across North America.

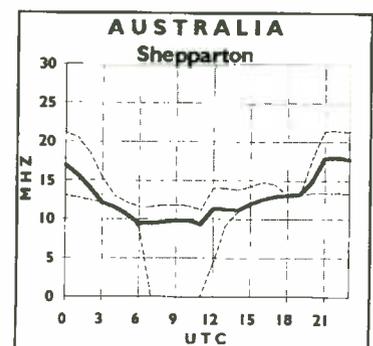
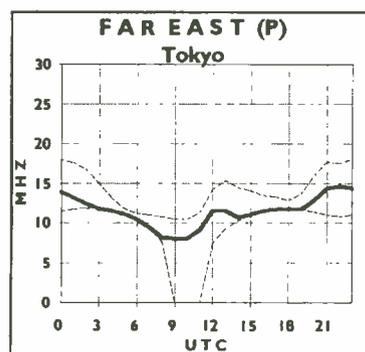
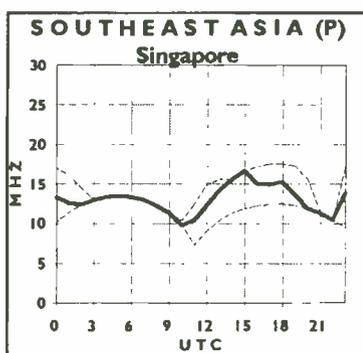
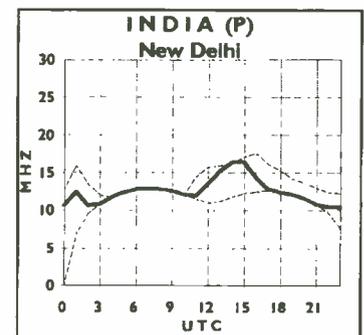
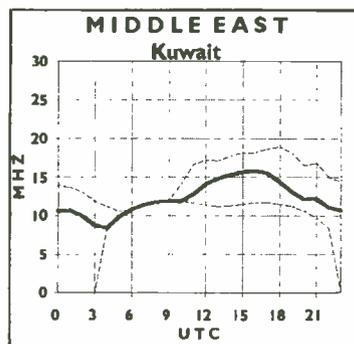
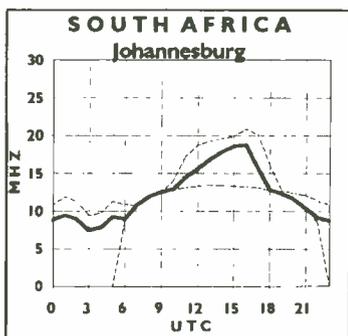
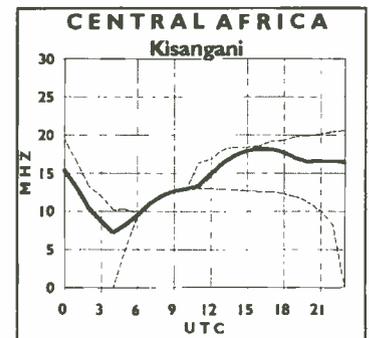
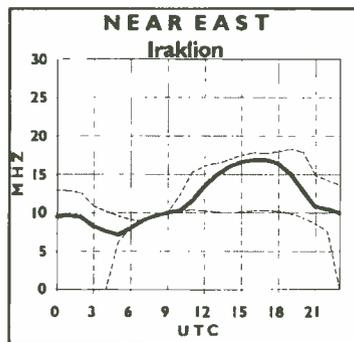
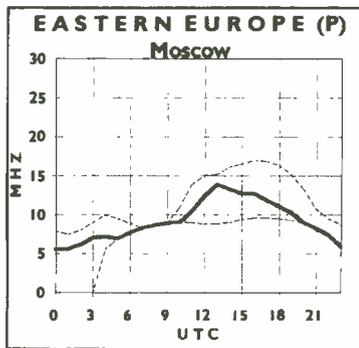
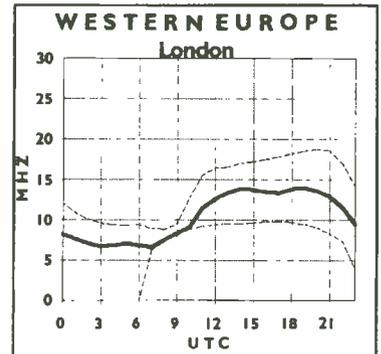
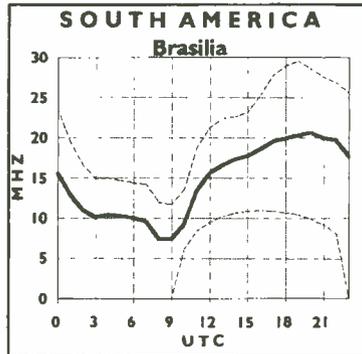
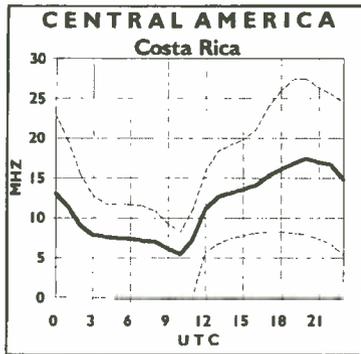
European DX Council (EDXC): Michael Murray, P.O. Box 4, St. Ives, Huntingdon, Cambs PE17 4FE, England. 70630.560

@compuserve.com. 16 member clubs across Europe.

South Pacific Association of Radio Clubs (SPARC): Arthur Cushen, 212 Earn Street, Invercargill, New Zealand.

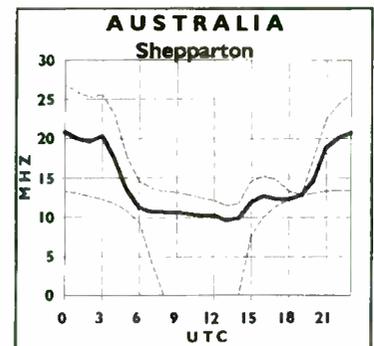
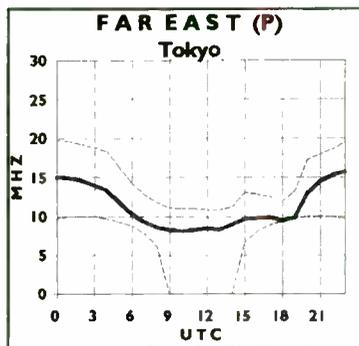
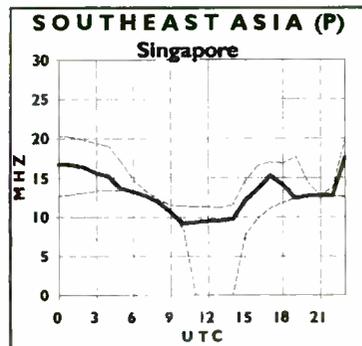
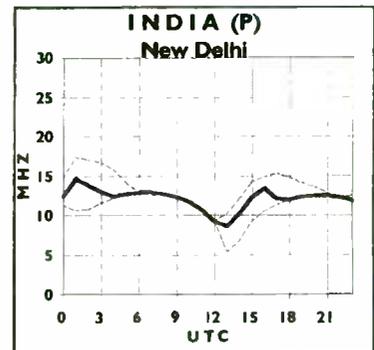
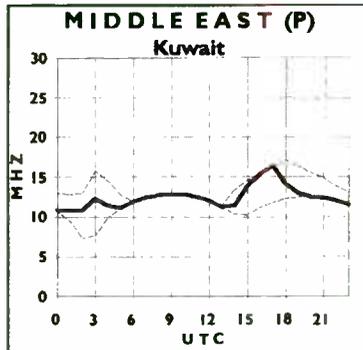
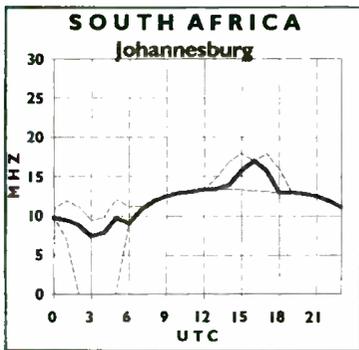
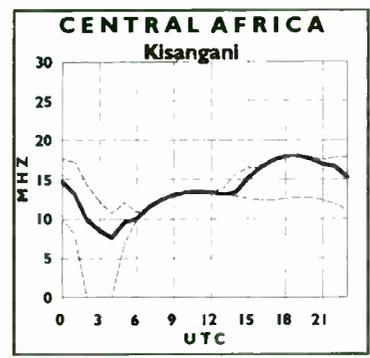
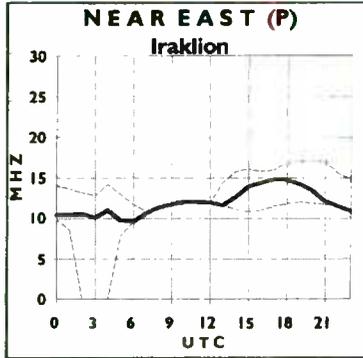
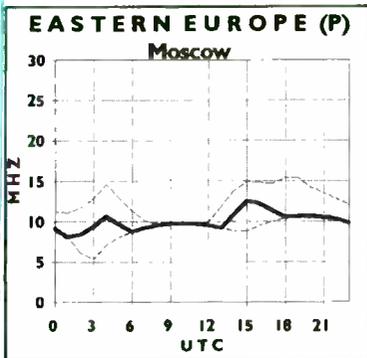
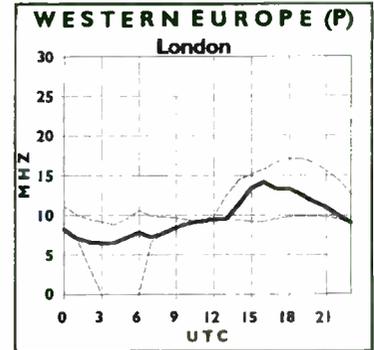
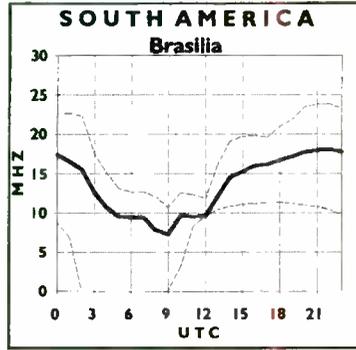
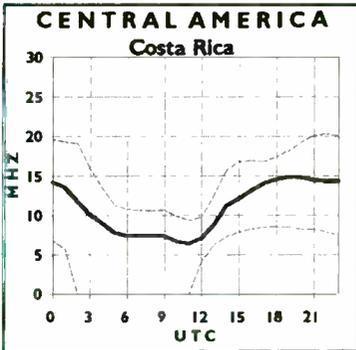
Propagation Conditions: Eastern United States

How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear. The Sun Spot Number used this month for forecasting purposes is 3.



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.



News & Loggings

After a great season of longwave DX, the mailbag is now overflowing with reader news and loggings. This month, let's sort out the results of this fine work and look at some other happenings in radio's basement band.

Reader News

Dick Pearce has tracked down yet another New England beacon site. This month we present his snapshot of SXD (265 kHz) in Springfield, VT. As with many of his other finds, locating SXD was not without its troubles.

When Dick reached the vicinity of the beacon, he pulled out his portable receiver to take another directional bearing. Just then, a fellow came running out of a nearby house hollering "Hey, turn that thing off...No filming here!" Dick tried to explain that it wasn't a camera, but the man seemed unconvinced and said "I saw you panning!"

Dick then tuned in the BBC to prove his case, but even that didn't work. The man continued to watch his every move until he drove away. Despite these hassles, it seems like the search was worth it. Figure 1 shows the first-class installation at SXD.

Al Hemmalin (RI) has checked in with another fine list of loggings, many of which appear in Table 1. Of special note is Al's intercept of SF (382 kHz) in Greenland. This is his first logging from Greenland, and one of the few that I'm aware of in the U.S.

Another interesting phenomena was reported by Al. On two occasions he has heard TWEB stations on 350 kHz (O'Hare-Chicago) and 404 kHz (Ocrakoke, NC) broadcasting weather information without their CW identifiers. To my knowledge, this does not represent a trend. Most likely these were either malfunctions or the IDs were temporarily shut off during transmitter maintenance.

GPS Caution

Too often when a new technology comes along, we abandon the established methods that have worked well for years. A case in point was noted in a recent issue of the *Local Notice to Mariners*. The bulletin carried this special notice about GPS systems:

"The National Transportation Safety Board



SXD (265 kHz) in Springfield, VT

(NTSB) has issued an Urgent Class I Recommendation to the U.S. Coast Guard following the grounding of a cruise ship. The recommendation included a request to advise mariners of the possible safety problems associated with Global Positioning System (GPS) receivers which automatically revert to dead reckoning (DR) tracking when satellite fixes are not received for a period of time.

"In the case prompting this advisory, it is believed a cruise ship ran aground due to an antenna failure resulting in the loss of satellite signals. This reverted the GPS to use positions based on DR tracking as input to the autopilot. Alarms indicating the receiver was in the DR mode were not heard, nor detected visually, which led to a course error of 14 nautical miles. This casualty was preventable by personnel.

"Vessel operators are advised of this circumstance and are urged to review the design of their bridge systems to identify potential system and operational failure modes that might result in undetected changes to the autopilot function and develop modifications as required. Additionally, bridge officers are reminded not to rely on any single aid to navigation, but to use all navigation resources at hand."

Unfortunately, there are fewer navigation resources to choose from today, due to the Coast Guard's decision to shut down most of its longwave beacons. By contrast, the FAA is continuing to study the use of GPS for air navigation, but it continues to support a robust network of radio beacons and other navigation aids.

Loggings

This month's huge list is brought to you by

MT readers Jerry Brookman (AK), Ken Stryker of *Aero/Marine Beacon Guide* fame (IL), Don Tomkinson (CA), and Al Hemmalin (RI).

I welcome logs from all readers. Send your reports to me at *Below 500 kHz*, P.O. Box 98, Brasstown, NC 28902, or via my Internet address: kevinc@mdsroc.com.

TABLE 1

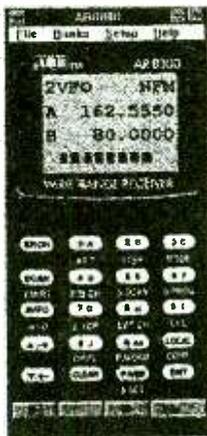
FREQ	ID	LOCATION	BY
135.9	NPG	Stockton, CA (U.S. Navy)	D.T. (CA)
196	FRN	Ft. Richardson, AK	J.B. (AK)
205	COR	Saylor Farms, CA	D.T. (CA)
214	DA	Dawson, Y.T., Can.	J.B. (AK)
221	SMU	Sheep Mountain, AK	J.B. (AK)
248	UL	Montreal, PQ, Can.	K.S. (IL)
248	WG	Winnipeg, MAN, Can.	K.S. (IL)
254	EV	Inuvik, N.W.T., Can.	J.B. (AK)
260	JH	Jackson, MS	K.S. (IL)
263	CQR	Candalar Lake, AK	J.B. (AK)
277	ACE	Kachemak, AK	J.B. (AK)
287	SMR	Santa Marta, Colombia	A.H. (RI)
300	ABL	Ambalema, Colombia	A.H. (RI)
305	RO	Roswell, NM	K.S. (IL)
305	PEE	Peters Creek, AK	J.B. (AK)
314	SPY	St. Paul Island, AK	J.B. (AK)
320	HTN	Miles City, MT	K.S. (IL)
320	OM	Omaha, NE	K.S. (IL)
320	FLA	Florencia, Colombia	A.H. (RI)
325	BVK	Buckland, AK	J.B. (AK)
326	UMM	Summit, AK	J.B. (AK)
326	MCY	Mercury, NV	D.T. (CA)
329	BUY	Burlington, NC	A.H. (RI)
333	STI	Mountain Home, ID	D.T. (CA)
350	NY	Enderby, BC, Canada	K.S. (IL)
353	LLD	Lanai Island, HI (Nice catch!)	D.T. (CA)
353	LWT	Lewistown, ID	D.T. (CA)
353	LAG	Largo Agrio, Ecuador	A.H. (RI)
363	RNB	Millville, NJ	K.S. (IL)
365	FKV	Gainesville, GA	K.S. (IL)
365	FT	Ft. Worth, TX	D.T. (CA)
371	BZP	Galena, AK	J.B. (AK)
374	SA	Sable Island, NS, Can.	K.S. (IL)
379	BRA	Asheville, NC	A.H. (RI)
382	SF	Sondrestrom AFB, Greenland	A.H. (RI)
390	HBT	Sand Point, AK	J.B. (AK)
391	3B	Brockville, ONT, Can.	K.S. (IL)
394	ENZ	Nogales, AZ	D.T. (CA)
400	ENS	Ensenada, MEX	D.T. (CA)
407	LET	Leticia, Colombia	A.H. (RI)
410	BA	Columbus, IN	A.H. (RI)
414	PYD	?? Unknown	D.T. (CA)
432	IZN	Lincolnton, NC	K.S. (IL)
519	EAA	Eagle, AK	J.B. (AK)
521	INE	Missoula, MT	D.T. (CA)
529	FDV	Fort Davis, AK	J.B. (AK)

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- True signal detection allows scanning upon loss of carrier with user supplied delay
- Max scan rate, user adjustable
- Scan by radio or computer
- Unattended frequency monitoring by time and date
- Lockout unwanted signals
- Rearrange all freq. in any combination by click/drag or entry

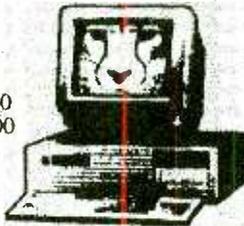


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- Watkins Johnson HF-1000
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Our software allows complete control of all functions supported by these radios through the standard manufacturer's interface.

SCANCAT allows you to:

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 - Top Hits Table

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ScannerWEAR™ SoftControl 2.0-WINDOWS 95'

compatible now supports:

- OptoScan 456 with Radio Shack PRO 2005/2006
- AOR 3000/3000A/8000 with Radio Shack PRO 2035
- ICOM R7000/R7100/R9000
- Memory banks include 100 channels per bank with frequency, description and mode.
- Search ranges include frequency, step, mode and description. New database search by service codes.
- Data logging to the file includes date and time stamp, signal strength, tone and number of hits, location (requires PerCon Database)
- Spectra analysis uses search ranges or displays logged data
- NEW High Speed CTCSS & DCS controlled scanning with the RS-2005/6, RS-2035 and OptoScan with 456/535.
- CTCSS & DCS controlled scanning on R7000/7100 & AOR 3000/3000A AOR 8000 with optional RC-125 Tone Interface Box
- Scan multipl: groups, banks, or search ranges in the same session.
- Birdie control file. • Unlimited file size.
- Import PerCon Database and comma-delimited ASCII.
- Special Eeprom support for the AOR 8000 including up and downloading of hex values, plus MODPLAN to enable lost 800-900 mhz.
- NEW database scan by service code, create memory banks from service codes.
- NEW memory bank up and downloads for ICOM R7000/R7100/R9000 and AOR 3000A/8000.
- NEW config window with support for com ports 1-8, IRQ calls on all ports, user modifiable dwell setting for all radios.
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The Telecom Act & DX

These days, it doesn't seem the President and Congress can agree on anything. In early February, they did, and the new telecommunications bill will have a dramatic effect on the broadcasting industry. Station owners and executives bear the brunt of this action, but DXers will notice some changes, too.

The biggest change is in multiple-ownership regulations. There are a variety of restrictions on how many broadcast stations may be owned by the same company. For years, this limit was seven stations nationally; in recent years, it was relaxed to 12, then 20. That limit has now been repealed, both for radio and for TV. However, no firm may own TV stations reaching more than 35% of the country.

Another regulation limited a company to one AM and one FM station in a given city; this one was also recently relaxed to allow as many as three of each in larger cities. While this regulation hasn't been repealed altogether, it has been vastly relaxed. In the largest cities, one firm may now own a total of eight stations, with a maximum of five on the same band. Even in the smallest towns, one firm may own five stations. This change applies only to radio — it's still illegal to own more than one TV station in the same city.

The changes may be confusing. Already, with authorization to run two or three stations in the same city, some companies have been using the same callsign on two frequencies. For example, talk station KHOW (630 AM) in Denver purchased KBCO (1190 AM) there. Much of the day, KBCO carries talk programming — and uses the "fake calls" KHOW-2. Expect to hear more of this. (Note that KBCO still uses their *real* call on the hour. Other stations affected by the new bill should do the same, but sometimes they don't!)

Another change will have considerable impact on the AM dial. Previously, if a station went off the air, its license would continue to be valid until the next renewal. If the station could convince the FCC it intended to return to the air, it could renew its license even if it had been silent for years. This is no longer the case. Under the new law, if a station goes off

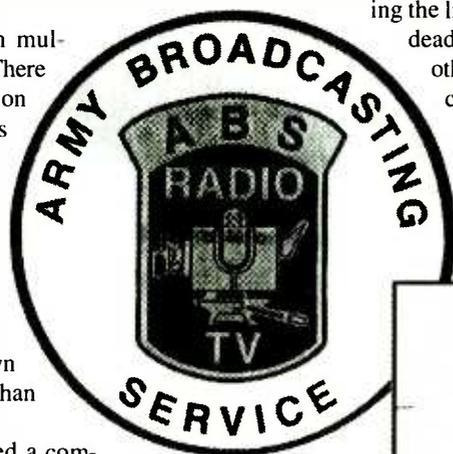
the air for 12 months, it loses its license at the end of that period.

Several dozen currently-licensed AM stations have been off the air for as long as four years. Other stations on the same frequencies have been required to protect these silent stations from interference. Revoking

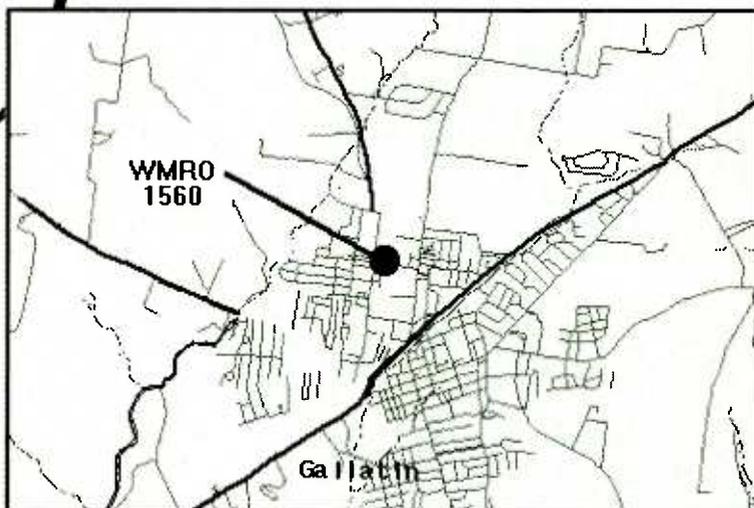
the licenses of the long-dead stations will allow other stations to increase power and remove nulls from their antenna patterns. DXers

the competing firm. In practice, this never happened unless the previous owner had committed serious violations of the regulations. However, station owners spent millions in legal fees to defend their licenses.

A provision of the Telecom Act requires the FCC to automatically renew licenses, unless the station has committed serious violations. If violations have occurred, the FCC must first hold a hearing on the violations. If the hearing finds the violations are serious enough, the FCC can refuse to renew the license. Only then can they accept applications for the now-vacant frequency from other



The Army Broadcasting Service provides American music and information for military personnel abroad. Tests of their station "KTRK" on 1670 kHz were widely heard by DXers here in the U.S.



Some Internet sites allow DXers to cross-reference the FCC databases and U.S. Census Bureau map files. This map of the tower location of WMRO (1560) Gallatin, Tennessee was obtained from one of these sites.

should expect this provision to reduce clutter in the band — not much, but every little bit helps!

Another major provision doesn't directly affect the DXer, but is still interesting to note. Under previous regulations, when a station applied to renew its license, other companies could apply to take over the frequency. In theory, if the FCC found a competing applicant would provide better service, they could refuse to renew the license, and turn it over to

firms. The Act also extends the terms of radio licenses from seven to eight years, and of TV licenses from five to eight years.

Advanced Television (ATV) was also addressed in the new law. It suggests (but doesn't require) the FCC to issue the first ATV licenses only to stations already broadcasting regular NTSC (the current standard) pictures. Technology will allow stations to use some part of their ATV channel for something other than broadcasting TV pictures and sound.

DX TEST BULLETIN

Mon, Apr 1 - KNIR-1360, Box 12948, New Iberia, LA 70562-2948. 1 - 1:30 am EST. Morse code IDs. Reception reports to Mr. Rick Morel, Chief Engineer.

Mon, Apr 1 - WTBQ-1110, 62 North Main, Florida, NY 10921. 5:15-5:45 am EST. Voice IDs, test tones, Morse code IDs. Reception reports to Mr. Rob McClean, Program Director.

Sun, Apr 7 - HCJB-690, Casilla 17-17-691, Quito, Ecuador. 12:15-12:30 am EST. Morse code IDs and "other unique items." Correct reports verified w/special QSL card. *If you hear code, you must report exactly when you heard it and what characters you heard.* Tape recordings welcome but cannot be returned. Include 1 International Reply Coupon or 1st class US or Canadian stamps for reply, to Mr. Rich McVicar (HC1JMN), Frequency Manager, Attn: DX Test, c/o English Language Service, HCJB. Arranged by Rich McVicar for the benefit of all DXers.

Unless otherwise noted, these tests were arranged by J.D. Stephens for the International Radio Club of America (P.O. Box 1831, Perris, CA 92572-1831); 32-cent stamp (US\$1 or 1 IRC overseas) for sample bulletin.

Stations that lease this extra capacity to other firms, or that use it for subscription programming, will be required to pay a license fee. Finally, 10 years after the first ATV licenses are issued, the FCC is to study the ATV program. Among other things, they're to determine how many ATV sets have been sold and how willing consumers are to buy them.

The so-called "V-chip" is now law. TVs with 13-inch or larger screens are required to pick up a rating code, transmitted above the top of the picture. Set owners can program their TVs to block programs carrying this code. I believe there won't actually be a "V-chip" as such — the function will be built into the closed-caption decoder chip, which uses a similar technology. Closed-caption decoding is already required in these sets.

Bits and Pieces

• Back in November, Gary Timm in Milwaukee sent information on a station the U.S. Army was to test on 1670 kHz. If you regularly check the expanded band, you now have the answer! KTRK, "K-Truck," did test from Ft. Meade, Maryland, for several days in early February. The station broadcast a variety of music and frequent IDs. After two days of broadcasting, they switched callsigns to "ARMY" — some speculate KTRK-TV

KTRK Loggings

In early February, the U.S. Army tested a mobile broadcast station for deployment to Bosnia. Calls used included KTRK, ARMY, and ABS. If you heard any of these stations on 1670 kHz, the Army Broadcast Service would like to hear from you.

Write:
ABS - attn. "DX"
Room 340
601 N. Fairfax St.
Alexandria, VA 22314

(channel 13 in Houston) complained about the hijacked callsign. Some tests were also performed on FM, though I don't know on what frequency. After tests were completed, the station was shipped to Bosnia, where it will broadcast to American troops on 1143 kHz.

DXers in Maryland, North Carolina, New York, Pennsylvania, and even Idaho have reported hearing KTRK. I was also one of the lucky DXers to land this station. If you heard KTRK, see the sidebar for an address for DX reports.

• Also in the expanded band, WJDM-1660 has begun regular 24-hour broadcasting. It's affiliated with the "Radio Aahs" network, which originates from Minneapolis and carries programming for pre-teen children. At my location near Nashville, WJDM is audible all day long! In the last month, I've received eight reports of WJDM from Michigan, Connecticut, Long Island, Maryland, Pennsylvania, and Ontario. DXers should pay close attention to the 1610-1700 kHz band; there are some excellent potential DX catches up there.

• Robert Wyman sent a couple of updates to the Internet list in the January column. Another Web page is now available for searching the FCC broadcast databases: connect to <http://www.radiostation.com>. This page has a map function similar to the one at aiss.uiuc.edu, but with more map options. Robert also mentions <http://www.xmission.com/~insearch/links.html>: this site has links to most broadcast stations on the Web. Check the *Monitoring Times* home page at www.grove.net for monthly FCC updates posted by your AM Bandscan author.

• So far, 1996 has been notable for loggings of unusual, but not very distant, stations. But there are plenty of regular, but distant, catches to be had. Your tip may help some other DXer identify his catches, or some other DXer may be able to identify yours. Send your DX, your questions, and your comments to me at Box 98, Brasstown, NC 28902.

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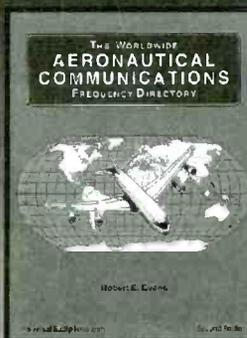
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Reynoldsburg, OH 43068

◆ Phone: 800 431-3939

◆ FAX: 614 866-2339

News from La Voz del CID and La Voz Popular

During a golden age of North American shortwave clandestines in the 1970's and 1980's, several unlicensed political broadcasters could be heard every day from countries such as El Salvador and Nicaragua. Only two "pure" clandestines are still on the air today from the Western Hemisphere, and we have news from both this month.

MT reader and *Cumbre DX* distribution editor Ullis Fleming of Glen Burnie, Maryland, was among the first to notice that the anti-Castro **La Voz del CID** was suddenly missing for two weeks in February. But, Ullis notes that the station has now returned to the air on their usual daytime frequency of 9941.6 kHz and their nighttime alternate of 6305 kHz. Both frequencies suffer continuous jamming from Cuba.

CID has gone silent in the past at times because of cash flow difficulties. It is unclear if the 1996 silent period was caused by finances or by transmitter difficulties. Given their occasional recent instability, it would be a good idea to log CID now while they are still active. Reception reports go to 10021 SW 37th Terrace, Miami, Florida 33165.

La Voz Popular is the other pure North American clandestine that has been recently active. This voice of the Guatemalan rebels transmits only on Tuesday and Friday evenings around 2300 UTC or earlier, using variable frequencies around 6957 kHz. Ike Kelly and Rick Doehner of Houston, Texas, both say that they occasionally hear them in AM mode with mariachi music and malé and female announcers in Spanish. If you hear them, try sending your report to Apartado Postal 19619, Mexico City 03910, Mexico.

■ Wired Pirate Coverage

Wired magazine, a computer communications publication, ran Andrew Yoder's list of the ten most active shortwave pirates of 1994 in their January 1996 issue. Half of these were active last month, and are found in this column's loggings. Our thanks go to Ken Pendarvis of California, who noticed this mainstream magazine's pirate advocacy.

■ Local FM Pirates

Two mysterious local FM pirates have materialized. Both Mike Fanderys of Parma,

Ohio, and Artie Bigley of Cleveland report that a station playing continuous music has appeared in the Cleveland FM broadcast band on 95.9 MHz. Apparently a local night club is using an FM wireless mike to reach its speakers, but the signal covers much of Cleveland.

In another incident, Malcolm Hunt of New Milford, Connecticut, has noticed a comedy skit pirate intermittently on 102.5 MHz. Malcolm used a Grove Spectrum Display unit to help him find this unusual stray signal.

Meanwhile, veteran DXer Ed Rausch of Cedar Grove, New Jersey, noticed a full column in the *New York Times* about Steven Dunifer's **Radio Free Berkeley** and his continuing battle with the FCC. Another column about Dunifer's unlicensed FM micropirate appeared in the *Los Angeles Times*; Thomas Risher of Whittier, CA, mailed a copy to *MT*. The FCC, despite recent budget cuts and turmoil caused by the new Telecommunications Act of 1996, is still putting pressure on Dunifer.

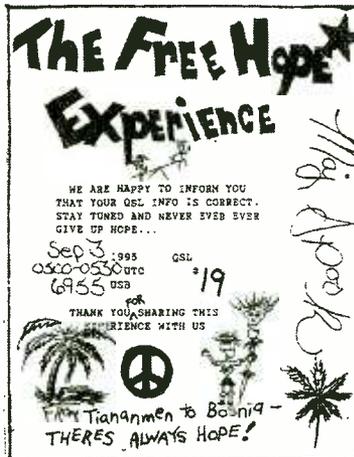
If you don't live in the Bay Area, you can hear RFB via computer! In *Free Radio Weekly* #15, Michael Volk of Kentucky reports hearing the station at 2000 UTC in RealAudio mode at <http://www.hotwired.com/club> on the World Wide Web.

■ New E-mail Address

Many of our readers communicate with *Monitoring Times* via internet e-mail. Please note that I have changed my computer address. **George.Zeller@acclink.com** should be used to whisk information to the Outer Limits via the internet. Or, you can still use the mail via PO Box 98, Brasstown, NC 28902.

■ What We Are Hearing

Mike Ryan of Fountain Valley, California, and Martin Theil of Holiday, Florida, checked in this month with requests for advice on how to pick up a pirate. All of the stations listed here have been heard at the UTC times listed,



A Free Hope Experience QSL from Ike Kelly

mostly on weekends. If you're trying to fish out a pirate, you should patiently scan around these spots, mainly near 6955 kHz.

Addresses used by pirate stations reported this month include PO Box 452, Wellsville, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; PO Box 605, Huntsville, Alabama 35804; Postfach 220342, D-42373 Wuppertal, Ger-

many; Ostra Porten 29, S-44254 Ytterby, Sweden; and PO Box 3103, Onekawa, Napier, New Zealand. For return postage, enclose three 32¢ stamps in the envelope to USA addresses; \$2 US or two International Reply Coupons go to foreign drops.

CELL, Cell Phone Radio- 6955 at 1945. Bob Grove often points out that cellular telephone calls can be picked up (albeit illegally) on most scanners. Now they can be heard on this new pirate, which plays juicy conversations between unsuspecting individuals who did not realize that their cellular calls were being recorded for broadcast on shortwave radio. Addr: Wellsville. (Michael Prindle, New Suffolk, NY; Barry Williams, Enterprise, AL)

Chuckie Cheese's Pizza Parlor- 6955 at 0000. They are not paid advertising for a pizza restaurant. They instead mix audio cuts, old music, and jabs at ACE QSL columnist John T. Arthur. Addr: None. (William Hassig, Mt. Prospect, IL; Williams)

Food Not Bombs Radio- 6955 at 1945. This California micropirate advocacy station sometimes plugs Steven Dunifer's **Radio Free Berkeley**. They target regular licensed broadcasters, so are not exclusively a pirate production. Addr: None for QSL's. (Pat Murphy, Chesapeake, VA; Jerry Coatsworth, Merlin, Ontario)

Free Hope Experience- 6955 at 0400. Major Spook features a mix of rock music and parodies. He has made many pirate DXers happy by announcing an address for the first time. Addr: Blue Ridge Summit. (Dennis Myhand, Mercedes, TX; Neil Wolfish, Toronto, Ontario; Robert Ross, London, Ontario; Murphy; Coatsworth; Williams; Prindle)

Friday Radio- 6955 at 2315. This station appears on Fridays, playing rock as a celebration of the beginning of the weekend. Addr:

Providence. (Ross; Williams)

He Man Radio- 6954 at 2130. He Man's sexist commentaries, whether genuine or satire, are always broadcast in Upper Sideband, which he calls "The Manliest of All Modes." Addr: Blue Ridge Summit. (Jesse Rose, Hampton, VA)

Interstate 44- 6956 at 2100. Their patriotic music mix uses a slogan, "Interstate 44: We're Faster Than Route 66." Addr: None. (Rose)

K-2000- 6955 at 1800. They are part of the DX parody genre, like Radio BLANDX and Radio Azteca. Many DXers feel that K-2000 is the funniest among this high quality group. Addr: Stoneham. (Williams)

KAOS- 6955 at 0400. Several pirates have used these call letters over the years. The latest one plays rock music while announcing a bogus 800 telephone number. Addr: None. (Coatsworth; Williams)

KDED- 6955 at 0400. The Voice of the Grateful Dead still plays Jerry Garcia's rock, but has broadened its programming to include comedy. Future plans include a "blabbermouth show" which will include short taped commentaries that are sent in by listeners. Addr: Providence. (Myhand; Coatsworth; Williams; Kelly)

KIW- 7460 at 0800. Graham Barclay's station has been transmitting a couple of times a month from New Zealand, using either this frequency or 7445 kHz. This excellent DX was Basil's first pirate outside North America! Addr: Napier. (Rich Hankison, Prairie Village, Kansas; Basil Shelley, Blythe, CA; Ross; Rose)

KMCR- 6955 at 0330. Magic Mike's rock music is usually best heard on the west coast, but he occasionally gets DX reports from east of the Mississippi. Addr: Blue Ridge Summit. (Shelley)

KOLD- 7460 at 0030. Aldo Batista's big band station reminds us that all pirate activity is not concentrated in the 6 MHz band. Kenneth says that another KOLD operated from Thule AFB in Greenland in 1955! Rob and Harold snagged their QSL. Addr: Stoneham. (Kenneth Clum, Tampa, FL; Harold Frogde, Midland, MI; Rose; Ross)

Mystery Radio- 6955 at 1830. Barry heard Pink Floyd music from them, but they played Christmas tunes around the holiday. He and Harold quickly received the station's nice multicolored QSL. Addr: Stoneham. (Williams; Ross; Murphy)

Numbers Parody- 6955 at 1800. One of the funniest pirates ever heard broadcasts five digit "numbers" like the numbers stations, but substitutes Mexican foods like "enchilada" and "quarter pounder with cheese" for the number digits. It has returned as a jammer of the real Spanish female numbers station that pops up on this frequency. Given the time, frequency, and good signal, it is likely that the real numbers station broadcasts from a transmitter within the United States. Gigi has been hearing numbers stations, but not the pirate. Addr: None. (Gigi Lytle, Lubbock, TX; Wolfish)

Omega Radio- 6955 at 2000. Dick Tator's format is dominated by Christian heavy metal rock tunes. He often interviews the musicians as part of the show. Addr: Wellsville. (Murphy)

Outlaw Radio- 6955 at 0030. The female announcer on this rocker says that she broadcasts "wearing nothing but a smile." Addr: Providence. (Williams; Ross)

Partial India Radio- 6955 at 1430. Sanjay is the star of this hilarious new DX parody pirate. He interviewed the rooster from the Radio Botswana interval signal, who has gotten a new job at a time signal in Peru. The cow in Botswana's IS claims to be a reincarnation of Jayne Mansfield. Note the good pun in the station name; **All India Radio** is India's international broadcaster. Addr: Stoneham. (Coatsworth; Wolfish; Williams; Murphy; Hassig)

Pirate Radio Insanity- 6955 at 0200. The 1995 Pirate Radio Insanity marathon did not repeat itself on New Years of 1996, but it resurfaced in late January with numerous stations taking to the air. This ID is for an event, not a station. Addr: None. (Randy Ruger, North Hollywood, CA; Williams; Myhand)

PR Radio- 1620 at 0700. Some pirates still use the area just above the medium wave broadcast band. This one plays classic rock music and relays Rochester, NY, FM stations. Addr: None. (Ross)

Radio Airplane- 6955 at 2245. Captain Eddy is back with entertaining comedy after a period of relative inactivity. He transmits all programs from a Piper Cub in flight. Addr: Wellsville. (Williams; Hassig)

Radio Azteca- 6955 at 1345. Bram Stoker skewers DXers, DXing, international broadcasters, *Monitoring Times*, and all things related to our hobby. His satire is always very amusing. Addr: Wellsville. (Dick Pearce, Brattleboro, VT; Wolfish; Williams)

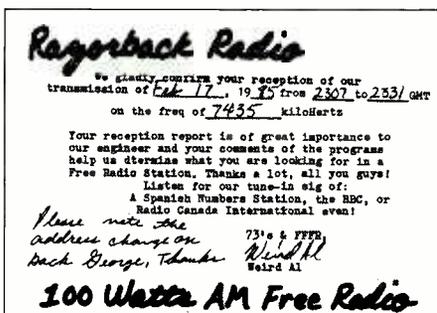
Radio Camouflage- 6955 at 0315. This Europirate has been relayed in North America lately. Its rock music and comedy format is more like a North American station than a Euro. This was Patrick's first pirate after 30 years of DXing; congratulations! Addr: Ytterby. (Patrick Griffith, Denver, CO; Williams; Ruger)

Radio City- 6955 at 2330. A North American relay of this Europirate's Christmas show was heard after Groundhog Day. Addr: Wuppertal (Williams)

Radio DC- 6953 at 0215. This one is an unusual Morse code CW beacon that transmits the message, "Don't Vote Republican." It may be more active this year because of the elections. Addr: None; occasionally verifies logs in *The ACE*. (Michael Hooker, Arlington, VA)

Radio Free Speech- 6955 at 1930. Bill O. Rights features rock music, editorials, and free speech advocacy, with both a brass band and parody version of the USA National Anthem at sign-on and sign-off. Addr: Wellsville. (Prindle; Rose; Ross; Williams; Pearce; Murphy; Shelley; Frogde)

Radio Titanic International- Mark sent a letter to the Titanic Historical Society with a copy of his Radio Titanic QSL, backed up by an Outer Limits item about the station. The Society replied "that it was news to them, but they seemed grateful that I shared the information." (Mark Burns, Terre Haute, IN)



Razorback Radio goes back to 1985

Razorback Radio- 6955 at 2300. It's still not clear if this is a resurrection of the station that used this name back in the mid-1980's, or if this is a new operation. The station is dominated by regional Arkansas themes, including Bill Clinton references. Addr: Stoneham. (Bill McClintock, Minneapolis, MN; Murphy; Hassig; Ross; Williams)

The Alan Masyga Project- 6955 at 1400. Controversy surrounds this new one, which mixed Alan Parsons Project rock music with jobs at MT contributor Alan Masyga. Alan tolerated the jokes, but we agree with him that it was inappropriate to announce Alan's alleged address over the air. Addr: None. (Alan Masyga, Winona, MN; Williams)

The Fox- 6955 at 0145. This veteran station, named after its announcer, is part of the Fox Broadcasting Network. Classic rock and freedom in broadcasting are their typical fare. Addr: Blue Ridge Summit. (Rose; Williams)

Up Against the Wall Radio- 6955 at 0130. Owsley asks that you include comments on his shows within reception reports that you send to him. In return, if you request it, he sends an extremely nice floppy disk digital QSL that displays an animated graphic on your PC. Addr: Providence. (Myhand; Williams; Prindle; Murphy; Shelley; Kelly)

WKND- 6955 at 1800. When he's not building amazing miniature portable pirate transmitters, Radio Animal still appears on the pirate bands with long shows promoting pirate radio. Addr: Blue Ridge Summit. (Williams; Hassig)

WPN, World Parody Network- 6955 at 2015. Captain Squirtlong plays rock music, but comedy selections are the meat and potatoes of his programming. He recently read a phony FCC Notice of Apparent Liability over the air. Addr: Huntsville. (Frogde; Kelly; Williams; Wolfish; Coatsworth; Murphy; Ross; Hassig)

WREC- 6955 at 0000. P. J. Sparx was one of the most active pirate broadcasters of 1995, and he is continuing the trend in 1996. Some of his shows have numerous cameo identifications read by announcers from other pirates, so be sure and listen for the WREC ID. Addr: Wellsville and Blue Ridge Summit. (McClintock; Murphy; Pearce; Coatsworth; Hassig; Wolfish; Ross; Williams; Rose; direct from the station)

WWWW- 6955 at 1915. This new one is not to be confused with the licensed FM station **WWWW** in Detroit. The pirate plays rock music. Addr: Wellsville. (Williams; Murphy; Wolfish; Ross)

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Information for the New Ham

Perhaps one of the major stumbling blocks for new VHF hams is finding out where to obtain information on our hobby. While there is a lot of good information available, many newcomers have difficulty locating the best sources.

■ The ARRL

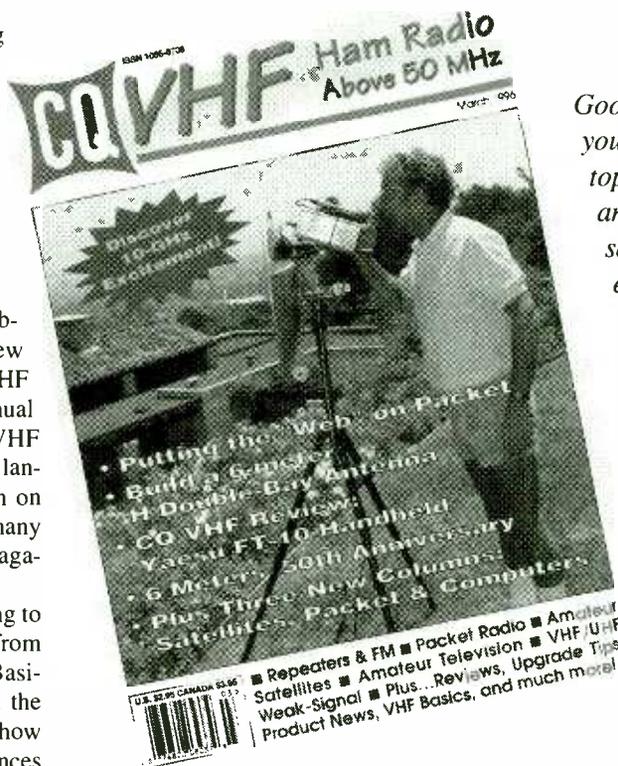
The American Radio Relay League publishes many excellent books for the new ham. A very good choice for the new VHF ham is *Your VHF Companion*. This manual covers every activity available to the VHF ham, and explains it in non-technical language. In addition, it contains a section on where to obtain information listing many other excellent books, articles, and magazines. Price is \$8.00.

An excellent manual for hams wanting to understand exactly how VHF signals get from place to place is *Beyond Line of Sight*. Basically a history of how hams pioneered the bands above 30 MHz, this book explains how VHF signals propagate over long distances and the many phenomena involved with such propagation.

In the ARRL's monthly magazine *QST* (available for \$25.00 per year from ARRL, 225, Main St. Newington, CT 06011), several regular columns are aimed specifically at the VHF amateur. "The World above 50 MHz" contains news about the latest happenings on VHF, listing records and awards as well as details on various openings - a very informative column for the active VHFer. "FM and Repeaters" is, of course, the place to be if you like checking out the repeater scene.

Best of all for the new VHF ham is a section of *QST* called "New Ham Companion," which, while not aimed specifically at the VHFer, does nevertheless provide a lot of good basic VHF info. Many projects and articles that help understand our higher frequency bands are aimed especially at the no-code tech.

Each month many articles and features throughout this superb magazine discuss VHF and higher bands. Excellent VHF/UHF building projects are frequently described; some of these projects are aimed at the skilled builder while others are easier and can be handled by the less experienced adventurer.



Good articles on setting up your station, mountain topping, building gear and antennas, contesting, satellites, theory, and every other facet of VHF make this required reading for amateurs involved in this portion of our hobby.

■ CQ Magazine

The major VHF thrust of *CQ* is a column called "Packet Users Notebook," though, since packet is used on other bands, it cannot properly be called a VHF column, although the majority of the column does discuss VHF packet. Frequent feature articles, though, do indeed make this fine magazine useful to the VHF ham.

Recently *CQ* came out with a new magazine called *CQ VHF*. As its name implies this magazine is aimed strictly at the VHF ham. After reviewing several issues, I can only say it is one heck of a good magazine for anyone interested in the bands above six meters. Good articles on setting up your station, mountain topping, building gear and antennas, contesting, satellites, theory, and every other facet of VHF make this required reading for amateurs involved in this portion of our hobby.

At \$21.95 per year it is a real bargain. It's available from *CQ VHF*, 76 Broadway, Hicksville, NY 11801-9962 or phone 1-800-853-9797.

■ Propagation

Conditions on the higher HF bands have not improved significantly in the past few months. 160, 80 and 40 have been the premier DX bands and will continue to be for the next few years. However, the season provides some consolation: it's spring in the northern hemisphere and fall in the south, meaning fewer electrical storms and nearly equivalent daylight hours. These provide the ideal conditions for working the antipodes—that spot which is opposite yours on the Earth—for some real DX on 160, 80, and 40.

Even a simple station can turn the trick: all that is needed is the desire to either stay up late or get up early to catch the morning sun. The best times are about one hour before sunrise to about one hour after, and again about half an hour before sunset to an hour after. One hundred watts should suffice if coupled to a decent vertical or high dipole antenna.

Thaws all for April, gang. 73 de Ike, N3IK



SPECIAL EVENT CALENDAR

Monitoring Times is pleased 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 Events Calendar, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net

Apr 2	Madison, WI	Spring Meeting of Communications Research Group. 12 noon to 5pm. Call Scott Miller, 608-837-7666, for details
Apr 6	Fairfield, NY	Fort Herkimer ARC Spec Event Station KB2UYI, 1400-1900 UTC, for Fairfield bi-centennial. 20m gen phone, 40m novice CW, 40m gen, 2m 145.110. Send QSL + SASE to AA2AT, Madeline Loiacano, 96 Grove St., Ilion, NY 13357
Apr 6	Wichita Falls, TX	Wichita ARS / Jimmy Dodson KB5TGO, PO Box 4363, Wichita Falls, TX 76308, 817-586-0215
Apr 6	Virginia Bch, VA	Chesapeake ARS / Preston Ipock N4SHI, 1026 Calloway Ave, Chesapeake, VA 23324, 804-543-4610
Apr 12-13	Tupelo, MS	Tup,Boonvle,Monroe Co ARCs / Jack Ellis KI5QV, Rte 4 Box 198-B, Tupelo MS 38801, 601-842-7255.
Apr 12-13	Lawton, OK	Okla State Conv / Robt Morford KA5YED, 1415 NW 33rd, Lawton, OK 73505, 405-353-8074
Apr 13	Bowling Green, KY	Ky Colonels ARC / Leon Garrett K4CIT, 2901 Smallhouse Rd, Bowling Green, KY 42104, 502-842-5307
Apr 13	Joplin, MO	Joplin ARC / Andy Gabbert KA0TUD, 1020 Carl Junction Rd, Webb City, MO 64870-1029, 417-673-8371
Apr 13	Fredericksburg, PA	Appalachian AR Group / Homer Luckenbill WA3YMU, AARG, 105 Walnut St, Pine Grove, PA 17963, 717-345-3780. Location: N Lebanon High School. Talk-in 146.04/64. 8am \$4 gen admission
Apr 13	Spokane, WA	Inland NW Hamfest Assoc / Al Lafky K7YY, PO BHox 14643, Spokane, WA 99214, 509-924-3475
Apr 14	Aurora, CO	Aurora Rptr Assoc / Wayne Heinen N0POH. Location: Adams Co Fairgrounds, US 85 North and follow signs. Talk-in 147.15 rptr. 8am.
Apr 14	Raleigh, NC	NC State Conv / Rollin Ransom NF4P, 1421 Parks Village Rd, Zebulon, NC 27597, 919-269-4406
Apr 19-21	Visalia, CA	Intl DX Convention / Don Bostrom N6IC, 4447 Atoll Ave, Sheman Oaks, CA 91423, 818-784-2590
Apr 20	Muskegon, MI	Muskegon Co ARES/RACES / Tom VanderMel KB8VEE, 722 Evanston, Muskegon, MI 49442, (616) 733-2963. Mona Shores High School, Seminole Rd. Talk-in 146.82(-) PI 94.8. 8am-12pm, \$4 admission
Apr 21	Newcastle, DE	Penn-Del ARC / Hal Frantz KA3TWG, 950 Ridge Road, Suite C-27, Claymont, DE 19703, 302-798-7270
Apr 21	Arthur, IL	Moultrie ARK / Ralph Zancha WC9V, PO Box 55, Lovington, IL 61937, 217-873-5287
Apr 21	Cambridge, MA	MIT RS & Harvard Wireless Club / Steve Fineberg W1GSL, PO Box 397082, MIT Branch, Cambridge, MA 02139, 617-253-3776 (Nick KA1MQX)
Apr 27	Owensboro, KY	Owensboro ARC / Suzie Young N9LJF, 2427 Latrobe Ave, Owensboro, KY 42301, 502-684-5157
Apr 27	Butte, MT	Butte ARS / Bob Evans AA7LU, Rte 1, Box 260, Butte, MT 59701, 406-494-3066
Apr 27	Roseburg, OR	Umpqua Valley ARC / Ed Pahl W5PIL, 1440 Wild Iris Lane, Roseburg, OR 97470-9469
Apr 27	Vancouver, WA	Clark Co ARC / Wayne Schuler A19Q, 13901 SE 18th Circle #12, Vancouver, WA 98684-4710, 360-896-8909
Apr 28	Grosse Pt Woods, MI	SE MI ARA / Thomas Orlicki N8HLY, 15835 Novara, Detroit, MI 48205, 313-527-3497
Apr 28	Poughkeepsie, NY	Mt. Beacon ARC / Ken Akasofu KL7JCQ, 316 Titusville Rd, Apt 4, Poughkeepsie, NY 12603-2944, 914-485-9617
Apr 28	Athens, OH	Athens Co ARA / Drew McDaniel W8MHV, 61 Briarwood Dr, Athens, OH 45701, 614-592-2106
May 3-4	Kingston, ON	Ontario DX Association Convention at Holiday Inn, Kingston. Special session for Ontario teachers: Shortwave Listening in the Classroom. For more information contact Steve Canney, Box 161, Station A, Willowdale, Ontario, M2N 5S8. Journalist Peter Trueman keynote speaker at ODXA '96.
May 4	Cedarburg, WI	Ozaukee RC / Gabe Chido, W58 N985 Essex Dr, Cedarburg, WI 53012-1439, 414-377-2784. Circle-B Recreation Center, Hwy 60 & Co I. Talk-in 146.37/97, 146.52. \$3 admission.
May 4	Kansas City, MO	PHD ARA / Chuck Miller WA0KUH, PO Box 11, Liberty, MO 64068, 816-781-7313
May 4	Klamath Falls, OR	Keno ARC / Tom Hamilton WD6EAW, PO Box 678, Keno, OR 97627, 541-883-2736
May 4	Greenville, SC	Blue Ridge ARS / Jeff Borke WA4EFT, PO Box 6751, Greenville, SC 29606, 803-967-3284
May 4-5	Abilene, TX	W Texas Section Conv / Peggy Richard KA4UPA, 1442 Lakeside Dr, Abilene, TX 79602, 915-672-8889
May 5	Decatur, IL	Cenois ARC / Bert Ruble N9ULQ, 4985 Melwood Ave, Decatur, IL 62521, 217-423-0314
May 5	Wabash, IN	Wabash Co RC / Donald Spangler W9HNO, 235 Southwood Dr, Wabash, IN 46992
May 5	Hagerstown, MD	Antietam RA / Bill Harclerode N8UKC, 993 Falling Waters Dr, Falling Waters, WV 25419, 304-274-3355
May 5	Yonkers, NY	Metro 70cm Network / Otto Supliski WB2SLQ, 53 Hayward St, Yonkers, NY 10704, 914-969-1053
May 5	Wrightstown, PA	Warminster ARC / Woody Woodside N6XES / 665 St Davids Ave, Warminster, PA 18974, 215-672-8482
May 11	Knoxville, TN	Knoxville ARC / Carol Whetstone, 3702 Vista Ln, Knoxville, TN 37921, 423-673-0475. TN Valley Fairgrounds.
May 11	Peotone, IL	Kankakee ARS / Willis Bowser K9IFO, 1210 N Riverside Dr, Momence, IL 60954-3452, 815-472-2079. Will County Fairgrounds
May 17-19	Dayton, OH	Dayton HamVention / Mel Berman W8GTR, PO Box 964, Dayton, OH 45401-0964, 513-276-6930
May 19	Cambridge, MA	MIT RS & Harvard Wireless / Steve Fineberg W1GSL, PO Box 397082, MIT Branch, Cambridge, MA 02139. Nick Alternburnd KA1MQX, 617-253-3776
May 26	Canfield, OH	Twenty Over Nine RC / Don Stoddard N8LNE, 42 S Whitney Ave, Youngstown, OH 44509, 216-793-7072
May 31-Jun1	S Sioux City, NE	Midwest Div Conv / Dick Pitner W0FZO, 2931 Pierce St, Sioux City, IA 51104, 712-258-1520
May 31-Jun2	Rochester, NY	Atlantic Div-NY State Conv / Harold Smith K2HC, 300 White Spruce Blvd, Rochester, NY 14623, 716-424-7184
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How to Minimize Man-Made QRN

Weak signals are often buried in man-made noise that originates in our neighborhoods. Nothing can be more frustrating than to tune a shortwave band and be confronted with ragged line noise that may often register S9 or greater. Various appliances are also capable of generating ear-shattering noise pulses that mask incoming radio signals. Such oaths as "drat" (or even uglier words than that!) are not uncommon utterings in the radio room when reception is spoiled by QRN.

I have been a frequent victim of power line and other electrical noise for many years, irrespective of where I lived. SWLs and amateurs who reside in urban areas are the most likely to experience difficulty because of power-line noise. This form of QRN can be caused by leaky pole transformers, dirty or defective power-line insulators, oxidized joints in the power-service wiring, or leaky circuit breakers on the poles. Your furnace motor, or that of a neighbor, may cause severe QRN. Fish-tank heaters, electric blankets, and similar appliances also generate man-made noise over short distances.

Let's examine various methods for minimizing or eliminating local QRN. Some of the tricks are easy and inexpensive to implement.

■ Locating the Noise Source

A portable BC band AM radio is excellent for pinpointing noise sources in and near your home. The QRN will become louder as you approach the noise source. Figure 1 shows a simple circuit you can plug into your portable broadcast-band radio to obtain a visual indication of the noise level. The shortcoming of this detection method is that the AGC (automatic gain control) in the radio will tend to level the noise amplitude, which means that noise-level increases will not be pronounced when monitored with the plug-in meter.

Disabling the receiver AGC is not difficult. The AGC voltage is rectified by the diode detector at the secondary winding of the last IF transformer. You need only to open the AGC circuit that leads from the detector back to the IF amplifier base-bias network.

If the noise seems to originate from a power-line pole, you should call your power company and ask that a troubleshooter check the equipment on that pole for defects. Do not

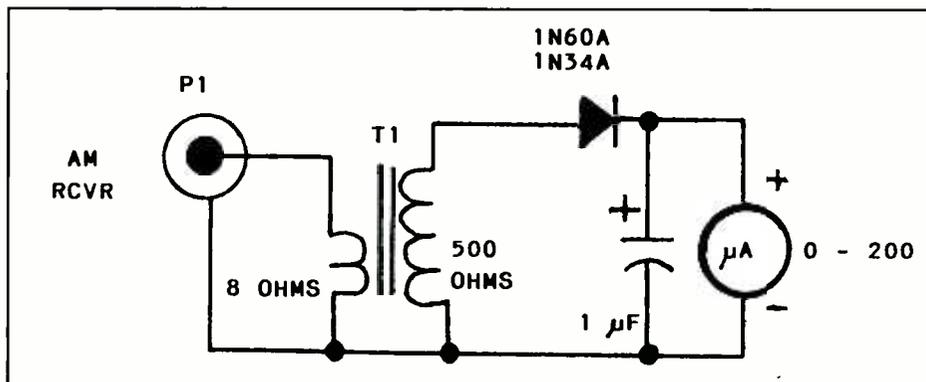


Figure 1 - Schematic diagram of a visual indicator that can be plugged into the headphone jack of a BC-band AM radio for observing noise levels. The receiver audio gain control must be set to provide a meter reading when noise is present. Do not change the gain control setting. Tune the receiver to 1650 kHz to avoid interference from radio stations. M1 can be any small dc meter from 50 to 200 microamperes, such as the signal and tuning meters from CB transceivers and FM radios. T1 is an audio output transformer taken from a discarded transistor radio.

bang on the pole with a sledge hammer, as some have done in an effort to make the noise cease!

You can often locate noisy appliances while using a portable radio in the manner discussed above. Electric motors that create noise pulses are likely to have dirty brushes. The usual cure is to clean the commutator and install a 0.1-mF, 600-volt capacitor from each brush terminal to the frame of the motor. It is unfortunate that little can be done to clean up fish-tank heaters and electric blankets.

■ Antennas that Help Minimize Noise

Electrostatically shielded small loop antennas¹ are effective when dealing with regional man-made noise. It is not unusual to find that unshielded single- or multi-turn receiving loops are suitable also for noise-pickup reduction.

I have been able to improve reception in noisy environments by simply laying 100 or more feet of insulated wire on the ground. This will often remove the antenna from the immediate, intense field of the radiated noise. A receiving antenna of this type will seldom provide signals that are as loud as those from a normal above-ground antenna. A low-noise preamplifier may be used with a small loop or with an on-ground antenna to compensate

for the signal loss. The single-transistor preamplifier described in figure 2 of DeMaw's Workbench for January of 1996 may be used with inefficient antennas of the foregoing variety.

Placement of your antenna is important. It should never be erected near a power or phone line, because noise pulses are transferred easily by way of mutual coupling. If your antenna must be close to commercial lines, within the guidelines for safety, be sure to erect it at a right angle to the power lines. This will greatly reduce unwanted coupling between the two systems.

Full-wave loop antennas have long been known for their relative immunity to man-made noise. All closed-circuit antennas of this type are "quieter" than dipoles or verticals. In fact, the worst antenna you can use in a noisy location is a vertical. This is because man-made noise is vertically polarized. This trait enhances noise pickup by a vertically polarized antenna.

■ Electronic Noise Reducers

We are keenly aware of how ineffective the noise blankers in modern receivers are. Although they can be used to reduce certain types of QRN, depending upon the repetition rate of the noise pulses, they cause strong signals to be distorted, and degrade the re-

ceiver dynamic range to the point where signals that are several kHz away from the listening frequency seem to splatter across the band. I have silently accused other amateur operators of using too much speech gain or processing, only to discover that my noise blander was turned on by mistake!

Two commercial products are available for reducing man-made QRN. I obtained one of them for review: the HF QRM Eliminator MK-11, a black box manufactured on the Isle of Man by a company named S.E.M.² I confess that I was skeptical about the manufacturer's claim that line noise could be reduced almost entirely with the product. When the unit arrived I wanted to dismiss it as just another electronic nostrum, but I was wrong.

I did not test the unit until a horrendous 20 dB over S9 line noise developed at my station. It was relentless, day after day. Reception on any MF or HF band was impossible. I inserted the MK-11 in the antenna line between my Yaesu FT-1000MP transceiver and the linear amplifier. A separate noise-sense antenna is necessary, so I connected my 2-meter Ringo Ranger to that port on the box. Next, I applied +12 volts and turned the gadget on.

Adjustment of the two phasing knobs produced a startling end result: The line noise was nulled out completely (better than a 50-dB reduction) and the signals stood out like sentinels. The same outstanding results were obtained from 160 through 10 meters. The circuit is somewhat "frequency conscious." Readjustment is required when changing bands, and when making large frequency changes within a specified band.

Phasing circuits of this kind (Figure 2) do not cause the signals to sound distorted. Depending upon the control settings, some signal loss can occur. Misadjustment can eliminate a desired signal. On the average, however, the signal loss is 6 dB or less when the noise is completely eliminated. I was unable to detect the presence of many signals before activating the MK-11.

I continue to be astonished about the performance of this product. It can be used also to null out strong off-frequency signals that disrupt reception. The product has an internal relay that can be controlled by the linear-amplifier-relay-activation circuit in one's transceiver. This protects the MK-11 during transmit periods. The unit is rated to accommodate up to 200 watts of pass-through RF power.

I observed that there is a similar product from JPS Communications, Inc.³ Their product is called the ANC-4, selling for \$175. The manufacturer claims a 50 dB noise reduction from 100 kHz to 80 MHz. It has its own built-in telescoping sense antenna. Though I have

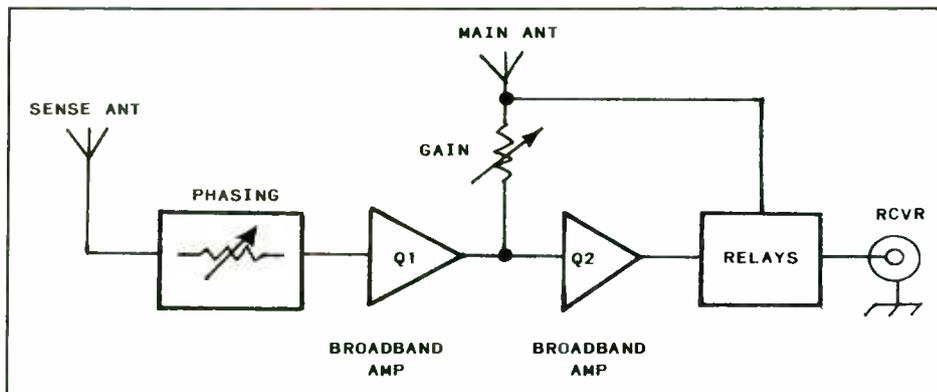


Fig. 2 - Block diagram that shows the inner workings of the S.E.M. noise canceller device.

not yet tested this product, a review by George Zeller appeared in the August '95 issue of *MT*.

Electronics engineers have said for decades that getting rid of noise ahead of the receiver is the most effective way to deal with the problem. The performance of the S.E.M. MK-11 has provided hands-on verification of this tenet.

■ Closing Thoughts

How we deal with man-made noise is dependent upon the financial and practical resources we have available. Urban dwellers may be unable to deploy long, on-ground antennas, or any outdoor antenna. Small receiving loops and preamplifiers may be the solution for those who live where antenna restrictions are in force.

Now, no matter what type of antenna you are using, noise reduction can be accomplished by using one of the commercial electronic noise-canceling devices. The principle of operation is to sample the noise with two antennas (main and sense antennas), reverse the phase of one noise channel by 180 degrees, apply the phase-reversed noise to the other noise energy and cause cancellation to occur.

Notes

¹ An excellent reference for this subject is *The ARRL Antenna Book*. It is available from The ARRL, Inc., 225 Main St., Newington, CT 06111. Also, see *WIFB's Antenna Notebook* (an ARRL publication).

² Factory direct from S.E.M., 8 Fort William, Douglas, Isle of Man IM1 5BQ.

³ JPS Communications, Inc., P.O. Box 97757, Raleigh, NC 27624. Phone: 1-800-533-3819 to order. Also available from Grove Enterprises, 1-800-438-8155.

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The Bay Area TRACON

Welcome aboard everyone! We'll start our April column with a look at the Bay Area TRACON. For newcomers to aviation terminology, the word TRACON is an acronym for "Terminal Radar Approach Control"—although departures as well as approaches to airports are handled.

A few months ago, this writer, accompanied by *MT* subscribers Ed Flynn and Carolyn Stone, visited the Bay Area TRACON at the Oakland (CA) Airport. Our host was Harvey Hartman, Assistant Manager of Programs. Harvey has been in Air Traffic Control since 1964: first in the military, then for the FAA at Concord Tower, San Francisco Tower, Oakland TRACON, San Diego and LAX facilities (as supervisor), and returning in 1979 to the Bay Area as a supervisor.

After we observed the controllers at work for a while, Harvey filled us in on the activity of the TRACON, which works traffic out to about 55 miles and up to an altitude of approximately 15,000 feet. Surrounded by other Approach Controls, such as those at Travis Air Force Base, Stockton, and Monterey, the TRACON is "fed" air traffic by these three facilities, as well as by the Oakland ARTCC. It's understandable why the TRACON is an extremely busy place.

Airports included in the TRACON's area of approach/departure control are San Francisco, Oakland, San Jose, Alameda Naval Air Station, Moffett (a former Navy airport which is now a federal airport run by NASA); San Carlos, Palo Alto, Reid-Hillview, and Hayward which are general aviation airports with FAA ATC Towers; airports without towers include Half Moon Bay and South County Airports.

There are twelve radar positions, and controllers must work half of the twelve to be certified. There is one position that all of the controllers rotate through called the "feeder position." All of the radar screens at this facility are the flat horizontal type. Seventy-five controllers work here and are divided into three overlapping eight-hour shifts: days, evening (sometimes called the "swing shift"), and mids (late night-early morning). A controller will work one and one-half to two hours, take a break, then go back on the boards (radar position).

The Bay Area TRACON is the *fifth* busiest radar approach facility in the United States

and currently running 1,000,180 annually. The others are New York TRACON as the busiest, Southern California coming in second, Chicago is third, and Dallas/Ft. Worth in fourth place. Actually, Dallas/Ft. Worth and Oakland go back and forth as to which holds fourth place.

Two radar systems are used by the TRACON, one located at Oakland and the other at Moffett. They serve as backup for the ARTCC for the 55 miles out that their radar can "see."

Our hearty thanks to Harvey Hartman and his staff for the time and the tour.

■ The Best QSL Ever!

Back in early October, I monitored a British Airway Concorde (Speedbird Concorde Alpha Delta) on an around-the-world charter flight. At that moment, the pilot was working San Francisco ARINC on 11282 kHz. Since it was a special flight, I immediately started jotting down a few details, such as time, date, frequency, etc.—all the good stuff you need to write a proper reception report. I included an IRC with the report and a letter, mailed it, and waited to see if I would receive an answer.

Sure enough, one morning about a month later, a large mailing tube was sitting outside my door! It contained my reception report—verified and signed by the captain—as well as a very friendly letter from him; a book on Concorde; a map of their around-the-world charter flight; *and* my IRC was returned. Wow, I felt as if I'd hit the jackpot!

The moral of this story is that, although there's no guarantee, a lot of airline pilots *will* answer reception reports. But first, you need to do your part, which consists of making sure that all particulars which can be verified are included in your report—items such as the date, time, frequency, airline, flight number, ground station, SELCAL, and even the present or next position. Since most airlines don't have their own QSL cards, enclose one of your own for verification purposes (if you have a computer, you can make your own prepared QSL very nicely).

As a gentle reminder, *never* mention anything you might hear that's sensitive, such as an argument between the pilot and radio operator over a clearance, any medical emergency on board, a pilot calling his dispatcher

a dumb jerk, etc. As when sending a report to a ground station, use discretion. Remember, unlike shortwave broadcasts, these transmissions are not really meant for our ears.

It is appropriate to include a bit of information about yourself; for instance, the type of receiver and antenna you use, a postcard from your city, or even a photo—just a bit of the personal touch! Don't forget return postage in the form of mint stamps, IRCs, etc.

Incidentally, if you want to send in a reception report of any British Airways flight you monitor, here's the address: British Airways, Heathrow Airport, London, Hounslow, Great Britain. Remember to include "Attn: Captain" and the flight number as part of the address on the envelope as well as on the reception report.

■ More LDOCS

- 13285 -Rainbow Radio
- 13300 -Lusaka (Zambia Airways)
- Stockholm Radio
- 13304 -Tel Aviv (El Al)
- 13324 -Tokyo (Japan Airlines)
- 13333 -Hong Kong (Dragonair),
- (Cathay Pacific), (Speedbird London)
- 13336 -Amsterdam (KLM)
- Rome (Alitalia)
- Budapest (Malev)
- 17913 -Rio de Janeiro & Sao Paulo (Varig)

■ Readers Corner

A subscriber from New York who prefers to remain anonymous contributed a list of the five books that every incompetent pilot should read:

- #5. *How the Side of a Mountain Can Interrupt Your Flight Plan;*
- #4. *Job Opportunities at Greyhound;*
- #3. *Flaps - They're Not Just a Decoration Anymore;*
- #2. *Never Assume Anything - Except Possibly the Crash Position;*
- #1. *The Bible.*

I can see why he wanted to remain anonymous!

Kevin M. (AR) says that taking off is the second biggest achievement in flying: The first is landing!

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What's Happening in Alaska?

Should you find yourself in Alaska this year, take a side trip to a location approximately two hundred miles southeast of Fairbanks. You will be in the town of Gakona, Alaska. Proceed down the Tok Highway to mile marker 11.3. This will place you at the geographic coordinates of 62 degrees 23.5 minutes North and 145 degrees 8.8 minutes West. Find the big gate that says HAARP RESEARCH PROJECT. You are there.

Where is "there" and what have you found? Proposed in the early 1990's and due for completion somewhere around 2002, this is the site of the joint U.S. Air Force and Navy project code named HAARP-High Frequency Active Auroral Research Project.

Much speculation has been written regarding this project—all the way from a doomsday machine which will destroy the earth, to a machine designed by the government to disrupt the human brain patterns, change the weather, interfere in wildlife migration, and even burn a hole in the upper atmosphere.

Putting the intent of the project aside for a moment, what we basically have up there is a massive transmitter array. It is a phased array, built on a 33 acre bed of gravel, measuring approximately 1000 by 1200 feet. There will be 180 towers arranged in a rectangle, each of which will support at its top two crossed dipoles. One set of dipoles will be for the low frequency array, from 2.8 to 8 MHz. The other is for the higher frequencies from 7 MHz to 10 MHz.

Providing perimeter protection around the array is an electrified fence which will keep away the roaming animals.

There is an elevated electrical ground approximately fifteen feet above the ground under which vehicles may drive between transmitter shelters and the control room.

There will be thirty individual transmitter buildings constructed. Inside each building will be six 10 kW transmitters. The radiated

power will be $6 \times 30 \times 2 \times 10 \text{ kW} = 3600 \text{ kW}$. The entire project will be powered by six 2500 kW generators.

When the transmitters are energized, they will provide a radio signal that is very narrow beam and is adjustable in amplitude and phase. The field intensity will be a few hundred millivolts per square meter. This is less than the natural ultraviolet radiation present in those latitudes.

The actual project will be in two parts, the first part described above, to be known as the High Frequency Ionospheric Research Instrument (IRI). The second is a UHF radar known as an Incoherent Scatter Radar (ISC). It will be used to measure electron density, electron and ion temperatures, and doppler frequency drift.

The two U.S. Government agencies involved are the U.S. Air Force (Phillips Labs) and the U.S. Navy (Office of Naval Research and Naval Research Laboratory). The government agencies have publicly announced that this research station will be used in instrument design, including HF ionosondes, ELF and VLF receivers, magnetometers, and a project known as LIDAR (Light Detection and Ranging) in both the optical and infrared spectrum.

What does this mean for us radio spectrum listeners? What will this machine do to the radio spectrum? Frankly, we don't know. It is a research instrument that will heat the ionosphere and allow the earth-bound scientists to measure what these heated ionospheric particles will do to radio transmission signals.

Modulation of one radio transmission by another radio transmitter will be examined. This was first noticed in 1933 with Radio Luxemburg, which was superimposed over another European long wave station. Both of these long wave stations were located in the

upper latitudes and both had output powers over one million watts. Talk about upper atmospheric heating!

Those who live at the latitudes involved with this transmission system, have speculated a great deal about the effect of these transmissions on the Northern Lights. The Northern Lights, or Aurora Borealis, wreak havoc with worldwide radio transmissions, especially in the short-wave spectrum. What will happen if this project has an unexpected effect on these lights? Could such a project have a pronounced impact on short-wave radio as we know it?

Two other ionospheric research projects are operated by the U.S. Government: one in northern Alaska and the other at the observatory at Arecibo, Puerto Rico. Both of these have been in operation for years, although their radiated power is less than that proposed by the HAARP project. We have all heard these ionospheric sweepers throughout the shortwave band.

There is a five-nation consortium based in Europe which is doing the same thing. Known as the European Incoherent Scatter Radar, it has one site in Norway, one in Peru, another near Moscow, and two other sites. This project also involves ionospheric heating at powers less than what is proposed by the HAARP project.

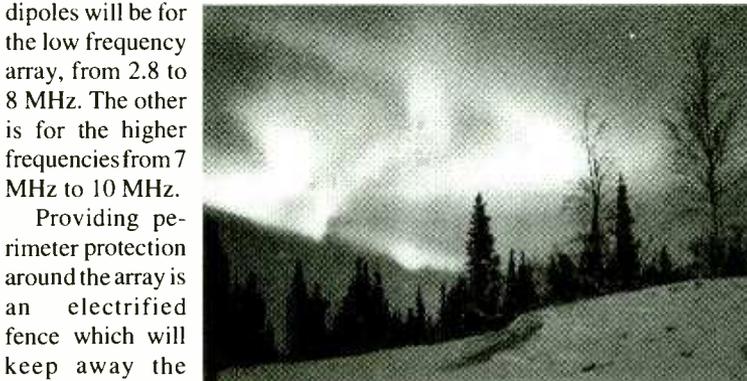
The project is due for completion in 2002. If you are connected to the Internet, do a Website search for the keyword "HAARP." There is plenty to find there and some interesting documents to read.

Why the interest? The Air Force and the Navy are the same guys that gave us Area 51. You just never know fully what they're up to.

■ The Army Corps of Engineers

Sometimes it pays to take a couple of days off and just go traveling. I did this a couple of weekends ago and ended up in Clewiston, Florida. This is an interesting town. Located at the very north end of the Everglades and at the very south end of Lake Okeechobee, it provided some very interesting monitoring. I did not start out with the intention of ending up there; it just happened.

Lake Okeechobee is the largest fresh water lake in the United States. Having such a



distinction almost guarantees that the federal government would be involved somehow. Well, they are. There is a very imposing federal compound located on the east side of town. You cannot help but notice the tall tower with all of the two-way radio antennas on it. All of the vehicles have two way antennas on them. Hidden from view, but easily seen if you drive to back of the city cemetery, is a big, high frequency, log periodic antenna on a tower. This antenna is just above the roof of a building that has a United States flag flying above it.

What had I stumbled into? Some secret federal installation? Well, maybe not. This is the headquarters of the United States Army Corps of Engineers, Jacksonville Division. According to the Federal Register, the Army Corps of Engineers is the Army's real property manager. It performs all activities associated with real property management and civil engineering. It provides research, planning, development, construction, and maintenance of all matters related to waterways and it assists other agencies in the recovery from natural disasters.

The majority of Corps communications is done on VHF in the 160 MHz band. There are numerous 400 MHz radio control links, and even satellite uplinks in the 400-406 MHz band can be seen. But, it's the massive high frequency backbone network that extends throughout the United States that accounts for the log periodic antenna.

The following is the basic frequency plan.

High Frequency Disaster Net

2.0640	2.3000	2.3260	2.3485
2.3500	2.6020	2.6050	
3.2870	3.2900	3.3020	3.3050
4.8500	5.0110	5.0150	
5.3270	5.3460	5.4000	5.4370
6.0200	6.7850	6.7900	
9.1225	12.2670	16.0770	

VHF Radio System

Chan	Freq	Use
01	164.7750	CONSTRUCTION UNIT RPTR INPUT
	163.4125	RPTR OUTPUT
02	163.4125	SIMPLEX
03	165.1875	FLOOD CONTROL RPTR INPUT
	163.4375	RPTR OUTPUT
04	163.4375	SIMPLEX
XX	150.4650	PHONE PATCH

There is a rainfall network using the following frequencies:

168.2250	169.2125	169.4250
171.0250	171.8750	407.2250
412.9250		

Satellite uplinks have been found on:

401.752 401.782

Radio control links have been reported on:

406.6375 406.9375 407.2375
 407.5625 412.0375 413.2375
 413.5625 416.4625 416.5375

There is a cross-Florida UHF "microwave" network running from south Florida to Camp Blanding in north Florida. The following frequencies are reused in a back-to-back system:

409.2375 409.9375
 412.8375 413.5625

Why the interest in the Corps of Engineers? They are a branch of the Department of the Army, they have an extensive radio network, and they are active participants in the SHARES exercises. (For information in the SHARES programs, refer to Larry Van Horn's Utility Monitoring columns.) And, as I discovered on my excursion into the countryside, they can be found in neighborhoods all around the U.S.

Mailbag

I received some very interesting mail this month. The first was from Mike Schulsinger (N8QHV) of Springfield, Ohio. Mike sent me some good loggings from Wright Patterson Air Force Base area (which gained some notoriety while hammering out a peace plan for Bosnia). The air base has gone to trunking. Their frequency layout is as follows:

Wright Patterson Air Force Base

Freq (B/M)	Use	Group/Channel
406.35/415.15	phone patch only	1/1
407.15/415.95	police/fire/sec.	1/2
407.95/416.75	same	1/3
408.75/417.55	same	1/4
409.55/418.35	same	1/5
408.95/417.75	same	3/4
407.35/416.15	same	3/2
(One group 1 channel is used for trunking data/changes daily)		
406.55/415.35	maint/ops/misc	3/1
409.75/418.55	same	3/5
409.95/417.95	same	2/5

The Balkan peace talks held at Wright Patterson used the following:

Department of State Security

Chan	Freq	Use
01	409.625	RPTR OUT
	407.200	RPTR IN
02	409.625	SIMPLEX
03	407.600	SIMPLEX

(The above uses 161.4 Hz private line.)

When the President of Uganda arrived there several weeks ago, the following channels came into use:

165.375 Secret Service
 415.000 Internal Revenue Service
 165.237 Customs

The simulkeyed **FBI repeaters** have shown up around Wright Patterson. The following channels are noted:

163.8375 FBI Dayton, Ohio
 163.9875 FBI Cincinnati, Ohio
 167.3625 Special ops
 170.9000 Special ops
 Low power simplex DES scrambling has been noted on 167.4875.

- Jeff Brickman sent in some interesting frequencies from the *New York* area.
 409.000 Coast Guard New York. Base/mobile also autopatch.
 407.925 Coast Guard New York. Fire net simplex
 407.625 Coast Guard New York. Ops channel also security
 416.325 DEA Aircraft Callsign "Flint 330" calling base
 408.600 State Department base. Callsign "bald Eagle" used for VIP helicopter

Jeff also reports *McGuire Air Force Base* is using the following:

413.100 Base commercial ops/paging/simplex
 407.400 Rptr out (in is 408.200) Fire crash net
 407.375 Rptr out (in is 413.375) Maintenance

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FM Radio in Your Back Yard

For those who grew up listening to AM radio with its attendant technological vagaries—the incessant static crashes, the constant fading, the adjacent channel interference—the advent of FM radio broadcasting was a balm upon the ears. For the first time, radio broadcasts could actually rival the realism of the concert hall, and receivers, especially stereo receivers, could actually live up to their manufacturer's claims. And today, with most stations playing compact discs, fidelity is better than ever.

Even so, FM broadcasting has its limits—specifically, geographic limits. Despite increases in transmitting capability and technological improvements in antenna design, FM signals are doomed to remain Earth-bound. Due to transmitting parameters and propagation realities, terrestrial FM broadcasts can travel only a few hundred miles. During the DX season signals can go considerably farther, but such events are rare and fleeting.

Listeners can help the cause of terrestrial signals by installing mast-mounted preamplifiers, rotating multi-element antennas, and similar technical advantages. Still, if you live near New York don't expect to hear stations from Chicago, let alone Los Angeles!

■ Radio Dream Come True

Suppose you could buy an FM radio that not only picked up FM stations from around the country but from all over North America; suppose that it could pick up many of the most popular shortwave stations as well, and that it could receive many other stations that aren't even available in any city over-the-air. Interested? I thought so!

This is not the mindless ravings of a radio listener trapped in the depths of the Solar Cycle. No, friends, there really is such a radio and what's more, it's affordable!

First, let's find out what this radio is and how it works.

For nearly twenty years satellite television broadcasters such as WGN have been uplinking local FM radio stations along with the video. This is because a satellite transponder has more bandwidth than a terrestrial transmission and

allows for such carrier "riders." Mostly, it's done as a "value added" attraction to cable operators for the benefit of their subscribers, and satellite TV viewers are the happy beneficiaries.

■ What You'll Need For Reception

It's a common mistake to assume that if you're only interested in listening to the audio of a satellite channel that you shouldn't need all that much in the way of equipment. After all, if I want to listen to the audio of my local TV stations, a simple portable TV-band radio from the local Radio Shack will do nicely for less than \$50.

Another common mistake is to assume that you'll have to mortgage your ranch in order to afford to get in on this type of FM DX.

In order to receive satellite television transmissions you must have the three basic components: an antenna (the dish and feed horn/LNB), a receiver, and a feed line.

In most areas of the U.S. a good 6 foot mesh dish will do nicely. At worst you'll spend \$200 for one new in the box. With a little sleuthing you just might find a used one for \$50-\$60. Ask your local dealer what he has available and call the usual mail order firms for comparative prices.

A used receiver is easily available for less than \$100. Most manufacturers sell reconditioned satellite receivers (still under warranty) for about \$200. Even new feed horns and LNBS have never been cheaper. Used ones are half priced. Don't be afraid to haggle.

You'll have to buy the feed line new. It's such an important ingredient that you can't afford to scrimp here. Typically, all-in-one "direct burial" cable runs 65 cents/foot. Fig-

ure on needing 100 feet.

You should be able to put together a nice new satellite TV system for about \$500 and one with used components for half that price or less. And now that you've got the thing paid for I'll let you in on a little secret: All of the FM radio signals you'll be listening to are free. They are unencrypted and available 24 hours a day. Even if you never watch one single TV show, you'll get years of cost-free enjoyment from listening to your satellite system. Millions have done so for over 15 years!

■ So, What Can You Hear?

Variety is the name of the satellite radio game. Let's take just one satellite as an example: Satcom C4 at 135 degrees West. On channel 5 you'll find no fewer than three versions of Radio Deutsche Welle! One is monaural, one is discrete stereo, and one is the foreign language service. On channel 6 there's WQCD-FM—a New York City-based adult contemporary "smooth jazz" format station. On channel 8 there's a background music channel and KILA-FM, an adult Christian music and talk station from Las Vegas, NV.

On channel 10 you'll find In Touch—a newspaper and book reading service for the sight-impaired, BRN—the Business Radio Network, and KNOW-AM—the public radio station from Minneapolis-St. Paul, MN. On channel 15 you can listen to classical music from WQXR-FM, New York City. And, finally, on channel 24 there's WSM-AM—the venerable country music giant from Nashville, TN.

Now, if that didn't whet your appetite, then you're not interested in radio! But wait, there's

more! There are 13 separate satellites which offer up to a dozen radio stations ranging from AFRTS Radio to VOXM-AM St. John's, Newfoundland. A glance at the accompanying chart makes this very clear.

Now, it's true that DirecTV offers dozens of channels of music but, while it's all commercial-free, you'll pay monthly for the privilege and you still won't find one real radio station in the lineup. Don't look to Primestar for

Audio Subcarrier Services on Galaxy 5 (125 degrees West)	
KLON-FM Long Beach, CA	Jazz music format
CNN Radio Network	All-news radio feed
World Radio Network	Variety of shortwave broadcasters
Yesterday USA Superstation	Old-time radio format
WFMT-FM Chicago, IL	Classical radio format
CNN Radio Noticias	CNN's Spanish language feed
WSM-AM Nashville, TN	Country music format
Superaudio	Soft Hits
Superaudio	Soft Sounds
Superaudio	Light'n Lively Rock
Superaudio	Classical Collections
Superaudio	New Age of Jazz
Superaudio	Classic Hits

any help either. They offer a similar line-up but again, don't look for the shortwave, AM, and FM stations—but do look for your monthly bill to arrive promptly.

■ An International Flavor

Your listening enjoyment is not limited to American satellites. Your TVRO system will also give you access to radio stations in Canada and Mexico. On Canada's Anik E1 you can tune into stations from every province of Canada as well as the CBC national service. On Mexico's Solidaridad 1 you can listen to over a dozen Mexican radio services, including stations from Mexico City.

If you're looking for even more exotic audio fare you're in luck; many countries retransmit their national radio service for American audiences. All you have to do is tune them in. Some of these include RAI Radio Net from Italy, BBC World Service, the famed World Radio Network from England, Antenna Satellite Radio providing Greek music and entertainment, Radio France Internationale, The Russian-American Radio Network, Radio Dubai, and Radio Tropical—variety programming in French for the Caribbean Islands.

■ The Future of Satellite Radio

Each year new stations are cropping up on audio sub-carriers on satellites throughout the Clarke Belt. And the one thing that makes the whole concept so great is the variety. There is no city or location in America where such variety and depth of programming is otherwise available. No cable company in this country carries all that's accessible to you from your back yard. And, yet, here it is: free for the taking, 24 hours a day all year. No fading, no static, no interference.

You don't need to wait for some clever programming packager to put all this together for you on a digital dish and charge you each month. The future of FM radio is here and it's right in your back yard.

And, finally, if you're a fan of old time radio, when AM was king and Ma and Pa Kettle and Lum 'n' Abner reigned, you'll be happy to know that they still haunt the airwaves on Yesterday USA Superstation on Galaxy 5, channel 7, 6.8 MHz audio. It's where the future meets the past.

■ Mailbag

• *MT* reader Grant Manning of Smithville, Tennessee, comments on my observations in the January column that the future for MMDS (Multi-channel Multi-point Distribution Sys-

tems—otherwise known as “wireless cable”) will be a rough one with the advent of small digital satellite systems: “...MMDS has grown lots over the last few years...”

It's true, and so has the C band TVRO industry. Their best year, 1994, was the same one in which DSS debuted. However, sales have gone down steadily since (from over 80,000 units per month to under 20,000 per month in 1995). There will probably be a leveling off point where the industry can look forward to a steady flow of customers—those who want more than DSS offers and for whom MMDS doesn't offer enough.

• Ken Hydeman just bought a new TV set and, wouldn't you know it, his Dayton, Ohio, newspaper came out with a story about the new age of “digital TV.” The article, as usual, was filled with rosy promises about new television sets with super resolution and a “cinema-style” aspect ratio.

While it's certain that eventually there will be a new standard for TV receivers, it's probably safe to say that such sets will be at least five years from popular usage. At any rate, manufacturers will try to ensure that such new standards are “backward compatible” with sets they've already produced. They don't want to be stuck with bogus inventory any more than we do!

• Dr. Jan R. Leszczynski of New Haven, West Virginia, has discovered that TV Polonia transmits Polish television 18 hours per day directly from Warsaw via PanAmSat 1 at 45 degrees West. He would like to know if a DSS system would be capable of receiving these transmissions.

I'm afraid that will not be possible as both systems use different digital compression schemes. However, anyone with an interest in Polish TV should write or call Polish Television USA, 1114 N. Milwaukee Avenue, Chicago, IL 60622 (312) 252-0444.

Also, PanAmSat may not be visible to locations west of the Mississippi and signals to the east may be hampered by buildings, trees or mountains.

• And, finally, our man in the UK, John Locker of Merseyside, England, reports that PAS 3R launched and has been testing in preparation for DBS service. PAS 4 at 68.5 degrees East is still visible about 2 degrees above the horizon (that's low down satellite viewing!).

And, John is “...tracking the Chinese spy sat which is falling to Earth rather rapidly...it has heat shields and is built like a tank, so will not burn up!...I am looking for some Army surplus tin hats to sell on the street over the next few weeks...Wherever it lands it's going to make an awfully big hole!”

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Cool Ways to Design Circuits - Part 1

The title is misleading. Though we will cover lots of turf that may have nothing to do with electronics, by next month you're going to be able to whip up some profoundly cool circuits like a pro.

There are many ways, both old and new, to fabricate electronic circuits, most of which are good, provided the circuit doesn't blow up and take out the neighborhood when you're done. Some methods are laborious, time consuming, error-prone, and not fun. We're going to explore a fun, new angle to old ideas, and the cost should be moot.

■ The Tools

The time-honored design tools for electronic circuits include pencil, paper (lots of it), slide rule or calculator, parts catalogs, and a "breadboard" (see Radio Shack's 276-175, 276-174, and/or 276-169). I have managed to dispense with these archaic tools of the trade for most of my design work, though I still use a breadboard to test ideas when I don't want to concoct permanent circuits. I also keep handy my trusty Radio Shack, Newark, and DigiKey catalogs, but I use them less and less.

I can do 'most anything, including run and test circuits, exclusively on my computer! In this miniseries I am going to show you how to design and lay out error-free circuits with your computer and existing software, or if you're just getting started, then with less than \$100 worth of software. That's all you need to begin an exciting and productive journey into circuit design and fabrication!

■ The Hardware

You need a personal computer of almost any type, but this focus is on the IBM/compatible 386 and higher class of machine that's capable of running modern software, including graphics, under a multitasking operating system.

■ The Software

Your operating system should be a multitasker, whether System 7.x, UNIX, OS/2, Windows 3.x, Windows NT, or Windows 95. You should have a decent word processor with a basic drawing tool. I use Microsoft Word 7.0 and its accompanying Microsoft Draw 1.01, but I understand that Word Per-

fect, Ami Pro, and the other better word processors also have drawing utilities. I'm sure they will work fine.

If you have none of these or are just getting started with computers, I strongly recommend Microsoft Works 3.0 (or 4.0 for Win95). A real powerhouse for the radioist, MS Works is an "integrated" package that contains a slick word processor, a decent spreadsheet, a powerful, easy-to-use database manager, and a modem communications terminal program, all in one! WORKS also comes with Microsoft Draw and other useful applets. The cost of MS WORKS is about \$79 for v4.0 for Windows 95 (with MS Bookshelf 95, another whopper reference tool!) Without Bookshelf 95, it's about \$49...a real bargain!

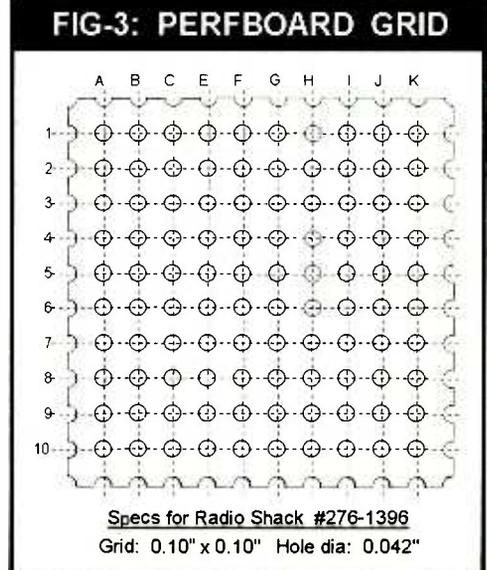
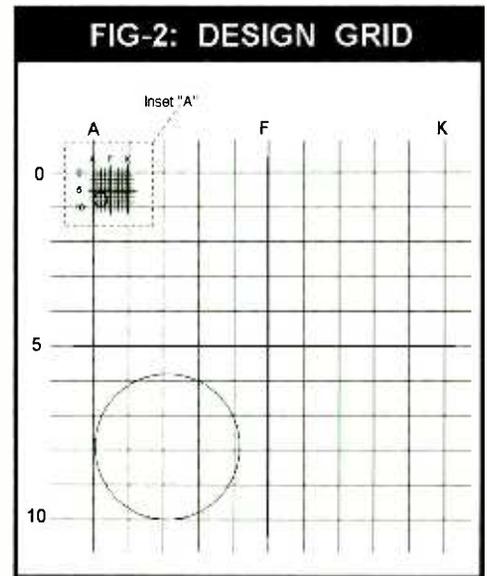
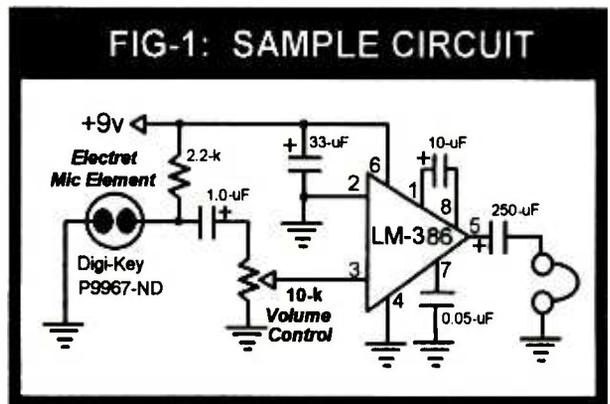
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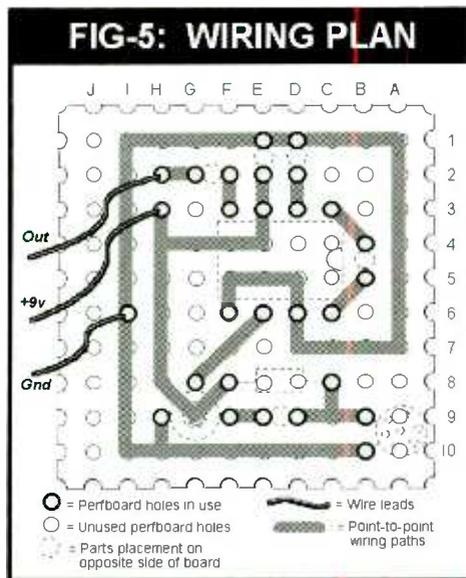
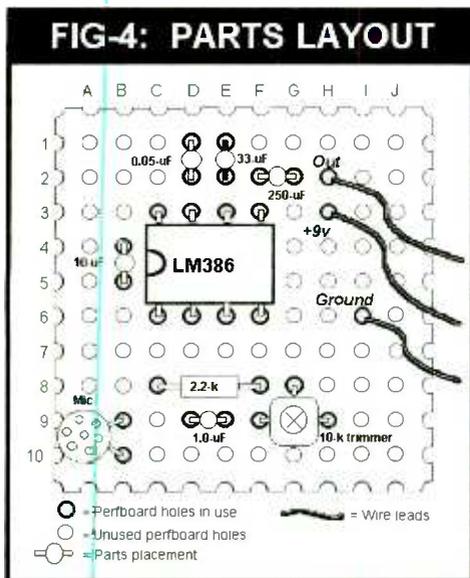
I dabbled with UNIX, fudged with OS/2, frolicked with Windows 3.1 and Windows For WorkGroups 3.11, and I still muddle and drown in Windows NT. But Windows 95 is a shining star in a sea of darkness! As a "Chicago" beta tester from the early days of 1994, and a Microsoft MVP, (unpaid volunteer technical support engineer for MS Personal Operating Systems), I heartily recommend Windows 95 for home, hobby, and small business needs where the emphasis and focus are on getting things done quickly and painlessly!

Windows 95 caveats for home, hobby, and small business include: IBM/Compatible 386 or better with 4-Mb of RAM and about 40-Mb of free space on the hard drive. I successfully used Windows 95 on 386SX/16 and 386SX/33 computers with as little as 6-Mb of RAM. A "comfortable" Windows 95 machine, however, will be a 486DX/33, 8-Mb RAM, and a 540-Mb hard drive.

■ Overview

The key to great circuit design with your personal computer is a drawing program, like Microsoft Draw that comes with some of their programs. Obviously, real schematic design and layout programs are "best," but they are costly, hard to use, and not readily compatible with other programs and graphic formats. I





hundredths of an inch, and the shrunken circle will be relative to .042!

Ungroup the drawing until you can select the tiny circle. **Copy** it to the clipboard.

Delete the Inset "A"—the large circle—and change the gridlines to dotted lines. **Paste** the tiny circle from the clipboard into the drawing and position it over the intersection of one pair of gridlines. **Copy** another tiny circle from the clipboard to the drawing and position it over an adjacent intersection of gridlines. Build a line of circles first, and then copy and paste the line(s), using the same **copy-paste-group** procedures described above for the grid, to construct a perboard as shown in Figure 3. Label it 1-10 and A-K as shown.

don't recommend AutoCAD, TurboCAD, OrCAD, or other CAD (computer-aided-design) programs for the casual hobbyist. There's no need. You need only a basic drawing tool (not a paint program!) with the following features and capabilities:

- Style:** lines, rectangles, circles, ellipses, curves, and text of various sizes and widths
- Group/Ungroup:** Group & lock selected objects (to the exclusion of other objects)
- Frame:** Outline an object
- Fill/Unfill:** Fill interior of object with shade or color
- Pattern:** Select one of several fill patterns
- Snap to Grid/Unsnap:** Snap objects to nearest grid point (digital movements versus analog)
- Rotate/Flip:** Rotate or flip selected object: left, right, up, down, invert vertical, invert horizontal
- Move:** Move objects to the front or rear of other objects (overlay/underlay)
- Reshape:** Change the size and shape of objects

■ Designing Perfboard Circuits

See Figure 1 for a simple audio listening device similar to Radio Shack's 277-1008. To transfer the schematic to a perfboard mockup drawing, first use your Draw program to create an accurate design grid as shown in Figure 2. Draw one straight line. **Copy** it to the clipboard and **paste** it back into the drawing for two lines.

Position the second line parallel and next to the first one. Then **copy** the pair to the clipboard and **paste** them back into the drawing for four lines. Position the new pair to be parallel and even with the first two. (If your "snap-to-grid" feature is turned on, it will be easy to get identical spacing between each line.)

Copy the four lines to the clipboard and **paste** them back into the drawing for eight lines. Align and space them as before. Finally copy and paste three more lines, aligned and spaced so that you have eleven identical parallel lines. Now "**Group**" and **lock** the eleven lines into a single "object."

Copy the 11-line object to the clipboard and **paste** it back into the drawing. Use the **Rotate** command, left or right, on the new object so that the lines rotate 90°. **Move** the new object over the first one to form a tic-tac-toe grid as seen in Figure 2. Label the grid 0-5-10 and A-F-K as shown.

The perfboard has 0.042" holes, so let's draw a large circle like in Fig-2, with a diameter just a little over four grid lines. **Group** and **lock** the entire drawing into one object.

We now have a grid that can be used to represent tenths of an inch, but we need one for hundredths of an inch, too, as shown in Fig-2, Inset "A". **Copy** the large labeled grid to the clipboard, and **paste** it back into the drawing. "**Grab**" a corner and proportionally shrink the pasted object until it exactly fills one small square on the larger grid. Voilà —

Figure 4 shows the parts drawn onto Figure 3. Figure 5 is the flip-side of Figure 4, where the point-to-point wiring was drawn by trial and error, just like you'd do at the workbench.

Go over your work, ensuring no errors, so that before you ever grab a soldering iron and parts, you'll be assured of perfect operation first time out!

It's all intuitive from Figure 3 through Figure 5, using nothing but a basic drawing program. Accuracy is within a hundredth of an inch or so, if you're careful. The bottom line to this exercise is that you can build your circuit on your computer until you are satisfied with it, without spending a dime or moving from the keyboard!

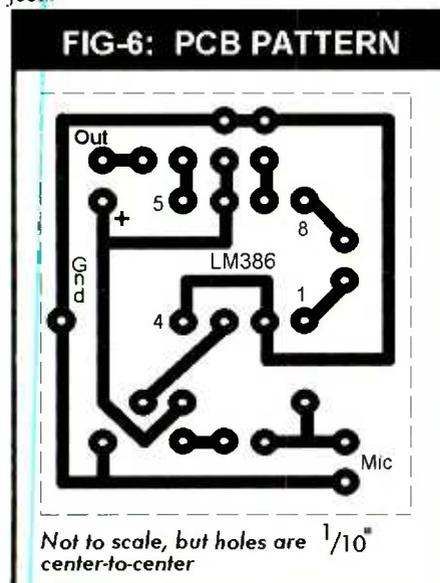
Figure 6 is a teaser for next month when I'll show you how to easily make your own printed circuit boards. It is simply Figure 5 with everything deleted except the hole and wiring pattern. The holes can be shrunk to an exact drill size (.03") using the above described technique.

That's all there is to a PCB pattern. Once you're satisfied with your drawing, save it and paste it into a word processor document where it can be "scaled" (enlarged or shrunk) to precisely accurate dimensions. Print the graphic; measure it; resize it; print it again; etc, until it's right. \$3000 AutoCAD is not necessary, folks!

I'll be glad to provide tech support and clarification of this article series by e-mail via any of my addresses at the header of this column. If you're befuddled, unsure, or have better ideas, *write!*

■ Contest Time

Remember my offer for the next three months: submit an idea or a project for this column and if selected, you'll receive an autographed copy of my latest book, *The Ultimate Scanner*.



Is Wireless for Real?

Marketers of wireless products and services would have us believe that this technology is in full bloom. Such is the nature of marketing. The ads on TV, the articles in magazines and newspapers, and the descriptions of new products in catalogs are preparing us for new wonders. So you've heard. But is this predicted deluge of wireless technology really going to affect you and your family that much? For an answer, look at the industrial activity behind the marketing, especially in personal communications systems (PCS) and direct broadcast systems (DBS).

As mentioned in last month's column, in the next few years telephone companies around the world will spend billions of dollars collectively to add new wireless network infrastructures to their systems. Telecommunications firms are building satellites at an unprecedented rate. Satellite launches are big business. And the backlog of launches is growing. This trend is expected to continue, making satellite communications one of the biggest industries of the next century. This tells us something.

The way we communicate is changing an exponential rate. Imagine pulling a small hand set out of your shirt pocket and calling from anywhere to anywhere in the world via satellite, just by pushing a few buttons. Reality? Maybe not yet. Not in a practical sense anyway. But giant telecommunications firms are rushing to develop the handsets and the fleet of satellites by the end of this decade.

Expect equally major advances in cellular phones, two-way paging, and computer communications. One research firm predicts that cellular and PCS subscribers will grow 25 percent annually well into the next century. PCS devices will not be restricted to voice and message transmissions. New devices in the future will include directional and interactive options as well. By the year 2000, cellular and PCS devices carried by consumers are expected to number in the hundreds of millions worldwide.

We're beginning to accept the concept of DBS in our lives. The idea of paying a few hundred dollars a year for home theater entertainment seems to be growing palatable. This market is still considered to be in its infancy, with more than two million subscribers. A number of new competitors are expected to join the fray over the next few years, promising rapid expansion of entertainment by satellite.

The use of ground positioning systems (GPS) in vehicle navigation will bring this technology into the life of everyone who drives a vehicle. GPS receivers are expected to generate more than \$5 billion annually by the turn of the century.

■ Telecommunications reform bill rocks industry

Depending on who you ask, the Telecommunications Act of 1996 will either boost or cripple the communications industry in the U.S. The new law allows phone and cable companies to compete. It deregulates cable rates, and enables media to more easily expand their holdings. All of this is bound to impact on the booming wireless industry.

Another provision of the law makes it illegal to pass "indecent and sexually explicit" materials via the Internet, which went into "virtual mourning" with the law's enactment.

President Clinton, in signing the law which updates the Communications Act of 1934, said it will "bring the future to our doorstep." AT&T chairman Robert Allen says the law will enable his company to win a third or more of the \$90 billion phone market within a decade. Other supporters say it will increase jobs, expand consumer choices and lower prices for cable, telephone, and other communications services.

Opponents (mostly consumer groups) predict that more jobs will be lost than gained through consolidation. They expect cable and telephone rates to increase because they expect few competitors to enter the industry.

■ Inmarsat launches world's first global carphone

Inmarsat, developer of the world's first global carphone service, says new technology will turn a vehicle into an office on wheels. You'll be able to make phone calls—and send and receive faxes—from your car by satellite, even when traveling beyond the reach of cellular phone service. Carphone users will be able to exchange data while in transit. Customers can choose between 14 service providers. Charges will range from \$4 to \$6 per minute.

Special antenna systems will track Inmarsat satellites at high speed or in rugged terrain including winding roads.

Companies marketing Inmarsat-approved carphone equipment include O'Gara Satellite Networks of the USA, IN-Snec of France, and STN Atlas Elektronik of Germany. Other makers of global carphone products include GEC Marconi of the UK, Hagenuk of Germany, and Ball Aerospace of the United States.

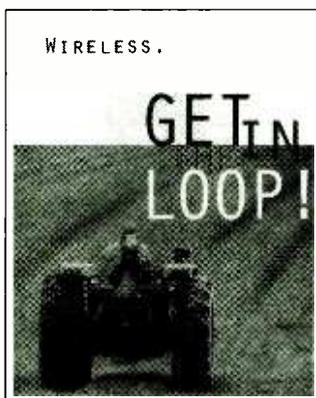
■ In a word...

Mark Twain once proclaimed the difference between the right word and the almost right word as the difference between lightning and lightning bug. In my February column on GPS I noted that a GPS receiver finds itself by measuring distance to "geostationery" satellites. Geostationery was anything but the right word, as pointed out by our astute readers.

With help from author Peter H. Dana, of the Department of Geography at the University of Texas at Austin, I'd like to ceremonially erase any reference to GPS satellites as being geostationery. They're not.

As Peter Dana explains, the GPS operational constellation consists of 24 satellites. They circle the earth in 12-hour orbits. These orbits repeat the same ground track, as the earth revolves beneath them, and are inclined at about 55 degrees with respect to the polar plane. This constellation provides users with between five and eight satellites visible from any point on earth at any given time. Data from four of the satellites is sufficient for precise positioning.

In a word, I apologize.



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ACARS Again and Hardware CATs

This month we'll look at a new ACARS (Aircraft Communications and Addressing System) program—this one from AEA. The results and our conclusions may surprise you.

Also, you may have wondered about the SCANCAT hardware accessories seen in several magazine ads from Computer Aided Technologies. We will try out four of them over the coming months. Then you can decide if they are for you.

■ ACARS: Feast or Famine

ACARS' whines and tones have long been heard on the VHF aircraft band around 131 MHz. The ACARS system was designed to keep track of in-flight aircraft's real-time situational conditions (location, routing, fuel, aircraft, and passenger problems) using data communications to minimize errors and crew workload.

In February we looked at the Lowe ACARS product, AirMaster version 2.0. This small decoder and software was the first stand-alone ACARS decoder I had come across after many years of searching. Wouldn't you know, the day after I wrote that review I received a press release from Advanced Electronic Applications announcing their ACARS decoder in three forms: the complete AEA ACARS package, ACARS 900, and an AEA FAX ACARS upgrade.

The decoding software is essentially the same for all three AEA products. The complete ACARS package includes a high density program disk and the now-familiar small plug-in interface (see Figure 1). The software runs on an IBM compatible, 386 16 MHz or better. The interface plugs into the serial port, while the cable is connected to the VHF receiver/scanner audio output. The ACARS 900 product is software only and is designed to work with AEA's line of PK-900 data controllers. The AEA FAX ACARS upgrade is also a software-only product. It is designed to work with the interface provided with the AEA FAX product.

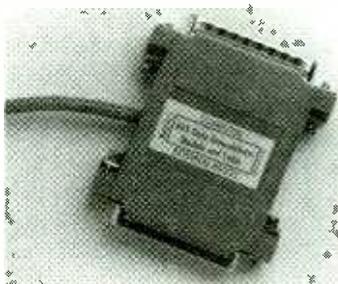
■ Will The Original ACARS Please Stand Up?

The installation of AEA ACARS is automatic, easy, and completed within a minute or

two. The main screen is shown in Figure 2. Look familiar? It should. Take a look at the Lowe Air Master main screen in Figure 3. Could these two programs be one and the same?

Both programs contain the LOG subdirectory and the file called "ac.exe," which is the heart of the ACARS program. The size

Figure 1 -
AEA ACARS
Data
Demodulator
Interface



of this file in both products is almost identical—the slight difference probably due to the slightly different main screen product title.

■ How Does AEA's Perform?

As expected AEA ACARS performs very well, as did Lowe's AirMaster (see February's column for operational details). The big surprise came from the interface. The AEA ACARS interface is exactly the same as AEA FAX (I,II,III) interface. However, although the AEA and Lowe interfaces are physically the same size, they are electrically different—so different that they will not work with each other. This is probably due to the fact that the two different software programs are "looking" at different serial port pins for data input. Why? I don't know. For some type of product uniqueness? Maybe. But the fact remains the Lowe software will not even load if it does not detect that the Lowe ACARS interface is connected to the serial port.

The only other difference I could find was in the criticality of the audio input setting. The AEA seemed to be more tolerant, yielding good decoding over a slightly wider range of settings. However, it was a small difference.

The AEA operations manual is well written and very complete. The 132-page manual includes over 100 pages on ACARS; system info, message format, lots of translated examples, abbreviations, airline codes, and North American Airport and VOR codes. The last

two are invaluable in understanding ACARS. The VOR (VHF Omni-directional Range) is a navigational aid which is also many times used as a positional "fix" or en-route destination point. You can see the importance of these codes in understanding the ACARS messages.

■ In My Opinion

AEA's edge comes in when you consider the many different plug-in decoders and modules we, as monitors, are faced with. Without plugging and unplugging interfaces, AEA ACARS can be used with AEA FAX III, and herein lies its edge, in my humble opinion. The combination allows decoding of FAX, RTTY, NAVTEX, FEC, Morse Code, and now ACARS, and all with just one small interface. Using the FAX III program's miniscope feature, raw ACARS signals can be displayed analyzed for correct tuning and audio level setting.

Finally, price is another factor to be considered. The complete AEA ACARS package, interface and software, retails in the USA for \$90! They have broken the \$100 mark, and that's the retail price. But if you already have the AEA FAX III product, and therefore the interface, the retail price of the software alone is well under this at around the \$50 mark! If you already own AEA ACARS you can upgrade to AEA FAX III for \$70.

In short, I really liked the AEA ACARS product and believe it's excellent value for money. Check with AEA distributors for exact pricing. For information on AEA ACARS, or other AEA products, call (206) 712-8054 for literature requests. They have an upgrades hotline at (206) 774-1722. AEA's address is P.O. Box C2160, Lynnwood, WA 98036.

However, there's still no ACARS program feature which will automatically translate all this gibberish into plain language. ACARS manufacturers: we're still waiting!

■ Next Up - SCANCAT Hardware?

SCANCAT (which, in my opinion, was the first full-feature, easy-to-use, and affordable program for logging, computer control of radio, database, and digital decoding), is a software product of Computer Aided Tech-



Figure 2 - AEA ACARS Main Screen

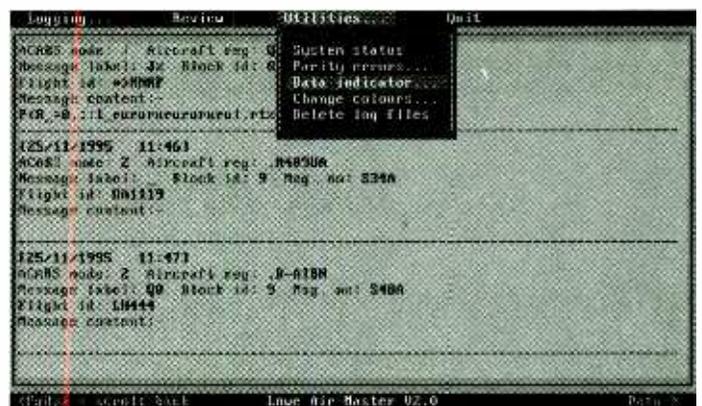


Figure 3 - Lowe's Air Master Main Screen

nologies. This company has quietly, but consistently, been widening their product base to include hardware accessories for use with their software. This month we will look at the first of four of these products: the Uni-Versatile (radio) Interface, CAT Squelch, CAT Yaesu Squelch Detect Adaptor, and the CAT ICOM Squelch Detect Adaptor.

The Uni-Versatile Interface is a replacement for the original radio manufacturer's interface. It connects between the serial port of your computer and your computer-controllable ICOM, Yaesu, or AOR AR8000 radio. Why is any interface needed? Well, the designers of computer serial ports adapted the same high voltage signal level convention used in telecommunications. Meanwhile, the radio designers designed their serial ports with the same data protocols, *but* at typically lower digital logic signal levels (5 volts). The interface is necessary to provide voltage level matching.

On the computer side there is standardization of serial connectors in the form of either the 25 or 9 Pin D-type, or Cannon, plugs. However, although the electrical functionality of most radio-to-computer interfaces are the same, no such standardization exists on the radio side. The Uni-Versatile Interface (UVI) addresses this problem by supplying adaptors to enable its use with all ICOM, Yaesu, and AOR computer controllable receivers.

The UVI (as in all of the CAT products we will cover) is housed in the same type case as AEA's ACARS interface (see Figure 1). One end is a female 25 pin D-type which attaches to the computer. If you have a 9 Pin serial port you will require a 9-to-25 pin adaptor which can be purchased from many mail order companies including Cyberguys (telephone 1-800-892-1010. Please mention you saw them in *MT's* Computers & Radio). It's the radio side that provides the real challenge.

The other end of the small adaptor case has a miniature stereo headphone jack, like on

your Walkman. A cable is provided with miniature stereo plugs at each end. One end plugs into the adaptor while the other comes with an array of options. For the ICOM products all you have to do is to install the included stereo-to-mono adaptor plug. Then this is plugged into the appropriate ICOM computer control port on the radio. ICOM radios without an on-chassis computer control port, such as the R-71, require the installation of the ICOM CT-14 serial port controller. The newer ICOM radios, such as the R7100, have this built-in from the factory.

For use with Yaesu radios, two adaptors are included into which the stereo plug is connected. Both are made from small flexible PC board material and measure roughly 2.5 x 0.5 inches (3.7 x 1.5 cm). The end of these adaptors terminate in 6 pin DIN, and mini-DIN plugs, consistent with the Yaesu computer control port. The AR8000 adaptor is made of the same material and slightly longer with PC board "fingers" which slide into the AOR port slot.

We used the interface on both ICOM and Yaesu radios, with SCANCAT Gold version 6.0, without a problem. As far as we could tell it performed just like the original manufacturers' interfaces. By replacing the original interfaces lots of desk room is recovered. Another obvious benefit is that when upgrading, purchasing a different brand, or testing different radios you no longer need to purchase a new interface.

■ Possible Improvements

The world of jumbled cables, plugs, and desktop fall-off is the darker side of high-technology. Therefore, the first area of improvement that comes to mind are the adaptor PC boards used for all but the ICOM radios. These adaptor boards are not housed in a case: A metal paper clip accidentally falling across the conductor tracks could short the runs together.

Would it cause any damage? I'm not sure. But do you care to risk your equipment in such a test?

My accidental shorting concerns could be greatly reduced by coating the bottom of the board with an insulator. This simple modification can be performed by the owner for under \$4.00—the cost of a tube of RTV silicon at a supply store like Home Depot. Make sure you (1) use the highest quality RTV (i.e. GE), (2) the interface is totally disconnected from any equipment, (3) the bottom of the board interface is clean and free from dust, and (4) you do not use the adaptor until complete RTV curing is achieved as per instructions on the tube.

Another consideration is the design philosophy used in the interface. For example, the original 1980's-designed Yaesu interface, FIF-232C, used its own power source, separate from the radio or the computer, in order to minimize the injection of computer noise into the radio. The UVI takes its power from the computers' serial port.

For a similar reason, all connections to the radio were made via light. That's not a misprint! Opto-couplers were utilized to further maintain isolation between computer and radio. In recent years, and with the advent of the Max232 (and similar voltage-leveling integrated circuits from other manufacturers), not much emphasis has remained on equipment isolation. Although performance in this case appears to be equal, it is something to watch for.

On the positive side, the UVI reduces the cable and AC cord clutter considerably, compared with the FIF-232C. For all but the purists among us, the UVI will be a useful addition to any monitoring equipment.

The Uni-Versatile Interface, with all the adaptors we have discussed, is available for \$99.95 from Computer Aided Technologies, P.O. Box 18285, Shreveport, LA 71138, telephone (318) 636-1234, live tech support at (318) 687-2555.

No News is Not Good News

One of the greatest stores of information anywhere in the world is available on the Internet: people. Newsgroups comprise millions of people worldwide, sharing information every day, swapping notes, ideas, and even files.

To get to newsgroups, you don't need special software, although it is available. Log onto the Net, and go into Netscape. (If you don't know how, read the Feb. column.) Press the **Open** button and type in: **www.excite.com** and hit **Enter**. Now you'll see Excite's homepage. There will be a bar on the page, much like your **Open** bar, where you can click and type information into the line. Click your mouse on that line and type in:

radio shortwave scanner

and go down to the Usenet (the formal name for newsgroups) button and click your mouse on the little circle next to it. This should put a dot in the circle, which means that you want to search Usenet for the keywords "radio, shortwave, and scanner." You don't need to put commas in between the words.

Now click your mouse on the Search button, and watch Excite do its magic. At the time of my search, Excite went through over 1 million articles in 10,000 different groups, and gave me the information I needed in less than 3 seconds (from a 28.8 modem). That's a pretty darn fast librarian!

Now that you've done your search, the next screen will list the articles it found. Documents matching the most requested words the most times will be listed first. You'll notice that all of these articles are underlined, meaning that they are links that will take you to the article. Choose an article and click on it now. (I can't recommend one, because you'll be looking at a different list than I am by the time you read this!)

If you get an error that it couldn't find the message, this simply means that the article was too old, and was deleted from their server. Hit the **Back** button, and try another article.

I'm reading an article about a North Carolina scanner and shortwave meeting. You'll notice at the top of the article, it has the date the article was written, who wrote it, the organization it came from, and the newsgroup it came from.

Newsgroups are divided into many categories, separated by periods (.). For example, **rec.radio.scanner** would be a recreational

group (rec) in the field of radio, specifically scanners. Or **alt.binaries.music.midi** would be in the alternative (alt) area, binaries (files) section, and would be devoted to music, specifically midi (Musical Instrument Digital Interface) files.

If the area refers to binaries, this means that there are usually files available for download. These files can range from music, to pictures, to shareware. It's a really wonderful system. However, you must have a news server to get these. When you are using Excite, you're only able to read the articles, not download the files.

To download the files, you'll need to enable the newsgroups feature of Netscape, or get a freeware program off the Internet called Free Agent. This can be downloaded at: **ftp://ftp.fortecinc.com/pub/forte/free_agent/fagent10.zip** (you can just type this in with the **Open** button in Netscape).

Once you acquire that program or Netscape, you need to configure it. To configure Netscape (version 2.0, available for free download from **http://home.netscape.com/comprod/mirror/index.html**), you'll need to go into the **Options** and then **Preferences**. Choose **Mail and News** and go to the **Servers** area. You'll need to fill that information in with the server information provided by your Internet Service Provider (ISP). If you do not have that information, contact your ISP and they can provide you with it.

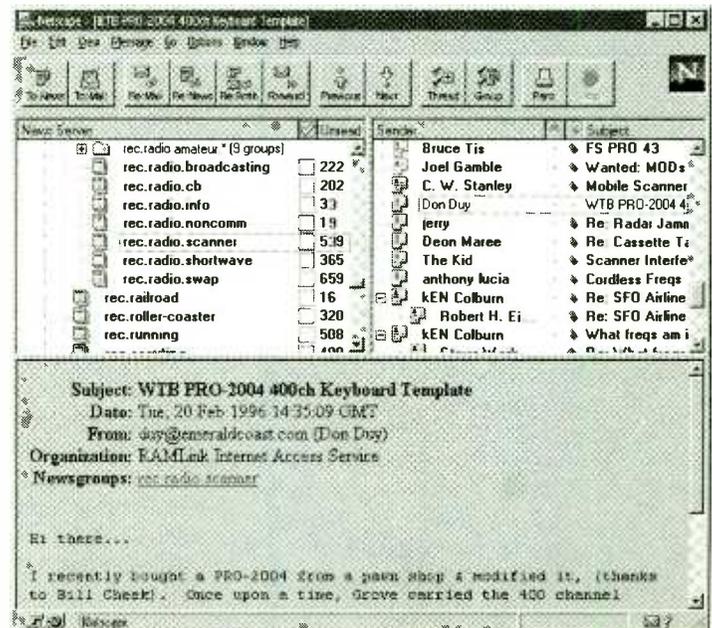
Once all that information is entered in, you can hit the **Ok** button and you're ready to use your news server. Click on either the **newsgroups** button, or go up to **Window** and **Netscape news(newsgroups)**. Now you are in the newsgroups area. Go up to **Options** and **Show All Newsgroups**. This will allow you to list all the groups that

are available. (Don't worry: it will take a while to download.)

Look over the list, choose an area, and double-click on it. This will take you to a narrower category; choose one of those, double-click on it, and continue to do so until you have a list of messages. Now double-click on one of the messages and it will come up for you to read. You have the choice to **reply** to it (send a reply back to the group), **reply by email** (send a message just to the person that wrote the message), **forward** it (send the message to an email address of your choice), or go on to the next message. Each of these groups has anywhere from a few people to thousands of people reading the messages each day.

The most popular place for radio hobbyists is in the **rec.radio** area, under which you have many choices, like scanner or shortwave, or even broadcasting in general. Overall, these groups have more information than you could ever absorb. But if you stick to a few of your favorite groups, you should get all the information you'll ever want, meet new friends, and learn a few things along the way.

If you have an idea or question for a future article, or have any information that you think would interest other radio listeners, please write to bill@grove.net.



WHAT'S NEW?

BOOK REVIEWS AND NEW PRODUCTS

by Larry Miller

Guest reviewers: Mike Bryson, Ed Muro

MFJ Shortwave Decoder

"Ever watch those spy movies and want to crawl into the fantastic life of a secret agent man? Now you can with the MFJ-462B MultiReader."

The MFJ-462B Multi Reader may not, as promised, "have you believing that you are the next James Bond," but it does allow you to decode RTTY, ASCII, and Morse Code signals from any shortwave radio.

The self-contained unit plugs into your shortwave receiver's earphone jack and, before your eyes, "those same chirps, buzzes and whistles turn into exciting text secret messages as they scroll across an easy-to-read LCD display."

The MFJ-462B features a printer port that allows you to monitor a frequency 24-hours a day, an MFJ Message Saver, a high-performance modem, and MFJ AutoTrak automatic Morse Code speed tracking software.

The MFJ-462 is priced at \$169.95 and comes with their "No Matter What" one year unconditional warranty.

For information or to order, contact MFJ at 1-800-647-1800.

Scanning With the Experts, Vol 1

A scanner writer who has been around for several years and who's one of the best is Les Mattson. Formerly the editor of *North East Scanner News* and now publisher of *The Scanning Club*, Mattson's

material has been noted for its practical value. It's hands-on-stuff written by a real scanner user. Mattson bills his writing as "news



you can use" and it is: It's refreshing—and genuinely useful.

The best of Mattson's work has been collected in a 60-page book called *Scanning With the Experts, Vol. 1*, and, together with others like Gene Hughes, Steve Donnell, Wayne Heinen, and Bob Coburn, offers excellent information on everything from 800 MHz trunked systems, choosing the right coax, and logbooks, to programming your scanner, image frequencies, scrambling, and business radio.

Scanning with the Experts, Vol 1, is the second in a series of inexpensively-priced books published by *National Scanning*. You can order yours by calling 610-273-7823 or by sending \$9.95 (postpaid) to National Scanning, Box 360, Wagontown, PA 19376.

Computer Control

DataFile Inc. has announced a brand new software release of Probe Version 2.0. Probe is made for Optoelectronics' OptoScan 456 and 535 which enable computer control of Radio Shack's PRO-2005, 2006, 2035, and 2042 scanners. Over 70 new features and enhancements have been added.

One feature, called SmartScan, allows the scan-

ning enthusiast to follow fast-breaking action. Key frequencies are used as triggers that activate on a specific bank or set of frequencies. For example, if you designate the air emergency frequency of 121.500 as a key frequency and it becomes active, you can have your scanner exclusively scan only those frequencies related to

air emergencies, like the local tower, ground control, rescue squad, and airport security. Once the action settles down, normal scanning is automatically resumed.

DataFile Inc. has a list of additional features. You can get a copy of it by writing to them at P.O. Box 20111, St. Louis, MO 63123. Their e-mail address is [datafile@genie.com](mailto:genie.com). The software is priced at \$129.95 plus \$7.95 shipping and handling. Payment can be in check, money order, Mastercard or Visa. Tell Perry Joseph that *MT* sent you.

Long-Life Handhelds

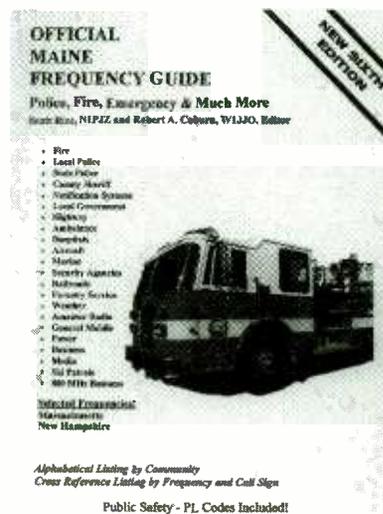
MetroWest is a well-established company catering to the handheld scanner enthusiast. While they do carry the normal line of books and even scanners, what makes them especially worthy of your attention is their line of extended life battery packs and chargers.

Mike and Pat Huth are in charge of the operation and would like to send you their latest catalog. You can call them at 708-354-2125 or write to them at 822 N. Spring, LaGrange Park, IL 60525. Tell them Larry Miller that *MT* sent you.

Maine Freq Guide

The new 6th edition of the *Official Maine Frequency Guide* is now out and spread across some 240 pages. I first learned about the accuracy of the Official Guides after taking one of these on a vacation trip and being very impressed. Not only are the Official Guides very accurate, but they also contain lots of helpful additional information besides straight frequencies.

This edition, written by the phenomenal Scott Rice, includes 60 pages of detailed information

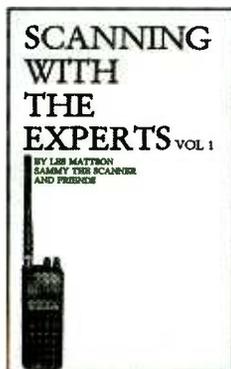


on state and national systems with descriptive maps, frequency allocation charts, the new emergency medical service, and the 220MHz allocations. Of special interest are the new licenses for the state fire marshall, transportation, and Maine state police regional repeaters.

The community listings include over 14,000 frequencies in a new easy-to-read format. Along with public safety are business frequencies. The cross reference listing by frequency, call sign, licensee, and city now includes PL tones as well.

The *Official Maine Scanner Guide* is \$19.95 plus \$3.95 shipping. You can order toll-free at 1-800-351-7226. You can order by

(Turn to page 95)



Enquire at your local book store for price and ordering information on these books, or if you are interested in an Electronics Engineers' Book Club, write to McGraw-Hill Book Clubs, PO Box 549, Blacklick, OH 43004-9918.

Mechanical Devices For The Electronics Experimenter

Hobbyists often take on electronic projects dealing with a significant amount of mechanical considerations. When your mechanical and electrical worlds collide, it would be nice to have Britt Rorabaugh's book *Mechanical Devices for the Electronics Experimenter*. This 237 page mechanical primer, published by TAB Books (a division of McGraw Hill Inc.) focuses mainly on robotics, but is still a good starting point for the mechanical neophyte.

The book starts off with the very basics of mechanical principles and progresses on to specific topics on sensors, motors and control, solenoids, gears, pulleys, pneumatics, hydraulics, and more.

Electronic Filter Design

If filter design is your game, you'll need *Electronic Filter Design Handbook* written by Arthur B. Williams and Fred J. Taylor. Clear out lots of space on your book shelf, though, because this book is over 750 pages of comprehensive information on passive and active filters. This third edition also includes new sections on digital filters as well.

Mainly written for engineers, the 18 chapters deal with topics in network theory, response charac-

teristics, low pass, high pass, band pass, and band reject filter designs. Topics also include component selection and design, intro to digital filters, impulse response, filter architecture, switched capacitor filters, EMI filters, and digital filter technology companion computer disk is included that complements the material.

Printed Circuits Handbook

"Etching" to learn more about printed circuit boards?! *Printed Circuits Handbook* has an impressive 42 chapters devoted to all aspects of the design, fabrication, and assembly of printed circuit boards (PCBs). Written by a team of PCB experts and edited by Clyde F. Coombs Jr., this fourth edition book is intended to serve as

a definitive reference to beginners in the printed circuit field as well as experienced PCB professionals.

One thousand pages are divided into nine sections dealing with PCB basics, engineering and design, fabrication processes, assembly processes, solder and soldering, test and repair, waste treatment, quality and reliability, and flexible circuits.

Surface Mount Technology Guide

Any printed circuit board designer worth a hoot should know about surface mount technology (SMT). This technology uses miniature electrical components designed to mount directly to the surface of a circuit board. The main benefits of this approach is increased board density, elimination of stray reactance due to leaded devices, and the reduced size of the overall circuit board design.

Design Guidelines for Surface Mount & Fine Pitch Tech-

nology, written by Vern Solberg, is an excellent, 260-page reference for anyone wanting to learn more about this technology. Topics include planning for SMT design, component selection, board pattern development, spacing requirements, layout guidelines, substrate materials, assembly, cleaning, and design evaluation.

Single Sideband Systems & Circuits

Single Sideband Systems & Circuits, edited by William E. Sabin and Edgar O. Schoenike, has a wealth of information dealing with SSB from the engineers of the Rockwell Corporation. Although this book was written for engineers dealing with SSB, it can be appreciated by the advanced amateur as well.

With over 650 pages, this second edition has 17 chapters devoted to topics such as an SSB overview, design considerations, HF link establishment, receiver and transceiver design, IF filters, speech processing, DSP, and frequency synthesizers.

Several chapters are devoted to power amplifiers, antenna matching, and receiver measurements. There is even a chapter devoted solely to the SSB software that is included with the book.

Digital Techniques in Frequency Synthesis

Do oscillator design problems have you down? Cheer up, because *Digital Techniques in Frequency Synthesis*, written by Bar-Giora Goldberg, can give you a whole new perspective on frequency generation.

This 320 page book deals with the digital techniques used to generate (and modulate) desired frequencies.

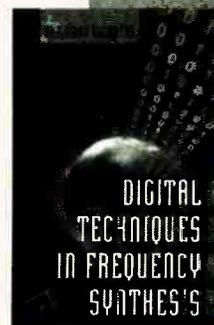
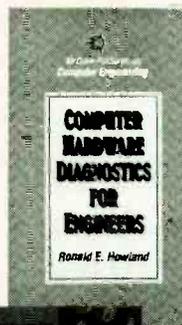
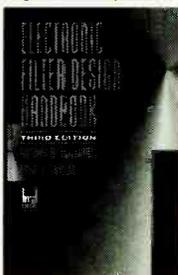
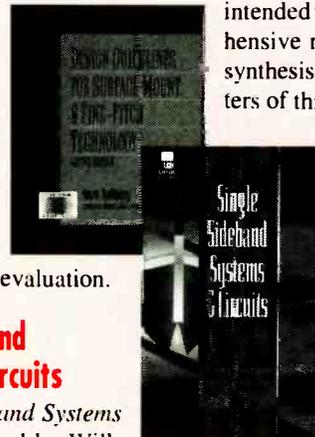
Written for the practical designer, *Digital Techniques* is intended to provide a comprehensive review of frequency synthesis design. The 10 chapters of this book cover topics such as: introduction to frequency synthesis (FS), system analysis, measurement techniques, direct digital synthesis, phase locked loop synthesizers, accumulators, digital to analog converters, and more.

Numerous design examples are given throughout the book.

Computer Hardware Diagnostics for Engineers

The latest release in McGraw Hill's Computer Engineering series is *Computer Hardware Diagnostics for Engineers* written by Ronald E. Howard. As the title implies, this book is written mainly for engineers dealing with computer hardware issues such as design, software development, testing, and quality assurance.

With over 200 pages devoted to diagnostic techniques for a wide range of hardware components, the book explains the basic principles and presents detailed examples of how specific diagnostics techniques are used. Its eight chapters cover hardware diagnostics, designing diagnostics, microprocessor board testing, memory testing, serial communications, secondary storage devices, video graphic devices, and diagnostic software.



mail, too, by sending a check or money order to P.O. Box 525, Londonderry, NH 03053.

Cop Speak

It finally happened. There's now a dictionary to go along with all of those action cop/rescue shows filling the TV these days. It's called *Cop Speak* and it's written by veteran police author Tom Philbin.

Philbin has made a book that's probably more entertaining than useful, as the dictionary is somewhat limited. It's also pretty crude at times, so brace yourself. Still, it's a good read—if you have the stomach for it. One that caught my imagination is an expression no doubt born out of the cop's need to deal with the heavy dose of horror they face every day:

Adiosis (state of): Police description of someone who has just died or is about to. Derived from adios, the Spanish term used to express farewell. Usually used at the scene of a fatal accident, one police officer might say to another, "How's he doing?" and be met with the response, "He's in a state of adiosis."

Cop Speak is available at your local book store for \$12.95. The ISBN number is 0471043044.

Broadcasting Professionals

Focal Press has introduced two new professional titles. The first, called *Broadcast Sound Technology*, is designed to "provide an understanding of modern audio technology to people working in or training for professional sound engineering and operations." Covered are the main areas of the broadcast chain: studio acoustics, microphones, loudspeakers, mixing consoles, recording and replay (analog and digital), and the principles of stereo. The price for *Broadcast Sound Technology* is \$32.95.

Title number two, *Broadcast News: Writing, Reporting, and Producing, 2nd Ed.*, "examines the skills, techniques, and challenges of writing, reporting and producing news for broadcast." It contains a complete treatment of reporting techniques and topics ranging from basic skills, to specialty reporting, to ethics (including what Focal Press calls "a new look at the Fairness Doctrine in light of radical, right-wing broadcasters and the Oklahoma City Bombing.") The price on this one is \$34.95. Order either title from Focal by calling 800-366-2665.

Used Test Equipment

If you're in the market for used test equipment—from oscilloscopes to frequency counters to environmental chambers and ovens—you may want to write down this number: 1-800-748-3457. It's the number for RAG Electronics. RAG technicians thoroughly clean, repaint, polish and replace, as needed. Then they calibrate, adjust and certify the equipment, packing it with original accessories,

instruction manuals, and a 6 month parts and labor warranty.

If you'd like to write, their address is 2450 Turquoise Circle, Newbury Park, CA 91320-1200. Tell them you read about their company in *MT*.

One other thing. RAG Electronics also buys used test gear so you may want to turn some of your old stuff into cash. Again, call the toll-free number for more information.

Free Ham Catalog

Advanced Electronic Applications now has their 1996 catalog ready and waiting to mail to you. AEA has introduced 16 new products and the catalog is packed with information on data controllers, software, antenna analysts,



remote radio controllers, and keyers.

If you'd like a copy of the catalog, send your name and address to AEA, 1996 catalog, P.O. Box C-2160, Lynwood, Washington 98036.

Weather Watch

For individuals or media to whom the weather is of critical importance, WeatherBrief is a software package that collates data

from a variety of sources and presents it in television broadcast quality display. Available in several formats, or customizable to your needs, WeatherBrief's modem automatically dials, downloads, displays, archives, and prints the weather information you want, with no additional monthly fees. For more information write WeatherBank, Inc., 1015 Waterwood Pkwy, Suite J, Edmond, OK 73034; tel. (405) 359-0773/341-0115 fax.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.



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Sky Scan Desk 1300

By Ed Muro

For most scanner hobbyists who have just come home with their first scanner, the next step after they plug the unit into the wall outlet and before they program it is to screw in the telescopic whip provided with the unit.

Some people will be very happy with this set-up for many years, but others will quickly get bored or frustrated. The type of antenna system you choose to use depends on three variables. The first is what kind of communications you wish to receive on your radio. The second is the location of your receiving station in relation to the source of your target signals. The third, and often determining, factor is the limitations of your location with regard to setting up an antenna system. The one principle upon which all technicians agree is that your radio is only as good as your antenna system.

For many reasons some people just do not have the ability to mount an outdoor antenna. Some people rent or may be in an apartment building, and some may simply not be up to the task of going up on the roof. Over the years there have been many "quick fixes" for this problem, but until now there really hasn't been an easy and adequate alternative. Coming to the rescue from the United Kingdom is the Sky Scan Desk 1300 desk top discone scanner antenna.

Built and designed specifically for scanners, the coverage of the Desk 1300 is 25 to 1300 MHz. The Desk 1300 stands three feet tall and is nine inches at its widest point. It comes complete with 10 feet of RG 58 coax and a pre-fitted BNC connector.

After reading the advertisement I was a bit skeptical, but intrigued enough to order it. It arrived about ten days after I faxed over my order. My friends think I am a little "odd" for having this strange-looking contraption in my bed room, but all I can say is that it works great.

After using the Desk 1300 for almost a year I can verify that in suburban Long Island, New York (which has relatively flat terrain), the Desk 1300 performs just as well as my roof mounted discone. When I took the antenna with me to rural upstate New York (which is mountainous) and used it on my portable unit, the antenna outperformed my Austin Condor rubber antenna by 30-40 %.

The Desk 1300 is unlike any other discone I have seen. Above the cone are four vertical whips, giving the Desk 1300 both vertical and horizontal active elements pre-cut to set frequency bands. The



four horizontal elements are three-inch rubber ducks.

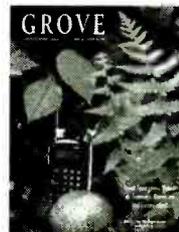
The Desk 1300 is made out of good quality stainless steel, aluminum, and a PVC mast. After unpacking the components I was extremely pleased with the high quality of the engineering. It took about five minutes to assemble the unit and it was ready for scanning action.

According to some promotional material supplied by the exporter, they claim that the Sky Scan 1300 has been tested with two other discones. They do not disclose the brand names of these two antennas but the stated results are as follows.

Test results taken against two other discone antennas, one without a vertically polarized section and one with such an element, showed that from 50 to 107 MHz there was no difference between the three antennas. From 108-136 MHz a gain of 4dB over the two reference discones was measured. Between 137-175 MHz this rose to 7dB, falling to 2dB between 176-525 MHz. Between 526-1300 MHz the Sky Scan showed a 4dB gain over the other two antennas. A Radio Shack PRO-2022 and an ICOM IC-R100 were used for these tests.

From my own monitoring experiences, if you can't mount an outdoor antenna or you just don't want to be bothered with one, the Sky Scan Desk 1300 is a great alternative. I use it along with a Bearcat 890 as my primary receiving set-up, while I have dedicated my roof-top antenna for use with my PRO-2005 to receive military aviation.

While several radio hobby retailers in Britain carry the Sky Scan line of antennas, the company from which I ordered is SRP Radio Centre, whose mail-order branch is: SRP Trading, Unit 20, Nash Works, Forge Lane Belbroughton, Nr. Stourbridge, Worcs, UK. Tel: (01562) 730672. Fax: (01562) 731002. The unit is listed in current ads as £49 (about \$75 U.S.).



The March-April Grove catalog is now out. If you are not on the Grove Enterprises mailing list, call for the free catalog at 1-800-438-8155. For our Internet customers, Grove is offering reduced prices and special package deals on scanners, receivers and accessories. Check out our new World Wide Web site: www.grove.net

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- Log signal strength information to printer or delimited log file while DELTA COMM™ I-7000 is scanning or activity logging the selected database file.

DELTA COMM™ I-7000 communication manager program includes all cabling, manual, UL listed power supply and Delta Research custom CI-V interface for \$299.00 + \$8.00 (U.S.) or \$25.00 (foreign) S&H. The DELTA COMM™ DSS interface upgrade comes complete with easy to follow NO SOLDER installation instructions, all cabling and 8-bit DSS A/D converter module (game port required) for \$99.00 + \$8.00 (U.S.) or \$25.00 (foreign) S&H and is available as an upgrade option to registered I-7000 users. Contact us for additional information on DELTA COMM™ communication managers for ICOM™ R7100, R71A, R72 and IC735.



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Model ara 60 The newly redesigned ara 60 features more gain and better IMD performance than the ara 40, making it the perfect partner for high-end receivers such as the Drake R8A, JRC NRD-535, Watkins-Johnson HF-1000, etc. Superior strong signal handling, +50dBm ICP3. Requires 12VDC power supply (optional). **Gilfer Price: \$269.95 (+\$10 s/h)**

Model ara 2000 Dressler's successor to the popular ara 1500 model, the ara 2000 utilizes a GaAs-FET amplifier for maximum gain (11-13 dB up to 1.3 GHz) and minimum noise figure (1-2.5 dB). Coverage from 50 MHz to 2 GHz, circular polarization, N-type coax connectors. Requires 12VDC power supply (optional). **Gilfer Price: \$269.95 (+\$10 s/h)**



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AOR AR7030: World's Best Receiver?

Look out, Drake! Watch out, Japan Radio! Heads up, Lowe! There's a new entry into the world of kilobuck-plus receivers, and it proves once and for all that AOR is *very* serious about building a top gun receiver.

The new kid on the block is AOR's AR7030 communications receiver, and our initial test results indicate that this hombre is giving no quarter and taking no prisoners.

This isn't AOR's first foray into the construction of world band receivers. The company's first offering, the AOR AR3030, acquitted itself well in its price range, earning four stars in the 1996 *Passport To World Band Radio*, but scarcely offered performance that anyone would call breathtaking.

■ First model from AOR-England

The AR7030, however, is the first receiver from AOR's newly established operation in the United Kingdom. One look at this radio—with its small footprint (about 9-1/2 x 9-1/2 inches, including protrusions), a rugged metal cabinet, those round pushbuttons, and a big tuning knob with a shallow speed dimple—and you start to get a strange sensation, sort of like seeing a familiar face that you can't quite place.

A quick check of the sales literature reveals that the '7030 was designed by John Thorpe, the engineer who was the mastermind behind the Lowe HF-225 (and its cousin, the Europa) and the Lowe HF-150—radios that have earned high marks from our review panel in the past. It's evident that the Thorpe design philosophy has been at work again.

■ Many features include remote control

The '7030 obviously was designed with exceptional strong-signal handling in mind, as well as an array of advanced features. The '7030 includes frequency coverage from 0-32 MHz; USB, LSB, CW, AM, synchronous AM, narrow FM, and data reception modes; four standard bandwidths (nominally 2.2, 4.5, 7 and 10 kHz, with slots for two optional bandwidths); clock and timer facilities; a variable-bandwidth synchronous detector capable of LSB, USB, or DSB operation; an illuminated LCD which displays frequency in



XX.XXX.XX MHz format, along with a wide variety of other visual information; passband tuning; a six-level attenuator (including preamp); an all-mode squelch; rear connectors for coaxial and wire antennas; and a switch for choosing between antennas, including a whip. Beady-eyed DXers will mourn the absence of a notch filter, but a tunable audio notch filter will be offered as an extra-cost option starting sometime late this year.

The '7030 comes with an infrared remote control capable of controlling most receiver functions: volume, tuning, tone, bandwidth selection, mode, VFO selection, passband tuning, frequency entry and memory. The infrared remote can operate the receiver close in, on the tabletop half a foot away, or from across the room. This makes it handy for the listener who wants to operate the receiver at a remove from, say, computer equipment that may generate interfering digital hash.

At a certain distance, however, the law of diminishing returns sets in—there comes a point at which the remote will continue to control the '7030, but the eyes can no longer read the display to determine if the receiver is, in fact, doing what it was commanded to do.

A sturdy metal bar flips down to tilt the receiver at a jaunty angle for ease of operation. Although the '7030 will operate from 12 VDC, AOR recommends—and supplies—a 15 VDC outboard power supply (AC adaptor) for optimal performance.

■ Breathtaking performance

In most measurements of receiver performance, the '7030 shines. Three of the four standard bandwidths offer excellent ultimate rejection, and the ultimate rejection of the fourth (the SSB bandwidth) is superb. All bandwidths have excellent shape factors. Im-

age rejection is superb, as is first IF rejection. Blocking and phase noise measurements are both excellent. Dynamic range is excellent at both 5 and 20 kHz separation points, and third-order intercept measurements at 5 and 20 kHz separation points are superb.

Sensitivity is good with the preamp off and excellent with it on. Overall distortion is generally good-to-excellent in the AM mode, although the

'7030 earns a "fair" rating at 100 Hz. (AOR confirms our finding, and may be implementing an improvement shortly.) However, it becomes excellent-to-superb when the synchronous detector is used, and in the SSB mode distortion is nearly nil.

Viewed as a whole, the performance measurements of the '7030 suggest electrical performance that eclipses most of the radios currently regarded as top-gun receivers. And the ear confirms what the lab suggests: the '7030 is exceptionally quiet and pleasant to listen to for extended periods. The synchronous detector works exceptionally well, and seems solid as a rock. For the serious DXer and fastidious SWL alike, this receiver is simply incredible.

■ What should be better...

But, as the ancient Greeks used to say, "Even Olympus nods," and likewise the '7030 has some problems. First, the bandwidths do not measure out as advertised. Instead of the promised 2.2, 4.5, 7 and 10 kHz, our lab measured 2.1, 6.6, 8.3 and 9.9 kHz. While some of the bandwidths are actually under the specified value, the big problem is 4.5 kHz nominal that measures 6.6 kHz.

For real flexibility, this receiver needs a bandwidth in the 4 to 5 kHz range. AOR can custom-install such a filter as a replacement, or you or a dealer can install a fifth filter yourself in one of the two open filter positions. By the way, this receiver will accept not only MuRata ceramic filters, but also Collins mechanical filters.

While this problem is real, we made these measurements without benefit of a circuit diagram, which AOR promises to provide in due course. With this additional engineering data, we may find that our measurements and AOR's

are less far apart. However, even AOR measures the #2 filter as 5.5 kHz, so the problem is real regardless of the degree.

Fortunately, the '7030 includes slots for two optional bandwidths. And, most unusual, this receiver includes a software routine for self-aligning the bandwidths for optimum performance. The receiver automatically detects and measures the bandwidth filter, then displays the bandwidth value of any new filter installed. Incidentally, the software measures the pre-installed bandwidths as 2.2, 5.9, 7.1 and 9.5 kHz. Until we receive the all-important schematic, we can't say for sure what proportion of this variation is due to limitations on our ability to measure precisely, and which are due to the receiver's not measuring to full accuracy. Once we have a complete circuit diagram, we will resolve this.

The second problem we encountered was that on one of our two units the remote control keys didn't "take" about 15% of the time. A colleague not on our test team reports similar difficulties with his remote, but on our second unit the keys worked flawlessly. AOR is aware of the problem, and hopefully will have had this corrected before high-volume production begins.

■ Menu-driven operating system

A third area of concern is the user interface of the receiver itself. There are three knobs and nine buttons on the face of the receiver—that's all. There is, for example, no keypad for direct frequency entry on the face of the radio, although there is such a keypad (in standard telephone format) on the remote control. On the receiver itself, three buttons are located above the tuning knob. These are used to change reception modes and to engage the fast-tuning capability. Hit the "FAST" button, twirl the tuning knob, and the Megahertz whiz by at warp speed.

To the left of the main display is a button turning the receiver on and off, while below it is another button labeled "MENU." Below that is the volume control knob. Underneath the main display is one knob and four buttons, the functions of which are controlled by the menu button. The labels above the knob and four buttons change according to which menu is activated, and there are even branching trees of menus that come into play as different buttons are pushed or the knob is turned.

Our two test receivers, which were from the first production batch of only eight units, arrived with a draft manual that did not include sections on memory, quick reference, remote keypad, menu tree, or computer remote-control protocol. As a result, we were largely left to figure out how to operate this

receiver on our own.

While one of our panelists opined that "it didn't seem too bad once you get the hang of it, and, yes, a real manual would be very helpful," our laboratory engineer felt this was "the human interface from Hell." He strongly felt that this receiver would be much improved by being made larger and including a number of single-function controls. He added that the '7030 is "potentially the best radio I've tested in the past five years."

It is perhaps unfair to judge the user interface without the complete manual. However, at first blush it appears that AOR, while trying to simplify operation of this receiver, may have actually made it more complicated than necessary. The trick with this receiver, it appears, is to operate it mostly from the remote control, like a TV, and to use the front panel buttons and knobs only when necessary. Nevertheless, the upshot is that some listeners may like the operating setup; others may put up with it to get the '7030's astounding performance; and still others—the "I want a button for every function" crowd—may hate the ergonomics with a deep and abiding passion.

■ Arguably the best receiver available... for some

Given that this is arguably the best receiver on the market, regardless of price, we were prepared for serious sticker shock. As it turns out, while the '7030 is no cheapie, its suggested retail price has been set at \$1,399, and presumably the street price will be \$100 or so lower. That's only a skotch above the price of a Drake R8A, and well below the price of a number of other "supersets." In the United Kingdom, it will sell for £799, including VAT, and in Japan the target price is ¥129,800.

So, the bottom line: The addition of a 4 to 5 kHz bandwidth should be a priority; thankfully, this is easily accomplished, but it would be better if AOR would do this with every

receiver at the factory in the first place. That and the potential "iffy keys" issue aside, this is clearly a five-star winner. AOR's new AR7030 offers DX and fidelity performance that, when you sum up every measurement of performance, blows away nearly every other receiver currently available—even through it has an idiosyncratic, if innovative, operator interface that will not be to everyone's liking.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

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The BC220XLT/BC230XLT Portable Scanner

Uniden made a lot of folks happy when they introduced the BC200XLT in 1987—the first Bearcat portable scanner with 800 MHz band coverage. It was a rugged, reliable scanner in almost all respects.

Building on that success, Uniden morphed the BC200XLT into the smaller BC220XLT by incorporating an internal NiCd battery pack, preprogrammed service scan, faster scanrate, and other improvements.

Uniden now combines the BC220XLT scanner with a second NiCd battery pack, a new CRX120 auxiliary charger, and markets the combination as the BC230XLT. The packaging and operating guide use the nomenclature BC230XLT, but the scanner furnished for our review was labeled BC220XLT and bears serial number 55000939.

Frequency Coverage, Scanning and Searching

The BC220XLT tuning step size and modes are factory set, and depend on the frequency:

- 29.0 - 54 MHz (NFM, 5 kHz steps)
- 108 - 137 MHz (AM, 12.5 kHz steps)
- 137 - 174 MHz (NFM, 5 kHz steps)
- 406 - 512 MHz (NFM, 12.5 kHz steps)
- 806 - 956 MHz, excluding cellular phone bands, (NFM, 12.5 kHz steps)

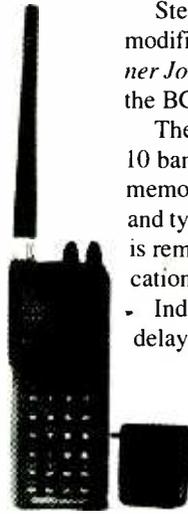


Photo by Pam Parnass, N9HRZ

Steve Donnell published an innovative modification in the January 1995 RCMA *Scanner Journal* to enable cell band coverage for the BC220XLT.

The BC220XLT supports 200 channels in 10 banks. According to the operating guide, memory is backed up for "at least three days, and typically 14 days" when the battery pack is removed, but we didn't verify the specification.

- Individual lockout and two-second rescan delay may be selected for each of the memory channels. Channels programmed with a frequency of 0.0000 are automatically locked out, so no time is wasted scanning them. Uniden boasts a maximum scan rate of 100 channels per second, although our BC220XLT scanned four banks of unsorted frequencies at only 34 channels per second.

There are 10 priority channels, one per bank, and one can designate any channel within a bank as a priority channel. When enabled, the priority channels are checked every two seconds.

A single programmable search bank allows entry of lower and upper limits for conventional searching. We measured search rates of 100 steps/sec. and 300 steps/sec in Turbo mode, available in the 29 - 54 and 137 - 174 MHz bands. Up to 10 frequencies can be locked out during a search—a feature useful for skipping birdies and unwanted paging frequencies.

A Service Scan feature permits scanning

of preprogrammed frequencies in four categories: Police, Fire/Emergency, Marine, and Commercial Aircraft. Up to 20 frequencies may be locked out in the Service Scan mode. Pressing the Weather button causes a scan for activity through seven preprogrammed frequencies used for NOAA weather broadcasts.

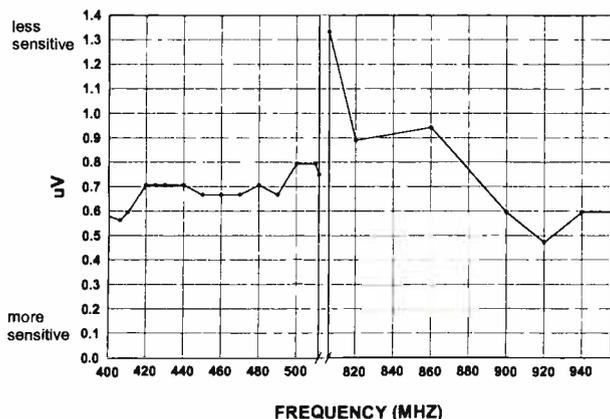
CRX120 Auxiliary Charger

The BC220XLT scanner is powered by a BP-120 4.8 volt, 600 mA NiCd battery pack. Two BP-120 battery packs are supplied with the BC230XLT, along with a 12 VDC wall wart power supply, and CRX120 auxiliary charging tray. The CRX120 permits charging

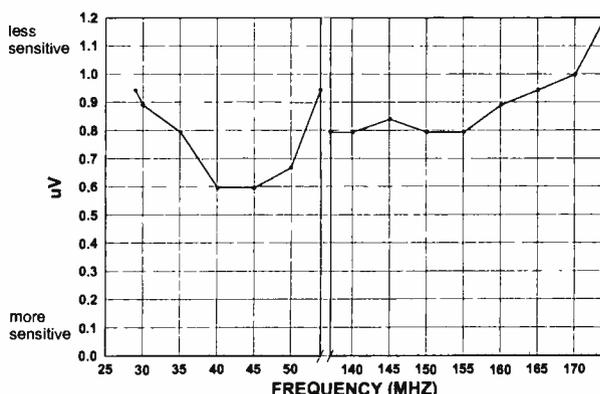
TABLE 1
Measured Specifications

Scan speed: 34 channels/sec. scanning an unsorted mixture of frequencies in 4 banks
Search speed: approx. 100 steps/sec. (normal rate), 300 steps/sec. (Turbo rate, 5 kHz step size)
Intermediate frequencies: 10.8 MHz and 450 kHz
Modulation acceptance: 14.5 kHz
Rejection of images 21.6 MHz away:
37.5 dB at 40.1 MHz
17.5 dB at 155.5 MHz
4.5 db at 460.1 MHz
0 db at 900.1 MHz
Battery drain (at 4.8 VDC):
off: 0 ma
scan: 70 ma
open squelch, receiving signals: 80 - 120 ma
open squelch, full volume: 150 ma
No battery saver action detected

BC-220XLT UHF NFM SENSITIVITY
12 dB SINAD, 3 KHZ DEVIATION, Serial #55000939



BC-220XLT VHF NFM SENSITIVITY
12 dB SINAD, 3 KHZ DEVIATION, Serial #55000939



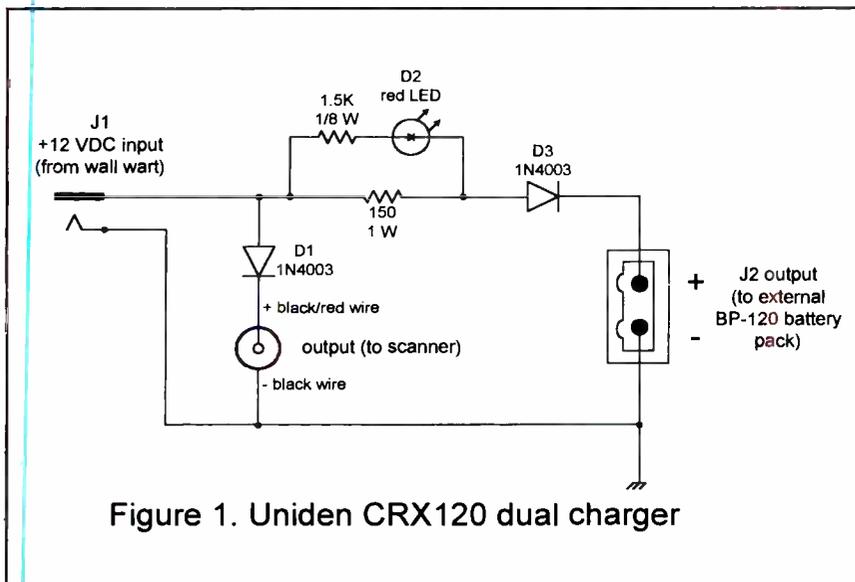


Figure 1. Uniden CRX120 dual charger

Conclusion

Hobbyists who praise the BC200XLT will like the BC230XLT package, too. The BC220XLT cannot use ordinary AA batteries, but having the second battery and new CRX120 charging adapter helps keep the scanner operating longer.

Note on advertisement below: As of 4/26/95 it became unlawful to market cellular-capable receivers in the US. Radio Progressive assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.

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ing of the extra BP-120 battery, and one can charge the other BP-120 battery inside the BC220XLT at the same time.

Although no schematics were furnished, we opened the CRX120 charger, studied the wiring, and drew our own schematic (Figure 1).

Test Modes

If the BC220XLT is powered off, you can enable the following test sequences by pressing the three keys listed simultaneously while turning the scanner on:

- 2 9 MANUAL or 2 9 PRIORITY: Clears all 200 memory channels, search limits, resets priority channels to the first channel in each bank.
- 2 9 LOCKOUT: Tests all LCD segments.
- 2 9 SCAN or 2 9 TURBO: Loads test frequencies into channels 1 - 21 and search limits.

Experimenters will be interested in these additional keystroke sequences we found, but we are not sure what function they perform:

- DATA MANUAL: Displays a value proportional to the battery voltage. Our BC220XLT displayed 1.67 on a freshly charged battery.
- DATA MANUAL, then a single digit 1 - 8: Displays numbers between 1.64 and 2.74, which can be varied using the UP or DOWN arrow keys. Could these indicate tuning voltages for the Track Tuned front end?

Good Performance Except for Images

The BC220XLT worked well and was easy to operate at home and on several field trips.

We measured and plotted the 12 dB SINAD NFM sensitivity (see graphs). Weak birdies degraded the sensitivity on some of the whole number frequencies, e.g. 35.000 MHz, 40.000

MHz, etc., compelling us to measure 100 kHz above whole number frequencies for a more accurate representation. AM SINAD sensitivity in the air band averaged about 1.1 uv at 60% modulation.

The BC220XLT uses a 10.8 MHz first IF, and it's no surprise that we heard images of signals 21.6 MHz above their proper frequency in the VHF-high and UHF bands. Image rejection measurements for our scanner appear in Table 1, and they fall in the same ballpark as the PRO-2040 we tested (see Dec. 1995 MT). Our BC220XLT had virtually no image rejection at 900.1 MHz, so we heard cellular phone images with no loss of sensitivity 21.6 MHz above their actual frequency.

The selectable Data Skip feature was useful in skipping dead carriers after a three second pause, but less effective on actual data channels. You cannot use Priority and Data Skip simultaneously, nor will Data Skip work while searching the aero band.

We are accustomed to setting the squelch control just beyond the threshold, but in this position, our BC220XLT required about 150 ms (milliseconds) to silence the audio after each transmission. The delay produced a long squelch tail, the noise burst at the end of each transmission. Further rotation of the squelch control shortened the squelch tail to 25 ms at the tightest squelch setting.

The audio quality from the 1-3/8", 1 watt speaker is good — much better than the Radio Shack PRO-43 or PRO-62 we tested (see Feb. 1995 MT). The top-mounted 1/8" headphone jack accepts the supplied earphone or sends audio to both sides of lightweight, 32 ohm stereo headphones.

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When I was a kid I found a coil which must have contained a thousand or more feet of very thin wire. I had read somewhere that the longer we make our antennas the more signals they should bring in, so I attached one end of this coil to my crystal set receiver. I was very surprised to receive—you guessed it—nothing.

Now, the wire I was using was all contained in a coil which was perhaps four inches long and one and a half inches in diameter; right then and there I began to suspect that the configuration of the antenna's wire (*how* you string your wire around) is important. If I had strung the wire from tree to tree, instead of leaving it in the form of a coil, it would have given me good reception, but it was so thin that this was impractical.

Luckily, I had also found about 150 feet of light-steel cable: I strung that up about 20 feet high, and it made an excellent antenna. The 150 foot antenna brought many stations in loud and clear on my crystal receiver.

Why did the 150 feet of wire make such a good antenna, although the much longer (but coiled up) length of wire I had tried did not work at all satisfactorily? We could say that the poor antenna, because it was smaller, had insufficient "signal capture area" (a sort of bastardization of the engineer's concept of "aperture") as compared to the better antenna.

It is usually true that larger antennas produce more signal output for a given signal input than smaller antennas do, but we must be careful to realize that this is not *always* the case. According to the capture area idea, a full-size halfwave dipole would encounter a larger portion of the incoming signal than would a small loop, and therefore the dipole would have greater gain (relative output for a given signal). Nevertheless the gain of the small loop can sometimes, if it is of the high-Q type, equal or even exceed that of the dipole.

And so, because an antenna's capture area is supposedly directly related to its gain, it would seem that the small loop has as large a capture area as does the larger dipole! Thus capture area is not necessarily equivalent, or even directly related, to the physical area of the antenna.

Gain is as Gain Does

Considering the above discussion we might conclude that we should always pick the antenna with the highest gain to get the best reception, right? Sometimes this is true, but often it is not. Consider the quarterwave groundplane antenna—an antenna with relatively low gain. This antenna is a great choice for nondirectional monitoring—except when you want to monitor weak signals; then its gain may be too low. Also, signals coming

from overhead are not received well by the quarterwave ground plane antenna (fig. 1A and 1B), and this obviously has nothing to do with the antenna's gain.

Now consider the horizontal full-wavelength loop; when used on shortwave this antenna excels at short distance, close-in communications, and is not a particularly a good DX performer. The foregoing facts say nothing about the gain of this loop or the groundplane antenna; it is the receptivity pattern of the antenna which dictates these variations in performance.

Did you know that receptivity patterns are formed by rearranging the antenna's capability to receive? To explain how this is done let's consider a nondirectional antenna. Imagine its all-around receptivity pattern as in fig. 1A and 1B. Then imagine that pattern to be made of clay. Take the clay and mold it into an elongated shape as in figure 1C and 1D. The antenna's pattern is now that of a beam antenna, and its receptivity is focused primarily in one direction.

The antenna designer does this molding of an antenna's pattern by configuring the antenna's elements such that they focus the antenna's receptivity into a pattern which is useful in some desired application.

Now consider the fact that any antenna you might use has *some kind* of receptivity pattern, and this pattern determines what coverage the antenna will give you in terms of compass direction (Figs. 1B and 1D) and in terms of the signal's angle of arrival (Figs. 1A and 1C). Note that if the signal which you wish to receive is not in a direction covered by the pattern of your antenna, that signal will not be received well, and possibly not at all.

And thereby hangs the tale of antenna directivity and gain: if the antenna you are using has a lobe which covers the directions (vertical and horizontal) from which the signals that you desire to receive are arriving, then your chances of receiving those signals are good; if the desired signals come from some other direction then the chances of your receiving them are poor. Gain is

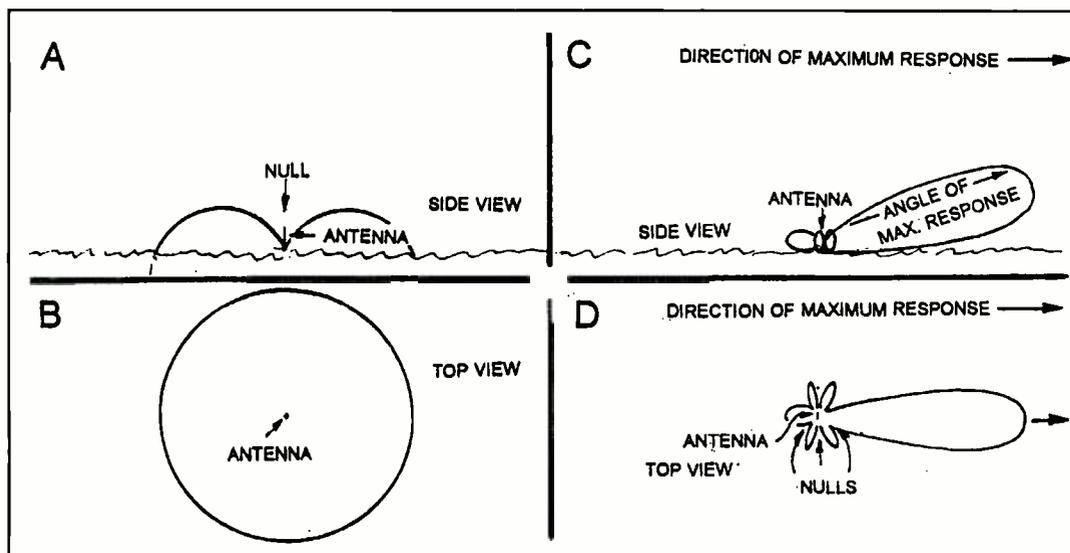


Fig. 1. Vertical and horizontal directivity patterns of a quarterwave groundplane antenna (A and B), and of one type of beam antenna (C and D).

important only if the signals are weak.

Generally, directive antennas have decent or better gain-levels, but not always. The table-top loop and the Beverage antenna are well-known exceptions to this rule. To illustrate the importance of directivity in antennas, many people who use these antennas don't realize that the table-top loop and Beverage are relatively low-gain antennas; the loop is actually *very* low in gain. The high performance obtained from these two antennas is due to their receptivity patterns. Their directivity rejects noise and interference so well that they can often bring the desired signal in much more clearly than less directional antennas which have much higher gain.

Again, size or length is not the determining factor here; a Beverage is hundreds of feet long, but the table-top loop is tiny compared to most antennas—and yet they are both champs *at the job they are designed to do*. And so, when we choose an antenna, we must think of the job we want it to do. Choose gain for weak-signal work, and choose directivity (or nondirectivity) for the direction and angle of arrival of the incoming signals you want to monitor.

RADIO RIDDLES

Last Month:

I pointed out that a halfwave dipole's radiation and reception pattern is much affected by its proximity to the earth's surface. Then I said "Although we are discussing the reception pattern of a halfwave dipole, the same pattern distortion occurs for most antennas as they come into proximity with the earth. Note that I said 'most antennas'; for what kinds of antennas is this pattern distortion not so prominent, and why?"

Well, as you might guess, in ground plane antennas, such as the popular quarterwave groundplane most of us have used, the groundplane part of the antenna is a "substitute" for the ground. Therefore their radiation patterns are affected relatively little by their height above ground. The same is somewhat true of antennas with a counterpoise, another type of ground substitute.

This Month:

The dipole and loop antennas mentioned above are very popular and useful in today's radio technology. What were the first antennas ever used in the work that led to our current technology?

You'll find the answer to this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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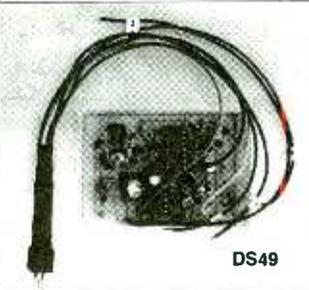
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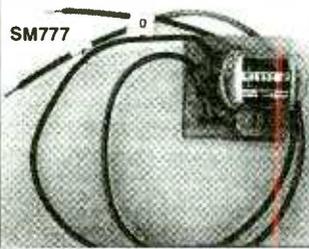
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(Continued from Page 4)

To add a bit of trivia: The USAF has a standard tail marking scheme, and that B-52 is an 'H model' from the 5th Bomber Wing at Minot AFB, ND. The planes stationed at Seymour Johnson are F-15E's, KC-10A's and T-38A's. Their tail numbers have a big 'SJ' displayed. Unfortunately the USAF does not have tail numbers 'ST.'

Hank Lichte via email

Scams that Won't Die

The February editorial was dead on about those plug-in antennas. I can vouch for the fact that every one I sell inevitably comes back. We refer to this type of item as a 'boomerang.'

Your RS pal, Nicolas Bello

Many years ago I recall reading ads similar to the one mentioned in the Feb "Closing Comments," as well as the enclosed item, and always wondered not if they could work, but how they worked. Fortunately, enough common sense prevailed and I never tried any of them. However, I have to wonder just how many readers will swallow not only the hook, but the rod and reel as well? Anyway, just thought you might like to see another 'miracle' of modern technology.

Mike Hardester, Jacksonville, NC



Bob Grove responds: "Mike enclosed an ad from the Wall Street Journal, Feb 14, 1996, sporting the bogus "Antenna Multiplier" from Haverhills, a prominent mail order company. We did an in-depth exposé of this scam several years ago. Pitched as a miracle replacement for real TV antennas, this nostrum was patented around the turn of the century, way before TV was even in-

vented! The only good thing about this flim-flam fake is its return warranty."

Editorial Direction

I think you tend to underestimate the abilities and interests of your readers. I think it would be safe to generalize that you assume your readers are not capable of or not interested in building station equipment. I believe this to be a mistaken assumption.

It is my belief that the radio listener who regularly reads a magazine such as *Monitoring Times* is a member of an elite minority ... You would do well to recognize that your readers have potential for upward mobility on the technical side of the hobby. Anyone who can understand the instruction books that come with some of the fancier receivers should be able to understand instructions on building simple station accessories which may not be readily available on the commercial market.

Jim Allen, N4DEE, Columbia, SC

I was very upset when I opened *DX Monitor* (the publication of the International Radio Club) and read a proposal to make it an electronic newsletter. Then I opened my *NASWA Journal* and page one says NASWA goes on the World Wide Web (just samples "of course"), followed by a proposal to make *NASWA Journal* an all electronic publication. This of course has nothing to do with you—or does it?

I have found that your magazine is an endless source of information for the SWL and MW enthusiasts. I appreciate your common sense approach to topics like receivers and antennas. I can see that computers can be a great thing for the radio hobby, but the computer junkies are trying to make the radio clubs into computer clubs.

Terry Jones, Plankinton, SD

I realize all things must change, but please let us not change the basic focus of *Monitoring Times* from radio and the abundant resource for information, expansion of one's own horizons, and the plain fun that sitting at the radio finding new things can be.

The computer world already has many magazines. There are presently only two US magazines covering all the non-amateur radio world ... and we should not lose one. Someone who wants to learn about computers is not going to pick up *MT* to learn about [them], but someone who just got their first scanner or shortwave radio will wonder if there is any resource available that might teach them about this exciting area they are about to explore. It

would be a shame and terrible loss if, when they picked up *Monitoring Times*, all they were to see would be articles about computers.

Allan Rosewarne, Rolling Meadows, IL

I wanted to thank you for Bill Cheek's series on computers. Those of us who have been hacking away for years at computers now have something to refer people to for information. Like others, I am deluged with requests for basic questions. Bill's series is immensely useful. Please give some thought to offering reprints.

Dan Beach via email

The debate between the "hard core" Internet surfers and radio buffs will not end anytime in the near future. Certainly, there must be room in this world—and in *Monitoring Times*—for both hobbies, especially considering the many ways in which the two have crossed paths, from packet radio to the real-time audio datastreams of the World Radio Network on the Internet.

None of us needs to "defend" our favorite hobby at the expense of another pastime: Net surfing is not in "competition" with radio, as though there were some insidious attempt to abolish signals which travel through the air.

We have our share of boors and saints in both of our hobbies. What we have in common is that those of us who truly love computing or radio will always be among the first to say, "Let's take the top off this thing and see how it works!"

Paul Sadek, Sioux Falls, SD

From the Editor

I am in perfect agreement with Paul Sadek, and couldn't state our editorial philosophy any better than he has.

To illustrate his point, let me plug an internet site that should appeal to those who love to collect and "take the top off" of old radios. <http://members.aol.com/caschwark/index.htm> belongs to Chuck Schwark of Chicago, Illinois. Not only does he have a nice display of his collection, but he includes links to many other related sites and clubs as well.

See you in May for more great monitoring times.

—Rachel Baughn
mtditor@grove.net

We often hear how much readers enjoy reading about the experiences, tips, and opinions of other hobbyists. Why not share yours? Letters may be edited for brevity and clarity.

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High Seas Hi-Jinx

Although much of the maritime digital traffic has shifted to the use of satellites, there is still a bonanza of traffic to be monitored in the HF Marine Bands. For all practical purposes (with the exception of vessels of the former Soviet block) all HF digital traffic utilizes one of the two SITOR (Simplex Telex Over Radio) modes.

SITOR-A (also known as ARQ-Automatic Request) is used by individual shore stations and vessels when communicating with each other. The signal has a characteristic "chirping" sound when transmission is actually taking place. All channels are duplex in nature, with the shore station transmitting on one frequency, while the vessel transmits on another.

SITOR-B (also known as FEC-Forward Error Correction) is used by shore stations to transmit to all vessels in their coverage area. This signal has a characteristic "singing" sound during idling periods. Such transmissions may include the latest news, weather, sports and financial information, as well as traffic lists advising vessels that they are holding messages for them. The use of automated response systems now makes it possible for ships to pick up their messages from their "mailboxes" without the need for human radio operator intervention.

The following is a brief sample of the types of digital traffic that can be monitored:

■ U.S. Coast Guard Marine Information Broadcasts

The daily USCG broadcasts from NMF CG Boston (HYDROLANTs) provide a wealth of information on what is happening on the world's oceans. Everything from vessels in distress, to persons overboard, restricted areas due to Shuttle launches, worldwide military exercises, non-operation of beacons and buoys, cable laying operations, oil rig movements and containers adrift may be encountered in their traffic.

CG NMC San Francisco provides the equivalent HYDROPAC information for the Pacific and Indian Oceans.

SITOR-B 100/170 12585.5 kHz
17:00 UTC 1/27/96
CQ DE NMF NMF NMF CG MARINE
INFORMATION BROADCAST
////////////////////////////////////
HYDROLANTs////////////////////////////////////
HYDROLANT 186/96(24). SOUTH
ATLANTIC-BRAZIL.
1. VESSEL SULAPA, BLUE AND WHITE,
FIVE PERSONS ON BOARD, REPORTED
ADRIFT 15 MILES SOUTH OF ILHA

GRANDE. VESSELS IN VICINITY REQUESTED TO ASSIST IF POSSIBLE.
BT

HYDROLANT 182/96(53). LIGURIAN SEA. NORTHWESTERN ITALY. ROCKETS. 1. ROCKET FIRING EXERCISES 1300Z TO 1900Z DAILY 29 AND 30 JAN IN AREA BOUND BY 44-00.7N 009-35.0E, 44-03.5N 009-51.2E, 43-50.0N 009-59.0E, 43-50.0N 009-47.0E.
BT

■ AT&T Coastal Stations

Anyone who has tuned the Maritime Bands has surely encountered the AT&T stations of WOO (Ocean Gate Radio), WOM (Mobile Radio), and KMI (San Francisco Radio).

WOO AT&T Broadcast Frequencies		
ITU Chan	Coast-TX	AT&T Station
405	4212.5	WOO
629	6328.0	WOO
834	8433.0	WOO
1307	12632.0	WOO

These radiotelex broadcasts can be used to activate an alerting SELCAL device when a telephone call is waiting for someone on board the vessel shown in the traffic list. Special receiving equipment is required on board the vessel for this function. For the latest information about AT&T SELCAL systems, call collect via AT&T to 1-201-644-8046.

Traffic lists are sent continuously. WX and high seas information scheduled broadcasts are as follows:

Station	WX	Information
KMI	ODD UTC HR+20	EVEN UTC HR+20
WOM	EVEN UTC HR+40	ODD UTC HR+40
WOO	EVEN UTC HR+20	ODD UTC HR+20

■ Globe Wireless - The New Kid on the Block

The Globe Wireless Network may be the new kid on the block, corporately speaking, but some of its stations have been around for years. Among the old-timers are KFS (San Francisco Radio) and WNU (Slidell Radio). Existing stations at St. John's, Nfld, Canada (VCT), SAB in Sweden, and ZLA in New



Photo courtesy of C. Brown, Radio Operator, SS Guadalupe

Zealand were annexed. New facilities were opened in Hawaii (KEJ), and the company plans further expansion.

SITOR-B 100/170 12607.5 kHz
15:02 UTC 2/01/96

HELLO ALL STATIONS.

THIS IS THE GLOBE WIRELESS NETWORK - SELCAL 1094

NEW ZLA FREQ - ITU CH. 1602 - 16807.5/16684 KHZ

NEW KEJ FREQ - GW CH. '501' - 4300.4/4154.5 KHZ

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626 627 632 802 803 819 830 837 838
1202 1203 1219 1257 1263 1265 1291
1347 1602 1647 1657 1673 1676 1691
2203

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3EBS5 3EDB3 3EGT5 3ELT5
5MZH 9HWW4 A8XQ HOYT
J8LJ9 KCGH KNLO KQ2XVJ0
LAEY4 P3CH3 P3WC4 TCEI
UBDK V7CR WBM6176 WGJT
WSLH YDLR YQKE
01 1449
WNU SITOR 1257

WNU often ends its traffic broadcasts with humorous news items, albeit sometimes a little morose in nature.

CAIRO—AUG. 1—ELEVEN PEOPLE DROWNED YESTERDAY WHILE TRYING TO RESCUE A CHICKEN THAT HAD FALLEN INTO A WELL. AN 18-YEAR-OLD FARMER WAS THE FIRST TO DESCEND THE 60-FOOT SHAFT IN A VILLAGE 240 MILES SOUTH OF CAIRO. HE DROWNED. HIS SISTER AND TWO BROTHERS WENT IN, ONE BY ONE, TO SAVE HIM. THEY ALSO DROWNED. TWO ELDERLY FARMERS THEN CAME TO HELP. THEY DROWNED AS WELL. LATER, SIX BODIES WERE RETRIEVED. THE CHICKEN WAS ALSO PULLED OUT - ALIVE.



Love on the High Seas

The following intercept is from an English merchant navy officer on a vessel communicating with Portishead Radio. The message was addressed to a newspaper in England with a "Companions Wanted" column. He gave instructions as to the number of times the ad was to be run and kindly provided his VISA number, bank, and name and address. The text of his advertisement read as follows:



Lonely Seafarer Seeks Soul-Mate

WATER SIGN/LIBRA LADY, 5'0 TO 5'7, 24 - 34. CAPRICORN MERCHANT NAVY OFFICER 35, 6'1 SEEKS SPIRITED SOULMATE FOR TRAVELS AFLOAT AND SOJOURNS ASHORE. IF YOU LIKE THE SEA, ARE FREE TO TRAVEL, AND OPEN TO NEW EXPERIENCES, PLEASE REPLY BOX . . .

At 6'1", I wonder what he's got against women who are over 5'7"? (If any MT readers care to reply, you can contact me for the actual box number and newspaper's address!)

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The Kiwa SW PreAmp is a high performance preamp optimized for the SW frequencies. The important features include dual antenna inputs (high and low impedance inputs for longwires, slopers etc.), the Kiwa BCB Rejection Filter to eliminate any BCB interference and a low noise amplifier for outstanding low-level signal performance. Gain: 10 dB (1.8 to > 30 mHz) • Noise Figure: < 4.0 dB Third Order Intercept ICP₃ (without BCB Filter): +34 dBm

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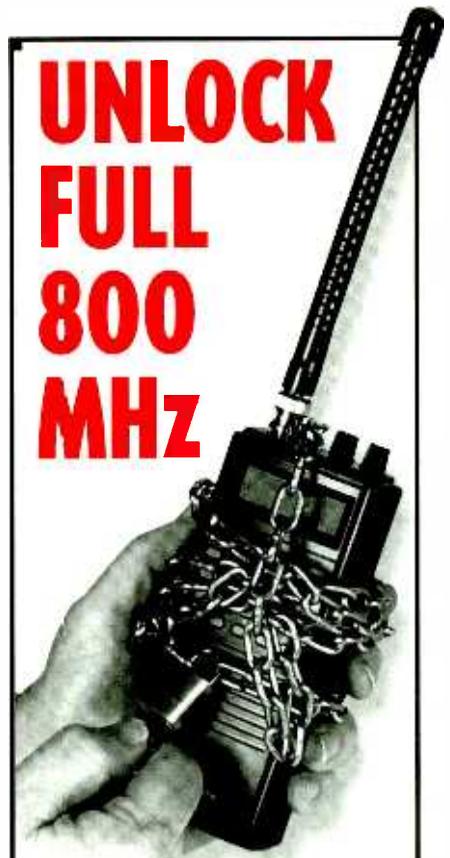
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Q. Why are there grounding pins (the third wire) on some appliances, but only two on others? (Hugh Waters, Singapore)

A. Shock hazard is the issue, and the electrical code specifies the construction and use of the equipment or appliance in question. That third wire is attached to earth ground, as is the third wire coming in from the power line. Simply stated, if the case and all touchable parts are well insulated from the "hot" wire, then the third wire ground is not necessary. In the case of metal enclosures, however, shock hazard is a distinct possibility and a third wire ground is required.

Q. Does Europe use the same broadcast bands we do for medium wave and FM? (Robert Brock, Phoenix, AZ)

A. Nearly identical, with one addition: 150-290 kHz. They also have 520-1620 kHz (9 kHz spacing on these first two bands) and 87.5-108 MHz (200 kHz spacing).

Q. Some frequency counters have readout with storage capacity. Do these units have decent reception range when connected to an outdoor antenna? Why can't they serve as a receiver to home in on various signal frequencies? (Lori Beckhart)

A. Frequency counters are nothing more than sensitive amplifiers with internal electric pulse counters capable of registering on a display the number of pulses per second (frequency in megahertz or kilohertz) being radiated by a close transmitter. As such, they have no frequency discrimination whatsoever; the closest (strongest) signal is the frequency the display will show.

If you attach a frequency counter to a large antenna it will display a garbage reading, a composite of all the signal frequencies it is getting at that time. For this reason, frequency counters are designed with poor sensitivity and thus have limited range. They are test instruments intended to measure the frequency of a known, adjacent transmitting device.

A scanner or other receiver is designed to

pick up just one frequency at a time, filtering out the rest so that they won't interfere with the target signal. Thus, you can put a scanner on an outside antenna and it will discriminate among the mire of signals, picking out the wheat from the chaff.

Q. I have heard that there are two schools of thought on the question, "Does current travel from positive to negative, or negative to positive?" What are your thoughts? (Mark Burns, Terra Haute, IN)

A. Our old friend, Ben Franklin, decreed that current flows from positive to negative. He was wrong. He was a statesman, tinkerer, printer, and philanderer, but he didn't know diddly about electrons. Fortunately, from a mathematical and computational standpoint, the direction of current flow doesn't make any difference whatsoever.

But let's nail down this myth once and for all. Since electrical current is defined as the density of electron flow, and for electrons to flow they must be attracted to a positive charge, it is obvious that current flows from negative to positive. Period.

Q. Please settle this friendly argument with a hobbyist friend. She says that the rules for "skip" reception and propagation are the same for shortwave frequencies as for scanner frequencies; I say they're different. Who's right? (Maryanne Kehoe, Atlanta, GA)

A. You are. "Skip" is the property by which radio signals are bent, absorbed, or reflected by various layers of our electrically charged atmosphere (the ionosphere). The lower frequency shortwave signals are altered differently from the higher frequency scanner signals. As you pointed out in your letter, there are seasonal differences as well due to the angle of the sun as well as the electrical effects of thunderstorms.

Q. I can't seem to find blimp operations frequencies. What do they use? (Robert E. Brock, Phoenix, AZ)

A. A variety of air-to-ground, FAA tower, business, and flight test, depending upon the

Cellular

Restoration for the PRO2035 and PRO2042 Scanners

One of our readers sent in a software code which, when entered into the Optoelectronics OS535 computer interface, will restore the missing cellular telephone frequencies in the discontinued Radio Shack PRO2035 and the current model PRO2042 base/mobile scanners.

If you have Scan Star Plus, version 5.56 or later, or the current version of ScanCat Gold (free update for pre-1/30/95 versions from Computer Aided Technologies by sending request with registration card), it will support the restoration by entering the following 20-digit string: 275 681 149 364 630 538 49. As we understand it, the code was originally reserved for enabling the missing frequency range in units provided for qualified government agencies.

Bob's Tips of the Month

Button the Beartracker Beep

Opinions are divided on the desirability of an audible beep on scanners every time a function is attempted. For those who want the best of all worlds, and who own one of the Uniden BCT-7 Beartracker scanners, *MT* reader Jerry Davidson of Pennsauken, New Jersey, offers hope.

When the little scanner is first switched on and goes through the self test for the warning system, it emits a loud beep. Jerry advises fellow listeners to press one of the service search buttons while switching on the radio and the beep will not sound. Isn't that easy?

Jerry also noted that the instruction manual fails to mention that you need to use the zeroes and 29-30 MHz segment search when clearing a 29-30 MHz user-programmed frequency. Thanks again, Jerry, for sharing your findings with fellow radio hobbyists.

craft and its mission. The Goodyear blimp, for example, has been reported on 151.625, 161.640, 161.700, 132.000, 467.750, and even using amplitude compandered sideband (ACSB) on 151.6125 MHz.

Q. Is anyone other than Sony producing a satellite receiver like the Sony Starman? (Arsenio Fornaro, Brooklyn, NY)

A. No, not even Sony, since the satellites have not yet been launched.

Q. Mathematically, how can I figure out where an image is coming from (Ryan J. McCarthy)

A. In modern, triple conversion receivers, there are several potential images for each signal, so let's discuss the simpler, single conversion, AM broadcast radio where the receiver's local oscillator (LO) mixes with the incoming radio frequency (RF) to produce an intermediate frequency (IF). For example, let's take a typical case—a medium wave receiver. The broadcast band is typically converted from its 530-1700 kHz RF to a 455 kHz IF by tuning an LO from 985-2155 kHz (985-530=455, and 2155-1700=455); the signal is then amplified, filtered, and detected for its audio.

But that's only half the story. When the IF is produced by mixing the LO with the RF, it can do it by their sum AND their difference. This can produce a problem: If two local stations are separated by exactly 455 kHz—one higher and one lower than the LO in frequency—they will BOTH be heard. When the LO is adjusted to 1105 kHz, you will hear a signal on 650 kHz right along with one on 1560 kHz. The one we don't want is called the image.

In a well-designed receiver we use frequency-tracking tuned circuits and up-conversion to select the signal we want as well as to reject the one we don't. To reduce images, modern shortwave receivers use up-conversion to typically 45 or even 70 MHz. This removes the image frequency so far from the radio's frequency-selective circuitry as to make it virtually inaudible.

Scanner manufacturers do the same thing, but with extremely wide-frequency radios, some images remain in the passband of the normal receiving range. This causes signals to be heard on frequencies on which they aren't actually transmitting, and allows cellular frequency reception on scanners in which that band has been factory deleted.

Q. I sometimes listen to the same aircraft frequency on two multiband radios. I may hear aircraft on one (but not the other) and no reply from the ground. Will Larry Magne ever be reviewing AM/FM multiband radios?

A. I hope not. Aside from the fact that Larry reviews only shortwave receivers, the little over-the-counter radios that offer AM and FM broadcasting, police band, aircraft, and so on have poor sensitivity, awful image response, dreadful dynamic range, lousy frequency accuracy, and miserable frequency stability. But they are cheap, some of them are colorful, and they make noise.

Aside from their general unsuitability for listening to communications, part of the problem you report is due to their sitting in two different places, so their antennas are receiving signals differently. Another reason is that an airborne radio signal is line of sight from you, making reception rather easy, while the airport tower antenna is quite low, making reception difficult beyond 15-20 miles, even with an outside antenna.

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

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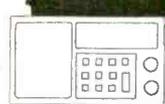
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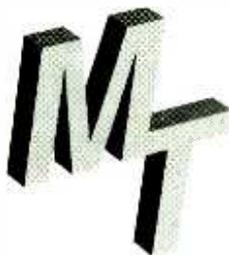
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The Telecommunications Act ...More protection than we want?



While many of us decry the increase in offensive material on TV, talk radio and computer networks, we may wonder whether the government's recent enactment to impose more regulations is more than we can stand. One observer wryly observed that under indecent language sanctions of the Communications Decency Act (CDA) penned by its fundamentalist sponsors, even the *Holy Bible* could be banned from the Internet. There are even more frightening scenarios.

Under the proscriptions of this ill-conceived legislation, life-saving medical advice, such as information on breast cancer and sexually transmitted diseases, could be forbidden. Classical works of art—Michelangelo's magnificent Sistine Chapel paintings, Greek statuary, and countless others—could be banned as well.

In 1934 Congress enacted the Communications Act which created the Federal Communications Commission. Now, more than 60 years later, the largest-ever overhaul in telecommunications is taking place. Is it evolving smoothly? No. Does Congress have a good understanding of it? No. Do you and I know what's really going on? No.

Why were there no public hearings prior to the passage of the pending Act? Why did the vote come one day after the Bill was released from committee, before legislators had a chance to read it? Was it, perhaps, really a polyglot of special interest concessions awarded as a political plum to key Washington lobbyists to assure their support during an election

year? Was this hasty legislation aimed at winning votes from an idealistic electorate rather than providing real decency protection to mainstream America?

Is there really a "For Sale" sign in the halls of Congress? Are cynics correct in their assessment of Washington's Political Action Committees (PACs) buying favors from our elected officials, i.e., that the main difference between prostitution and politics is that politics is legal and pays better?

Many hidden agendas seem to be covered by the Bill, such as the deregulation of cable and long distance providers (will this encourage the reformation of monopolies?) and V-chip blocking of nasty TV programs (as defined by whom? Howard Stern? Jesse Helms?).

But there is hope on the rational horizon. Telecommunications experts suspect that the legislation isn't even legal and that the courts will strike it down. A coalition of 22 professional associations and organizations has filed a sweeping lawsuit in the United States District Court, Eastern District of Pennsylvania, challenging the constitutionality of the CDA. They charge that its wording is imprecise, that it makes no distinction between materials appropriate for a five-year-old child and a 17-year-old college student, and that its restrictive working abridges constitutionally protected expression. A federal hearing was scheduled for March 21, 1996.

Stay tuned.





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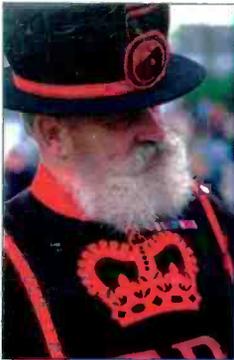
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