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Monitoring Times

The Full-Spectrum Radio Magazine
A Publication of Grove Enterprises, Inc.

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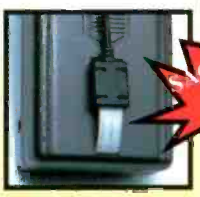

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Monitoring Times™

Vol. 15, No.5 May 1996

CONTENTS

Cover Story

Anchors Aweigh for Great DX

By Jim Pogue

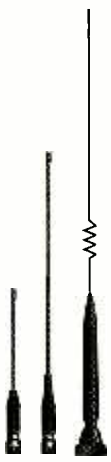
"Any navy incapable of communicating effectively is probably not capable of mounting any kind of successful operation," says author Pogue. For warships far from home, communications are critical. Although most of their traffic is passed via satellites, the shortwave utility listener will find plenty to fill his logbook. To get started, turn to page 9 for frequencies and information on the U.S., Canadian, British, German, Australian, and New Zealand naval forces.

The ship on our cover is the HMS *Endurance* Ice Patrol Ship, being guided through icebergs by one of her Lynx helicopters while undertaking survey work near Antarctica. The award-winning photographer is Brian Bower.

DEPARTMENTS

Reviews:

The long-awaited results are in: Magne's review of the Drake R8A appears in this issue on page 98. So is it better than its predecessor? Yes and no. The significant improvements in ease of operation will probably outweigh the few areas of decreased performance for all but the most discriminating.



Three antennas from ANLI are tested by *MT*'s publisher, Bob Grove. Although the RD8H, RD78H, and AT-2 antennas are designed for amateur VHF/UHF work, they are excellent performers for scanners as well. See page 96.

Is your computer radio-controlled? Continuing his look at hardware accessories offered by Computer Aided Technologies, Catalano checks out three squelch adapter options (p.90).

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Weather Stations/Scanners/CB

New Products Available

Now, purchase your police radio scanners, short-wave radios, weather forecasting equipment and more directly from Communications Electronics Inc. Your **free fax-on-demand catalog** including unadvertised specials is instantly available by calling 313-663-8888 from your fax machine.

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

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CB/Ham Radios

A National Weather Service receiver with automatic emergency broadcast activation has been added to the legendary Cobra 29 CB radio. The integrated receiver in the Cobra 29LTDWX will automatically activate to receive emergency announcements about severe weather and travel conditions across the United States and Canada.

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Cobra HH40-Y CB 40 channel handheld transceiver $99.95
Maxon GMRS210+3-Y GMRS transceiver $199.95
Ranger RCI2950-Y 25 watt 10 meter transceiver $239.95
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Uniden GRANTXL-Y SSB CB Mobile $139.95
Uniden PRO538W-Y CB & Weather $59.95

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Bearcat 220XLT-Y handheld/SPECIAL $207.95
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Sportcat 150-Y handheld with 800 MHz. .. $151.95
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Bearcat 80XLT-Y handheld with 800 MHz. $134.95
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LETTERS

System Survey

In the February "Letters to the Editor," we invited readers to report to *MT* about the type(s) of communication system used by their local public safety agencies. Following is one response, received by fax from the staff at "Scanning Illinois."

"We are big fans of *Monitoring Times* and were just dropping a line to say keep up the good work... Here are some answers concerning 800 MHz. The Joliet police use a conventional 800 MHz system, and they frequently have problems, such as open keys all the time. So bad is the system that I personally have heard both dispatchers and police complain (on the air!) about the system. It is an analog system, non-trunked, very weak signals, especially in the fall and early part of winter. All communications are in the clear, and accessible by the public.

"Recently, Will County OEM attempted to move all radio systems in the county into a trunked system. However, voters did not want a surcharge added to their phone bill, so that's how it stands, but things could change overnight. Take care all, and let us hope to stay up with radio communications. We in the scanner hobby will not go away, we WILL be able to listen in!" — *Alex Blaha, publisher, and staff of Scanning Illinois*

Columnist Rich Barnett has carried my query one step further. He would like to compile a report on the systems used by communities around the U.S. To the best of our knowledge, this type of survey has never been done, and could be quite informative—for the hobby, for communities that are investigating their options, and for the industry. See page 30 for the questions he'd like our readers to answer.

Every scanner buff also owes it to himself to read Barnett's lead story on Winston-Salem, North Carolina. Copy this one and show it to your local officials; there *are* alternatives to cutting out public access to police and fire communications, and Winston-Salem has been leading the way!

Don't Forget Radio Budapest

David Fink, editor of *Hungary Today* from Radio Budapest, writes, "On page 10 of the February issue of *Monitoring Times*, there is a list of English language shortwave sources for news on Operation Joint Endeavor. I was disappointed to see that the author failed to mention Radio Budapest.

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This confirms reception of a transmission originating from our site in Antigua W.I.

DATE			TIME UTC		FREQUENCY	NETWORK
DD	MM	YY	FROM	TO	kHz	BBC OR DW
03	08	95	0456		5975	BBC World Service

December 4, 1995 .....
Company Manager

Sharon Cenna of Westlake, Ohio, sends in a copy of a verification letter from the Caribbean Relay Company. She says, "This is my first try at a QSL. It is exciting!"

"As your readers may know, Kaposvar, Hungary, is the site of the staging area and logistics center for the American force in Bosnia. This is a story Radio Budapest has followed closely. In fact, one of our reporters was on assignment in Kaposvar throughout December and into January, filing daily reports. Since then, we've continued to air stories on a regular basis ... Your readers might want to tune in."

Thanks, David, for reminding us of the fine coverage to be found on Radio Budapest, which aired specials in February and April. Listen for station announcements of other upcoming features on peacekeeping in the Balkans.

Your Wish is Granted

• "I read with great interest the "wish list" on p. 4 of the March issue. One of the items was for a TV-audio radio covering the full spectrum of TV transmissions.

"The Radio Shack 'Portavision 55' came out in late 1982, I think, but did not last long. I have one of these beauties and it covers AM-FM, plus TV Channels 2 to 83. The reception on the UHF channels is fine. Unfortunately, here in Palm Springs, you need cable TV to get anything, so my radio sits idle except for AM and FM or if I go on a trip and take it with me.

"It's my impression that this model was withdrawn from sale in a rather short time and I have not seen a new or used model of it for sale since I bought mine."

Milt Kosberg, Palm Springs, California

• "What's so complicated about an audio-only VCR? Take a standard VCR, switch to Line input, and plug in the audio cables. The sound quality from a stereo hi-fi VCR is excellent.

"To make things even better, I use a second VCR. This one is old and mangles tapes, but still has working electronics. I take the video from its Status display (time and date) and plug that into the video line input of my good VCR, to go along with audio. Result: perfect on-screen logging of reception times. Being a radio person, I almost never record TV programs!"

Peter Olsen, Oakton, Virginia

Station Identification

"I thought some readers might be interested in how I check and verify frequencies, departments, and localities. I have a Bearcat 890XLT which I use for checking a specific frequency. I program in the frequency, and cable the scanner to a VOX (voice operated) tape recorder. This cable plugs into the Aux jack in the back of the scanner and goes to the remote jack on the tape recorder. The tape recorder does not start until there is a hit on the scanner.

"My recorder also has a function called ALC. This is an automatic level control which means that you can have the external volume turned completely down and it will still record at the preset level.

"When I have enough info (usually you can tell by the counter), I play the tape back and note all the pertinent information. Then I turn to my computer. I have two phone book CDs, a frequency CD, and a map CD. Most of the time this provides enough info to pinpoint

(Continued on Page 104)

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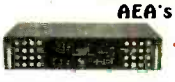

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Note: Std. COPYCAT Does Not Support Radio Interface

NEW COPYCAT-PRO FEATURES

- Control BOTH your TNC and radio simultaneously! Send commands to TNC and at same time, send frequency and mode to radio!
- NEW! Multiple pop-up windows for HELP, frequency files, and text editor. Instantly go between any of three windows with single keystrokes.
- Supports ALL SCANCAT frequency file formats, or create your own!
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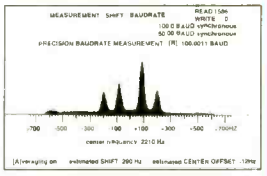

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- SWED-ARQ-SWE
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- ARQ-N-ARQ1000 Duplex Variant
- ARQ-E3-CCIR519 Variant
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- TDM342/ARQ-M2/4
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- Hellschreiber-Synch/Asynch
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Dial 911

It was a terrible accident with an unusual ending. In Clifton Park, New York, the driver of a tractor trailer pulled out in front of a 1986 BMW. In a flash of screeching tires and ripping metal, the BMW slammed into the side of the truck, lodging itself completely under the trailer. When the smoke cleared, a telephone was ringing at the local 911 center. From inside the crushed car, the driver had picked up his cellular phone and called for help.

The Beemer, which officials described as "destroyed," was extracted and the driver sent to the hospital, suffering from minor injuries. The driver of the truck was charged with failing to yield the right-of-way. The pilot of the BMW got a citation for driving too fast for conditions.

Don't Dial 911

New Hampshire rescue workers are complaining about the explosion of cellular phones on the state's mountains and hiking trails. The problem is that people often gain a false sense of security from the phones and exceed their personal limits—and common sense. This endangers rescue personnel as well.

Officials cite the recent case of Richard Mandia and Cindy Lawrence who started hiking up Fume Mountain in snow and freezing rain. The two were equipped with only a tent, sleeping bags, a heater, and a cellular phone.

"About 5 o'clock Sunday morning, we get a 911 call from the girl saying that the man is suffering from hypothermia.

A rescue expedition was organized and the team headed up the mountain, first on snowmobile and later on snowshoe. Toward the peak, rescuers met the two walking down the mountain, "neither suffering apparent long-term effects."

"We have the obligation to respond," says one rescuer. "But people need to understand that it's their responsibility to try everything that's possible to save themselves before calling out a rescue party on the cellular phone."

Radio Canada Granted Reprieve

Ian McFarland put it into words in his March feature when he asked "will they simply be getting a reprieve for a year and have to go through all this unbearble agony again in early 1997? The possibility of that happening is as unthinkable as RCI's possible demise." But that's exactly what has happened.

Deputy Prime Miister Sheila Copps has said, "The enormous outpouring of support for RCI, both within Canada and around the world, has persuaded us that this is a vital voice for Canada which we must maintain." The Coalition to Restore Full RCI Funding points out, however, that the government has not guaranteed any long term funding, has not authorized a separate budget, nor has it really committed Canada to having a permanent international radio service.

What can you do? Continue writing to say why Canada needs an effective, strong voice on the international stage. Tell the government how RCI has helped you and your family, friends, and business associates. Write to: The Right Hon. Jean Chretien, Prime Minister of Canada, Ottawa, Canada K1A 0A6; fax (613) 957-5556; The Hon. Sheila Copps, Minister of Canadian Heritage, Ottawa, Canada K1A 0A6; fax (613) 992-2727.

Valuable Frequencies

The frequency auctions currently going on in Washington may not be popular with broadcasters but no one in the government is complaining. According to *Radio World*, as the 13th round of bidding came to a close, the net revenue for the latest broadband Personal Communications Services (PCS) auction totalled $3.3 billion.

PCS licenses are being sold for uses in a variety of mobile services including portable phones, faxes and other imaging devices. Bidders are competing for 493 Basic Trading Area (BTA) broadband licenses in markets throughout the United States.

Some Fun, Eh?

Another mayday rang out from the frigid Atlantic waters off the coast of Massachusetts. As always, the Coast Guard responded, launching rescuers from Boston, Gloucester, and Air Station Cape Cod. The problem was that the mayday was a fake. Everyone headed home. Not too long afterwards, police heard a man bragging on his CB about making a false distress call. The man, an 18 year old living at home with his parents, was not arrested, but Coast Guard officials say that sending false distress signals is a violation of federal law and that charges are possible.

CB Fun

The names and location have changed. But the story is the same as the story we ran in April.

This month's CB operator is Jon Loveless. Loveless, a self-employed, 34 year old janitor, took to the CB airwaves when he moved to Vancouver in 1994. Immediately, complaints of interference began. "Brander"—Loveless' CB handle—began coming through loud and clear on phones, stereos, computers, and TVs. When neighbors reported Loveless to police, he retaliated with profanities, goading the neighbors.

Once, Brander started singing the old party song, "999 Bottles of Beer on the Wall." By the time he got to verse 340, the neighbors had had enough. A judge who heard the resulting court case said that the broadcasts "have the mark of someone who's seriously disturbed."

Loveless was sentenced to pay a $200 fine, spend two days in jail, and eight days on a work crew. He is appealing the conviction.

New Phones Hung Up

Pacific Bell Mobile Services has spent $1.7 billion in a new digital wireless phone system for the San Diego, California, area. Permits were already obtained for 42 antennas when a problem arose.

The system, called PCS 1900, allegedly causes hearing aides to produce a loud buzzing. City Council then put the remaining 12 tower permits on hold. The whole issue gets murky because several critics of PacBell's technology are reportedly backers of competing technology, called code division multiple access or CDMA.

"We've heard truths and half-truths, and we've read things that are lies (on the issue)" says Councilwoman Valerie Stallings. "It casts some real doubt..." PacBell had wanted to have the system up and running in time for the Republican National Convention in August.

Pirates Ahoy

The network of low-power pirate stations seems to be growing at a dramatic rate, and while the FCC seems to be keeping pace, its once legendary iron fist seems to have turned a bit softer. 87X is now on the air in Ybor City, Florida, with "something offensive for the whole family." DJs Billy Budget and Kelly Combat were shut down last month but vowed to return to the air again within days. No penalties were assessed.

In New York's East Village, Steal This Radio on 88.7 is run by a mix of street people, community activists, and electronic hobbyists. Steal This Radio took to the air to protest the eviction of squatters from two buildings on East 13th street. It operates now from a roving van with shows like "This Old Squat" (a parody of the PBS television program, "This Old House"). It has not yet been shut down.

Lutz, Florida, has been the home of Arthur Lonnie Kobres' station. Kobres has been on the air for a year on 96.7 FM with details of an impending new world order.

In the last four published accounts of low-power FM pirate stations, an FCC official is quoted as indicating that either prosecution is unlikely or ineffective (because the broadcasters have no money). In the case of Kobres, *The Orlando Sentinel* quotes FCC Engineer-in-Charge Ralph Barlow as saying that the FCC is unlikely to seek fines or prison terms unless operators of unlicensed stations do something dangerous, such as airing fake emergency signals or interfering with air traffic control transmissions.

Scanner Heroes

• A high school scanner listener from Hartford, Connecticut, was on the receiving end of a $1,000 reward, a nomination for a civic award, and lots of publicity. Sixteen year old Liam O'Rourke overheard a police radio transmission describing a vehicle sought in the robbery of a local bank. When the suspect drove by a few minutes later, O'Rourke followed and got a description of the suspect and his license plate number. He even pulled up next to the vehicle at an exit ramp to get a better look at the suspect's face.

As a result of O'Rourke's action, Alvin Robertson, a seven-time bank robber out of prison only eight months, was arrested. "I don't really feel I did anything that big," said O'Rourke, "I didn't want anyone doing anything wrong in my town."

• In Topeka, Kansas, two citizens in a truck heard a report of a robbery on their scanner. When they saw a car matching the description given out by police, they used their cell phone to call police who stopped the car. Four people were arrested. Police think the suspects may have had a hand in as many as 15 recent robberies in the area.

Repeat after me: "People should not be able to listen to scanners. People who listen to scanners are bad..."

Motorola Takes Loss

Citing increased cell-phone competition, Motorola posted a big drop in profits. Their stock fell some 45% from $78 to $45.

Radio Rescue

A new safety feature in some General Motors cars automatically uses your cell phone to call for help when the airbag is deployed. It goes one step further, too. Using GPS (Global Positioning Satellites), it also tells emergency personnel where you are located. The unit also works when the car is stolen, telling authorities the vehicle's exact location when activated.

A Strong Mail Reaction

The *W5YI Report* says that a San Diego man, upset that Radio Shack took his name and address and sent him promotional mailings, sued the company. According to the story, the customer reportedly asked the company not to send him any unsolicited mail. He wrote these instructions (along with a $1,000 breach of contract clause) on the back of a check which Tandy cashed.

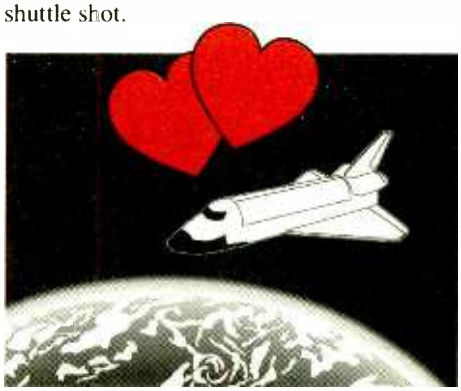
When five Tandy Computer City flyers arrived at his house, he took the company to court for $5,000. The judge did not buy the $5,000 claim but, surprisingly, did award the man $1,000. We wondered how you would write this one up ... assault with a deadly mailer?!

On the Move

The U.S. Federal Communications Commission has finally signed a lease that will move the agency's offices to the Washington, DC suburbs. FCC Chairman Reed Hunt then celebrated the moment by telling Congress that he needs an additional $59 million dollars to make the move and handle additional expenses regarding the telecom bill. That's a 26% raise over last year's allocation for the FCC.

A Marriage Made in Heaven Space

It's a first for ham radio and a first for the United States space program. N5RAW (Steve Nagel) and N5RAX (Linda Goodwin), both astronauts, have married. The two fell in love after flying together on STS-37 in April of 1991. Both have operated the Shuttle Amateur Radio Experiment from space; Linda was scheduled to be aboard last month's shuttle shot.



"Communications" is written by Larry Miller with help from Rachel Baughn and the following members of this month's *Monitoring Times* Monitoring Team: Dave Alpert, New York, NY; Albert Bakell, Metarie, LA; George Beard, Kansas City, KS; Art Blair, Orangevale, CA; Robert Coburn, NH; Charles Hardy, Jr., Boston, MA; Maryanne Kehoe, Atlanta, GA; Kevin John Klein, Appleton, WI; Suzi Liff, Freehold, NJ; Paul McDonough, Somerville, MA; James McDonald, Soldier, KS; Bob Miller, San Diego, CA; Edward Miller, Madison, WI; Alan Patrick, Texas; August Pickett, FL; "Raccoon," Florida; Howard Ragan, Beaverton, OR; Doug Robertson, Oxnard, CA; Pete Stenger, Liberty, Kansas; Lawrence Van Raeder, Rockville, CT; and Mark Zelinoski, Philadelphia, PA. We also consulted the following publications and organizations and list their names in appreciation: *National Scanning, New York Times, Radio World, World Radio, W5YI Report.*

Anchors Aweigh . . . For Great DX

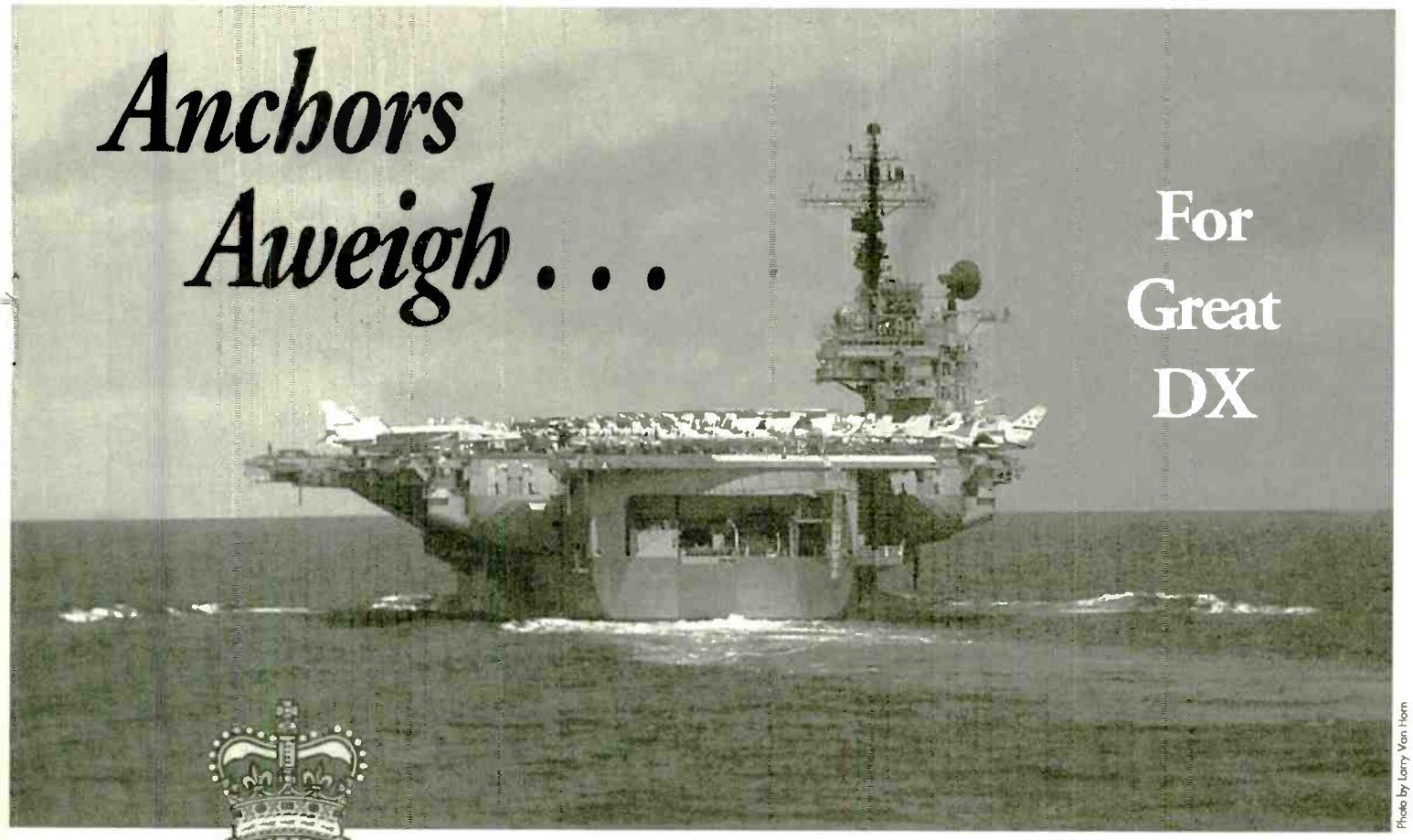


Photo by Larry Van Horn

The world's navies provide a constant source of great utility monitoring. Tune in to the USS Kittyhawk (above) in the western Pacific, or receive stickers and QSLs from the Canadian Maritime Command (above) or the US Navy's John Hancock.

By Jim Pogue

Since the dawn of civilization, history tells us of the daring exploits of people who have challenged the seas. We read of the sleek galleys of ancient Greece and Rome; explorations of new worlds by Magellan, de Gamma, and Columbus; the spectacular sea battles of two World Wars; and most recently the ships and sailors who served in the Persian Gulf War and Operation Sharp Guard.[1]

Until relatively recent times, communications has not been a big issue for seafarers. Warships would sometimes be out of touch from the rest of the world for months. On the eve of the Spanish-American War, Commodore Dewey expected to do battle with the Spanish fleet in the Far East. Yet he could not act as promptly as he would have liked had he already been at sea near the Spanish colony of the Philippine Islands. Instead, his Asiatic Squadron had to stay anchored at Hong Kong until war orders arrived by undersea cable sending him to Manila Bay.

Today, however, captains rely heavily upon rapid and reliable communications to accomplish their incredibly varied missions. It is safe to say, any navy incapable of communicating effectively is probably not capable of mounting any kind of successful operation, offensive or defensive.

Most communications by the noteworthy navies of the world take place on satellite channels, over encrypted data circuits or by using constantly changing tactical voice callsigns. But if you know when and where to listen, you can still log (and verify) many of these warships from around the globe. Keep

reading to learn how Navy DXing is (to badly paraphrase an old recruiting slogan), "not just a hobby, it's an adventure!"

Lots of Action From Uncle Sam's Fleet

The U.S. Navy is arguably the most technologically advanced force of its kind in the world, and the sophistication of its communications systems clearly reflect this. Yet opportunities to hear "in the clear" communications from its warships take place almost every day. One of the easiest is on the frequencies used by SESEF[2] Norfolk.

When east coast U.S. Navy warships are in a shakedown status, have new equipment installed, or old equipment repaired or upgraded, SESEF Norfolk often helps them check out the gear. Ships can be heard communicating with SESEF, checking transmitters, doing calibrations—almost anything related to communications imaginable. Most transmissions take place weekdays during normal working hours on the east coast (roughly 1200-2000 UTC).

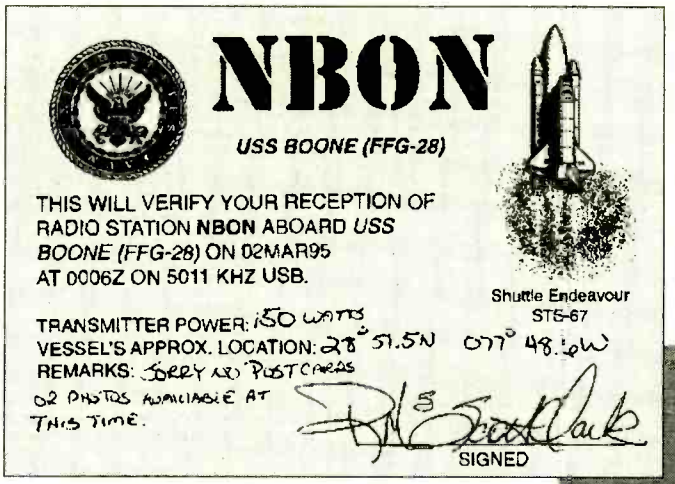
Another way to hear U.S. Navy warships is to monitor during NASA Space Shuttle launches. At least one destroyer or frigate is generally assigned to patrol the waters off the coast of Florida during launches. The ships can be heard communicating with any U.S. Coast Guard cutters assigned to the same task, with DOD Cape Radio and military aircraft present for the launch.

Maritime Command Guards Canadian Waters

Although they used to be called the Royal Canadian Navy, since 1968 they have gone by the name Canadian Forces Maritime Command. This naval force once boasted aircraft carriers and cruisers in its inventory. Today, it is a smaller but more modern fleet. Canada's warships and sailors pose a formidable threat to anyone who might challenge them.

Most of a new class of 12 "*Halifax*-class" frigates is in service, mounting Harpoon missiles and many other ultra-modern weapons systems. Two vessels of the class, the *Vancouver* and *Regina*, recently made an extended deployment to the Far East and South Pacific, proudly showing the maple leaf flag there. *HMCS Calgary*, another *Halifax*-class frigate, is serving in NATO's Mediterranean Squadron helping enforce the embargo on states of the former Yugoslavia. Plans are also being formulated to build several new modern submarines.

Her Majesty's Canadian Ships can be heard on a variety of frequencies, often using their ship's names as callsigns. Most communications are with either Halifax Military Radio/CFH or Vancouver Military Radio/CKN. Monitors should also listen on U.S. Coast Guard System Coordination Net (SCN) frequencies.


NBON

USS BOONE (FFG-28)

THIS WILL VERIFY YOUR RECEPTION OF RADIO STATION NBON ABOARD USS BOONE (FFG-28) ON 02MAR95 AT 0006Z ON 5011 KHZ USB.

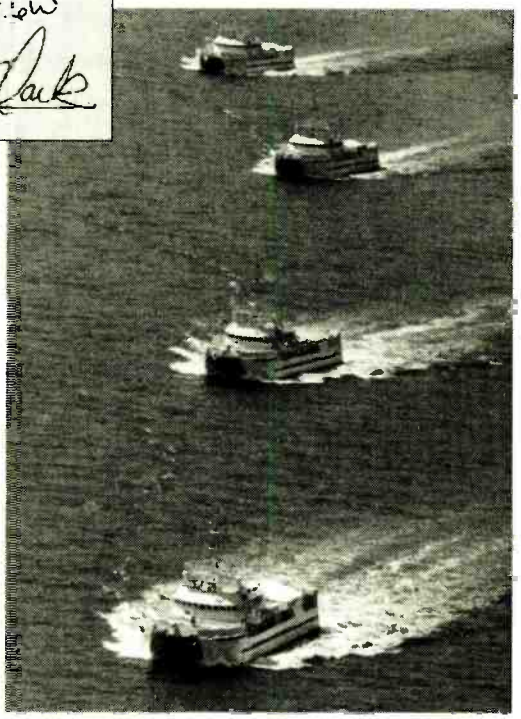
TRANSMITTER POWER: 150 WATTS
VESSEL'S APPROX. LOCATION: 28° 51.5N 077° 48.6W
REMARKS: SORRY NO POSTCARDS
02 PHOTOS AVAILABLE AT THIS TIME.

SIGNED

Shuttle Endeavour STS-67

Try This for some Royal Listening

One of the oldest and most respected of all seagoing services is Britain's Royal Navy (RN). With everything from aircraft carriers and nuclear submarines to supply ships and polar research vessels, the Queen's own is truly an impressive force.



Four Royal Australian Navy Coastal Survey ships

One of the easiest ways to hear these vessels is when sailors call place morale phone calls to home through Portishead Radio in the United Kingdom. The ships are easy to spot, as they generally identify with their full name and international callsign. An example of a call might go, "Portishead Radio, Portishead Radio, this is Warship Broadsword, Warship Broadsword, Golf Uniform Uniform Sierra."

In addition to calls via Portishead Radio, you may tune-in RN vessels patrolling English coastal waters on fisheries and environmental enforcement duties. Listen for ships as they call or communicate with MAFF Base[3] or Coastal Control.

Lastly, keep an ear open on any U.S. Coast Guard SCN frequencies, as the RN has sometimes been known to pop up there as well.

Bundesmarine Communications

Although many western navies battled German warships in two world wars, today's Bundesmarine plays an integral role in NATO.

Royal Navy warship HMS Broadsword

Modern ships with highly skilled and motivated crews make Germany's navy a powerful ally to the rest of the western world.

One of the most interesting vessels that is often heard is the *Gorch Fock*. Built in 1958, she is a 293-foot-long sail training ship. She is built along much the same lines as the U.S. Coast Guard Cutter *Eagle*, the Portuguese navy's *Sagres*, and Russia's *Tovarisch*, all taken from Germany as reparations at the end of the second world war.

Even if you don't know a single word of German, there is an abundance of communications from the warships of the Bundesmarine that can easily be heard. When operating in the upper sideband (USB) mode, the ships and shore stations use English for most of their communications. Although they sometimes slip into German, they still identify with their international call signs, given phonetically.

This circuit, by the way, is called MRL or Maritime Rear Link. When warships have messages that are only for German national addressees, MRL is a fast way to get them into the German teletype network. The messages themselves, of course, are encrypted.

The shore station most often heard is Wilhelmshaven Naval Radio/DHJ59. A typical call here might go, "Delta Hotel Juliet Five Niner this is Delta Romeo Alpha Xray." (DRAX is the call sign of the *Gorch Fock*.) Once communications have been established, stations tend to abbreviate their calls to "Five Niner" for Wilhelmshaven and the last two letters of the ship's call sign (all Bundesmarine warship call signs begin with DR).

Most communications heard from the Bundesmarine on these circuits are related to setting up radioteletype (RTTY) communications. Operators establish the voice link, send their messages, then go back to voice for the QSLs or message repeats as needed. If you tune across one of the frequencies listed in Table 1 and hear RTTY, be patient and you'll probably hear the Bundesmarine in USB.

In addition to communications with DHJ59, Bundesmarine vessels—as well as other European navy and coast guard vessels—can sometimes be heard working Glücksburg Rescue. Check the frequencies in Table 1.

Easy Signals from Down Under

Although the warships of the Royal Australian Navy (RAN) may seem like unlikely prospects for tuning in naval communications, they are amazingly easy to hear. The shore stations and warships of the RAN often put strong signals into North America from coast to coast, winter and summer.

DXers in Ohio, Virginia, California, and here in Tennessee, regularly listen to Her Majesty's Australian Navy. A recent naval exercise called Kangaroo '95 produced signals from no less than 20 different warships at the author's location in Memphis. Everything from frigates and submarines to research vessels and patrol boats were easily heard, often with incredibly strong and clear signals. All this in the midst of a sweltering Southern summer.

There is one hitch, however. It helps if you're a night owl, since most of the communications take place through the early morning hours in North America. The best times to listen are from about 0630 to 1200 UTC.

There are several Australian naval shore stations that can be heard on these circuits. They use the voice identifications Canberra Control, Cairns Control, and Darwin Control,

TABLE 1

Where to hear the International Navies
(* indicates best frequencies)

AUSTRALIA

Frequency	Channel
4375*	A2
6218	A3 (?)
8122*	A4
13116	

CANADA

4560*	
5198.5	
6694	
6705	
6715*	

GERMANY

3116	Glücksburg Rescue
3121	
4154.5	
5680	Glücksburg Rescue
6779*	
7446	
8335.5*	
10192.5*	
10197	

NEW ZEALAND
VIS/Sydney Radio - Channel 802
Ship transmit: 8198
Shore transmit: 8722
Plus RAN frequencies

UNITED KINGDOM

2702	Coastal Control
4128	MAFF Control
4463	MAFF Control
5472	MAFF Control
5680	Plymouth Rescue
5750	MAFF Control
6647*	MAFF Control
6745	MAFF Control
11168	MAFF Control

PORTISHEAD RADIO FREQUENCIES

Channel 816
Ship transmit: 8240*
Shore transmit: 8764
Channel 1224
Ship transmit: 12299
Shore transmit: 13146
Channel 1602
Ship transmit: 16363*
Shore transmit: 17245

UNITED STATES

2764	Space Shuttle launches
3187	Space Shuttle launches
4040	SESEF Norfolk
5011	Space Shuttle launches
5711	Space Shuttle launches
7535*	SESEF Norfolk
10711	SESEF Norfolk
10780	Space Shuttle launches
12315	SESEF Norfolk

U.S. COAST GUARD SCN FREQUENCIES:

Ship transmit	Shore transmit
4134	4426
6200	6501
8240	8764
12242	13089

and are located in or near the same respective cities. Mention has been made of a Perth Control as well, but the author has never heard this station. The ships do not identify as "warships" in the manner the Royal Navy does. They simply use their vessel's name. Some of these names are easily recognizable, like *Protector, Success* or *Melbourne*. On the other hand, some bear names that reflect the colorful language and locations of the Australian continent. Some examples of these are *Wollongong, Wewak,* and *Bandicoot*.

The RAN has purchased six new *Oliver Hazard Perry*-class guided missile frigates and two surplus LSTs[4] from the U.S. Navy in recent years. Add to this the new *Collins*-class submarines and *ANZAC*-class frigates under construction, and you'll find plenty to listen to.

HMAS Launceston, Fremantle-class patrol boat

Kiwi Navy Small but Interesting

The Royal New Zealand Navy (RNZN) was one of the two partners in the famous ANZAC[5] alliance in World War II. The courage of the crews in warships like the cruiser *HMNZS Leander* (torpedoed by Japanese destroyers) and the anti-submarine trawler *Moa* (sunk by Japanese aircraft) earned the RNZN its place in the history books.

Today's RNZN is somewhat small by global standards, but in partnership with Australia, it is building two of its own *ANZAC*-class frigates. Also like the RAN, New Zealand's warships bear names that are a mixture of its Anglo heritage and indigenous influence. Vessel names like *Wellington, Canterbury,* and *Endeavour* can be heard along with *Waikato, Manawanui,* and *Wakakura*.

One recent mission cast the RNZN into high visibility, when it provided support for the fleet of private vessels opposing French plans to resume nuclear testing at Mururoa Atoll. The *HMNZS Tui,* an oceanographic research vessel, actied as a mother ship to the ad hoc fleet, carrying several members of the New Zealand Parliament aboard.

RNZN warships have been heard via a couple of routes, both thanks to Australian shore stations. Check on Sydney Radio's 8 MHz ship-to-shore channel for New Zealand sailors making phone calls to the wife and kids back home (see Table 1). Also, keep your ears open when you're listening to the Australian "control" stations, as New Zealand warships sometimes check in with them as well.

Confirm Your Reception with a QSL

So you've spent some time listening to the frequencies listed in Table 1, figured out who you've heard, and would like to try for a QSL from some of the ships? Very few, if any, warships have their own printed QSL cards. However, many ships stations will reply if you enclose a prepared QSL card (PFC) that they simply need to sign and return (using the return postage you enclosed with your letter). As with any utility-type reception, be sure not to mention any details of conversations you may have heard. Just provide the date, time, frequency, mode of transmission and the name of the station the ship was calling or with which it was communicating.

To become familiar with the ships of a particular nation, the publication *Jane's Fighting Ships* is hard to beat for accuracy and completeness. It is a very expensive publication, but most public libraries carry a reasonably recent copy.

But, how do you identify the warships that use only their call signs? The Bundesmarine call signs are listed in ITU directories, for one. If you don't have access to these publications, the author has an extensive list of call signs and ship names. You can write or send e-mail to identify any stations you may hear.[6] Many ships are also included in the by-callsign *International Callsign Directory* by Gayle Van Horn, available from Grove Enterprises. You might also query the WUN (Worldwide Ute News on Internet)--see "Club Circuit" column for details).

Another question that comes up concerns addresses. For the U.S. Navy, all current Zip Code directories list Fleet Post Office (FPO) addresses in the back of the book. Generic addresses for the Canadian Maritime Command, the Royal Navy, Royal Australian Navy and Royal New Zealand Navy are listed in Table 2. Addresses for the Bundesmarine are pretty complicated and diverse, so once again please contact the author for more information.

The rewards of communicating with these international navies can go quite beyond just getting your PFC back in the mail. The author has received shoulder patches, countless information brochures about ships, beautiful photographs and postcards, and even an invitation to come aboard one vessel when it visited an American port. So, why not put on your "Dixie cup" caps and your headphones, and tune in to the interesting world of Navy DXing. Anchors Aweigh!

[1] Operation Sharp Guard is the UN effort to enforce restrictions on unauthorized vessels and prevent arms from entering the former Yugoslavia by ship.
[2] Ship Electronic Systems Evaluation Facility
[3] Ministry of Agriculture, Fisheries, and Food
[4] Landing Ship Tank
[5] ANZAC originally stood for Australian New Zealand Army Corps, but became a general term applied to servicemen from both countries.
[6] Jim Pogue, PO Box 3888, Memphis, TN 38173-0888; email KH2AR@aol.com

TABLE 2

International Navy Addresses

AUSTRALIA
Commanding Officer
HMAS *(name of ship)*
Warships Section
Clyde, NSW 2890
AUSTRALIA

CANADA
Commanding Officer
HMCS *(name of ship)*
FMO Halifax, NS B3K 2X0
CANADA
or
Commanding Officer
HMCS *(name of ship)*
FMO Victoria, BC V0S 1B0
CANADA

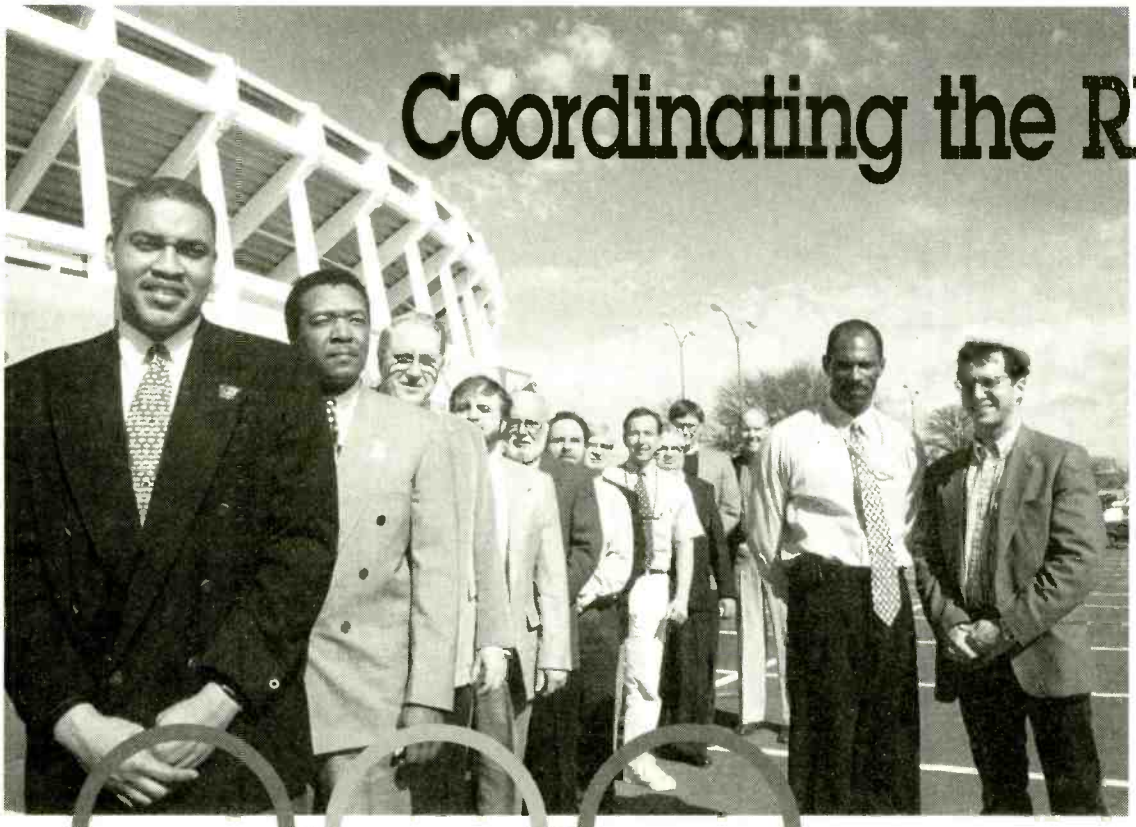
GERMANY
Contact author*

NEW ZEALAND
Commanding Officer
HMNZS *(name of ship)*
Overseas Branch
CPO Auckland
NEW ZEALAND

UNITED KINGDOM
Commanding Officer
HMS *(name of ship)*
BFPO Ships
London, ENGLAND

UNITED STATES
Consult Zip Code directory

Coordinating the RF Event of ALL TIME



Atlanta's 1996 Olympic Games

Story and photos by Bennett Liles

A test of microwave broadcasting from the Atlanta Stadium parking lot verified the tough challenge facing the Olympic Broadcast Frequency Coordination Committee. Pictured are (l to r):

Paul Andrews, ACOG
Ray Malone, Motorola, Chairman OFCC
Vee Owensby, WSB-TV
Doug Miller, FCC
Tom Giglio, WQXI
Andy Funk, WAGA-TV
Fred Broce, FCC
David Conwell, AOB
Earl Johnson, WAGA-TV
Bill Jackson, WAGA-TV
Mike Johnson, ACOG
Mike Smalls, ACOG, Chairman OBFCC
Lou Libin, NBC, Co-Chairman OBFCC

Billed as the largest radio frequency event in history, the Centennial Olympic Games will descend on Atlanta in July, bringing along some twenty-five thousand two-way radios, five hundred wireless microphones, four hundred wireless IFB's, two hundred wireless intercom systems, dozens of RF data links and ENG microwave setups, hundreds of satellite uplink trucks, and a deluge of additional pagers and cellular phones. All this will be poured into the most radio-active city in the southeast and steam heated at around one hundred degrees.

Local broadcasters are already preparing for an unprecedented demand on their entire RF spectrum. They and all other local users of the broadcast auxiliary band are members of the Olympic Broadcast Frequency Coordination Committee (OBFCC). Under an agreement with the Federal Communications Commission (FCC), this committee will be the official frequency coordinator of the Olympic Games. The OBFCC will have a Special Temporary Authority (STA) to govern all Part 73 licensees operating within 100 kilometers of the Georgia Dome between April 1st and the end of the Atlanta Special Olympics in August.

The agreement also suspends Part 74.24 - Auxiliary Broadcast Short Term Operations, within the OBFCC's area. That section normally allows broadcasters to operate auxiliary equipment such as wireless mics and IFB's (Interrupted Foldback) for up to 720 hours without specific prior notification. FCC Part 90, covering operation of hand-held radio transmitters (walkies) among other equipment, will also be surrendered to the Atlanta Committee for the Olympic Games (ACOG) for this time period. These provisions will have the effect of funneling all broadcast auxiliary RF operation through the OBFCC, and that will cover quite a bit of territory.

2-Gig or not 2-Gig?

Holding all the broadcasters' RF reins will be ACOG's Co-Chairmen of the OBFCC, Michael Smalls and Louis Libin. With such a huge team to handle, they have had to get an early start on the job. One of their first hurdles was sizing up Atlanta's saturated 2-GHz ENG (electronic news gathering) microwave band. On the sweltering asphalt near the Olympic Stadium, trials were held.

"Last summer, we brought ENG live shot trucks from all the local stations and set them up next door in the parking lot of the baseball venue, Atlanta-Fulton County Stadium," says Smalls. "We ran tests to see just how far we could go with split channel operation."

The trials worked, but in the torturing heat and humidity, success required very careful coordination and precise tweaking on the gear. With the masses coming to Atlanta this summer, laboratory precision will be too much to expect. Therefore, their hospitality won't extend to 2-Gig units from other areas. Mike says, "If you have a two-gig unit and you're planning to bring it to Atlanta ... *please don't!*" No such imported ENG units will be permitted to operate in the OBFCC's area during the Games.

Even the FBI has reportedly carved out some space in this band. Down on the Georgia Coast, most of Savannah's 2-Gig will be in use by the Olympics while yachting events are underway there. Lou Libin, Mike's OBFCC Co-Chairman, paints a bleak picture for any additional ENG microwave. "The higher frequencies don't work as well in north Georgia terrain. That's why everyone around here is 2-Gig."

Photo by Harry Boughn

Venues include kayaking in backwoods Tennessee to basketball at downtown Atlanta's Omni.

Opening ceremonies at the new Olympic Stadium will provide enough RF "to defrost a chicken in 7 minutes," joked ACOG technical representative Nick Lundhild. Avoiding interference is the concern.

Transmitter Critters

The 450 MHz band, already heavily used by local broadcasters for 2-way communication and IFB on live shots, will be stretched even more. The local 450 MHz repeaters are going to be prime property, and sister broadcast affiliates will be time-sharing those frequencies. The 460 MHz band will be in constant use for walkies supplied by local vendors who, as Part 74 users, are also members of the OBFCC.

The traffic on these frequencies will sound like you've tapped into the United Nations. Don McCambell, President of Musimatic Industries, will be renting over three thousand walkies, wireless microphones, IFBs, and intercoms to clients from Japan, Belgium, and elsewhere. "We've been in communication with broadcasters from all over the world," says McCampbell, "Most foreign broadcasters are renting here because all equipment used in OBFCC's area must be FCC type-accepted."

Pocket-sized emitters will be swarming like a hill of Georgia fire ants around each venue, and OBFCC will be trying to ride herd on these small transmitters in UHF TV channels 14-35 and 64-68 (69 may not be used in Atlanta), as well as VHF in the 160-220 MHz area. Each of these UHF TV channels is usually divided into 47 wireless mic channels spaced .125 MHz apart, although various manufacturers use different spacing.

The big problem with these systems is not their overwhelming power. All these widgets operate at between ten and one hundred milliwatts. The potential trouble is in their mobility. Many of these units are smaller than a pack of cigarettes, and use a 110KF3E transmission with a range of up to two thousand feet. A wireless microphone or intercom on the same frequency as one that Atlanta Olympic Broadcasting, 1996 (AOB 1996), is using would never cause a problem until someone walks into the venue and turns it on or powers it up just outside.

What makes it tricky is that these two emitters probably won't collide until right before a big event is to get underway. Before any Falcons game in the Georgia Dome, a spectrum analyzer's green display will suddenly start to sprout new "grass" in the VHF and UHF mic bands as sideline reporters and wireless parabolic mics start powering-up.

TABLE 1

Shared RF Spectrum

Atlanta ENG comm/IFB repeaters	450-451 MHz & 455-456 MHz
VHF wireless microphones	171-174 MHz
VHF wireless intercom/IFB	170-205 MHz
UHF wireless microphones	470-806 MHz

Operators must avoid local VHF and UHF TV transmissions in these bands. Atlanta currently has TV on channels 2, 5, 8, 11, 14, 17, 28, 30, 36, 46, 54, and 69.

Photo by Harry Baughn

Mini-cells can be moved where they are needed, including some of the more remote venues.

Those same blips will be coming up around each of the Olympic venues. Frequency agile gear, such as Sony WRT wireless mic systems and some Sennheiser models, cannot be coordinated. It will be up to TV crews to use their tunable gear to dodge interference; although that may sound simple, the tunable receivers have a wide front end, featuring less selectivity than fixed frequency equipment. Broadcasters using wireless microphones that can tune all over their VHF or UHF band will create a very "fluid" situation at the venues. These bands could sound like a real tower of babel, with people talking in 80 languages on wireless mics constantly tuning each other in and out.

Interference problems are more difficult to avoid on the IFB and wireless intercom systems. IFB systems do not feature tunable emitters and receivers, but usually have only one or two frequencies built-in. These are typically in the 170-190 MHz area. The more modern wireless intercoms are most likely to be used between the production truck and the field at each venue.

Monitoring entire conversations on these can be tricky because each belt-pack/headset transmits on an independent frequency. The key is to tune in the base station freq because all units are "repeated," or simultaneously retransmitted on the base frequency, usually the lowest of the group. Wireless intercoms can legally operate at up to 150 milliwatts on the base channel, but remember: under the terms of the Olympics STA, ACOG's OBFCC is the legal authority on who can operate what and when.

While NBC will use as few "on-air" RF production links as possible (wireless microphones), the main interference threat to visiting broadcasters is of course, other visiting broadcasters. Working under authority from the Interference Subcommittee, ACOG workers will affix stickers to all inspected and approved wireless gear. Smalls says, "We're serious about this. If it's not stickered it won't get into the venue."

Equipment of paying rights holders will be stickered to get into those venues for which rights have been purchased from ACOG. The emphasis will be on friendly prevention but the Interference Subcommittee will have the job of finding and notifying an offender to cease operation. Then, it would be up to FCC representatives accompanied by federal marshals to actually pull the plug and confiscate equipment, should it come to that.

Herding the COWs

The OBFCC will encourage visiting broadcasters to use cellular phones for their communication rather than further taxing the already heavily loaded 450 MHz and 460 MHz bands for communication. Anticipating a staggering load on the 800-900 MHz cellphone freqs, Bellsouth is investing some $77 million to upgrade and double its cellphone capacity in north Georgia. This expansion will stay in place after the Olympics.

As a temporary measure, the cellphone capacity within a two-mile radius of downtown Atlanta—an area containing 65 percent of the venues—will be increased about 800 percent during the second half of August. To accomplish this, over 100 mini-cells will be added in downtown Atlanta.

COWs (Cells On Wheels) will also be used at some of the more outlying venues such as the International Horse Park in Conyers, rowing at Lake Lanier, and yachting in Savannah. Once the action has moved on to other venues, the COWs can pull up stakes and be moved along with it for temporary concentration of cellular capacity.

Longtime trunking expert Motorola will also ride the 800 MHz band with a specially installed system using a digital trunked simulcast technology known as SMARTNET II™. Although specifically designated for ACOG use, it will free-up cellphone spectrum badly needed by broadcasters and others.

Very similar to large scale public safety trunking systems, SMARTNET will incorporate three digital simulcast networks. One six-site, wide area system will handle the overall call distribution, while a single-site repeater will be located at Georgia Tech's Olympic Village for coordinating its operations. In downtown Atlanta a separate, two-site system will handle its expected heavy load. In all, three new towers and 250 new repeaters will go into service using Motorola's SMARTNET II.

Info on Getting Around

Broadcasters, and everyone else coming to town, will sorely need this. The most up-to-date source of Olympic information on broadcast radio will likely be at 640 AM and 105.7 FM. Atlanta's WGST has been designated by ACOG as the Official Olympic Information Radio Station and will not only be reporting action at the venues, but Olympic news occurring throughout the city; particularly the schedule of events and flow of traffic. Visitors this summer will need quick information on Olympic scheduling and traffic problems. From its exclusive newsroom at ACOG's communications center, WGST will have access to communications that will cover broadcast happenings, ACOG traffic, and operations of the many public safety agencies in attendance.

The Skyzappers

The actual event coverage done by AOB 1996 will represent only a small part of the televised images generated by the Atlanta Olympics. The vast army of journalists from around the world will be shooting their own video, editing biographic, technical, historical, and human interest packages and interviewing seemingly everyone within an arm's reach—even each other.

Most of the broadcaster RF traffic will eventually end up at the IBC: the International Broadcast Center, located at the World Congress Center. As at the Democratic Convention of 1988, the exhibition floor will once again be awash in a sea of production trucks, and the monotonous drone of air conditioners will mix with the chattering screech of fast winding video tape from hundreds of editing stations. This flood of information has to go somewhere; in most cases, that somewhere is UP.

In uplinking their Olympics coverage, journalists face two forms of potential inter-

ference: electronic and architectural. As long as the uplinks are aiming at satellites over the eastern United States, RF interference should not be a problem. It's the foreign broadcasters aiming closer to the horizon who may have some trouble. Many of them will have to raise their beam and use an interim step in their path, bouncing their signal to a second downlink on its way home.

Architectural interference is generally a much more formidable foe. Distance from truck to downlink will be critical. The World Congress Center is surrounded by concrete and steel structures: the Omni to the south and the massive Georgia Dome immediately to the west. No uplink will be able to shoot from the Congress Center itself. To deal with this problem, broadband fiberoptic lines will reach from the IBC into several strategically located parking lots reserved as uplink parks. Those fiber links will carry the signals from the venues to the uplinks.

Interference from architecture such as the Georgia Dome (venue for gymnastics and boxing) is a problem for uplinks from the International Broadcast Center, housed at the World Congress Center.

Making RF History

The OBFCC and its parent body, the Olympic Frequency Coordination Committee, have a huge job in coordinating the many forms of RF that broadcasters will be using. The north Georgia airwaves will be a sea of activity carrying dozens of different languages, constant ENG microwave activity, and hundreds of uplink beams. Local scanning buffs and satellite dish owners, RF'd to the hilt, will have their tongues hanging out by the end of August.

To avoid a world of grief, any broadcaster planning to bring these RF emitters to Atlanta this summer should contact Mike Smalls at (404) 224-1400 or Louis Libin at (212) 664-2746 or FAX them at (404) 224-1964. Can Mike, Lou, and the OBFCC handle it all? The answer to that question is about to make RF history.

Educators to Meet at Expo

By Larry Van Horn
Expo '96 Publicity Chairman

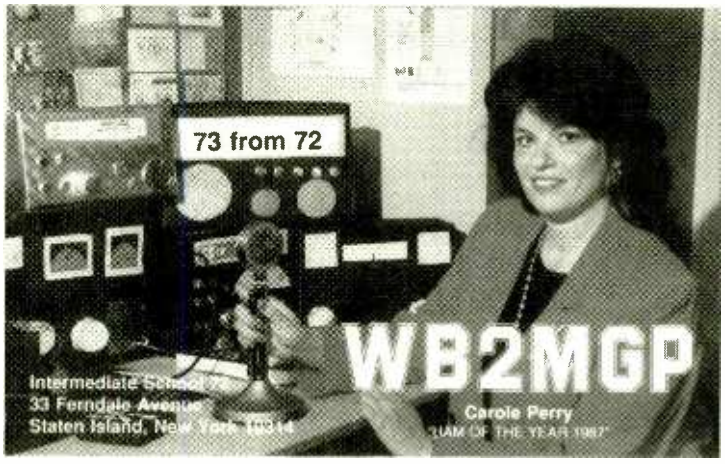
To most of us who read the pages of *Monitoring Times* and *Satellite Times* magazines, radio monitoring is nothing more than a hobby. But the same technology we use in our radio shack can also be used as a powerful teaching tool in the nation's classrooms. Unfortunately, most educators are not aware that this technology exists, what resources are available, nor how to integrate radio into the curriculum. To help get this information to educators, Grove Enterprises will sponsor a special one day forum at this year's *Communications Expo*.

In announcing this special event, Bob Grove, President of Grove Enterprises, said, "With the intrusion of computer and communication technology into every phase of our lives, Americans feel they are losing control and comprehension of their environment. This year the *Grove Expo* is making a special outreach to classroom instructors, demonstrating and informing them of the myriad uses of radios and computers in our society. Teachers in attendance will become better equipped to prepare the youth of today to meet the challenges of tomorrow."

This special event will be kicked off at 9:00 a.m. on Friday, October 18, 1996, with opening remarks to the forum participants by Bob Grove.

At 9:30 a.m., *Monitoring Times/Satellites Times* Internet columnist, Bill Grove, will give a presentation on *Education and the Net*. The Information Superhighway brings to the classroom one of the most powerful teaching aids in the educator's toolkit. Students and teachers alike will find more information available to them on the net than they ever imagined. During this forum, Bill will show some of the best educational sites on the Internet and demonstrate ways in which these resources can be used in the classroom.

Bob Grove will return to the podium at 10:30 a.m. to talk about *Shortwave Radio - Listening to the Global Village*. Although teachers do their best to make foreign languages, social studies, and other courses of study come alive in the classroom, nothing can compare with personal experience. Bob will show how an inexpensive shortwave radio can help bring the world to the student's desk.



The QSL card of educator Carole Perry, who uses amateur radio in her Staten Island classroom.

A shortwave radio allows foreign languages to be heard in their actual dialect; social and political struggles can be monitored directly from the lips of those who are fighting to bring democracy to their country. Science educators can successfully employ shortwave radio to demonstrate radio wave behavior and atmospheric propagation, along with solar influences on the electromagnetic spectrum.

One person who has been using radio in her classroom for more than ten years is the 1993 *Monitoring Times* convention keynote speaker, Mrs. Carol Perry, WB2MGP. She will start the afternoon sessions off with a forum entitled *Reading, 'Riting, and Radio*. Carol will show how she uses amateur radio in her Staten Island classroom to make a school curriculum come alive. Handouts, sample lesson guides, and important addresses to enhance the learning experience for students will be provided.

Satellite Times magazine "View From Above" columnist Dr. Jeff Wallach will make a presentation at 2:15 p.m. on *Mission to Planet Earth*. Jeff will discuss how to receive weather satellite imagery directly into the classroom. Information on hardware, software, and what's up there to view will be discussed in this lively one-hour forum.

Space and computers still hold a fascination for our school children. Dr. TS Kelso of the *Satellite Times* staff will have a 3:30 p.m. session that will discuss methods which combine these subjects to teach a variety of related classroom subjects. Kelso will present a broad range of suggestions that will help grab students' attention and make teaching fun.

Extracurricular Activities!

In addition to all the scheduled presentations mentioned above, there are several additional activities available to educators during the day on Friday. The *Grove Expo* is proud to offer a unique opportunity for educators. We have assembled an outstanding panel of international shortwave broadcasters from around the world who will be available to speak to educators one-on-one starting at 11:30 a.m until 4:00 p.m. These broadcasters will be available to answer specific questions from educators on information about their country as well as provide critical insights into their cultures and societies.

Participants in the above seminars will also have access to the *Expo* commercial exhibits and can attend the live demonstrations of radio astronomy technology being conducted by the Society of Amateur Radio Astronomers throughout the day on Friday.

The cost for the entire educators' program is only $10. Registration for this exciting one day event can only be taken by mail. Requests for a seat at the forum must be in writing on the educational institution's letterhead and payment must be enclosed with the request. But you must hurry, as seating for this exciting program is extremely limited and a sellout is expected.

Educators registered for Friday's program who wish to participate in the rest of the weekend's acitivities will receive a $10 discount off the $55 Expo registration, or may sign up for single seminars at $5 each ($5 discount).

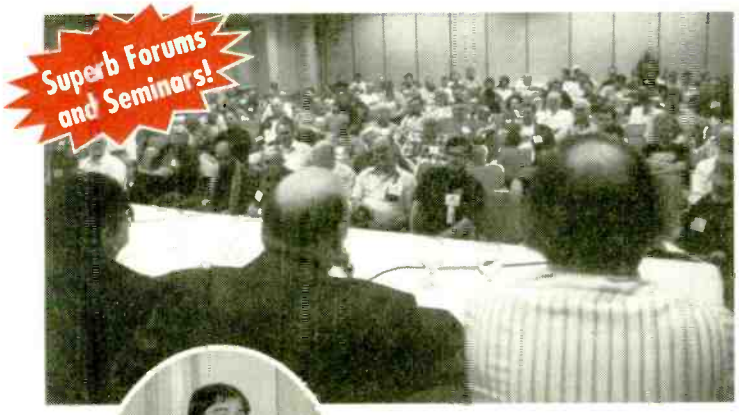
For more information email **expo96-info@grove.net**, or write to: Educator's Forum, c/o Judy Grove, P.O. Box 98, Brasstown, NC 28902.

"Share the experience—bring a friend!"

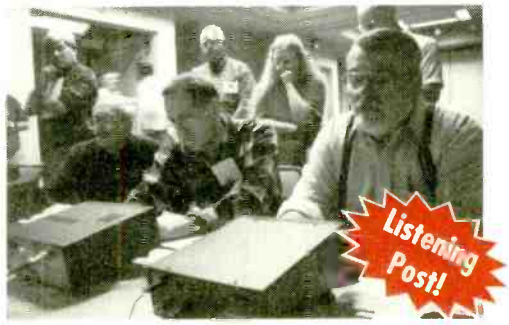
Come to Grove Communications EXPO '96

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

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



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



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

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.**

Atlanta Airport Hilton October 18-20, 1996

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

GROVE COMMUNICATIONS EXPO

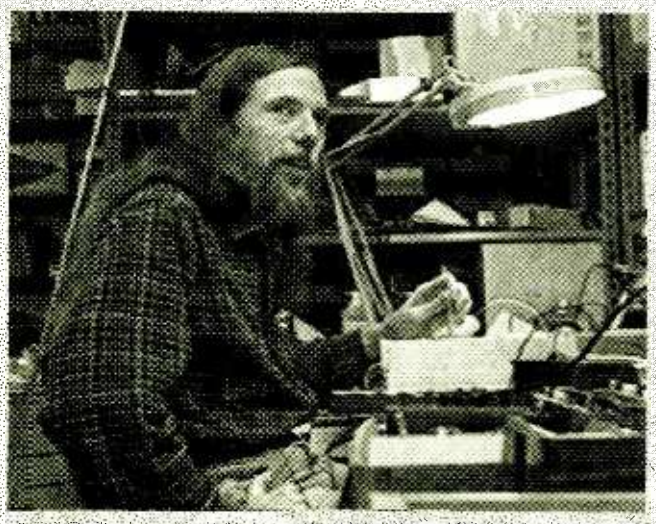
Grove Enterprises, Inc.

7540 Highway 64 W., Brasstown, N.C. 28902

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

Dunifer says it's no surprise the government takes issue with his operation. He is not the FCC's biggest fan. "I told them in a press statement that the FCC could kiss my bill of rights," Dunifer says, "They weren't too thrilled by that."

FREE RADIO BERKELEY



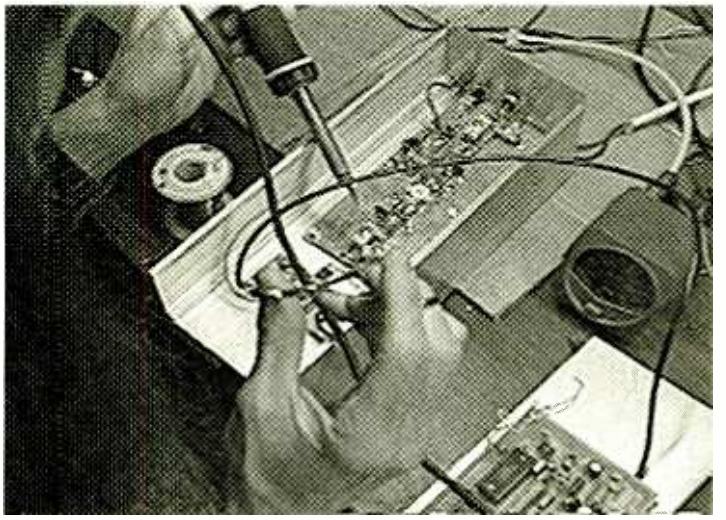
Free Radio Berkeley founder Stephen Dunifer caught on videotape in his workshop.

By Marcus Harton AE4EX
Pictures by Lyle Jackson

To the Federal Communications Commission, it must look like Al Capone's command center. The rest of us would barely give the old run-down house a second glance. Only the ground plane antenna on the roof might tip a radio buff to what's going on inside. This is the mother of the modern pirate radio movement, *Free Radio Berkeley*. At 104.1 on the FM dial, it is on the air 24 hours a day, seven days a week *without* a license.

While most pirate stations operate from periscope depth, Free Radio Berkeley is as bold as they come. It welcomes media coverage, puts its phone number on the air, and publicly distributes a program guide.

A glance at the guide proves the station is no easy-listening juke-box. Monday from 5-6pm: *Street Spirit Show*, by, about, and for houseless people. Wednesday 6:30-8:30pm, *Sisters of Hysteria Show*, covers women's music and female issues. That's followed by the *Copwatch Report*, an exchange of ideas to control local police misconduct and brutality.



Dunifer works on an FM transmitter/amplifier combination.

Inside the Pirate

One Wednesday evening, on the front porch of the rooming house that contains the station, a man bangs on a door adorned with several deadbolt locks. He's there for his announcing shift, running late, and it doesn't look like anyone hears him knocking. He says his name is Dean. (He and some of the other Free Radio Berkeley staffers are hesitant to have their last names published.) A trip around the side of the house to tap on the studio window solves the problem. The announcer inside leaves the control board to let Dean in.

Dean is there to read the news. Tonight, he is the solo announcer for *The Radical News Hour*, a program dedicated to revolutionary news from around the world. He reads news accounts gleaned from newspapers and internet news groups: striking government workers in France seem close to gaining concessions; the status of elections in Haiti; and closer to home, plans for a San Francisco protest of U.S. Bosnia policy.

He reads for an hour, virtually without interruption. No commercials, no music, no sound effects. The studio telephone rings twice to give him a breather. A listener calls to clarify a point made earlier. And a late night DJ calls to plug his upcoming show. This is a very unusual radio station.

A glance around the walls of the studio confirms that impression. Instead of the *Billboard Top 100* or the Emergency Broadcasting System instructions you would see in a regular studio, Free Radio Berkeley's walls are covered with material that reflects its political slant and its pirate status. There are handbills for radical causes in the San Francisco Bay area, autographed glossies of artists who are way, way out of the mainstream, and next to the console, instructions for what to do in the event the FCC knocks on the door.

The setup looks fairly professional. The equipment is an assortment of donated consumer-grade turntables, tape machines, and CD players. The operator on duty uses a professional audio board to mix it down. But it's not unusual to hear an announcer apologize when something goes on the blink or appeal for a replacement unit if the meltdown is serious.

But forget the programming and the interior decorations. There's one final giveaway that you're not dealing with a run of the mill FM station. Take a look at the transmitter. It would just about fit in a shoe box. No kilowatt-consuming blowtorch here. The power output is 30 watts, just about enough to light the bulb in the back of your refrigerator. It gives FRB a range of eight or ten miles. The station's founder calls it "Micropower Radio." And while the power output is small, the station and its founder are receiving lots of attention from the government.

A Pirate is Born

Stephen Dunifer put the station on the aion April 11, 1993. Even though it was on the air only a few hours a week, it took the FCC less than a month to take notice and track down the transmitter. On May 2, 1993, FCC field agents located the transmitter, knocked on the door, and put in motion legal proceedings that are still creeping their way through federal court.

Dunifer says it's no surprise the government takes issue with his operation. He is not the FCC's biggest fan. "I told them in a press statement that the FCC could kiss my bill of rights," Dunifer says. "They weren't too thrilled by that."

When the FCC took Dunifer to court, it asked Federal District Judge Claudia Wilken for a restraining order to prevent any further transmissions from Free Radio Berkeley. The FCC was stunned by her response. For the first time in United States history, a judge failed to grant an injunction against an unlicensed broadcaster. Judge Wilken told the FCC that Dunifer's constitutional claims might have some merit. She also ruled that the hardships to the government of continued broadcasts would not be severe.

Dean reads the news on The Radical News Hour.

The FCC says there's nothing personal about it. The commission is just enforcing regulations that forbid unlicensed broadcasting. It has fined Dunifer $10,000 and taken him to court to force Free Radio Berkeley off the air.

But lawyers for Dunifer have so far fended off both the fine and the shutdown of the pirate station. The National Lawyers Guild Committee for Democratic Communications is using the Dunifer case to challenge the FCC's system of licensing radio stations. They are focusing their legal attack on one main point. The FCC refuses to grant licenses to any micropower station. 100 watts is the lowest power level authorized by the FCC for a stand-alone FM station. They say the FCC's refusal to license low power stations is so broad that it violates the constitution.

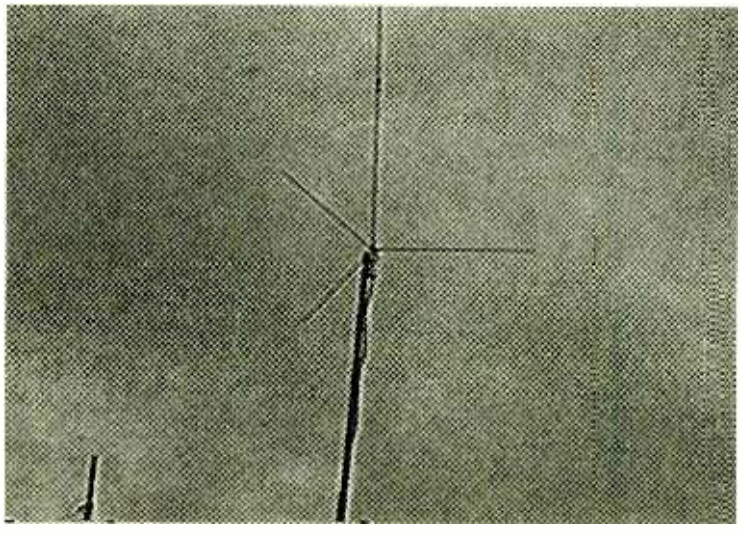
Dunifer and his lawyers point to Supreme Court rulings that say the government must use the least restrictive measures to achieve its goals when it has reason to restrict the First Amendment rights of citizens. The micropower backers say the FCC should grant micropower licenses wherever it can.

The CDC lawyers also make a class argument. They say the ban on low power stations prices regular folks out of access to the airwaves. Dunifer says it can cost between $50,000 and $100,000 to put a legal station on the air. He says anyone who wants could put together a micro station like FRB for less than $1000, "There's absolutely nothing wrong with it except the FCC will not allow this to happen in a reasonable and legal manner."

CDC attorney Alan Korn wants the government to make the airwaves more accessible to average people. "People don't stand on soap boxes any more, and what the FCC has set up is a system where you need a golden soap box," says Korn, "You have to be rich. You have to have hundreds of thousands of dollars to engage in any kind of meaningful speech in our society."

The FCC declined a request for an interview about the Dunifer case, but in court documents, the FCC defends its decision not to license low power stations. The FCC says fewer, higher-powered stations deliver better quality signals to more people. The FCC says the biggest constraint on the numbers and types of FM stations is interference from stations operating on the same frequency. Having a greater number of lower powered stations would result in increased areas of interference. And that interference would reduce the amount of service available to listeners.

That scenario is true, says Dunifer, for large metropolitan areas of the country where there is a station assigned to every nook and cranny in the FM band, "We're not asking for some process where everything be thrown to the winds. We feel licensing low-cost, low-power stations would be no problem whatsoever in many parts of the country." He says the FCC should create a mechanism to license low-power stations wherever there is sufficient space on the dial.



The Free Radio Berkeley antenna farm.

A Surprise Decision

When the FCC took Dunifer to court, it asked Federal District Judge Claudia Wilken for a restraining order to prevent any further transmissions from Free Radio Berkeley. The FCC was stunned by her response. For the first time in United States history, a judge failed to grant an injunction against an unlicensed broadcaster. Judge Wilken told the FCC that Dunifer's constitutional claims might have some merit. She also ruled that the hardships to the government of continued broadcasts would not be severe.

Within a week or two of the judge's ruling, Free Radio Berkeley was on the air around the clock. Its staff of volunteers grew to about 60 people.

Dunifer says any group that wants should have the chance to put its own micro station on the air. It would work for churches, political parties, neighborhoods, you name it. But he says the FCC and big broadcasters are standing in the way. Dunifer believes they are defending their audiences from his sort of community broadcasting.

The National Association of Broadcasters has filed court papers supporting the FCC's case against Dunifer. The NAB represents the interests of licensed radio and television stations in Washington. NAB attorney Jack Goodman says Dunifer is wrong about the association's motivation. Goodman says the NAB opposes Dunifer not because it fears the competition of micro stations. He says broadcasters are concerned about the interference they would suffer if others followed Dunifer's example and put stations on the air without obtaining licenses.

The NAB points to more than 60 years of broadcast regulation and to supreme court decisions that affirm the FCC's right to regulate the airwaves. The association says accepting Dunifer's constitutional claims would scrap the whole regulatory setup.

While Dunifer might take some glee in scrapping the regulations, he seems more interested in reforming the economics of commercial radio. He says the system of big-signal broadcasting forces stations to appeal to big audiences, and to abandon small interest groups in their search for large audiences fit for delivery to advertisers. Micropower supporters believe listeners would be better served by having more choice in programming.

"That's one reason the NAB is a little bit scared of the micro radio movement," says attorney Alan Korn, "because it puts genuine excitement back on the airwaves."

The Berkeley micro broadcasters see their station as a means for them to level a playing field tilted in favor of big money and big government. They are convinced mainstream media ignore their thoughts and issues.

"Nickel," the punk rock DJ, works his board shift at FRB.

Do-It-Yourself Transmitters

Dunifer built his first home-brew transmitter and put FRB on the air out of frustration with mainstream coverage of the Gulf War. He was bothered that he saw only one viewpoint on the nightly news. "After seeing the situation where the media moved into a spare room in the Pentagon and told everyone to tie a yellow ribbon tourniquet around their brain and quit thinking," he says, "I decided something had to be done."

Dunifer took his electronic engineering background and put it to work. He held a First Class FCC ticket, "Back when they meant something." He had also worked as an engineer for commercial radio stations.

His political views and engineering ability come together in his electronics workshop. That's where Dunifer designs and markets a variety of low power broadcast equipment. He sells kits. Transmitters at power levels from 1/2 Watt to 6 Watts. RF amplifiers from 6 to 150 Watts. He says the average builder can assemble the simplest of his kits in a few hours. Dunifer estimates he's shipped enough equipment to put between 200 and 300 micro stations on the air.

He is refining his basic transmitter kit. He wants to make them more stable, easier to operate and easier to assemble. Dunifer and his attorneys also want to make them legal. Until that happens, his sales material will likely have to continue to include the following admonition to potential customers:

"For educational purposes only. These kits are offered for the furtherance of one's knowledge regarding radio frequency design and principles. At all times during operation the assembled unit must be connected to a dummy load. Part 15 of the FCC rules prohibits an antenna being used with these units."

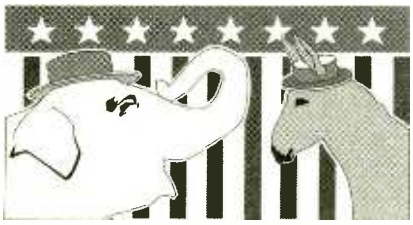
The FCC is eager to zing Dunifer for using an antenna instead of a dummy load for Free Radio Berkeley. The stakes are high. If Dunifer loses in Federal court, he'll have to pony up $10,000 and cut the coax to FRB's antenna. If he wins, micropower stations could change the character of your FM dial, and we might start telling our children the tale of "The Little Pirate Who Could."

For More Information

If you want to know more about Free Radio Berkeley, the station has a page on the World Wide Web. The URL is **http://www.best.com/pub/frb/** At that location you can browse a programming schedule, read legal and technical information, learn more about the micropower broadcasting movement, or locate information about the kits he offers for sale.

If you prefer the low-tech postal approach, here's the mailing address:

Free Radio Berkeley
1442 A Walnut St. #406
Berkeley, CA 94709



Scanning the Presidential Campaigns

The presence of this EMS/light truck and NJSP (below) tipped off the landing site for the presidential helicopter.

Story and photos by Louis G. Shirley

It's unavoidable. Every four years we are inundated, bombarded, assailed, and blitzed by the campaigns of those seeking the office of the U.S. Presidency. The flip side to this political stumping for the scanner hobbyist is that some rarely-heard federal agencies and scanning activity may be coming to your home town.

Over my years of monitoring the Oval Office hopefuls as they campaigned, I've had plenty of opportunity to see and hear all the major campaigns come to town. New Jersey's electoral college vote is the 9th largest among the 51 electoral states—enough to be of pivotal importance. With New Jersey's Gov. Whitman being viewed as a possible VP candidate this year, political observers are keeping an especially close eye on the state.

I'm also in the excellent position of being centrally located. Just about everyone looking for votes has visited my home town. Table 1 is a compilation of Secret Service frequencies I have heard during past visits. Perhaps some of the "intelligence gathering" techniques I have used will also help you enjoy the scanning opportunities that come along with these campaigns.

Clear Voice Clues

A typical scenario was President Bush's visit to Princeton in May '91 (see Table 1). Though there was surprisingly little press coverage of the event, I copied Philadelphia US Secret Service (USSS) passing traffic to Camden about the visit. NJ State Police used the State Police Emergency Net (SPEN) channel 1 frequency of 154.680 MHz to talk to Princeton Borough PD about the visit. An aircraft on 122.750 MHz mentioned sighting the President's choppers as he approached Princeton, while 126.200 MHz was used to request info on the restricted airspace.

Princeton Borough PD provided support on 159.090 MHz. Because police departments sometimes bypass the repeater and use simplex for important details, this is an excellent time to search for those hidden channels. Princeton University used 151.775 MHz for campus business, which gave me some unexpected details about the visit. All of the foregoing info was clear voice. By paying attention to it, I pretty much knew where everyone was and what was happening. ... So much for DES.

The Secret Service frequency plan outlined in Table 1 is one of the more popular lists you'll find in hobby publications nationwide. The frequencies in use in the NY/NJ Metro area are marked with an "X" with the dates on which they were used.

A frequency counter will capture the Secret Service pager frequency with little difficulty.

Over the years I've found only a few others to be active here. On two occasions 166.360 MHz seemed to be either a simulcast or input for Charlie, but this re-

mains unconfirmed. In Philadelphia you'll hear the USSS use the 164.800 MHz repeater as their local channel, whereas New York City favors 165.375. When the action is in your backyard, your local USSS office will be involved, so don't overlook their customary main channel.

Know your frequency allocations

It is of paramount importance that you have the ability to search for new frequencies and the ability to remember old ones—even those of a towing service. Here's a case in point. Several years ago a Secret Service agent had broken down on the NJ Turnpike and called it in on the 165.375 repeater, but I did not hear exactly where he was located. A trooper also found him and called in a request for a tow on the 155.580 frequency assigned to the Pike. When the tow truck seemed to have gotten lost, the turnpike then used its road service frequency of 453.875 MHz (the tow trucks have turnpike radios in them) to try and find the tow truck, but they got no answer. The Pike then phoned the tow operator asking where the truck was. Since I knew who was contracted to tow on the Pike, I then tuned in the dispatcher on 150.830 simplex telling his driver, "That not-so-secret car is at mile marker 81.9 in the car lanes."

Rule number one is—commit your local frequency allocations to memory. You never know when you'll need to quickly tune something in. It allowed me to track the above account from start to finish and learn that the turnpike radios are also used by the towing service. Again, although 165.375 MHz was scrambled, everything else was clear voice. When the tow truck called in that he was now headed back,

TABLE 1

Monitoring the Secret Service

NAME	FREQ	A	B	C	D	E	F	G	H	I	J	K
ALPHA	32.230	-	-	-	-	-	-	-	-	-	-	-
BRAVO	165.7875	X	-	-	-	-	X	X	X	X	X	X
CHARLIE	165.375	X	X	X	-	X	X	X	X	X	X	X
DELTA	169.925	-	-	-	-	-	X	X	-	-	-	-
ECHO	407.850-	-	-	X	-	-	X	X	-	-	-	-
FOXTROT	415.700	-	-	X	-	X	X	X	X	X	-	-
GOLF	165.7625	-	-	-	-	-	-	-	-	-	-	-
INDIA	407.925	-	-	-	-	-	-	-	-	-	-	-
JULIET	170.000	-	-	-	-	-	-	-	-	-	-	-
KILO	167.825	-	-	-	-	-	-	-	-	-	-	-
LIMA	168.7875	-	-	-	-	-	-	-	-	-	-	-
MIKE	165.2125	X	X	-	X	-	X	X	-	-	X	-
NOVEMBER	166.700	-	-	-	-	-	-	X	-	-	-	-
OSCAR	164.8875	X	X	X	-	X	X	X	-	X	X	X
PAPA	164.400	X	X	-	-	-	-	-	-	-	-	-
QUEBEC	165.4125	-	-	-	-	-	X	-	-	-	-	-
ROMEO	166.400-	-	-	-	-	-	-	-	-	-	-	-
SIERRA	166.5125	X	-	X	X	X	X	X	X	-	X	X
TANGO	164.650	X	X	-	X	-	X	-	X	X	X	X
UNIFORM	165.0875-	-	-	-	-	-	-	-	-	-	-	-
VICTOR	164.100-	-	-	-	-	-	-	-	-	-	-	-
WHISKEY	167.025	-	-	-	-	-	-	X	-	-	-	X
X-RAY	166.4625	-	-	-	-	-	-	X	-	-	-	X
YANKEE	162.6875	X	X	-	-	X	X	X	X	-	X	-
ZULU	171.2875	X	X	-	-	X	X	X	-	-	X	-
PHILA RPTR	164.800	-	-	-	-	X	-	-	-	-	-	-

Key to ALPHA listings:
A - Reagan & Gorbachev in NYC 12-5-88
B - Reagan & Gorbachev in NYC 12-6-88
C - Prez Bush in NYC 6-30-89
D - Prez Bush in NYC 9-17-89
E - Prez Bush at Princeton University to receive a diploma, May of '91
F - Prez Bush in NYC 9-23-91
G - Prez Bush in East Brunswick, NJ, on 9-24-91
H - Prez Bush in NYC 6-30-92
I - Prez Bush re-election campaign NYC August of '92
J - Candidate Clinton in New Brunswick, NJ, in August of '92
K - Candidate Clinton in New Brunswick, NJ, in September of '92

A little sleuthing enabled the author to intercept this Secret Service car being flatbedded after a breakdown on the NJ Turnpike.

I timed his departure. Knowing the route he'd take back to the garage allowed me to snap the accompanying photo!

Prepare for the unexpected

I use a memory-modified 400 channel scanner which is comprised of sixty-four 400 channel scanners within it, programmed with every known federal frequency listed by monitor buffs. Each individual 400 channel block is programmed for a specific purpose. One scanner has nothing but USSS frequencies in it while another has only those USSS that are used locally, along with NJ State Police, local PDs, and assorted frequencies like the hotel security where a dinner may be held. Other scanners are programmed for business, police, fire, and aircraft. Allocations are already loaded in so that all I have to do is simply switch to the desired scanner.

Being able to quickly scan a known agency's frequencies may help you uncover activity you wouldn't have known about otherwise. An example of this is as follows:

On one Clinton visit to the Central Jersey area, I was driving home from work when I caught the routine use of 407.925 simplex by two mobile units on the NJ Turnpike. I did a little calculating of our presumed distance apart, approximate speed, and time traveled. This led me to the conclusion that they were about 11 miles away when I first heard them and that they were using 25-35 watt mobile units. After they had stopped for dinner at a rest stop on the New Jersey Turnpike, they resumed travel, but now were heard on Charlie frequency. By having USSS UHF frequencies already programmed in the scanner and constantly searching through them, I learned of the UHF usage.

I've searched the UHF band whenever the Secret Service is in town but have not found any other usage. Eventually I plan to use a spectrum analyzer to look for the frequency hopping that is rumored to exist on their UHF frequencies. Other monitors, however, list Washington DC as one of the places normal simplex and repeater UHF is employed.

Try to have every frequency you plan to monitor already programmed into your scanners, or at the very least, on paper, in duplicate. Keep one copy in your wallet. If you break the list down into "Known," "Listed but not generally used," and "Listed but never heard in use" VHF channels, you now have three banks filled with frequencies. Do the same for the UHF allocations.

It's highly recommended that you employ more than one scanner. This allows you to monitor traffic on one scanner while searching for new frequencies or inputs on the other. The normal use of protection frequencies is simplex and low power. The Command Post (CP), on the other hand, will have more power and be easier to hear.

Always monitor the known input frequencies of your local Secret Service, however. The USSS office in Newark has provided protection along with the detail traveling with the President. They use 165.5125 with an input of 166.4875 MHz, but I've heard both frequencies used in the simplex mode alone to provide protection.

In New Jersey the USSS uses both of the above channels as well as 165.6875 (ch 2) with a possible input of 166.800 MHz. I have also heard them using Tango (64.650) and Delta (169.925) on counterfeit surveillance details. Mention has been made that their radios have numerous other USSS channels in use, so stay alert and search.

By the way, all Federal agencies in New Jersey use the SPEN channels. I know the USSS radios contain at least State Police Emergency Network channels SPEN-1 (154.680) and SPEN-2 (155.475).

Equipment selection

Start monitoring your selection of frequencies a week before the President arrives. I've found that the USSS will set up radio shop two days in advance, at the very least. Most communication is clear voice and simplex. The radio testing procedure provides an excellent opportunity to look for new frequencies. If you live near the area to be visited, then a trip well in advance of the visit will help you familiarize yourself with the area.

If you plan to take pictures, you'll need to know just which spot will present the best opportunities. Now is the time to bring your camera along to help find the best site for pictures. Nothing is more frustrating than arriving an hour before the visit to find no place to park and no idea which (permissable) location is the best for viewing.

A frequency counter is a must. I've used them long enough to know they will uncover just about any activity around you. Experiment with using a low power two-way radio or, better still, a very low power wireless microphone. This has taught me how to notice any activity around me—even when the counter doesn't lock onto the exact frequency.

You should also learn to use antennas "tuned" to a specific band. I can easily find the 167.025 MHz portable pager the USSS brings along on a counter, but finding the very low power simplex X-Ray channel takes some doing.

Everyone who is serious about scanning should have numerous antennas in his collection to help ferret out those hard-to-find frequencies. This will also help you tune into the known ones more easily. I find that even while I'm at work inside a brick and steel building I can slip on my favorite rubber duck tuned to a particular surveillance frequency and hear a "bug" a couple of blocks beyond what the general purpose antenna provided with the scanner can pick up.

How to spot activity

Setting up shop at a political event is easy. As I mentioned earlier you must plan well in advance. Even observing the terrain in the area can alert you to a possible landing site for the helicopters the President's entourage uses. Look for the presence of fire apparatus and/or emergency vehicles. Knowing they would be used at the landing site allowed me to place myself as close as I did to the site.

I also discovered the NJ State Police bomb squad mobile unit. With the unfortunate threat of terrorism in our society these days, this is a needed precaution and can be another giveaway of where the President will land.

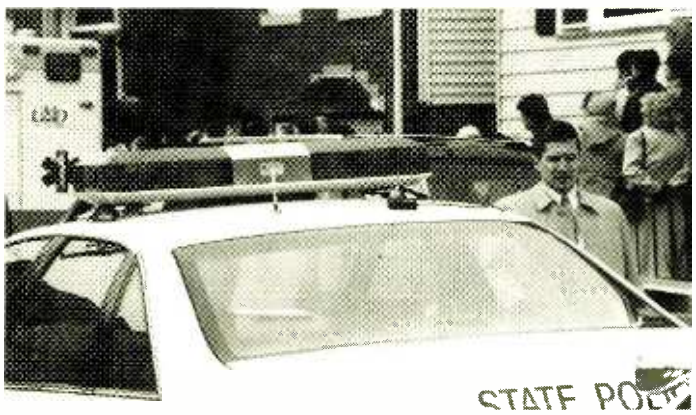
Ross Perot waves to rally at Flemington Speedway.

The restriction of an area by the police is also a potential indication of a possible landing site or motorcade path that will take the protected party to its final destination. Just a word of caution here: Do not try to enter a restricted zone! As a spectator you'll be allowed to get more than close enough for a good telephoto lens to capture all the activity. If in doubt, ask for permission to stay in the area from which you want to take pictures. When I covered the Edison, NJ, natural gas explosion (*MT* 03/95), I used a county road map to find the back roads to the site to avoid adding to the traffic jams in the area, and I asked the first police officer I saw if I could park my car in the area. This allowed me to get a super view and uncover a lot of low power communications I could never have heard if I were miles away. But, I kept out of the restricted areas.

Monitoring two-way business, fire, police, traffic helicopters, taxis, and even cellular traffic can easily alert you to unfolding events. For example, during one Clinton visit to New Brunswick, NJ, I overheard a businessman state that he just saw the President's motorcade drive past a store where he was parked on Route #1S, just beyond the main highway one would have expected the motorcade to take. There was only one way into the town of New Brunswick after that, on a smaller, less traveled road.

Sure enough, that's the one they took, only minutes after I had taken it to bypass traffic and get into town quicker. Despite DES encryption by the USSS and New Brunswick PD using digital voice protection, I still discovered what was going on.

Here's another helpful hint: Pay attention to the use of 167.025 MHz, which is the paging freq for the USSS. One Secret Service agent told me that they indeed do have a portable pager they bring along. It is used to pass alphanumeric messages along to agents rather than tie up the two-way radios. Such mundane things like, "keep an eye open for a lost purse," or asking someone to bring some food back to the command post are routine.



The red tip on the magnet mount antenna on this NJ State Police car is a tip-off that federal agents are involved (as well as the presence of the USSS agent about to enter the car).

While I do not have a photo of the newer Advisor pagers by Moneyrola, the older pagers were Motorola OPTRX (see photo). They are a binary digital (GOLAY sequential code) alphanumeric unit. These Motorola pagers have data, tone alert, and voice capabilities, although I've never heard the USSS use voice on them. The frequency range for these units is 132-174 MHz VHF, 403-430, and 440-512 MHz UHF. A newer model may be employed in your monitoring area. You'll have no problem catching the paging frequency with a frequency counter.

If you find the frequency used a lot, something may be up. Watch for sudden activity by agents after they receive pages. Pages can be sent to an individual or to the whole group and generally are only a sentence long. Two-way radio, however, is still the preferred communication medium.

Make good use of photos

Over the years I've noticed the use of USSS radios by the local PD, especially the state police. This is how they keep in touch with each other. But I also notice that the cars involved have magnet-mounted antennas with red tips on them like those in the photo, which was taken several years ago. The same, signature red-tip antennas are visible (though not enough for reproduction here) in other photos from a variety of events up to the present day.

The Motorola OPTRX pagers may still be in use by the Secret Service, though they are being replaced by the newer Advisor model.

Protection service is provided to all declared candidates that want it. One who apparently didn't was Ross Perot—at least, he campaigned in 1992 in New Jersey without it. I was present when he attended a rally at the Flemington Speedway in Hunterdon County. No red-tipped antennas showed up here..

I noted that, in the absence of the USSS, the local PD and the Sheriff provided traffic control and escorted Mr. Perot while in public. They used Hunterdon county radios (154.815/159.030 MHz) for traffic control and the State Police Emergency channel of 154.680 MHz as their command post. The Emergency Medical Service used their county radios (154.965/158.955 MHz) and the State Police emergency channel of 153.785 MHz for the CP. The local hospital used 155.340 MHz for the transport of a patient at the rally.

If the USSS is not involved, then your state PD and/or local PD will be there providing security. The NJSP provided two troopers—that was it! The Flemington Speedway security force was the only other viable protection I saw.

This brings up a tip that can be applied anytime: the speedway security people used Pace Landmaster III radios on 151.745 MHz, purchased new for $365 dollars each. That's right, folks: business radios! Since then, I've found narcotic squads and drug dealers both hiding on business frequencies. I now listen all the time!

It has been rumored that the Perot people use business radios. I didn't notice any while he was in Flemington, but don't rule them out. Have one scanner with at least two banks loaded with itinerant, business, and low power GMRS frequencies. Even the press will use business frequencies along with their assigned 450/455 band frequencies. Obviously, monitoring the press is always a good way to learn about what is happening—sometimes before it happens.

Let the campaigns begin

Using the techniques I have described, I recently attended a Democratic fund raiser at the Garden State Exhibit Center in Somerset, NJ. President Clinton was the "main event" that evening, using the fund raiser as his reelection campaign kickoff.

I arrived early to scout out the area. While evaluating the area for a possible landing site, I spotted the NJSP bomb squad truck. Aha!—a possible clue to the landing site. I then drove down the street where the press was parked and found a small group of spectators with cameras ready. Sure enough, right next to them were the NJSP preparing to watch the helicopters land.

EMS and fire apparatus were stationed very close to the landing site in case an emergency should arise. Therefore, listening to the paging, fire ground, mutual aid channel, and normal rescue/fire frequencies helped ascertain the arrival time and landing site for the choppers. On one occasion I have heard the choppers use 46.700 MHz while they were on their way to a presidential function. You may also wish to search the military bands for communications.

I set up my scanners to monitor each group involved with this detail—police, fire, rescue, business, USSS, press, and a few special tricks such as monitoring the cordless phone frequencies. Before long I could hear the first group of choppers coming to roost.

Radio activity will occur just before arrival and taper off quickly afterwards. I soon noted Charlie and Tango in use and shortly found out that Tango was being used by the Clinton detail while inside the Exhibit Center. How did I discover that, you may wonder, since such communications are encrypted?

Those of us with an insatiable love of scanning often learn—by tireless experimenting or through the grapevine—techniques that the two-way radio users themselves generally don't know about. It is advisable for both parties to keep it that way. However, if you take the time to work through the problem, you should be able to come up with some ideas on how to overhear someone's communication and circumvent their scrambling. It might not be foolproof, but it is occasionally possible.

Even despite some encryption, with all the clear voice communication going out over the air from various two-way radio users, you should still be able to enjoy your hobby. If you pay attention to some of the tips that you may have learned from this article and, of course, from your own experience, you'll have an enjoyable time when the campaigns come to town.

It should be an interesting election year. And I'm sure that there will be plenty of opportunity to scan the campaigns as they travel nationwide. Enjoy your hobby, collect a few memories, and while you're at it, do yourself a favor and register to vote. Don't complain about the results if you don't let your voice be heard.

LATE PRIMARIES

Though "Super-Tuesday" has come and gone, these primary elections may yield local scanning action.

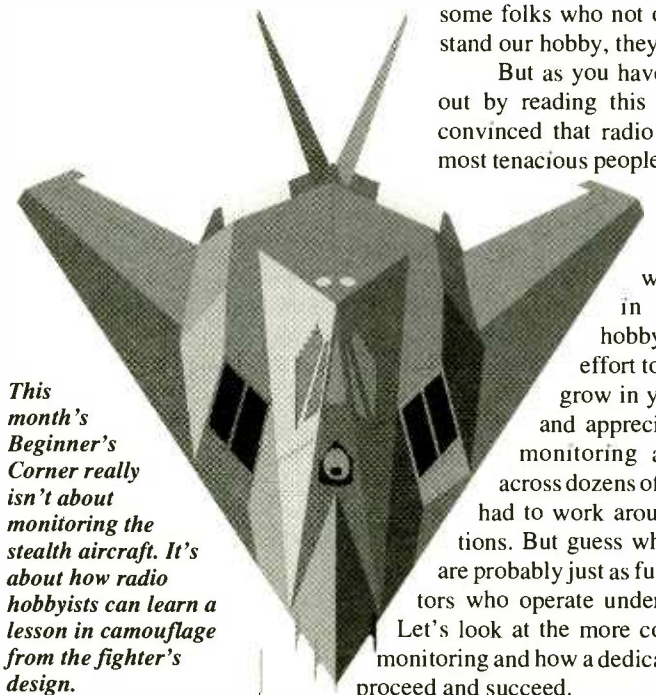
5/7	District of Columbia, Indiana, North Carolina
5/14	Nebraska, West Virginia
5/21	Arkansas
5/28	Idaho, Kentucky
6/4	Alabama, Montana, New Jersey, New Mexico

Skip Arey, WB2GHA
TJAREY@delphi.com

Stealth Monitoring

One hard fact you learn as you go through life is that, sometimes, appearances do mean a lot. Not every dedicated radio hobbyist is blessed with unlimited options when it comes to setting up a listening post. In fact, there are even people in this world who go out of their way to limit the hobbyist's ability to participate in radio monitoring altogether. These limitations can run all the way from someone in the family saying, "You're not putting that contraption in our family room," to legal limitations on buildings and property. Hard as it may be to understand, there are some folks who not only do not understand our hobby, they actively loath it.

But as you have probably figured out by reading this column, I remain convinced that radio hobbyists are the most tenacious people on our planet. We enjoy the challenge of coming up with creative ways to participate in the monitoring hobby in spite of every effort to prevent it. As you grow in your understanding and appreciation of the radio monitoring art, you will run across dozens of cases of folks who had to work around various limitations. But guess what: their logbooks are probably just as full as those of monitors who operate under ideal conditions. Let's look at the more common barriers to monitoring and how a dedicated monitor might proceed and succeed.



This month's Beginner's Corner really isn't about monitoring the stealth aircraft. It's about how radio hobbyists can learn a lesson in camouflage from the fighter's design.

■ Stealth Shack

I'm lucky to have half a room in my basement totally devoted to the radio hobby. Desks, shelves, and racks full of radio stuff fill this little corner of my world. Further, all I need to do to make my home look like any non-monitor's home is pull the basement room's door shut. Guests to my home would be none the wiser as to my choice of hobbies. (I've often thought of buying some old golf clubs and leaving them in my hall closet just to throw people off the scent.)

But many people are not as fortunate as I am. Perhaps they share their domicile with others who do not appreciate a web of coaxial cables coming in through a hole in the wall and a table covered with equipment that reminds the uninitiated of a NASA space launch. People forced into keeping their hobby low-profile around the household can resort to a few simpler versions of my basement room.

The first logical solution is to convert a closet over to the hobby. Even a small closet puts all hobby essentials out of sight while still allowing the hobbyist a place of relative privacy to play radio. It's a fairly simple matter to have an electrician run power to a closet. This, plus a chair and a few shelves, will allow any listener to get fully involved in any aspect of radio he may choose.

A still smaller version of this idea can be applied to any esthetically pleasing cabinet or other piece of appropriate furniture. One idea I've always wanted to try was the classic "roll-top" desk. I think it would be the height of "cool" to have a desk that looks as if it came out of the 1800s with a top that would roll back to reveal an ultramodern radio monitoring station. The current trend toward miniaturization makes this a real possibility. Someday I may move out of my basement and give it a try.

The key to this part of our study is simple concealment. Think of all those dedicated Allied resistance operatives during World War II that had to hide their equipment in drawers and cabinets for reasons far more important than esthetics. You're bound to come up with a few attractive ideas of your own.

■ Stealth Antennas

Nothing can get those non-radio oriented neighbors more upset than a few well-placed antennas. Yes, believe it or not, the vast majority of the public do not sigh appreciatively every time they see a well-thought-out tri-bander and rotor on top of a gleaming sixty foot tower.

If the neighbors and the local regulations say "no" to outside antenna installations, you have basically two choices. The first is to turn on the legal machinery to challenge these regulations. You may be surprised to find that federal law, especially as it applies to amateur radio operators, supports many antenna installations. But you still have to drag the issue through an oftentimes expensive legal process to get what you want. Even if you do this and succeed, you may never again get invited to your neighbor's barbecue.

The second alternative is to go undercover. If you

really think things through, antennas are little more than a bunch of selectively cut wires arranged in an manner to optimize performance. Also, if you're not planning to transmit, you may be able to be a great deal less selective about what you do with those wires. Yeah, I know I'm making a lot of engineering types out there cringe, but bear with me.

All you need to do to keep the neighbors off your back is to figure out a way to make the outside antenna look as if it is something other than an outside antenna. How about demonstrating your patriotism by putting up a flagpole? Let's see now, if I remember my antenna math, a twenty foot flagpole would give you an eighth wave resonant vertical, dead in the middle of the popular 49 meter shortwave broadcast band. If your neighbors have any negative comments you can give them the standard "Sands of Iwo Jima" speech.

Another possibility can be found by checking out the down spouts on your rain gutters. More than one ham has led an active operating life by loading up their down spout. Just to give this idea a try, I used a self-tapping screw to connect a wire to the down spout here at "Casa del Stucco." The results were impressive in the listening mode. I found I could hear just about everything a could get with my 80 meter dipole. Going the next step, I loaded the down spout up on the 20 meter ham band and tried a few contacts. It worked, and probably could have been further improved by laying down a ground wire system. The idea definitely deserves further study.

A trick I used for years when living in college dorms was an antenna I could lower out my window at night and reel in before anyone noticed in the morning. A simple piece of wire with a small weight attached works well. Some people also get reasonable results using the famous child's toy, the Slinky. This coiled wire toy makes a great removable antenna that can allow for listening in most locations. Of course, I must warn you to be careful when tossing anything out a window. Take precautions not to hit anyone or place the wire in such a way that somebody gets "clotheslined" by it. Remember, you're already operating in an environment that is hostile to the radio hobby. Don't make it worse by causing injuries to people or property.

Apartment and condominium dwellers have a few more obstacles to outside access than do folks in single family homes. Still, many antenna designs have been used with great success even in these environments. Shorter flag poles patriotically hung off of balconies have been known to work. So have loop antennas hidden along floor boards.

When it comes to serious stealth antenna designs, three books pop into mind:

Shortwave Listener's Guide for Apartment/Condo Dwellers by Edward M. Noll W3FQJ, $9.95, published by MFJ Enterprises, Inc. Mississippi State, MS.

Hidden Ham Antennas by Frank P. Hughes VE3DQB $12.95, published by Tiare Publications, Lake Geneva, WI.

Low Profile Amateur Radio by Jim Kearman KR1S, $8.00, published by The American Radio Relay League, Newington, CT.

These books are available from many of the radio hobby suppliers that advertise in the pages of *Monitoring Times*. Most of the designs these books discuss are well within the scope of any beginning radio hobbyist. Antenna experimentation is inexpensive and almost always improves reception. Most of all, it's fun!

Stealth Mobile Operations

Any car that has been turned into a porcupine by its antennas will lead to a certain amount of unwanted attention. First, your significant other may not appreciate how these additional antennas enhance the appearance of your family vehicle. Even more importantly, an extra antenna or two can make your car the target of those predatory types in our society who would rather break into your vehicle than seek gainful employment. The easiest solution is no outside antenna at all. Just set any handheld type equipment close to a window and you should get reasonable results.

Another solution that would improve performance somewhat would be to use a device such as one of the Mobile Antenna Multicouplers marketed by Grove Enterprises. These devices allow you to connect your scanner through most cars' standard AM/FM broadcast antenna. If you want coverage into the HF ranges you can opt for a device such as the Grove "No-Tenna." This allows you to enjoy the radio hobby without attracting any unwanted attention to your activities.

Stealth Pedestrian

To paraphrase the singer Alanis Morissette, "I've got one hand in my pocket and the other one is holding a scanner!" Many places that are fun to scan take a dim view of folks walking around their environment with a scanner in their hand. The easiest solution, of course, is to put the rig in your pocket and run an earphone under your clothing. I've done this for years and scanned many places without drawing any attention to myself. Since scanning receivers have become pocket-sized, people have taken them most anywhere with few problems.

Some devices to aid in frequency location, such as the Optoelectronics "Scout" frequency counter, can be operated totally hidden from view. All you need to do is stick the unit in your pocket and take a walk through the mall. By the time you return to your car you will have all of the significant mall operation frequencies stored in the Scout's memories without anyone knowing you've captured them.

Devices such as the Scout can be set into modes of operation that require no operator input during their use. But there will be times when you need to control the unit. I've developed sufficient sleight of hand skills to make hitting the buttons on my handheld scanner appear to anyone around me as if I'm scratching my side under my jacket. These are the acquired skills of any stealth monitor.

The most extreme notion I've run across was a suggestion from one of my "Scanner Scum" compatriots, Bill Cole. He proposed obtaining a used video camera casing from the "graveyard" pile at any TV repair shop. It would be an easy task to strip the video guts out of the casing and fill it with one or more scanning receivers. You may even be able to situate the scanner's controls so that they can be operated while you appear to be taping the kids. It's interesting that many environments that have expressed bans on scanners and radios allow folks to roam freely with video cameras.

One last word of warning: Disobeying any environment's laws or regulations concerning the possession and use of scanning equipment can result in ejection, confiscation, or possibly prosecution. Use a little common sense before entering into "stealth" mode and you will not have any sad radio experiences.

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

Scanning Sounds Good Like a Cable Channel Should

"Huh?" you ask. "What is this guy talking about now?" Well, it all started when someone passed a little note on one of the online scanner "lists" (more on these list-servers another time) mentioning that a visitor to Winston-Salem, North Carolina, was watching local Cable Channel 13, the city access channel, when, much to his surprise, he heard the Winston-Salem police department radio broadcasts. Well, this piqued my interest, to say the least, so we did a bit of investigative work to find out more.

We called the Winston-Salem police and spoke to a sergeant who confirmed that, yes, the main police dispatch/emergency channel was rebroadcast over local Cable Channel 13. *Wow!* In this day and age, when police chiefs and power-brokers are deciding that their municipality should switch to expensive trunking or digital radio systems—in part so their citizens can no longer monitor public safety transmissions—here was a city, Winston-Salem, that made it easier for its people to stay attuned to their own surroundings.

The sergeant was kind enough to pass us on to Mr. Ray "J.R." Snider of the city's cable access channel. Mr. Snider was not only very pleasant (a lot of nice people live in North Carolina, it seems), he was truly a breath of fresh air when it comes to the burning issue of citizens monitoring the police.

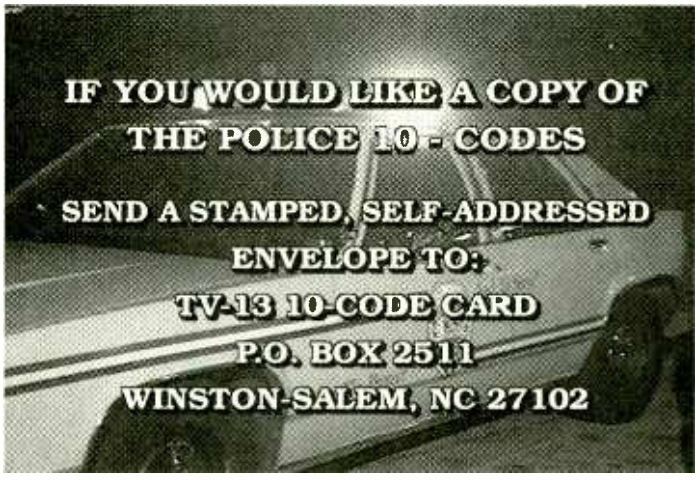
J.R. said that he instituted the cable broadcasts back in 1989 when he first got the idea. He felt that it was the best way for the general public to "hear" how their tax dollars were spent, 24 hours each day. And, J.R. said, it was a way for honest people to know what's going on in their city. *Wow, again!* And why is this kind of enlightened thinking so rare today in city government?

Mr. Snider got the idea six years ago when he was working for the police in Public Relations and Training. At that time, the city decided that it wanted to have one of the local cable channels devoted to advertising the local happenings upcoming in Winston-Salem. They put up a scroll of notices, such as meetings of church groups, events at the coliseum and the convention center, and the like. Initially, the city was going to have music playing over the scroll, but J.R. realized that if someone wanted to listen to music, they wouldn't do it through the three-inch speaker on their TV set. He knew there had to be compelling audio to keep people watching the channel.

It was then that the idea hit him. Why not program a scanner for the main police dispatch channel, as well as the primary fire channel, and then let the radio scan as it broadcast the audio out over the cable access channel? This way, the public would be more interested in watching the events scroll, and they would learn more about their city, their police and, their fire department.

It was a stroke of brilliance that continues to this day. Interestingly, though, J.R. mentioned that an issue recently came up regarding the 1934 Communications Act. Most likely it is the matter of rebroadcasting. I'm no attorney, but it seems to me that if the police and fire departments have authorized it, why should there be a problem? Unfortunately, there is talk in the city of switching over to an MDT (mobile data terminal) dispatch system. Most of the radio calls will then no longer be available to the public.

We couldn't help wanting to learn more about this service. What does the public think of it? Mr. Snider was kind enough to relate a couple of interesting stories on just that subject. It seems that one Halloween night a few years back, the city decided to run special programming until 9 pm, produced especially for the local access channel. They were hopeful that the shows they developed, on subjects important to Winston-Salemites, would be both entertaining and useful.



Well, it seems that many residents were none too happy with this. Especially not on Halloween, which is a very active night for the police! The department heard about it the next day with multiple phone calls from angry residents. That was the last of the late-night programming.

Mr. Snider also reported that a couple of times, when the scanner went on the fritz and no one at the cable channel or the police department was aware of it, they have received phone calls from folks all over the city to apprise them of the situation.

Why don't other cities provide this same service? Mr. Snider is baffled. When we told him about other cities and counties switching to digital to keep us "riff-raff" from monitoring, he replied, "What are they trying to hide?" *Wow, number three!*

J.R. pointed out that Winston-Salem broadcasts the audio of the dispatch/emergency channel. The city police "Information" channel three, "narcotics" channel four, and "car-to-car" channel five, are not relayed. This provides a degree of privacy for the police, even though they understand that anyone can go out and buy a scanner and listen to all their UHF radio calls. J.R. also informed us that every officer, from sergeant on up, has a cellular phone in his patrol car, which does provide a degree of security. Mr. Snider said that as long as a community has some means to provide the police with a secure channel, there's no reason not to allow general dispatch frequencies to be made available to the public.

How do Winston-Salem police officers themselves feel about all this? They are not crazy about those situations where the public shows up at an incident, Mr. Snider told us, but there's a fall-out from the service that decidedly pleases most people in the department. Citi-

zens of Winston-Salem are coming up to officers and saying things like, "I never realized how busy the police were in this city."

J.R. has also heard stories from officers about incidents where they responded to a call to a home, arrived late and apologized for their tardiness. "Don't worry about it," the residents say, "We heard how tied up you were on the TV and we knew you'd be late." I'm fresh out of *wows*!

Now for the real kicker. After the police and fire audio was on the air for a time back in '89, the cable channel and the police department began getting calls from the locals. "What the heck are all these radio codes and signals? I don't understand what you're talking about." The city uses 10 codes, but the public didn't know what they were. So, a number of folks went to the chief of police and asked if he would mind if they offered to give away copies of the code list.

The chief, taking a page from the J.R. Snider "Book of Enlightened Thought," said, "sure." And, now, when you watch Cable Channel 13, along with the scroll of events at the Winston-Salem Convention Center, you'll also see a notice offering a free copy of the city's 10-codes when you mail in a self-addressed, stamped envelope. Enough with the *wows*. I'm simply moving to Winston-Salem.

Winston-Salem cable is accessible to 80,000 homes in the city, and over the years more than 5,000 requests for code lists have been fulfilled. Mr. Snider knows of no other city in the nation which offers this service. Most, he correctly assumes, prefer to play elevator music. If any of our readers are aware of other democratic-thinking communities which offer public safety audio in a similar manner, please let me know. I wish I could tell you how many police departments I've called for frequency information, only to be told that channel usages are classified government secrets and their frequencies are impossible to monitor. Every so often, thank goodness, my faith in local government is revived.

■ Bunking with Trunking

Are you one of the "lucky" ones who lives in a city, county, or state where trunking has taken over? I live outside of Boston where, thankfully, we are not burdened with trunking to any great degree. The city of Boston has a 10-channel Motorola system which is used by just about all city agencies other than the police and fire departments. Transportation, public works, elder vans, parks and recreation, housing authority, and others all use the system.

Just to the north of Boston, the city of Cambridge uses another Motorola trunking system for all departments except police, whose transmissions are often simulcast on the 800 MHz network. The fire department simulcasts their dispatch on their old VHF channel, so it's easy to follow the goings-on of this important community. To the south of Boston, a few small towns, as well as Bristol County agencies, utilize other Motorola trunked systems. It has also been reported that all the towns on Cape Cod will be switching to a trunked system in the near future.

The only other major community in the state which has gone trunked is the city of Worcester. Worcester, located in the center of Massachusetts, is fairly large. It always seemed to the casual listener that their UHF police and fire systems worked great. Worcester Public Works was in desperate need of new radios, but somehow the city was convinced that an 800 MHz Ericcson EDACS trunked system was the way to go.

For those of you who are aware of Ericsson EDACS, four beeps follow all transmissions and, on some systems, a buzzsaw sound rotates among all the trunked channels. Of course, none of the system users hear this racket, just us poor, dumb, and dishonest scanner folk. Wonder what J.R. would have to say about this.

There is one huge agency that has gone to trunking in the state, which is unfortunate for scanner listeners, and that is Massachusetts State Police. They're constructing a statewide Motorola system, which is used by a number of state agencies. The system started in greater Boston and has expanded over the years. We'll write more about this system at a later time.

What I wanted to suggest, though, is this: Let's keep track of trunking and digital systems around the nation. I've just offered a list of the systems here in Massachusetts. Please write me in care of *MT* or e-mail me at ScanMaster@aol.com with a listing of the active and future systems in your region or state. Answer the following questions if you can:

- Is it a Motorola, GE/Ericsson, E.F. Johnson system or other system? If it is a Motorola system, is it Type 1 or Type 2, if you know? How many channels are used?
- What agencies operate on the system?
- What agencies are expected to join the system?
- How many tower sites are used?
- Is digital communication used for certain units or for all units?
- What problems, if any, has the city, county or state experienced with the system?
- What has been the reaction of the city administrators and system users? In your opinion, was the switch to trunking/digital really necessary?
- Is there any simulcasting still going on? If so, on what frequencies?

The future of our hobby depends on our keeping track of the future of two-way radio systems. If the future is regional or statewide trunking, we must know, and make scanner manufacturers aware, of this trend. If the future is all digital, that's something that must be addressed, too.

Bob Grove wrote in the February issue of *Monitoring Times* that the scanning hobby will experience a gradual decline which will be interrupted with the advent of a trunk-tracking scanner. In the marketplace we see that the decline may have already started. Let's do what we can to see that this interruption, and hopefully a reversal, really does come to pass.

■ Catching up with the Mail

We have a lot of mail to catch up on, so here goes.....

Joseph W. Smith, Jr., N3UED, a Telecommunicator III with Lancaster County Wide Communications in **Lancaster, Pennsylva-**

nia, writes: "The following are our frequencies which we utilize for communications:"

Fire Frequencies

33.460	Lancaster County Fire Police
33.560	Lancaster County Northeast
33.600	Lancaster County EMS Channel & Siren
33.640	Lancaster County Northwest
33.680	Lancaster County Suburban
33.720	Lancaster County South
33.760	Lancaster County Overflow Channel
33.820	Lancaster City Fire
33.900	Lancaster County Fire/EMS Dispatch

Police Frequencies

155.685	Lancaster County Channel "A" -County
155.640	Lancaster County Channle "B" -Northwest
154.860	Lancaster County Channel "C" -South
155.535	Lancaster County Channel "D" -Northeast
154.875	Lancaster County Channel "E" -City
155.430	Lancaster County Channel "F" -Metro
155.895	Lancaster County Channel "G" -Simplex
154.055	Lancaster County Constable Frequency
155.475	National Police Frequency

"We also have the following other frequencies in our county that tie in to local municipalities and organizations:"

Fire Frequencies

31.040	Warwick Ambulance Association
33.040	West End Ambulance Association
33.080	Manheim Township Ambulance Association
33.420	Manheim Fire Company
33.440	Rohrerstown/West Lancaster Fire
33.480	East Petersburg Fire
33.520	Eden Fire Company
33.620	Manheim Fire Company
33.660	Silver Spring Fire Company
33.700	Maytown/Florin/Bainbridge Fire
33.800	Lititz Fire Company
33.840	Ephrata Pioneer Fire Company
33.920	Lafayette Fire Company
33.960	Lititz Fire Company

Police Frequencies

155.715	Millersville Borough	155.880	East Hempfield Township
156.015	Penn Township	158.745	Mount Joy Township
155.580	Pennsylvania State Police -Lancaster	154.845	Ephrata Borough Police
158.805	East Cocalico Township	155.925	Warwick Township
155.145	Mount Joy Borough	155.250	Pequea Township
155.655	Manheim Township	158.955	Manheim Borough
153.980	Elizabethtown Borough	155.055	West Hempfield Twnsp.
155.085	Rapho Township		

A young man, Branden Watson, writes to us from the **Buffalo, New York,** area with some of the frequencies he listens to:

418.900	Drug Enforcement Administration
165.2375	United States Customs Service
460.025	Buffalo Police F-1 Traffic
460.350	Buffalo Police F-2 Detectives
460.425	Buffalo Police F-3 North Dispatch
460.475	Buffalo Police F-4 South Dispatch
460.025	Buffalo Police F-5 Car to Car
460.450	Erie County Sheriff North
460.075	Erie County Sheriff South
460.200	Erie County Sheriff Central
460.400	Erie County Sheriff Car to Car
155.790	Hamburg Police F-1
155.730	Hamburg Police F-2
46.200	Hamburg Fire Control F-1
46.380	Hamburg Fire Control F-3
46.220	Hamburg Fire Control F-4
159.225	New York State Department of Conservation (ENCON)

Thanks, Branden. But now a question for you Buffalonians: What are all those 423 MHz frequencies used for in the city?

Buffalo, like a number of other areas which border Canada (across the lake), received a special waiver from the FCC allowing use of the 423 through 426 MHz band for public safety and business communications. Other states (besides New York), which come to mind as having similar allocations include Ohio and Michigan.

The following are the 420 MHz frequencies shown in my database as licensed to the city of Buffalo. If you can match up usages with each frequency, Branden, and other Bills fans, will be most grateful.

423.850, 423.875, 423.900, 423.925, 424.050, 424.075, 424.225, 424.350, 424.375, 425.250, 425.375

Keep it coming!

There's no better way to keep all of us informed as to new frequencies and systems than by our readers sharing lists of their favorite, active, local channels. We also love the local newspaper clippings about proposed new communications systems. Thanks again to all of you who have already sent in data. Please keep the mail coming.

Note on advertisement below: As of 4/26/95 it became unlawful to market cellular-capable receivers in the US. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.

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A complete listing of public safety and business radio communications—$29.95; Order BOK63-95.

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Discover and monitor the frequencies of law enforcement and military agencies in nations around the world—$19.95; Order BOK13DS.

National Sports & Recreation Frequency Directory
Thousands of listings for recreational and amusement operations—$13.95; Order BOK 90.

Scanner Master Guides
Undoubtedly the most accurate and comprehensive scanner/radio guides ever printed.

- Massachusetts Guide—$29.95; Order BOK11DS.
- Upstate New York Guide—$29.95; Order BOK44DS.
- Sixth edition D.C., Delaware, Maryland, and Virginia Guide—$19.95; Order BOK57DS.
- Illinois Communications Guide—$29.95; Order BOK60DS.

Pocket Guides
Includes police fire, ambulance, DPW, emergency management, and other local government frequencies for every community in each state.

- Massachusetts, Rhode Island & So. New Hampshire, 6th edition with latest update sheet—$13.95; Order BOK39DS.
- Maine, New Hampshire and Vermont—$13.95; Order BOK40DS.
- Chicagoland—$13.95; Order BOK61DS.
- Greater Philadelphia/South Jersey, 3rd edition—$13.95; Order BOK55DS.
- New York Metro/Northern New Jersey—$13.95; Order BOK49DS.

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Larry Van Horn, N5FPW
steditor@grove.net

Monitoring Maritime Safety Broadcasts

The U.S. Coast Guard broadcasts different kinds of maritime safety warnings and bulletins on a variety of HF, VHF, and UHF frequencies to ensure that all ships of every size and nationality can receive this vital information. This month we will look at two of these broadcasts commonly heard in the utility bands — marine information broadcast (MIB) on 2670 kHz and NAVTEX on 518 kHz.

■ Marine Information Broadcast (MIB)

Urgent marine information is transmitted on 2670 kHz using upper sideband (USB) after first being announced on the distress, safety, and calling frequency of 2182 kHz. A complete listing of all these U.S. Coast Guard broadcasts is presented in Table 1.

■ NAVTEX

NAVTEX is an international, automated system for instantly distributing maritime navigational warnings, weather forecasts and warnings, search and rescue notices, and similar information to ships. NAVTEX uses 518 kHz and the SITOR-B mode to transmit these broadcasts.

How does the system work? NAVTEX uses a small, low-cost, and self-contained "smart" printing radio receiver which is installed in the pilot house of a ship or boat. It checks each incoming NAVTEX message to see if it has been received during an earlier transmission. The receiver also verifies if the message is a category of interest to the ship's master.

If it is a new and wanted message, it is printed on a roll of adding-machine-sized paper; if not, the message is ignored. A new ship coming into the area will receive many previously-broadcast messages for the first time; ships already in the area which have already received the message won't receive it again. No person needs to be present during a broadcast to receive vital information.

The International Maritime Organization (IMO) has designated NAVTEX as the primary means for transmitting coastal urgent marine safety information to ships worldwide. The Coast Guard began operating NAVTEX from Boston in 1983, and completed its last installation in Adak, Alaska, just in time to meet IMO's August 1993 requirement that ships carry NAVTEX receivers.

In the United States, NAVTEX is broadcast from Coast Guard facilities on both coasts and in Alaska, Guam, and Hawaii. Signal coverage is reasonably continuous in these areas. The U.S. has no coverage in the Great Lakes, though coverage of much of the Lakes is provided by the Canadian Coast Guard.

■ NAVTEX Message Selection

Every NAVTEX message is preceded by a four-character header B(1)B(2)B(3)B(4). The B(1) alpha character identifies the station, and B(2) is an alpha character used to identify the subject of the message. NAVTEX receivers use these two characters to reject messages from stations or concerning subjects of no interest to the user. B(3)B(4) are two-digit numerics identifying individual messages, used by receivers to keep messages already received from being repeated.

For example, a message preceded by the characters FE01 from a United States NAVTEX station indicates that this is a weather message from the Coast Guard NAVTEX station in Boston MA.

■ Transmitter Identification Character B(1)

The transmitter identification character B(1) is a single unique letter which is allocated to each transmitter. It is used to identify the broadcasts which are to be accepted by the receiver and those which are to be rejected. In order to avoid erroneous reception of transmissions from two stations having the same B(1) character, such stations must have a large geographical separation. NAVTEX transmissions have a designed range of about 400 nautical miles.

■ Subject Indicator Characters B(2)

The subject indicator character is used by the receiver to identify different classes of messages (See Table 2 for a complete list). The indicator is also used to reject messages concerning certain optional subjects which are not required by the ship (e.g. OMEGA messages might be rejected in a ship which is not fitted with an OMEGA receiver). Receivers also use the B(2) character to identify messages which, because of their importance, may not be rejected (designated by an asterisk in Table 2).

The subject indicator characters **B**, **F**, and **G** are normally not used in the U.S. Since the National Weather Service normally includes meteorological warnings in forecast messages, meteorological warnings are broadcast using the subject indicator character **E**. The subject indicator character **A** is used for U.S. Coast Guard district broadcast Notices to Mariners (NTM) that affect ships outside the line of demarcation as well as inside the line of demarcation in areas where deep draft vessels operate.

Table 3 gives a complete list of NAVTEX stations worldwide. If you want more information on how to monitor these broadcasts, see the "Below 500 kHz" column in the September 1994 issue of *Monitoring Times*.

TABLE 1: U.S. Coast Guard 2670 kHz Marine Information Broadcasts

NCF	Miami Beach, FL	0350 1550
NMA10	Mayport, FL	0620 1620
NMA21	St. Petersburg, FL	0320 1420
NMB	Charleston, SC	0420 1620
NMC	San Francisco, CA	0203 1403
NMC6	Monterey, CA	0303 1533
NMC11	Humboldt Bay, CA	0303 1503
NMF	Boston, MA	0440 1040 1640 2240
NMG2	New Orleans, LA	0550 1035 1235 1635 2235
NMK	Cape May, NJ	1103 2303
NMN13	Cape Hatteras, NC	0133 1303
NMN37	Fort Macon, SC	0103 1233
NMN70	Chincoteague, VA	0233 1403
NMN80	Hampton Roads, VA	0203 1333
NMO2	Honolulu, HI	
	Weather	0545 1145 1745 2345
	Noice to Mariners	0903 2103
NMQ9	Los Angeles, CA	0503 1303 2103
NMR1	San Juan Section, PR	0305 1505
NMW	Astoria, OR	0533 1733
NMY42	Moriches, NY (Sandy Hook Backup)	0010 1210
NOE	North Bend, OR	0603 1803
NOQ	Mobile, AL	
	Notice to Mariners only	1020 1220 1620 2220
NOW	Port Angeles, WA	0615 1815
NOY	Galveston, TX	1050 1250 1650 2250
NOY8	Corpus Christi, TX	
	Hydro/Notice to Mariners	1040 1240 1640 2240
NRV	Guam	0705 2205

Table 2- NAVTEX subject indicator characters:

A	Navigational warnings *
B	Meteorological warnings *
C	Ice reports
D	Search & rescue information, and pirate warnings *
E	Meteorological forecasts
F	Pilot service messages
G	DECCA messages
H	LORAN messages
I	OMEGA messages
J	SATNAV messages (e.g. GPS)
L	Navigational warnings - additional to letter A
V	Notice to Fishermen (U.S. only)
W	Environmental (U.S. only)
X/Y	Special services - allocation by the IMO NAVTEX panel
Z	No message on hand

TABLE 3: List of Fully Operational NAVTEX Services

All broadcasts are made on 518 kHz using forward error correcting (FEC) narrow-band direct printing techniques (SITOR-B). English unless otherwise noted. Times in UTC.

Argentina (All broadcasts in English and Spanish)
- Ushuaia (A) 0240 0840 1440 2040
- Rio Gallegos (B) 0410 1010 1610 2210
- Comodoro Rivadavia (C) 0040 0640 1240 1840
- Bahia Blanca (D) 0210 0810 1410 2010
- Mar del Plata (E) 0110 0710 1310 1910
- Buenos Aires (F) 0510 1110 1710 2310
- Rosario (G) 0010 0610 1210 1810

Azores
- Horta (F) 0050 0450 0850 1250 1650 2050

Bahrain
- Hamala (B) 0010 0410 0810 1210 1610 2010

Belgium
- Ostende Radio (T) 0248 0648 1048 1448 1848 2248

Bermuda
- Hamilton (B) 0010 0410 0810 1210 1610 2010

Bulgaria
- Varna (J) 0130 0530(weather forecast) 0930 1330 1730 (weather forecast) 2130

Canada
- Sept Isles (C) 0020 0420 0820 1220 1620 2020
- Prince Rupert (D) 0030 0430 0830 1230 1630 2030
- Sept Isles (D) 0035 0435 0835 1235 1635 2035 (French only)
- Tofino (H) 0110 0510 0910 1310 1710 2110
- Wiarton (H) 0110 0510 0910 1310 1710 2110
- St Johns (O) 0220 0620 1020 1420 1820 2220
- Thunder Bay (P) 0230 0630 1030 1430 1830 2230
- Sydney, NS (Q) 0240 0640 1040 1440 1840 2240
- Sydney, NS (S) 0255 0655 1055 1455 1855 2255 (French only)
- Montreal (T) 0355 0755 1155 1555 1955 2355 (French only)
- Yarmouth (U) 0320 0720 1120 1520 1920 2320
- Yarmouth (V) 0335 0735 1135 1535 1935 2335 (French only)
- Montreal (W) 0340 0740 1140 1540 1940 2340
- Labrador (X) 0350 0750 1150 1550 1950 2350

Chile
- Antofagasta (A) 0400 1200 2000 (English)
- (H) 0000 0800 1600 (Spanish planned)
- Valparaiso (B) 0410 1210 2010 (English)
- (I) 0010 0810 1610 (Spanish planned)
- Talcahuano (C) 0420 1220 2020 (English)
- (J) 0020 0820 1620 (Spanish planned)
- Puerto Montt (D) 0430 1230 2030 (English)
- (K) 0030 0830 1630 (Spanish planned)
- Punta Arenas (E) 0440 1240 2040 (English)
- (L) 0040 0840 1640 (Spanish planned)
- Isle de Pascua (F) 0450 1250 2050 (English)
- (M) 0050 0850 1650 (Spanish planned)

China (All broadcasts in English and Chinese)
- Guangzhou (N) 0210 0610 1010 1410 2210
- Shanghai (Q) 0240 0640 1040 1440 2240
- Dalian (R) 0250 0650 1050 1450 2250

Croatia
- Split (Q) 0250 0650 1050 1450 1850 2250

Cyprus
- Troodos (M) 0200 0600 1000 1400 1800 2200

Egypt
- Serapeum (Ismailia) (X, N) 0210 0610 1010 1410 1810 2210
- Serapeum (Ismailia) (X) 0350 0750 1150 1550 1950 2350
- X is for Gulf of Suez & Red Sea and N is for Meciterranean Sea; until the station in Alexandria starts its NAVTEX operation on 518 kHz

France
- Cross Corsen (A) 0000 0400 0800 1200 1600 2000
- Cross La Garde (W) 0340 0740 1140 1540 1940 2340

Greece (All broadcasts in English and Greek)
- Iraklion (H) 0110 0510 0910 1310 1710 2110
- Kerkyra (K) 0140 0540 0940 1340 1740 2140
- Limnos (L) 0150 0550 0950 1350 1750 2150

Hong Kong
- Hong Kong (L) 0150 0550 0950 1350 1750 2150

Iceland
- Reykjavik Radio (R) 0318 0718 1118 1518 1918 2318

India
- Bombay (G) 0100 0500 0900 1300 1700 2100
- Madras (P) 0230 0630 1030 1430 1830 2230

Indonesia
- Jayapura (A) 0000 0400 0800 1200 1600 2000
- Ambon (B) 0010 0410 0810 1210 1610 2010
- Makassar (D) 0030 0430 0830 1230 1830 2030
- Jakarta (E) 0040 0440 0840 1240 1640 2040

Israel
- Haifa (P) 0230 0630 1030 1430 1830 2230

Japan
- Naha (G) 0100 0500 0900 1300 1700 2100
- Moji (H) 0110 0510 0910 1310 1710 2120
- Yokohama (I) 0120 0520 0920 1320 1720 2120
- Otaru (J) 0130 0530 0930 1330 1730 2130
- Kushiro (K) 0140 0540 0940 1340 1740 2140

Malta
- Malta (O) 0220 0620 1020 1420 1820 2220

Netherlands
- Coast Guard Ijmuiden (P) 0348 0748 1148 1548 1948 2348

Norway
- Bodo Radio (B) 0333 0733 1133 1533 1933 2333
- Rogaland Radio (L) 0148 0548 0948 1348 1748 2148
- Vardoe Radio (V) 0300 0700 1100 1500 1900 2300

Oman
- Muscat (M) 0200 0600 1000 1400 1800 2200

Peru (All broadcasts in English and Spanish)
- Paita (S) 0300 0700 1100 1500 1900 2300
- Callao (U) 0320 0720 1120 1520 1920 2320
- Mollendo (W) 0340 0740 1140 1540 1940 2340

Portugal
- Lisbon (Monsanto) (R) 0250 0650 1050 1450 1850 2250

Russian Federation
- Noveressiysk (A) 0300 0700 1100(weather) 1500 1900 (weather and ice report) 2300
- Vladivostok (A) 0000 0400 0800 1200 1600 2000
- Kholmsk (B) 0010 0410 0810 1210 1610 2010
- Murmansk (C) 0120 0520 0920 1320 1720 2120
- Petropavlovsk (C) 0020 0420 0820 1220 1620 2020
- Megaden (D) 0030 0430 0830 1230 1630 2030
- Beringovskiy (E) 0040 0440 0840 1240 1640 2040
- Arkhangelsk (F) 0200 0600 1000 1400 1800 2200
- Providenya (F) 0050 0450 0850 1250 1650 2050

Saudi Arabia
- Damman (G) 0005 0605 1205 1805
- Jeddah (H) 0705 1305 1905

Singapore
- Jurong (C) 0020 0420 0820 1220 1420 2020

South Africa
- Cape Town (C) 0020 0420 0820 1220 1620 2020
- Port Elizabeth (I) 0120 0520 0920 1320 1720 2120
- Durban (O) 0220 0620 1020 1420 1820 2220

Spain (All broadcasts in English and Spanish)
- La Coruna (D) 0030 0430 0830 1230 1630 2030
- Tarifa (G) 0100 0500 0900 1300 1700 2100

Sweden
- Stockholm Radio (H) 0000 0400 0800(weather forecast)1200(ice report) 1530 1600 2000(weather forecast)
- Stockholm Radio (J) 0330 0730(weather) 1130(ice report) 1530 1930 (weather) 2330
- Stockholm Radio (U) 0030 0430 0830(weather) 1230(ice) 1630 2030(weather)

Thailand
- Bangkok Radio (F) 0050 0450 0850 1250 1650 2050

Turkey
- Samsun (E) 0040 0440 0840 1240 1640 2040
- Istanbul (D) 0030 0430 0830 1230 1630 2030
- Antalya (F) 0050 0450 0850 1250 1650 2050
- Izmir (I) 0120 0520 0920 1320 1720 2120

Ukraine
- Mariupol (B) 0100 0500(weather) 0900(ice) 1300 1700 (weather and ice) 2300
- Odessa (C) 0230 0630 1030(weather)1430 1830 (weather and ice report) 2230

United Kingdom
- Cullercoats (G) 0048 0448 0848 1248 1648 2048
- Portpatrick (O) 0130 0530 0930 1330 1730 2130
- Niton (S) 0018 0418 0818 1218 1618 2018

United States
- Miami (A) 0000 0400 0800 1200 1600 2000
- San Francisco (C) 0400 0800 1200 1600 2000 2400
- Boston (F) 0045 0445 0845 1245 1645 2045
- New Orleans (G) 0300 0700 1100 1500 1900 2300
- Kodiak (J) 0300 0700 1100 1500 1900 2300
- Portsmouth (N) 0130 0530 0930 1330 1730 2130
- Honolulu (O) 0040 0440 0840 1240 1640 2040
- Cambria (Q) 0045 0445 0845 1245 1645 2045
- San Juan, PR (R) 0200 0600 1000 1400 1800 2200
- Guam (V) 0100 0500 0900 1300 1700 2100
- Astoria (W) 0130 0530 0930 1330 1730 2130
- Adak (X) 0340 0740 1140 1540 1940 2340

Utility Loggings

Larry Van Horn

UTILITY WORLD

Abbreviations used in this column

AFB	Air Force Base	HF	High Frequency
AFSATCOM	Air Force Satellite Communications	HMCS	Her Majesty's Canadian Ship
AM	Amplitude Modulation	ID	Identification
ANDVT	Advanced Narrowband Digital Voice Terminal	IFE	Inflight Emergency
		INS	Immigration and Naturalization Service
ARQ	Synchronous transmissions and automatic repetitions teleprinter system	LDOC	Long Distance Operational Control
		MARS	Military Affiliate Radio System
ARQ-E3	Single channel ARQ teleprinter system	MoD	Ministry of Defense
ARQ-M2	Multiplex ARQ teleprinter system with 2 data channels	m/v	Motor vessel
		MWARA	Major World Air Route Area
ASSMS	Any stateside MARS station	NA	North America
		NCS	Net Control Station
AWACS	Airborne Warning and Control System	NW	Nightwatch
		OC	Oceania
CAMSPAC	Communications Area Master Station, Pacific	POB	People on board
		RDARA	Regional and Domestic Air Route Area
CanForce	Canadian Forces		
CCG	Canadian Coast Guard	RTTY	Radioteletype
CG	Coast Guard	SAM	Special Air Mission/South America
Comm	Communications		
Comsta	Communications Station	SAR	Search and Rescue
CW	Continuous Wave	SAT	South Atlantic
DEA	Drug Enforcement Administration	Selcal	Selective calling
		SITOR	Simplex teleprinting over radio system
DSN	Defense Switching Network	SITOR-A	Simplex teleprinting over radio system, mode A
EAM	Emergency Action Message	SITOR-B	Simplex teleprinting over radio system, mode B
ETA	Estimated Time of Arrival	U.S.	United States
Fax	Facsimile	USAF	U.S. Air Force
FTS	Federal Telephone System	USAV	U.S. Army vessel
		USCG	U.S. Coast Guard
GANTSEC	Greater Antilles Section	USCGC	U.S. Coast Guard cutter
GHFS	Global HF System	USN	U.S. Navy

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

2182.0 NMR1-GANTSEC USCG San Juan, PR, "CG San Juan" at 0910 in USB with pan-pan announcement of a Boeing 757 down near Puerto Plata, DR, with 189 POBs. This was Alas Domincanas flight 301. (RD Baker, Austintown-OH)

2520.0 PIQN-m/v *Wilma* (UK-88), PDKF-mv/ *Christina* (ZZ4), PFJS-m/v *Klaasje Catharina* (UK317), DENP-m/v *Gerda Maria*, PEQD-m/v *Henrikje* (UK-59), OSVB-m/v *Nidojoa 2*, 3EWN4-m/v *Lorely*, C6MK7-m/v *Tysso*, P3UV4-m/v *Calypso*, MKCE7-m/v *Christina*, and MPSE3-m/v *Antje de Vries* working Scheveningen Radio at various times in USB. (Ary Boender-Netherlands)

3023.0 Kinloss Rescue with a test transmission at 0734. (Boender-Netherlands)

3032.0 Mama Bear working NW01 at 0649. (Jeff Haverlah-Houston, TX)

3113.0 Mama Bear working NW01 at 0422. (Haverlah-TX)

3134.0 Valorous and Leftfoot working NW01 at 0625. (Haverlah-TX)

4009.5 NNN0TDR-USN MARS NCS for Ohio net at 2220 using 170/75 RTTY with administrative traffic. (Baker-OH)

4055.0 Dragoon, Condor, and Condor Bravo working each other at 0215. (Haverlah-TX)

4162.5 USN Foxtrot Tango Link 11 coordination net at 0545 with single letter callsigns. (Baker-OH)

4177.0 YLBO-Latvian tanker TK *Dizhon Rids* at 0639 in SITOR-A with "TD-1" report to LSC Tanker Dept, ETA Rotterdam, log-in 60640 YLBO. (Baker-OH)

4372.0 Oakgrove (NORAD SE Air Defense Sector Control-Tyndall AFB, FL) at 2135 working Crisco. (Baker-OH) USN I3Z, 1YN and X5Q active checking comms and confirming someone "in the blue, 131 tac 003" at 0516. (Keith Stein-Woodbridge, VA)

4384.0 GKT20-Portishead Radio at 0600 with a traffic list. (Baker-OH)

4426.0 NMN-USCG Chesapeake, VA, with computer voice "Coast Guard communications Atlantic, Chesapeake, Virginia has a new toll number 800-742-8519 to discuss any problems with our services. The number again... This is NMN Coast Guard communications Atlantic, out." at 0423. (Stein-VA)

4495.0 Bedspread calling NW - checking into the net blind at 1138. Foot Sore calling Bedspread "on 4495 how copy over." No joy at 1209. Bedspread working Foot Sore "what designated frequency are you on at this time? S-304 was the answer" Bedspread wanted to do a data-modem check and Foot Sore said negative he was in middle of something. Op on Foot Sore said he had 60 "horse" interference problems. Both stations moved to frequency "Tango Sierra Alpha." Bedspread calling NW01 on S304 (self ID), no joy at 1305. NW calling Foot Sore on S304 at 1505, no reply ended with "Be advised nothing heard - out." (Larry Van Horn-Brasstown, NC)

4560.0 CGAK-HMCS *St. Johns* (FFH-340) Canadian City class frigate at 0436 working St. John's military with a phone patch request. (Baker-OH)

4703.0 Boomtown working Noted on this one (said would conduct checks every hour at 1327. Boomtown working Noted and Joust (they were both weak) and they moved off to frequency Charlie Bravo (11187) at 2135. (LVH-NC)

4721.0 5XC calling Sidecar at 0307. (Haverlah-TX)

4741.0 Mama Bear (off frequency) calling NW0, who was on 4742, but could not hear Mama Bear at 0543. (Haverlah-TX)

4742.0 Architect working Ascot 4201at 0954. (Boender-Netherlands) Architect working CanForce 415 at 0620. (Haverlah-TX)

5099.7 RFTJ-French Forces Dakar, Senegal, at 0526 in ARQ-E3 192/425 idling, should be circuit AFL to Paris. (Baker-OH)

5152.0 SAM 682 working Andrews AFB on "primary" (F-486) with signal checks at 2130. (Jeff Jones-CA)

5397.7 RFFP-MoD Paris, France, at 0502 in ARQ-M2 200/425 idling. (Baker-OH)

5565.0 Recife (SAM-RDARA) at 0515 working Iberia 6811 with position report, flight bound Madrid-Rio. At 0533, Dakar, Senegal (SAT-2 MWARA) working unidentified flight 3711with position report. (Baker-OH)

5680.0 Rescue 169 working Plymouth Rescue at 0902. Navy 177 working Edinburgh Rescue at 0953. PC025 (German Navy) working Glucksburg Rescue at 0958. Belgian AF94 working Koksijde Rescue at 1228. Gotland Rescue working Riga Rescue at 1302. SRG128 working Kinloss Rescue at 1211. Sweden Air Rescue working Rescue Y58 at 0952. Karup Rescue working Sweden Air Rescue at 0918. Plymouth Rescue working Shanwick Radio at 0940. (Boender-Netherlands)

5696.0 USCG COMSTA New Orleans, LA, working X9I regarding unsuccessful ANDVT on 3E7 and then moving to 3E4 (ANDVT comms heard on 5106.0) at 1605. (Haverlah-TX) Bear Ace 01-USN E-2C Hawkeye from Airborne Warning Squadron 124 (VAW-124), Carrier Air Wing 8 (CVW-8) deployed aboard USS *Theodore Roosevelt* (CVN-71) at 0721 calling CG 6033, and at 0733 reports to CG San Juan that he is on-scene. Later ID'ed by San Juan as on-scene commander for SAR at crash of Alas Domincanas flight 301 (757) in Caribbean. (Baker-OH)

5700.0 Bedspread calling NW01 on P381 (self ID), no joy at 1306. NW01 working WAR46 - radio check said he was just warming up the radios at 1500. NW 01 called WAR 46 at 1520 and asked him to run and patch to DSN 939-xxxx. The party at the other end ID'ed as the last four digits of the phone number and NW thanked him for the check. (LVH-NC)

5700.5 Possible Link 11 data frequency with 8 pulses at 0704. (Haverlah-TX)

5715.0 Illegal fishing network noted with casual chatter in English at 1700. (Bob Grove-Brasstown, NC)

5726.0 Bedspread working Foot Sore (probable TSA designated frequency) at 1313. Bedspread working Foot Sore heard time ticks being broadcast from the FTS phone system (self ID'ed) by Bedspread at 1511. (LVH-NC)

5905.0 Spanish female 5-digit numbers station at 1105 in AM. Gone at 1118. (Sue Wilden-IN)

6272.5 NMC-CAMSPAC Point Reyes, CA, at 0626 in SITOR-A with SITOR free signal, CW ID "NMC", have found NMN here in ship maritime area before with SITOR signals to maintain comms with USCGC *Eagle*. (Baker, OH)

6637.0 Universal Radio Houston, TX, (NA-OC-LDOC) at 0520 working United 993 with selcal check. At 0521 attempted to work Air Transport 018 who was calling "over New Mexico," but no joy here for either. (Baker-OH)

6683.0 Andrews working NW01 in voice and data with NW01 sending his data "to downtown" at 0500. (Haverlah-TX)

6712.0 McClellan GHFS with a 20/20/26 character EAM set over a seven minute period at 0620. (Haverlah-TX)

6717.0 SAM 26000 calling Andrews GHFS at 0618. (Haverlah-TX)

6730.0 Andrews calling Spar 67 at 0627. At 0644, callsign Sierra calling Bear 03, with a ticking on frequency that was similiar to the current ticking on 4739 and 8971 kHz. (Haverlah-TX)

6739.0 A very weak NW calling Mainsail at 1506, no reply. (LVH-NC)

6745.3 Tunisian Navy (unidentified vessel) at 2130 in SITOR-A with 'routine secret' traffic. Weak, move from 6741.7. (Baker-OH)

6761.0 Air Force One working Andrews through out the night, enroute to Newark. Also heard AGAR calls on frequency as well. (Haverlah-TX)

6986.0 SAM 683 enroute El Salvador working Andrews at 2317. (Haverlah-TX)

7330.0 Bedspread calling NW01 on S-307 at 1546. Made this one primary and P381 secondary. NW01 with 20c EAM brdcst at 1551, preamble 54CRIX After message NW asked BS how he copied the 20 item traffic, BS said

he got a good copy. (LVH-NC)

7456.3 RFTJ-French Forces Dakar, Senegal, at 0431 in ARQ-E3 192/425 idling, should be circuit AFL to Paris. (Baker-OH)

7619.3 Royal Navy (RN) at 2135 in 75/850 RTTY RYRY & VMGTCNJ, back into encrypted GXQ RN London fleet traffic. (Baker-OH)

7710.0 VFF-CCG Iqaluit, NWT Canada, at 2110 with 120/576 FAX. Chart appeared to be ice chart. Thought this station was closed for winter? (Baker-OH)

8026.0 Patroit (deep slow southern accent) calling Patroit Bear at 0233. (Haverlah-TX) Andrews attempting contact with SAM 682 on 290 upper at 0318. Very poor contact, also tried 6730 (F267), 4724 (F058), and 11214 (F064). (Don Edwards-Northville, NY) *Welcome to the column Don, thanks for posting your logs via the internet-Larry*

8027.5 V2M-Unidentified U.S. Military at 2115 calling unidentified trigraph callsign, no joy. (Baker-OH)

8031.5 NNN0CRZ-USS *America* (CV-66) at 2308 working unidentified shore station about computer info. America returning from her last deployment before being decomm'ed this summer. USN MARS alternate nightime calling channel. (Baker-OH)

8107.7 RFQP-French Forces Djibouti, at 2137 in ARQ-M2 200/425 with Controlle de Voie. (Baker-OH)

8240.0 NDTS-USCGC *Dauntless* (WMEC-624) at 0023 calling NMN, no joy using ID as "CG cutter *Dauntless*". (Baker-OH)

8294.0 AAOU-USAV *Manassas* (LCU-1667) at 0310 calling Raider-1097th Transportation Company, Rodman Naval Station Panama, no joy. At 0313 calling MacDill(!). At 0422, ADMP-USAV *Five Forks* (LCU-2018) calling Raider, also no joy. (Baker-OH)

8297.0 AAFA-USAV SP4 *James A. Loux* (LSV-6) at 0515 working AAC2-Harbormaster Ft Eustis, VA, with position/status report, vessel at Guantanamo Bay, Cuba. At 2255, AADT-USAV *Aldie* (LCU-2004) working AAC2 with position and status. Location was Port-au-Prince, Haiti. (Baker-OH)

8348.0 P3MG6-m/v *Procyon* at 0027 in CW sending 3 messages via unidentified coastal station. (Baker-OH)

8387.0 ELAJ6-Bulk carrier m/v *Rosina Topic* at 0522 in SITOR-A, with ETA Cristobal, Newcastle, log-in abbrev "ROSTOP". (Baker-OH)

8392.5 UNES-Bulk carrier TKH *Marshal Budennyy*, at 2210 in SITOR-A with DISP-1 report from master KM Artem'ev. (Baker-OH)

8397.0 UZHG-TKH *Kapitan Ponomarev* at 0753 in SITOR-A with DISP-2 report to UCE from master KM Kotlyarenko, note ITU shows ship callsign changed to UCBO, but old callsign UZHG is still used in traffic. (Baker-OH)

8412.0 SQGN-Polish bulk carrier m/v *Budowlany* at 0022 in SITOR-A with position telex to Shortramp Szczecin, ETA Dublin. (Baker-OH)

8414.0 UFBE-Russian factory trawler BATM *Maluvsyaii* at 2150 using 50/170 RTTY with RYRY/DE to UDK-2 then into crew telegrams to Murmansk Radio using hull ID MA-0061 (MRM/KRH). (Baker-OH)

8420.5 CBV-Valparaiso Radio, Chile, at 0400 using SITOR-B with traffic list. (Baker-OH)

8968.0 Bedspread working Albrook for NW working freqs at 1135. Passed S304 Pri/P381 Sec. Mentioned that NW was in monitor period for 1 hour. McClellan GHFS with Foxtrot broadcast at 1143. On McClellan's heels was another very weak station with Foxtrot broadcast. Offutt with a Descent foxtrot broadcast at 1415. Bedspread with a 26 character EAM, preamble 54KNDB not heard on any other channel (GHFS and otherwise) and not relayed by anyone at 1452. A very weak NW calling Mainsail at 1508. no reply (his signal on S304 was a boomer, but barely heard him on 6739/8968. Bedspread with a 26 character EAM at 1525, preamble 54KNDB. Again this was not broadcast on any other channel and it was not repeated. (LVH-NC) Chalace Bravo (E-3 AWACS) at 2032 working Offutt with phone patch to Hickam Meteo who ID's the aircraft as Sentry 31. (Baker-OH)

8971.0 Spangle 709 (USN P-3C) at 2330 working Blue Star. Said will stay up on 101 net (*military satcom channels 253.650 and 265.550 MHz-Larry*) for safety of flight with ACU. (Baker-OH)

8992.0 MacDill GHFS passing 'Exercise Injects' to NW01 at 1732. (Haverlah-TX)

9007.0 SENTRY 40 (USAF E-3 AWACS) 964th ACS Tinker AFB at 2022 working Trenton military with weather for KCOF, KVPS, and MYNN. (Baker-OH)

9016.0 Rowboat working McClellan GHFS with voice and data at 211. (Haverlah-TX)

9017.0 Andrews working Trout 99 on this frequency throughout the morning. (Haverlah-TX)

9023.0 Darkstar Mike calling Okie Sam for a signal check at 1823. Dragnet Sierra (female operator) working Northern Lights at 1740. Dragnet Uniform calling Northern Lights at 1836. Focus calling Redhead at 1840. (Haverlah-TX)

9057.0 Overdraft with a 26 character EAM to Fishboat at 2107. Jaildoor working Raftlog (probable USN asset) at 1833. "At my count. 3,2,1." I was expecting ANDVT comms, instead the freq lit up with distinct one-second ticking. After a few minutes of ticking, more voice comms, and a "thanks for t-quad check." (Haverlah-TX)

9076.7 RFFA-MoD Paris, France, at 2156 in ARQ-E3 192/425 idling. (Baker-OH)

10205.0 Andrews working SAM 204 at 1902. (Haverlah-TX)

11053.0 SAM 203 calling Andrews with phone patch for Andrews ext. 7157 at 1933. No Answer. (Michael Graham-New Albany, MS)

11175. Offutt GHFS with a 26 character EAM, preamble 54DUZH at 1443. Offutt with 20 character EAM at 1547, preamble 54CRIX. (LVH-NC) Snowcom 78 with phone patch through MacDill GHFS for Snowcom Operations at 2020. 78 didn't seem to know how to use GHFS. Keyed up without giving callsign. Maybe his first time. After connected he asked for name of person answering patch. Replied with "Major Owens?" 78 said HF made him sound strange. Who is Snowcom?? Not a callsign I'm familar with. SAM 203 calling Andrews with request for 11 meg freq from VIP at 1910. SAM communications wants to stick with 11175, but then moves to F-354 (THANKS for the Mystic Star column in January). (Graham-MS) *You should thank Jeff Jones for the list. I don't have a listing for Snowcom so help on this end. Welcome to the column-Larry.* Tailpipe Hotel calling any station for radio check at 2323 with no response. Falls 32 working.Hickam GHFS with phone patch to Malmstrom AFB at 1719. (Edwards-NY)

11187.0 Boomtown working Noted and Joust at 2138, Noted asked Joust what they were doing and he said, "just doing some long haul HF comm checks." (LVH-NC)

11214.0 Dragnet Tango working Eagle 3 through a phone patch with Trenton military at 2001. (Haverlah-TX)

11217.0 Sentry 31 working MacDill GHFS with lengthy phone patch to radar maintenance at Tinker AFB regarding doppler radar problems at 1910. Operator advised ground party that they were on a surveillance mission for the INS. (Haverlah-TX) *Interesting Jeff. I knew about the DEA/Customs missions, but INS is a new mission for the AWACS to this editor-Larry.* Dipe 03-USAF KC-10 at 1637 calling Bayonne Global, no joy then called Mainsail, no joy. (Baker-OH)

11220.0 Threesome calling Contender at 2104. (Haverlah-TX)

11460.0 SAM 973 working Andrews with phone patch traffic at 2152. (Haverlah-TX)

11494.0 WGY912 calling an alphanumeric callsign at 2001. (Haverlah-TX)

12070.0 NW01 working Space Ace at 1825. At 1841, NW 02 is up on frequency. (Haverlah-TX)

12479.5 UIJS-Russian tanker TK *Aleksandr Tsulukidze* at 1722 in SITOR-A with adminstrative telegram traffic from Chief Engineer and ships master KM Khoshtariya, log-in 55311 UIJS. (Baker-OH)

12495.0 USSN-TK *Aliot*, Ukrainian tanker at 1819 in SITOR-A with DISP-1 report from master KM Gorostvatov after sending selcall KYXX (UGW-Novorossiysk Radio). (Baker-OH)

12496.0 VCLM-m/v *Arctic* at 1826 in SITOR-A with BBXX meteo telex via Halifax CG. (Baker-OH)

12509.0 WEZM-SS *Ewa* at 2113 using SITOR-A with telex for departure report. (Baker-OH)

12561.0 DQFX-m/v DSR *Asia* at 1645 in SITOR-B with relay of DSR Rostok news in German, off with DE DQFX 73. (Baker-OH)

12561.5 UELX-Russian Factory Trawler BATM *Volopas* at 1756 in 50/170 RTTY with adminstrative telegrams to Kaliningrad from master, KM Morozov. This is apparently the ex-LYGD. (Baker-OH)

12565.0 UUJN-Ukrainian Medium Freezer Trawler STM *Aleksandr Lavrenoy* at 1909 using 50/170 RTTY with RYRY/DE, also to UTSW then into administrative telegrams, "Antarktka" used frequently. (Baker-OH)

12567.5 UAMD-Russian Fisheries Research vessel NPS *Zund* at 2210 in 50/170 RTTY with crew telegrams, ex-EWVV. (Baker-OH)

13242.0 Overdraft (female operator) working MacDill with voice and data at 1658. (Haverlah-TX)

13248.0 SAM 050 working Andrews at 1944. SAM 204 working Andrews at 2006. (Haverlah-TX)

13509.0 Halifax Canadian CG with weather fax at 2013. (Wilden-IN)

14441.5 NNN0NZN-USS *Mount Vernon* (LSD-39), at 1802 calling ASSMS with a beam heading of southwest for routine phone patch traffic. At 2206, NNN0CXN-USS *Portland* (LSD-37) calling ASSMS with NNN0ERA answering. They moved to 14470 for phone patch traffic; at 2209. NNN0CUO-USS *Spruance* (DD-963) calling NNN0LNB and NNN0FLH, no joy. (Baker-OH)

15016.0 Tiger 60 working Ascension GHFS (interupted by EAM "For Thrall"), with phone patch involving Tiger 60's possible declaration of an IFE. Said he would use 13777.0 and AFSATCOM for further comms. (Haverlah-TX)

16699.5 LAUG4-m/v *Brunto* at 1644 in SITOR-A with telex about sailing from Paita and ETA Salaverry (Peru), log-in 26215 BRUNTO. (Baker-OH)

16702.0 UOAW-TKH *Fatezh* at 1653 in SITOR-A with telex to Azov London, ASC Mariopol, per change listed in 1993 ITU, callsign should be UWDL, but UOAW is still used. (Baker-OH)

SHORTWAVE BROADCASTING

The Global Forum

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

AFGHANISTAN [non?] R. Message of Freedom moved again, to 6240 at 0230-0400, 0730-0900 (BBC Monitoring)

ARGENTINA R. Castañares, Bs. As. on 6239.86 at 1138-1212 relaying MW 1170 (Gabriel Iván Barrera, *BC-DX* via George Thurman)

AUSTRALIA RA is starting to close down the Carnarvon site; some English broadcasts on the remaining two transmitters in the M-96 sked from here: 1130-1430 9560, 1430-2100 11660, 2100-2400 13745; 0030-0100 15240, 0630-0900 17715, 0900-1130 7240, 1430-1930 6090, 2330-2400 15240 (ARDXC, Wolfgang Büschel, *BC-DX* via Thurman)

BRAZIL Best Braz music is on R. Cultura, 17815, sometimes audible 2130-0100+ (John Cobb, GA, *World of Radio*)

BULGARIA R. Bulgaria, 60th anniversary special, June 1, 2200-2300 probably on two of 11720, 9700, 7480, with greetings in 12 languages, special numbered QSLs (Rumen Pankov via *BC-DX*)

BURMA Jamming of VOA has resumed, but with only two transmitters, against 11840 and 6030 at 1130-1230 in Burmese, while 15140 and 9505 are clear (Victor Goonetilleke, Sri Lanka, R. Netherlands *Media Network*)

CAMBODIA R. of the Provisional Government of National Union and National Salvation of Cambodia, supporting Khmer Rouge, used to broadcast in English and Thai, and also on 5200, but now is on 5407v in Cambodian at 1130-1330, 2330-0130 (BBCM)

CANADA RCI began new Peacekeepers service in Feb on 15275, 17725 at 1800-1900 French, 1900-2000 English, including *Canadian Forces Magazine* weekdays, *Quirks and Quarks* Sat, two comedy shows Sun (Dave Jeffery, NY) Sackville confirms they are the site (gh, *World of Radio*) One hour earlier now?

CHILE R. Esperanza, 6089.98, at 0720-0835+ Spanish IDs and religious music, except at 0735-0803 in English, believed weekends only; no Brazil fade-in until 0830 (Brian Alexander, PA)

CHINA Beijing, Network One on 4850, Sunday 0900-1000 with English recordings, hotel commercials (Arthur Cushen, *NZ DX Times*)

COSTA RICA on R. for Peace International, *World of Radio* is scheduled: Fri 2000, Sat 0400, 1100, 1800, Sun 0200, 0900, 2300, Mon 0700, Tue 1900, Wed 0300, 1000 on some of: 6200, 6205-USB, 7385, 15050-USB (gh) *Feminist International Radio Endeavour* marks its 5th anniversary May 1 with special broadcasts; scheduled daily at 1700, 0100, 0800 (RFPI *Mailbag*) *Spiritual Awakening* is now seven days a week at 2355, 0755 (James Bean) New during 2nd quarter is *The Secret Side of Global Trade*. Thursdays 2130, Fridays 0530. KCRW has ceased production of *Amnesty International Reports*; we hope to get a monthly replacement elsewhere (Joe Bernard, RFPI)

RADIO EXTERIOR DE ESPAÑA

TIFC, 9645, had a DX mailbag in Spanish on a Tuesday at 1230, to be continued the next day (gh, OK)

R. Exterior de España sked revision shows 3225 M-F 1100-1400, Tu-Sa 0100-0400 (via Ron Trotto)

CUBA R. Rebelde, 5025, operates only at 0500-2300 UT (Arnie Coro, RHC *DXers Unlimited*) Noted on a Sunday 1130-1230+ with nice program of old Cuban Music, now 1030? (gh, OK)

[non] One retaliation by Pres. Clinton for Cuba's shooting down American planes was an additional transmitter carrying R. Martí, Delano at 0700-1200 on 5890, 1200-1400 on 7405, 1800-2300 on 13665 (Kim Elliott, VOA *Communications World*) 13665 put out horrible spurs 13315-13330, 13495 (Thurman & gh) see also NICARAGUA

CZECH REPUBLIC R. Prague announced they are moving out of their large impressive building, which is being sold for a sesquimegacrown, part of which goes to refurbishing new premises in a 60-year-old building, rich in history and full of character (Ron Montague, WDXC *Contact*, via BC-DX via Thurman)

DOMINICAN REPUBLIC R. Revelación, 2479.89 = 2 x 1240, at 0116-0154* with intense Spanish talk, off after anthem, surprisingly good signal (Brian Alexander, PA, *W.O.R.*) Also from *1100; successor to La Voz de la Libertad, HIAU, which I heard on 6218 in 1973 (Jerry Berg, MA, *Fine Tuning*) Strongest foreign harmonic I've heard (Kevin Hecht, PA)

ECUADOR HCJB's *DX Partyline* quickly reverted to 36 minutes when another fill program was found (gh) My family and I are leaving HCJB permanently in October, going back to N. America. Ken MacHarg will resume hosting *DXPL* (Rich McVicar, *DXPL*) Only Z-96 change in English is to Eur, 0700-0830 on 11615, 19900-2200 on 15540 (McVicar)

EQUATORIAL GUINEA R. Africa, one Sat actually on nominal 15190 instead of 15185.7, 2015-2200+ religion in English, covered by France at *2159 (Brian Alexander, PA, *W.O.R.*)

FINLAND YLE Z-96 English to us is daily at 1130, M-F 1230 on 11900, 15400 (Joe Hanlon, *W.O.R.*)

FRANCE Once again March 3-6, RFI clashed with itself on 13625 at 1200-1257, French overriding English at same time on same frequency; symbolic? (gh) see SOUTH AFRICA

GEORGIA Programme Georgia in English now expected to be one hour earlier than: 0630, 0830, 0930 on 11910; 1600 on 6230; 1830 and 1930 on 6080, in sked provided by station, not all confirmed (BBCM)

Abkhaz Radio erratic due to electricity shortage and on reduced sked, 0400-0600 on 9495 (VOR *DX Klub* via BBCM) Actually slightly off-frequency, indicating it's really in Abkhazia rather than Russia (Chris Greenway, BBCM via Hans Johnson via *BC-DX* via Thurman) 9494.75 for this, and at other times relaying Mayak, Mir (Koutamanis, *Jihad DX* via *BC-DX*) Also includes local ads, weather for Krasnodar at 0800-0810 (Vladimir Titarev, Ukraine, DSWCI via *BC-DX*)

GERMANY [non] Gustav-Georg Thiele, for many years chief engineer of DW, and supporter of the European DX Council, died Dec. 22, 1995, (*Play-DX*) Signature on numerous QSLs of the 1960s and 70s (Chris Lobdell, *Cumbre DX* via *BC-DX*) Father of planning and building Kigali and Sines relays, but not El Salvador (Wolfgang Büschel, *BC-DX* via Thurman)

GUATEMALA La Voz Popular [see last month], varies 6970-7015, Tue & Fri 2315-2420 in Spanish and Mayan, and previously also used 3640-3650 (BBCM) Heard Fri before Xmas at 2139 on 6957 (Ike Kelly, TX, *The ACE*)

HONDURAS R. Copán Int'l old 15675 transmitter is retuned to 7460 for first tests, maybe later 4940, delayed by hospitalization of a key actor (Jeff White via Marcel Rommerts, DSWCI *DX Window*) 7460 began testing March 10 (White, HCJB *DXPL*) 7460, fair 0155-0403 and claiming 15 MHz (Alexander, PA) See also USA—

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

WRMI

IRAQ [non] V. of Rebellious Iraq, 1300-1530 on 6085 (BBCM)

ISRAEL Kol Israel still faces termination of all international broadcasts, so PLEASE keep your letters and faxes coming to them! DST began already March 15, and after seasonal frequency changes, English was expected to be: 0400-0415 7465, 9435; new 1400-1430 on 15615, 12077; 1900-1930 on 7465, 9435, 11605 (Daniel Rosenzweig via Thurman)

ITALY AWR had given up hope for a major station here, but then Pres. Scalfaro signed a law permitting AWR to apply for a SW license for international broadcasting to upgrade low-power Forlì station to high-power. AWR had an option on a large tract of land near the Adriatic coast in the north, reclaimed from the sea, flat and ideal site; was about to give up the option when, providentially, this opportunity arose (*Trans-Missions*, AWR via Adrian Peterson, *DX Listening Digest*) 4 x 100 kW (Ken MacHarg, HCJB *DXPL*)

Rai radio files of various programs available experimentally via RealAudio on Internet: **http://www.rai.it/grr** (BBCM) This isn't really radio; should we run such info here? (gh)

JAPAN [non] Z-96, R. Japan relays via BBC Singapore: 0500-0900 11920, 1900-2100 6035 to Oceania (Tooru Yamashita, R. Japan *Media Roundup*) 0500-0530 ex-0300-0330 via Guiana 11895, direct on 11885, 15230 (Hanlon) For summer Canada relay again 0100-0200 on 5960 including *Media Roundup* 0125 Mon (RJ*MR*)

KOREA SOUTH RKI Z-96 dropped the 0600 to NAm on 7205; remaining English one-hour: 1200 on 7285, 11810, 15575 (RKI *SW Feedback* via Diane Mauer) And via Canada 1030-1100 on 11715 (gh)

MALI CRI relay on 11760 ex-11715 clashing with Cuba (Kevin Hecht) 0000 & 0300 English

MALTA Resulting from DW pullout, 35 V. of the Mediterranean employees, more than half of whom are over 40, received termination notices. Some had worked there 21+ years, but received no compensation (Joe Lewis Sammut, Malta, WDXC *Contact*)

MÉXICO R. México International stronger and clearer than before on 9705 to 1700* (George Thurman, TX) From March using trylon omni BVR antennas, sked as shifted for DST: 1200-1600 9705, 1800-2300 9705, 5985, 2300-0500 5985, with English at 1400-1600, 1900-2100, 0300-0500 (Juan Mort, Grupo IMER via George J. Poppin, CA) has multilingual announcements, including German, Nahuatl, but English blocks lapse into lots of Spanish segments, a turn-off for Anglos. 9705 can be good, but 5985 useless even this close. See Hauser's Highlights for some program titles (gh, OK)

GRUPO IMER
INSTITUTO MEXICANO DE LA RADIO
SECRETARIA DE GOBERNACION

R. Huaya(cocotla), 2390, will QSL, and reports may be E-mailed in English for a reply in Spanish by Francesco [sic] Ramos: **Framos@uibero.uia.mx**. Also check the Universidad Iberoamericana website, **WWW.uia.mx/** (David Sharp, *DXFL*, via DSWCI *DX Window* via Thurman)

MOZAMBIQUE R. Mozambique may have to close down for lack of funding; advertisements, sales of music cassettes, and government grants are not enough to pay for electricity, salaries, spare parts; and of the 15 SW transmitters, 12 are not in operation (Dr. Manuel Veterano, chairman, R. Moz, interviewed by newspaper *Savana* via BBCM)

NEW ZEALAND Final version of RNZI, M-96 showed switch from 11735 to 15115 an hour later than planned, at 2300 or 2307 (Adrian Sainsbury, RNZI *Mailbox*) See Hauser's Highlights for programs

NICARAGUA Moves are underway to transfer the CIA's anti-Cuban station Radio Martí from Miami to Managua, on air by May with 60 kW, as well as TV towards Cuba. A building for it near Lake Managua is being remodelled; frequencies may have already been assigned. The move is backed by presidential candidate Arnaldo Alemán, who takes for granted he will win the 20th October election. It is not clear whether the station will still be called Radio Martí (*Barricada*, Sandinista newspaper via BBCM) We find this hard to believe, unless the U.S. wants to get rid of it; Nicaraguan facilities could not match VOA's (gh)

PALAU KHBN, V. of Hope for Asia, at 0800 English on 9960, per QSL 16 kW (Arthur Cushen, *NZ DX Times*) English ID amid Chinese 1300 on 9965 omitted call-sign; no longer applies with independence? (gh)

PALESTINE [non] V. of Palestine, V. of the Palestinian Islamic Revolution, operates from Iran, in Arabic, maybe for summer now one hour earlier than: 0400-0430 on 9670, 5995; 1230-1300 on 11745; 1830-1930 on 7070, 6025, highlights activities of Hamas, anti-Arafat; same transmitters carry V. of Islamic Republic of Iran at other times. Al-Quds Palestinian Arab Radio, mainly AM & FM from Syria, 0600-1700 in Arabic, English, Hebrew, also heard on SW 5990v, 5910v, previously on 4320, 7460, 15050-USB; jammed. Address: P.O. Box 5092, Damascus (BBCM)

PARAGUAY R. Nacional came back, near nominal on 9736v, somewhat distorted from 2300 (Ernie Behr, Ont., *W.O.R.*) Closes abruptly between 0300 and 0305 (Randy Stewart, MO, *ibid.*)

PHILIPPINES FEBC is redoing one or both of its antenna farms for loud and clear signals in Asia (Ken MacHarg, HCJB *DXPL*)

POLAND R. Maryja, 5900 sudden *0722 with fine pop music over HCJB (Giovanni Serra, Italy, *The Four Winds*) Catholic station R. Maryja is under investigation for transgression of the law on commercial activity. When over 200 kilomarks were stolen from station it came to light R. Maryja money was being taken abroad as cash without permit, to purchase equipment. Meanwhile an alternative Catholic network is being established this year (PAP via BBCM)

PUERTO RICO AFRTS Roosevelt Roads on 6739.5 USB (Pete Costello, NJ) Tuned it right in, loud & clear with C&W music service, probably from satellite, breaking for local announcements around :48 and :18 past each hour, heard past 0500, but only on this UT Mon, not heard since. These ad-hoc relays tend to be one-shots, probably for some VIP out of range of local outlet (gh, *DXLD* & *W.O.R.*)

RUSSIA Follow-up to item here in March: Karl Yegorov is back at VOR after a sesqui-year, and got his old *Jazz Show* back. There are a lot of old R. Moscow shows re-run, e.g. *Audio Book Club*—I heard several with announcers that have been dead for many years and others no longer employed there. Some mid-Jan Xmas shows were re-runs from 6 or 7 years ago (Maryanne Kehoe, GA, *W.O.R.*)

I sent a reception report to VOR E-mail address: **roots@avrora.msk.su**. Within 6 days I received a friendly online QSL from Ms. Ol'ga Troshina, WS, Letters Dept (Sandte, *Cumbre DX* via

ARDXC *Electronic DX Press* via Thurman)

SERBIA R. Yugoslavia on new 7130 at 0145-0215 (Le Roy Long, OK, *W.O.R.*) When I checked, English was at 0200-0230, but times and frequencies likely changed for summer, not necessarily just one hour earlier (gh) 7130 ex-7115 at 0200 (Sanchovich via Thurman)

SIKKIM AIR Gangtok testing 4790 at *1028-1132* but lots of QRM from Itanagar and nearby Pakistan. [non] Itanagar on 4790 at 1300-1505, regular (Roland Schulze, Philippines, DSWCI *DX Window* via HCJB *Latest Catch*)

SOUTH AFRICA African partly in English on 5965 at *0441-0530+, usually under Cuba until 0500 and then fading down, first thought to be Nigeria, then Zimbabwe, finally IDed as R. Oranje with positive ID, cigarette ads (Brian Alexander, PA, *W.O.R.*) As scheduled M-96 at 0440-0650 from Meyerton, which also started relaying RFI in Feb, French at 0300-0400 on 7135 (via Cindy Lindau)

SRI LANKA VOA Chilaw station is still under wraps, as I saw huge crates lying in the Colombo harbor. There was also talk of damage by rain. DW Trincomalee is still off air, all the German staff on a long holiday or lounging in Colombo—met them at the disco. DW relay station totally run by diesel as not enough local electricity. I saw a German supertanker moored in Trincomalee port, so might be on air again soon (Manosij Guha, *DX Ontario*)

SUDAN [non] V. of Sudan, 8000, had English segment 1850-1859, then Arabic (Harald Kuhl, DSWCI *SW News*) That was a Fri, and English again on Sat same time (Finn Krone, *ibid.*)

SWAZILAND Dr. Gene Scott sked in Feb showed Swazi Radio, 6155, daily at 0300-0700 (via Diane Mauer)

TAIWAN New Star Broadcasting, 8300, ID, music and Chinese numbers at 1500, 1607-1625 and 2232 (Harald Kuhl, Germany, DSWCI *SW News*)

UKOGBANI The BBC WS budget has been cut by 13 magapounds; unknown which of 42 languages will be dropped, but committed to strengthening key languages such as Mandarin, Arabic (VOA *Communications World*) BBC has opened a new production office in Miami, the first outside UK, mainly for benefit of Latin American programming (Jeff White, *Viva Miami* via Diane Mauer) May add Quechua service (via White, *Radio-Enlace*) In exchange for the relay of BBC via WYFR, BBC UK is relaying WYFR at 1800-1900 on 9805—only one hour compensating for higher power (Kim Elliott, VOA *CW*) *Waveguide* may return in less than a year as an expanded media/communications magazine (BBC *Write On*)

USA WWCR pioneered US broadcasting on the 120m band, from March 1 testing 2460, then 2390 at 0200-0600—if this is kept, we hope overlap with Guatemala, México will be miniminzed (gh) Tentative schedule, shifts planned: until May 31, WWCR-1 1200-0100 13845, 0100-1200 5935; June & July, switch at 0200 instead. WWCR-2, 1000-2200 15685, 2200-2400 9475, 0000-1000 3315; June & July, switch at 0100 instead. WWCR-3, thru July, 1300-2300 12160, 2300-1100 5065, 1100-1300 7435, WWCR-4, thru Sept, 1000-2300 9475, 2300-1000 7435 [published before 2 MHz was approved] (WWCR) Tentative *World of Radio* for May, as timeshifted, based on times in effect as of March: Thu 2030 15685, Fri 2115 15685, Sat 1028 5065, Sun 0300 & 0700 3315, 1800 12160, Mon 1130 & 2030 15685, Tue 1230 15685; listen for additional weekend times on WWCR-4 (gh) *Ham Radio & More*, live, Sun 2205 on 9475. Harvey Thomas' *View from Europe*, Fri 2110 on 15685. *Angel Too Gospel Hour* alternating with *Country Crazy International Artist Showcase*, M-F 1700-1800 12160, 0800-0900 5065, Sat 2000-2100 9475, Sun 0800-0900 3315 (Chuck Adair, WWCR Country)

Clarifying last month's item about Timothy McVeigh's listening habits, the original *Arizona Republic* story by Mark Shaffer gives James Nichols, with whom McVeigh stayed in Michigan, as the source. For broadcasting this news, gh was hit with a vicious personal attach by William Cooper (gh)

Swapping with WWCR, 9400 is the only frequency for WGTG, available 24 hours, all seasons (David Frantz, WGTG) Bro. Stair turned down his last chance to be on WGTG, "vinegar and hate," refusing to pay for anything unless he had full control, full time. (Diane Mauer, WI)

Stair reneged on his pledge to give WRNO $100,000 up front for a new transmitter. The order had to be cancelled, and WRNO is looking at an ELCOR instead (David Frantz, WGTG) Instead of Nazi programming, WRNO, 7355 on a Sunday at 2330 [now would be 2230 on 15420], ran *Let's Talk It Over with Joe Costello* about Guatemala, then an hour of Creole/Cajun music (Diane Mauer, WI)

Although no word about it had been received from WRMI, 9955, Mark Koernke, Michigan militia, announced his *Intelligence Report* from mid-March would also be on WRMI an hour earlier than on WWCR (Tim Hendel, FL) Is that Radio Militia International now? Mark from Michigan confirmed on WRMI at 0000-0100 UT Tue, saying he would be on five nights a week versus once or twice a week following hour on WWCR; both probably shifted one hour earlier now (gh) SWR Switzerland relays on WRMI have been suspended due to poor response, continue on IRRS Milan (Peter Galliker, BDXC *Communication*)

In late Feb, KAIJ resumed using both transmitters but one has to take a one-hour break for frequency changes: KAIJ-1, 2300-0100 13740, 0200-1300 9815, 1400-2200 15725, KAIJ-2, 0000-1400 5810, 1400-2400 13815, sked given to me by Gene Scott HQ (Jim Moats, OH) Maybe some one-hour-earlier timeshifts for DST now, maybe not

WVHA is in court for a tax dispute with the town of Greenbush, ME. Town denied request for tax abatement, assessed at $7.7 million, including 500 kW transmitter, radio equipment, towers, 75 acres. Would be 20% of total tax take by Greenbush, pop. 1800. WCSN had paid about $150K a year since 1987. Prophecy Countdown claims WVHA is a church since services are held in lobby, and exemption due. But town says must also be for charitable purposes, and the main purpose here is being a SW radio station (Don Gagnon, Bangor *Daily News* via HCJB *DX Partyline*)

Asia-Pacific Network is new name for R. Free Asia Project, with new head Richard Richter, recruiting staff for 8 strategic languages duplicating VOA, also from Washington at separate studio, via Pacific Island and other Asian countries' transmitters (VOA *Communications World*) Same day as Martí spurs [see CUBA], VOA Creole until 1300 on 11935 was doing same on 11560, 11750 (gh) see also NICARAGUA

VENEZUELA R. Amazonas, Puerto Ayacucho on 4939.55 until 0411*, former frequency of R. Continental, Barinas (Karel Honzík, CSDXC *DX Revue* via *BC-DX* via Thurman) Mostly LAM and disco music, 0055-0406* on 4939.5, and at 0947 (Brian Alexander, PA) When I visited Barinas last year, owner showed me SW transmitter, too expensive to operate, but might move it to his AM 1130 station in Puerto Ayacucho (Jeff White, *Jihad DX* via *BC-DX* via Thurman)

VIETNAM Hanoi DS-2 on unlisted 7153.8, not Laos, from 1045 // 4960, tho slight delay, food for thought (Craig Seager, ARDXC *EDXP*) Like a satellite feed to the South?

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

Broadcast Loggings

SHORTWAVE BROADCASTING

Gayle Van Horn

0030 UTC on 5940
BELARUS: Radiosta Belarus. Belorussian. European service with religious programming to Russian balalaika music. (Stokes Schwartz, Madison, WI)

0445 UTC on 5815 (USB)
RUSSIA: **Taldom East** (Tentative). Russian. Music, announcer's chat to jingles and commercials. Mentions of Russia, but no recognizable ID. Station sign-off 0500. (Jerry Witham, Keaau, HI) Russia's **Radio Rossii** heard in Russian on 7347 at 0750. (Schwartz, WI)

0130 UTC on 5975
ANTIGUA. BBC World Service. *Seeing Stars* program featuring the moon, the constellation of Orion and galaxies. (Bob Fraser, Cohasset, MA)

0525 UTC on 5880
VATICAN STATE: Vatican Radio. German. Featured discussion to 0530. Sign-off routine with ID and interval signal. Frequency shift down from 5882. (Witham, HI)

0605 UTC on 5915
UKRAINE: Radio Ukraine International. Ukranian. Regional folk style music to announcer's presumed news briefs. ID and pop music, // 17725, 13720, 11840, 9640, 9610. (Tom Banks, Dallas, TX) German service heard on 9620 at 2140, // 7135, 6020, 7240. (John Hanz, Old Bridge, NJ)

0635 UTC on 17715
AUSTRALIA: Radio Australia. *Pacific Beat* show at tune-in. ID/UTC time check at 0700 to pop music bridge. *Pacific News* and sports roundup. (Banks, TX) Station noted on 7240 at 1000 with news on China/Taiwan relations and report on leprosy elimination in southeast Asia. (Hanz, NJ)

0700 UTC on 15130
INDONESIA: RRI-Jakarta (Tentative) Indonesian. Time pips to possible ID with mentions of Jakarta and Indonesia. Second ID routine at 1715, interview and more chat on Indonesia. (Witham, HI)

0704 UTC on 6085
GERMANY: Bayerischer Rundfunk. German. DJ with German pop music to local info. (Schwartz, WI)

0722 UTC on 5900
POLAND: Radio Maryja. Polish. Sudden sign-on with pop music. IDs and brief musical pauses. Religious music and possible sermon text. (Serra, Italy)

0750 UTC on 7115
MONACO: Trans World Radio. English religious programming with ID/ frequency breaks. (Banks, TX) TWR heard on 7115 at 0815. (Swartz, WI)

0800 UTC on 7345
CZECH REPUBLIC: Radio Prague. News, current affairs, and *Calling All Listeners* mailbag program. Music from Czech rock group Olympic playing *Big Beat.* (Schwartz, WI; Moser, IL)

0803 UTC on 9700
NEW ZEALAND: Radio New Zealand International. World news to ID. Pacific economic report, pop music pause and mailbag program. (Giovanni Serra, Rome, Italy)

0825 UTC on 6186
MEXICO: Radio Educacion. Spanish. Regional news to ID at 0830. (Schwartz, WI; Frank Hillton, Charleston, SC)

0925 UTC on 3280
ECUADOR: La Voz Del Napo. Spanish. Regional newscast to station ID at 0931 and instrumental music. (Hanz, NJ)

0944 UTC on 3375
BRAZIL: Radio Nacional. Portuguese. Brazilian vocals and instrumentals. Multiple IDs and station announcements at 0950. (Hanz, NJ; Hillton, SC)

0953 UTC on 6005
GERMANY: Deutschlandradio. German. Classical music to pause, pops and interval signal. ID as, "Deutschlandradio Berlin" with frequency quote. (Serra, Italy)

1150 UTC on 5030
COSTA RICA: Adventist World Radio. *Kaleidoscope* program with *Family Forum* segment. E-mail address to station ID at 1155, followed by children's *Story Hour* program. (Larry Zamora, Alamogordo, NM) AWR audible at 2306 on 5030. (Sue Wilden, Columbus, IN)

1152 UTC on 4890
PAPUA NEW GUINEA: NBC. American pop music with USB interference. Station frequency announcement to sign-off ID and national anthem at 1201. (Zamora, NM)

1203 UTC on 4820
HONDURAS: La Voz de Evangelica. Spanish religious programming. Singing HRVC ID with time announcement and music. Birthday greetings to on-the-air phone chat with listeners. (Zamora, NM)

1208 UTC on 6155
SINGAPORE: SBC/Radio One. American 70's music to 1217 ID. Frequency quote/ID for 90.5 FM service. Announcements to local taxi drivers about prize giveaways at gas service stations. (Zamora, NM)

1215 UTC on 11615
FRANCE: Radio France International. News item on President Chirac's popularity poll stands at 45%. (Fraser, MA) French programming of music and RFI info heard on 9770 at 2030. (Schwartz, WI) RFI audible on 12025 at 2033 in French. (Wilden, IN; Serra, Italy)

1215 UTC on 5965
ASCENSION ISLAND: BBC World Service. Program segment *From Pins to Paperclips.* (Fraser, MA; Zamora, NM)

1300 UTC on 11715
UNITED STATES: KJES. Weak signal for station ID and young boy's comment, "let me know if you can hear me." Religious folk music with interference from VOA. (Zamora, NM; Knight, NJ)

1310 UTC on 6070
CANADA: **CFRX**. Local weather updates to auto dealer commercial and promo for an upcoming seminar. ID "you're tuned to CFRB." (Zamora, NM) **CFCX** noted on 6005 at 1330 with news and weather. (Knight, NJ)

1412 UTC on 15084
IRAN: VOIRI: Announcers talk to Farsi singing and a call to Islamic prayers. (Knight, NJ)

1414 UTC on 15115
ECUADOR: HCJB. Promo for *Musical Mailbag Program* from Jack Rowland. Station ID, UTC time check and scripture readings. (Knight, NJ; Wilden, IN)

1442 UTC on 11840
NORWAY: **Radio Denmark**. Travelogue visit to Copenhagen's Royal New Square. **Radio Norway** heard on 11840 at 1415 with feature on the Norwegian film industry. (Fraser, MA)

1624 UTC on 15240
SOUTH AFRICA: Channel Africa. African news to ID. World news to time check, frequency quote and *Sportswatch* program. Afropops to *Business Watch.* (Serra, Italy)

1630 UTC 11965
SAUDI ARABIA. BSKSA. *Call of Islam* program with very good reception. (Howard J. Moser, Lincolnshire, IL) BSKSA noted on 15230 at 1340 in Arabic. (Sam Wright, Biloxi, MS) Noted on 15060 at 1407. (Knight, NJ)

1655 UTC on 4820
BOTSWANA: Radio Botswana. Information for visitors and refugees entering Botswana, with registering information. Music at 1700 into presumed Gaborone for a music and announcer's chatter format. (Witham, HI)

1725 UTC on 9530
IRAN: VOIRI. Middle Eastern music to ID routine. News and views in unidentified language at 1730. Musical interlude from *Scheherezade* at 1740, and lengthy telephone report. Potent signal! (Witham, HI; Knight, NJ)

1720 UTC on 5009.5
MADAGASCAR: RTV Malagasy. Presumed Malagasy. Two males in lengthy discussion beyond the half hour to signal fade out. (Witham, HI; Serra, Italy)

1740 UTC on 9025
SOUTH AFRICA: Channel Africa. Report on sports tournament facing possible boycott from Nigerian participants. News in brief at 1755, station ID to 1800 sign-off. Heard over bubble-jammer interference. (Witham, HI)

1855 UTC on 9605
MADAGASCAR: Radio Netherlands relay. *Weekend* show on China's social security breaks up, to feature *Crossing the River by Breaking the Stones.* (Fraser, MA)

1900 UTC on 15235
LIBYA: Radio Jamahiriya. Arabic. Intermittent talk and text to Arabic music program. Good signal. (Moser, IL)

1925 UTC on 7295
THAILAND: Radio Thailand. Program on Thailand's economic relations with other countries. ID at 1930 into, *A Look At Whats Happening Around Town,* a report about loudspeaker placement at strategic locations on the streets of Bangkok to give traffic reports. (Witham, HI) Station heard on 11905 at 0030 with regional and world news to 0100*. (Moser, IL)

2001 UTC on 9435
ISRAEL: Kol Israel. *Israel News Magazine* show hosted by woman, with Tel Aviv stock market report and national news. Time pips/ID at 2030. (Wilden, IN)

2045 UTC on 9700
BULGARIA: Radio Bulgaria. Great signal for current affairs and folk musical program. (Schwartz, WI) Station noted at 2201 on 9700. (Wilden, IN; Serra, Italy)

2115 UTC on 9900
EGYPT: Radio Cairo. Poor signal! Female host with news and lesson on the Holy Koran at 2120. (Wilden, IN)

2145 UTC on 9965
ARMENIA: Voice of Armenia. Talk on national affairs, with good reception, heard to 2230. (Moser, IL)

2150 UTC on 6205
MOLDOVA: Radio Dniester International. Discussion on the banking system in Dniester. to ID and 2200*. (Moser, IL)

2230 UTC on 7200
SUDAN: Radio Omdurman. Arabic. Text about Sudan to sign-off routine ID and national anthem at 2300. (Moser, IL)

2240 UTC on 6200
DENMARK: Radio Denmark International. News and program feature on Copenhagen being *European Union City of Culture for 1996.* (Schwartz, WI)

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

Gayle Van Horn, gayle@grove.net

Spring Has Sprung

The winter doldrums are gone and its time to redirect your attention to springtime listening!

From the popular winter tropical band listening, many of you will likely focus on Far Eastern openings from 1100-1300 UTC, and the Middle East and Europe on 15 and 17 kHz in mid afternoon. In the evenings, stations in the 31 and 49 meter bands (in 6 and 9 kHz) yield some excellent catches.

Springtime also is the return of sporting events to mediumwave such as baseball, hockey, and basketball. Sunset into local evenings are the best hours for AM stations. Listen at the top of the hour for news, weather, and IDs.

Finally, it's that time of the year to clean up the shack, raise the new antenna, and check your coax and connectors. This could be your best springtime DX season yet!.

AUSTRALIA

Telstra Mobile Radio and Satellite Services, 8176 USB kHz. QSL letter signed by Herman Willemsen-Station Manager. Received in 27 days for an English utility report, two IRCs, letter and souvenir postcard. Station address: 61, Jennifer St., La Perouse, Sydney. (or) P.O. Box 321, Marouba NSW 2036 Australia. (Eric M. Walton, Vancouver, BC Canada)

Radio Australia, 17795 kHz. Full data QSL card signed by Catherine McCafferty. Program schedule and '96 calender enclosed. Received in 90 days for an English report. Station address: P.O. Box 428G, Melbourne, VIC 3001 Australia. (Walton, CAN)

BOLIVIA

Radio Santa Cruz, 6135 kHz. Full data verification on station letterhead, signed by Ma. Yolanda Marco. Station pennant and sticker enclosed. Received in 51 days for a Spanish report and one U.S. dollar. Station address: Casilla 672, Santa Cruz de la Sierra, Bolivia. (Darren White, Hattiesburg, MS)

BULGARIA

Radio Bulgaria, 7205 kHz. Full data studio building picture card, unsigned. Received in 263 days for an English report and no return postage. Station address: 4, Dragan Tsankov Boulevard, Sofia 1040, Bulgaria. (Charlie Washburn, North Perry, ME)

MEDIUMWAVE

KDKA, 1020 AM kHz. Full data QSL card signed by M.M. Check-Engineering Crew Chief. Coverage map, stickers, business card, and personal letter enclosed. Received in 30 days for an English AM report, address label, and U.S. mint stamps. Station address: One Gateway Center, Pittsburgh, PA 15222. (Don Dacus, Russellville, AR)

WJDM, 1660 AM kHz. No data standard verification on station letterhead, signed by Don Neumuller-Chief Engineer. Coverage map enclosed. Received in 7 days for an English AM report and mint stamps. Station address: 9 Caldwell Place, Elizabeth, NJ 07201. (Ph# 908-965-1530, Fax# 908-965-1538. (Loyd Van Horn, Brasstown, NC)

KXTL, 1370 AM kHz. Verification letter signed by Dave Levin, coverage map enclosed. Received in 15 days for an English AM report and one U.S. dollar (returned). Station address: P.O. Box 3788, Butte, MT 59702. (Patrick M. Griffith, Denver, CO)

KUSA, 1660 AM kHz. No data QSL card unsigned. Information packet and special compact disc with demos of digital broadcast recorded from the air signals of several U.S. stations enclosed. Received in 225 days for an English AM report, two followup letters, and one U.S. dollar. This was a special test transmission of digital AM technology during the NAM convention. Station address: USA Digital Radio, 332 S. Michigan Ave., Suite 605, Chicago, IL 60604. (Griffith, CO)

WHAM, 1180 AM kHz. Full data station logo card unsigned. Station info sheet enclosed. Received in 148 days for an English AM report and follow-up report. Station address: 207 Midtown Plaza, P.O. Box 40400, Rochester, NY 14604-0900. Ph# 716-454-4884. (George Knight, Garfield, NJ)

WVNJ, 1160 AM kHz. Station letter signed by Ron Lostberg-General Manager. Station keychain and magnet enclosed. Station address: 1086 Teaneck Road, Suite 4F, Teaneck, NJ 07666-4853. Ph# 201-837-0400. Fax#201-837-9664. (Knight, NJ)

MEXICO

Radio Mexico International, 9705 kHz. Full data station logo card unsigned. Personal letter, program schedule, movie poster, and handpainted bookmark. Received in 28 days for an English report. Station address: Apartado Postal 21-300, Mexico D.F., Mexico. (White, MS)

SHIP TRAFFIC

Philadelphia Sun WSKH, 500 kHz (Tanker). Full data prepared QSL card verified, fact sheet on vessel enclosed. Received in 32 days for an English utility report and U.S. mint stamps. Ship address: c/o Sun Transport, P.O. Box 1078, Delaware Ave. & Green St., Marcus Hook, PA 19061-1078. (Hank Holbrook, Dunkirk, MD)

Sealand Expedition WPGJ, 500 kHz (Cargo). Full data prepared QSL card verified. Received in 17 days for an English utility report and U.S. mint stamps. Ship address: c/o Sea-Land Services, Inc., P.O. Box 2000, Elizabeth, NJ 07207. (Holbrook, MD)

Addiriyah HZLL, 500 kHz (Container). Verification letter received in 97 days for an English utility report and one U.S. dollar. Ship address: c/o United Arab Shipping Co., Airport Road, P.O. Box 3636, 13037 Safit, Kuwait. (Holbrook, MD)

Stolt Aspiration 3EXF5, 156.600 MHz (Chemical Tanker). Full data prepared QSL card verified and stamped with ship's seal. Received in 155 days for an English utility report, one U.S. dollar, one IRC, mint stamps and a self addressed-envelope. Ship address: c/o Stolt Parcel Tankers, 15635 Jacintoport Blvd., Houston, TX 32405. (Russ Hill, Oak Park, MI)

Mountain Blossom C6IK5, 4077 kHz (Chemical Tanker). Full data prepared QSL card verified and stamped with ship's seal. Received in 93 days for an English utility report, one U.S. dollar, mint stamps and a self-addressed-envelope. Ship address: c/o Mall Maritime Ship Management, 22 Admiral House, Mountbatten Business Centre, Millbrook Road East, Southampton SO1 OHY United Kingdom. (Hill, MI)

SOUTH AFRICA

Channel Africa. Full data QSL card signed by Kathy Otto. Station sticker and schedule enclosed. Received in 47 days for an English report. Station address: Sentech (PTY) Ltd., Private Bag X06, Honeydew 2040, South Africa. (Paul F. Jablonowski, Greenfield, WI)

UNITED STATES

WGTG (With Glory To God), 7355 kHz. Full data station logo/antenna card, signed by David L. Frantz-Chief Engineer. Received in 171 days for an English report and mint stamps (used on reply). Station address: P.O. Box 1131, Copperhill, TN 37317. (Gayle VH, Brasstown, NC) *David's new frequency (9370 kHz) can be heard on Fri., Sat., Sun. from 1300-2100 UTC -GVH*

KMI High Seas Radio, 4402 kHz USB kHz. Full data station card signed by F.W. Kugkendall, AT&T booklet and frequency guides enclosed. Received in 12 days for an English utility report. Station address: AT&T Coastal Station KMI, P.O. Box 9, Inverness, CA 94937. (Terry Jones, Plankinton, SD)

WOM High Seas Radio Station, 8207 USB kHz. Full data station card signed by Frank Beecher. AT&T booklet and frequency guides enclosed. Received in 15 days for an English utility report. Station address: AT&T Coastal Station WOM, 1340 NW 40th Ave., Fort Lauderdale, FL 33313. (Jones, SD)

How to Use the Shortwave Guide

1: Convert your time to UTC.

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

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

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

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

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

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

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

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

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

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

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

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

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

Radio Programs — Compiled by Jim Frimmel

Sundays

0024 Radio Exterior de Espana: "Distance Unknown"
0030 Voice of America (ca): "Communications World"
0030 WWCR #1 (Tennessee): "World of Radio"
0109 HCJB (am): "DX Partyline"
0124 Radio Exterior de Espana: "Distance Unknown"
0200 KWHR (Hawaii): "DXing with Cumbre"
0200 WWCR #3 (Tennessee): "Spectrum"
0200 Radio For Peace Intl: "World of Radio"
0234 Radio Havana Cuba: "DXers Unlimited"
0249 Radio Romania Intl: "DX Mailbag"
0258 Vatican Radio: "On-the-Air"
0315 Voice of Turkey: "DX Corner (biweekly)"
0410 Australia, Radio: "Feedback"
0430 WHRI (Angel 2): "DXing with Cumbre"
0434 Radio Havana Cuba: "DXers Unlimited"
0508 Vatican Radio: "On-the-Air"
0509 HCJB (am): "DX Partyline"
0524 Radio Exterior de Espana: "Distance Unknown"
0525 Radio Japan: "Media Roundup"
0610 Australia, Radio: "Feedback"
0634 Radio Havana Cuba: "DXers Unlimited"
0635 Radio Vlaanderen Intl: "Radio World"
0700 WWCR #1 (Tennessee): "World of Radio"
0725 Radio Japan: "Media Roundup"
0810 Australia, Radio: "Feedback"
0835 Radio Korea: "Shortwave Feedback"
0900 Radio For Peace Intl: "World of Radio"
0915 AWR-Europe (Slovakia): "Wavescan"
1100 AWR Latin America: "Wavescan"
1138 Radio Korea: "Shortwave Feedback"
1235 Radio Vlaanderen Intl: "Radio World"
1235 Radio Korea: "Shortwave Feedback"
1238 Radio Korea: "Shortwave Feedback"
1345 WRMI (Florida): "Wavescan"
1352 Vatican Radio: "On-the-Air"
1425 Radio Japan: "Media Roundup"
1635 Radio Korea: "Shortwave Feedback"
1725 Radio Japan: "Media Roundup"
1800 WWCR #3 (Tennessee): "World of Radio"
1805 Radio Vlaanderen Intl: "Radio World"
1830 WHRI (Angel 1): "DXing with Cumbre"
1838 Radio Korea: "Shortwave Feedback"
1935 Radio Korea: "Shortwave Feedback"
2105 Radio Vlaanderen Intl: "Radio World"
2115 Radio Budapest Intl: "Radio Budapest DX Show"
2115 AWR-Europe (Slovakia): "Wavescan"
2125 Radio Japan: "Media Roundup"
2135 Radio Korea: "Shortwave Feedback"
2149 Radio Bulgaria: "Radio Bulgaria Calling"
2205 WWCR #3 (Tennessee): "Ham Radio and More"
2215 AWR-Europe (Slovakia): "Wavescan"
2300 AWR Latin America: "Wavescan"
2300 KSDA (Guam): "Wavescan"
2300 Radio For Peace Intl: "World of Radio"
2325 Radio Japan: "Media Roundup"
2335 Radio Vlaanderen Intl: "Radio World"

Mondays

0000 WRMI (Florida): "Wavescan"
0115 WRMI (Florida): "Wavescan"
0125 Radio Japan: "Media Roundup"
0235 Radio Korea: "Shortwave Feedback"
0245 Radio Budapest Intl: "Radio Budapest DX Show"
0330 KWHR (Hawaii): "DXing with Cumbre"
0400 WWCR #3 (Tennessee): "Ham Radio and More"
0430 Radio New Zealand Intl: "Mailbox (biweekly)"
0445 Radio Bulgaria: "Radio Bulgaria Calling"
0620 Voice of Med. (Malta): "VOM DX Corner"
0635 Radio Korea: "Shortwave Feedback"
0700 Radio For Peace Intl: "World of Radio"
0800 WWCR #1 (Tennessee): "Spectrum"
0905 WWCR #1 (Tennessee): "Ham Radio and More"
1040 All India Radio: "DX-ers Corner (2/4)"
1130 WWCR #1 (Tennessee): "World of Radio"
1215 Radio Bulgaria: "Radio Bulgaria Calling"
1355 Radio Romania Intl: "For Radio Amateurs"
1420 Voice of Med. (Malta): "VOM DX Corner"
1435 All India Radio: "DX-ers Corner (2/4)"
1525 Radio Romania Intl: "For Radio Amateurs"
1615 KTWR (Guam): "Pacific DX Report"
1840 All India Radio: "DX-ers Corner (2/4)"
1915 Radio Tallinn: "Radio Estonia DX Program"
1920 AWR Latin America: "Wavescan"
1955 Radio Romania Intl: "For Radio Amateurs"
2030 WWCR #1 (Tennessee): "World of Radio"
2130 All India Radio: "DX-ers Corner (2/4)"
2155 Radio Romania Intl: "For Radio Amateurs"
2240 Radio Exterior de Espana: "Distance Unknown"

Tuesdays

0255 Radio Romania Intl: "For Radio Amateurs"
1210 AWR Latin America: "Wavescan"
1230 WWCR #1 (Tennessee): "World of Radio"
1241 Radio Sweden: "MediaScan (1/3)"
1341 Radio Sweden: "MediaScan (1/3)"
1441 Radio Sweden: "MediaScan (1/3)"
1726 Radio Sweden: "MediaScan (1/3)"
1841 Radio Sweden: "MediaScan (1/3)"
1900 Radio For Peace Intl: "World of Radio"
1950 Polish Radio: "Polish Radio DX Club"
2139 Radio Havana Cuba: "DXers Unlimited"
2141 Radio Sweden: "MediaScan (1/3)"
2239 Radio Havana Cuba: "DXers Unlimited"
2241 Radio Sweden: "MediaScan (1/3)"
2340 All India Radio: "DX-ers Corner (2/4)"

Wednesdays

0041 Radio Sweden: "MediaScan (1/3)"
0135 Radio Havana Cuba: "DXers Unlimited"
0141 Radio Sweden: "MediaScan (1/3)"
0241 Radio Sweden: "MediaScan (1/3)"
0300 Radio For Peace Intl: "World of Radio"
0335 Radio Havana Cuba: "DXers Unlimited"
0341 Radio Sweden: "MediaScan (1/3)"
0535 Radio Havana Cuba: "DXers Unlimited"
0700 HCJB (eu): "The Latest Catch"
0800 HCJB (eu): "Ham Radio Today"
0930 HCJB (pac): "Ham Radio Today"
1000 Radio For Peace Intl: "World of Radio"
1030 HCJB (pac): "The Latest Catch"
1315 FEBC (Philippines): "DX Dial"
1720 Polish Radio: "Polish Radio DX Club"
1915 Radio Budapest Intl: "Radio Budapest DX Show"
1920 Argentina, RAE: "DX'ers Special"
1930 HCJB (eu): "Ham Radio Today"
2000 HCJB (eu): "The Latest Catch"
2030 WRMI (Florida): "Wavescan"

Thursdays

0115 Radio Budapest Intl: "Radio Budapest DX Show"
0130 HCJB (am): "Ham Radio Today"
0153 Radio Netherlands Intl: "Media Network"
0200 HCJB (am): "The Latest Catch"
0235 Argentina, RAE: "DX'ers Special"
0530 HCJB (am): "Ham Radio Today"
0600 HCJB (am): "The Latest Catch"
0752 Radio Netherlands Intl: "Media Network"
0830 Radio New Zealand Intl: "Mailbox (biweekly)"
0953 Radio Netherlands Intl: "Media Network"
1153 Radio Netherlands Intl: "Media Network"
1220 Polish Radio: "Polish Radio DX Club"
1352 Radio Netherlands Intl: "Media Network"
1553 Radio Netherlands Intl: "Media Network"
1753 Radio Netherlands Intl: "Media Network"
1952 Radio Netherlands Intl: "Media Network"
2030 WWCR #1 (Tennessee): "World of Radio"

Fridays

0053 Radio Netherlands Intl: "Media Network"
0253 Radio Netherlands Intl: "Media Network"
0453 Radio Netherlands Intl: "Media Network"
0714 Radio Prague: "Calling All Listeners"
0914 Radio Prague: "Calling All Listeners"
1014 Radio Prague: "Calling All Listeners"
1314 Radio Prague: "Calling All Listeners"
1546 Radio Portugal Intl: "Radio Portugal DX (triweekly)"
1614 Radio Prague: "Calling All Listeners"
1714 Radio Prague: "Calling All Listeners"
1930 Radio New Zealand Intl: "Mailbox (biweekly)"
1930 AWR Latin America: "Wavescan"
1947 Radio Bulgaria: "Radio Bulgaria Calling"
2000 Radio For Peace Intl: "World of Radio"
2014 Radio Prague: "Calling All Listeners"
2016 Radio Portugal Intl: "Radio Portugal DX (triweekly)"
2115 WWCR #1 (Tennessee): "World of Radio"
2144 Radio Prague: "Calling All Listeners"
2210 Australia, Radio: "Feedback"
2314 Radio Prague: "Calling All Listeners"
2330 WHRI (Angel 2): "DXing with Cumbre"
2345 Radio Bulgaria: "Radio Bulgaria Calling"

Saturdays

0010 Australia, Radio: "Feedback"
0014 Radio Prague: "Calling All Listeners"
0210 Australia, Radio: "Feedback"
0214 Radio Prague: "Calling All Listeners"
0244 Radio Prague: "Calling All Listeners"
0246 Radio Portugal Intl: "Radio Portugal DX (triweekly)"
0400 Radio For Peace Intl: "World of Radio"
0500 KWHR (Hawaii): "DXing with Cumbre"
0600 WHRI (Angel 1): "DXing with Cumbre"
0600 WHRI (Angel 2): "DXing with Cumbre"
0700 KWHR (Hawaii): "DXing with Cumbre"
0739 HCJB (eu): "DX Partyline"
0815 KTWR (Guam): "Pacific DX Report"
0909 HCJB (pac): "DX Partyline"
0940 FEBC (Philippines): "DX Dial"
0940 KTWR (Guam): "Pacific DX Report"
1030 Voice of America (as pac): "Communications World"
1030 WWCR #3 (Tennessee): "World of Radio"
1100 Radio For Peace Intl: "World of Radio"
1215 Radio Bulgaria: "Radio Bulgaria Calling"
1230 Voice of America (as pac): "Communications World"
1245 Voice of Turkey: "DX Corner (biweekly)"
1342 Radio Tashkent: "Radio Tashkent DX Program"
1349 Radio Romania Intl: "DX Mailbag"
1519 Radio Romania Intl: "DX Mailbag"
1607 WWCR #3 (Tennessee): "Ham Radio and More"
1730 Voice of America (af/me/south as): "Communications World"
1800 Radio For Peace Intl: "World of Radio"
1909 HCJB (eu): "DX Partyline"
1915 Voice of Turkey: "DX Corner (biweekly)"
1949 Radio Romania Intl: "DX Mailbag"
1958 Vatican Radio: "On-the-Air"
2100 WRMI (Florida): "Wavescan"
2130 Voice of America (me): "Communications World"
2137 Radio Havana Cuba: "DXers Unlimited"
2149 Radio Romania Intl: "DX Mailbag"
2215 Voice of Turkey: "DX Corner (biweekly)"
2224 Radio Exterior de Espana: "Distance Unknown"
2236 Radio Havana Cuba: "DXers Unlimited"
2300 KSDA (Guam): "Wavescan"

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Dave Datko
California

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New Hampshire

MT MONITORING TEAM
Next Reporting Deadline
May 22, 1996

Jim Frimmel, Program Manager
Texas DXComp@aol.com

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

NEWSLINE

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

0000 UTC
(8:00 PM EDT, 5:00 PM PDT)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (south as)
Canada (North-Quebec)
China Radio Intl
Croatian Radio
KWHR (Hawaii) [T-A]
Monitor Radio Intl [T-A]
Radio Australia
Radio Exterior de Espana
Radio New Zealand Intl
Radio Prague
Radio Thailand
Radio Ukraine Intl
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WHRI (Angel 2) [T-A]
WWCR #4 (Tennessee) [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 [M-A]
Voice of America (am) [T-S] (Special English)
Voice of America (as) (Special English)
Voice of Russia
0035
Voice of Iran
0045
BBC (am)*
BBC (as pac)*
BBC (south as)*
0050
RAI Italy

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

0200 UTC
(10:00 PM EDT, 7:00 PM PDT)
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as) (Newsday)
Canada (North-Quebec)
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio Korea
Radio New Zealand Intl [T-A]
Radio Prague
Radio Romania Intl
Radio Yugoslavia
RAE Argentina [T-A]
Voice of America (as)
Voice of Myanmar (Burma)
Voice of Russia
Voice of Vietnam
WWCR #3 (Tennessee) [T-A]
WWCR #4 (Tennessee) [T-A]
0203
Voice of Free China
0213
Radio Havana Cuba [T-S]*
0215
Radio Cairo
Radio Nepal
0228
Radio Havana Cuba [S]
0230
Radio Austria Intl
Radio Budapest
Radio Havana Cuba [T-A]
Radio Netherlands Intl
Radio Pakistan
Radio Portugal Intl [T-A]
Radio Prague
Radio Sweden [T-A]
Radio Tirana
Voice of Russia
Voice of Vietnam

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

0400 UTC
(12:00 AM EDT, 9:00 PM PDT)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) [S-F] (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Bulgaria
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio New Zealand Intl [A]
Radio New Zealand Intl [M-F]*
Radio 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]
WWCR #4 (Tennessee) [T-A]
WYFR (Satellite Network) [A]
ZBC Zimbabwe
0403
Radio Pyongyang
0410
China Radio Intl*
0413
Radio Havana Cuba [T-S]*
0425
RAI 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) (Newsday)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-F]
Radio Australia
Radio Cameroon
Radio Canada Intl [M-F]
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [S-F]
Vatican Radio [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 Austria Intl
Radio Havana Cuba [T-A]
Radio Romania Intl
Voice of Nigeria
Voice of Russia
0555
Radio Japan [A]

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

WWCR #1 (Tennessee) [S]
WWCR #3 (Tennessee) [M-F]
0601
Voice of America (af) [M-F]*
0603
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 (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]
Radio Norway Intl [S]
Radio Prague
Voice of Malaysia
Voice of Myanmar (Burma)
Voice of Russia
WWCR #3 (Tennessee) [M-F]
0703
Croatian Radio
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 (as pac)
BBC (eu)
BBC (south as)
KNLS (Alaska)
Monitor Radio Intl [M-A]
Radio Australia
Radio Korea
Radio New Zealand Intl
Radio Pakistan
Voice of Indonesia [A-H]
Voice of Malaysia
Voice of Russia
0803
Radio Pyongyang
0810
Radio New Zealand Intl [M-F]*
0830
R Slovakia Intl
Radio Netherlands Intl
Voice of 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 Prague
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 [M-A]
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 Tanzania
Swiss Radio Intl (eu)
Voice of America (as)
Voice of America (ca)
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]*
Vatican Radio [M-A]
1030
FEBC (Philippines) [M-F]*
Radio Austria Intl
Radio Dubai
Radio Netherlands Intl
Radio Prague
Voice of Nigeria
Voice of Russia
1045
Voice of Nigeria [A-S]*

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

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

1300 UTC
(9:00 AM EDT, 6:00 AM PDT)
BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
BBC (south as) (Newshour)
Canada (North-Quebec) [A-S]
China Radio Intl
KNLS (Alaska)
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Canada Intl [S-F]
Radio Ghana
Radio Norway Intl [S]
Radio Prague
Radio Romania Intl
Radio Singapore Intl
Radio Tanzania [A-S]
Radio Vlaanderen Intl [M-A]
Swiss Radio Intl
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 Finland
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Radio Tashkent
Radio Yugoslavia
Voice of America (as) (Special English)
Voice of Russia
Voice of Vietnam
1335
FEBC (Philippines) [M-F]*
Voice of Greece
1355
Radio Singapore Intl [A]
Radio Singapore Intl [M-F]*

1400 UTC
(10:00 AM EDT, 7:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio Canada Intl [S]
Radio France Intl
Radio Ghana
Radio Japan
Radio Norway Intl [S]
Radio Pakistan
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
WWCR #3 (Tennessee) [M-F]
1410
China Radio Intl*
1415
Radio Nepal
1424
HCJB (am) [M-F]
1430
FEBC (Philippines) [M-A]
Radio Netherlands Intl
Radio Romania Intl
Radio Sweden [M-F]
RTM Morocco [S]
Voice of Myanmar (Burma)
Voice of Russia
WYFR (Satellite Network) [M-F]
1431
Radio France Intl [T]*
1445
All India Radio
Voice of Myanmar (Burma)
1455
Radio Japan [A]
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
Estonian Radio [M-F]
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
Radio Portugal Intl [M-F]
Voice of Nigeria [M-F]
Voice of Russia
1535
Voice of Iran
1555
Radio Japan [A]

1600 UTC
(12:00 M EDT, 9:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio France Intl
Radio Jordan
Radio Korea
Radio Pakistan
Radio Prague
Radio Tanzania
Swiss Radio Intl (eu)
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 Tirana
Vatican Radio
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) [M-F]*
Radio Canada Intl [M-F]

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [M-A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
Monitor Radio Intl [M-A]
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio France Intl
Radio Japan
Radio Jordan
Radio New Zealand Intl [M-F]*
Radio Pakistan
Radio Prague
Swiss Radio Intl
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WHRI (Angel 1) [M-F]
WHRI (Angel 2) [A]
WRNO (Louisiana) [M-F]
1703
Radio Pyongyang
1710
China Radio Intl*
Radio Australia*
1715
Radio Sweden [M-F]
1730
Radio Austria Intl
Radio Netherlands Intl
Radio New Zealand Intl [M-F]*
Radio Romania Intl
Voice of Russia
1740
BBC (af)*
1745
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 (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio New Zealand Intl [M-F]*
Radio Omdurman
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]*
R Slovakia Intl
Radio Bangladesh
Radio Korea [S-W/A]
Radio Kuwait
Radio Netherlands Intl
Radio New Zealand Intl [M-F]*
Radio Sweden [M-F]
Radio Tirana
Radio Yemen
Voice of America (af) [A-S] (Special English)
Voice of America (me) (Special English)
Voice of Russia
Voice of Turkey
1840
Voice of Greece [M-A]
1855
Radio New Zealand Intl [M]*

1900 UTC
(3:00 PM EDT, 12:00 M PDT)
All India Radio
BBC (af)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
China Radio Intl
Deutsche Welle
Estonian Radio [M/H]
HCJB (eu)
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Japan
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [S]
Radio Romania Intl
Swiss Radio Intl (eu)
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]*
Radio Austria Intl
Radio Netherlands Intl
Radio New Zealand Intl [S-H]*
Radio Yugoslavia
1935
RAI Italy
Voice of Iran

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

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

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

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

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- Birdie log during frequency search automatically characterizes your R7000, then locks out those frequencies.

- Activity log function continuously monitors and logs all frequencies of a scan database while displaying active, was active and never active channels.

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- DSS allows user programmable upper and/or lower signal level detection limits during DELTACOMM™ I-7000's spectrum log, scan and search functions.
- Log signal strength information to printer or delimited log file while DELTACOMM™ I-7000 is scanning or activity logging the selected database file.

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FREQUENCIES

0000-0030	Australia, Radio	11855as	13605pa	13745as	17750as
0000-0100 vl	Australia, VL8A Alice Spg	2310do			
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0015	Cambodia, Natl Voice of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFCX Montreal	6005do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0030 mtwfa	Canada, R Canada Intl	6040am	9535am	11940am	
0000-0100	Canada, R Canada Intl	5960na	9755na		
0000-0100	China, China Radio Intl	9710na	11655na	11715na	
0000-0100 vl	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am	15460am		
0000-0010	Croatia, Croatian Radio	5895eu	7370eu		
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
0000-0100	Lebanon, Voice of Hope	6280va			
0000-0100	Lebanon, Wings of Hope	9960va			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na		
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100	Palau, KHBN/Voice of Hope	9965as			
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Philippines, FEBC/R Intl	15450as			
0000-0100	Russia,Voice of Russia WS	7105na	7125na	7180na	
0000-0030 mtwhfa	Serbia, Radio Yugoslavia	6195af	7130na		
0000-0100	Spain, R Exterior Espana	6065na	9540ca		
0000-0030	Thailand, Radio	9680af			
0000-0100	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na
		6055na	7205na		
0000-0100	United Kingdom, BBC WS	5965as	5970sa	5975va	6175na
		6195as	7265as	7325va	9590va
		9915sa	11750sa	11955as	
0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0100	USA, KAIJ Dallas TX	5810am	13740am		
0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	USA, KVOH Los Angeles CA	9975am			
0000-0100	USA, KWHR Naalehu HI	17510au			
0000-0100	USA, Monitor Radio Intl	7535am	9430ca		
0000-0100	USA, Voice of America	5995am	6130am	7215va	7405am
		9455am	9770va	9775am	11695am
		11760va	13740am	15185va	15290va
		17735va	17820va		
0000-0100	USA, WEWN Birmingham AL	5825eu	7425na		
0000-0100	USA, WHRI Noblesville IN	5745am			
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100 m	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	USA, WWCR Nashville TN	3315am	5065am	5935am	7435am
		13845am			
0000-0100	USA, WYFR Okeechobee FL	6065na	6085na		
0030-0100	Australia, Radio	15240pa	15365pa	15415as	15510as
		17795pa	17860pa		
0030-0100	Ecuador, HCJB	9745am	21455va		
0030-0100	Iran, VOIRI	6015na	9022na		
0030-0100	Netherlands, Radio	5905as	7305as		
0030-0100	Sri Lanka, Sri Lanka BC	15425as			
0030-0100	Sweden, Radio	6065am	9850am		
0030-0100	Thailand, Radio	11905na	15370as		
0038-0055 1st m	Denmark, R Denmark Intl	5905va	7275va	7465va	
0050-0100	Italy, RAI Intl	6005na	9645na	11800na	

SELECTED PROGRAMS

Sundays

0000 USA, WWCR #1 Nashville TN: What Does the Bible Say?. M. H. Reynolds exposes other religions.
0000 USA, WWCR #3 Nashville TN: World of Prophecy. Texe Marrs and a guest discuss the evils and pitfalls of today and the outlook for tomorrow.
0005 UK, BBC London (south as): Spotlight. Focus on the theater.
0010 UK, BBC London (south as): Country Style. Wally Whyton plays a selection of the best in country music.
0025 UK, BBC London (south as): Words of Faith. People of all faiths share how their scripture gives authority and meaning to their lives.
0030 UK, BBC London (am): Letter from America. Alistair Cooke shares his inimitable view of contemporary American life.
0030 UK, BBC London (as pac/south as): Folk Routes. Ian Anderson extends the range of folk music to include country, cajun and blues.
0030 USA, WWCR #1 Nashville TN: World of Radio. Glenn Hauser's communications program for shortwave radio listeners.
0045 UK, BBC London (am/as pac/south as): Britain Today. News about Britain.

Mondays

0000 UK, BBC London (am/as pac): Chimes of Big Ben (1). Hear the famous bells at this time on the first Monday of each month.
0000 USA, WWCR #1 Nashville TN: Grace in Action. Paul Kamanu evangelizes from Honolulu, Hawaii.
0000 USA, WWCR #3 Nashville TN: Full Disclosure Live (live). Glen L. Roberts takes calls and discusses subjects dealing with privacy and surveillance technology.

0025 UK, BBC London (south as): Words of Faith. See S 0025.
0030 UK, BBC London (am): Development '96. See S 0615.
0030 UK, BBC London (as pac/south as): On the Move. A weekly program about travel and transport with Malcolm Billings.
0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Tuesdays

0000 USA, WWCR #1 Nashville TN: Newswatch Magazine (T-A). See M 0100.
0000 USA, WWCR #3 Nashville TN: Protecting Your Wealth (live) (T-A). Mike Callahan's financial commentary, investments, and politics dealing with money issues.
0005 UK, BBC London (south as): New Ideas. See S 2330.
0005 USA, WWCR #4: The Law Loft Report (live) (T-A). Susan Harris and Peter Ludlow report on behind the scenes in Congress.
0025 UK, BBC London (south as): Words of Faith. See S 0025.
0030 UK, BBC London (am): Global Concerns. See M 1230.
0030 UK, BBC London (as pac/south as): Record News. See S 0445.
0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Wednesdays

0005 UK, BBC London (south as): Pop Short. See S 0355.
0010 UK, BBC London (as pac/south as): Let's Go (1st,8th). See T 0530.
0010 UK, BBC London (south as): Variable Music Feature. See S 1401.
0025 UK, BBC London (south as): Words of Faith. See S 0025.
0030 UK, BBC London (am): Folk Routes. See S 0030.
0030 UK, BBC London (as pac): Variable Feature. See S 1130.
0030 UK, BBC London (as pac/south as): Songs for Children. See S 1550.
0030 UK, BBC London (south as): Variable Feature. See S 1130.
0040 UK, BBC London (as pac/south as): Science View. A five-minute science program.
0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Thursdays

0005 UK, BBC London (south as): Take Five. See M 2310.
0010 UK, BBC London (south as): Soundbyte (2nd,9th). See M 0615.
0010 UK, BBC London (south as): Variable Feature. See S 1130.
0025 UK, BBC London (south as): Words of Faith. See S 0025.
0030 UK, BBC London (am): From Our Own Correspondent. See S 0330.
0030 UK, BBC London (as pac/south as): Jazz Now and Then. See S 1230.
0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.
0054 Radio Netherlands: Documentary. Buddy, can you spare a home? (30th). See F 1454.
0054 Radio Netherlands: Documentary. Living by the Water (18th,25th). See W 1154.
0054 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (2nd,9th). See A 2354.

Fridays

0005 UK, BBC London (south as): The Insider's Guide. A look behind the scenes to bring the inside story about Bush House.
0015 UK, BBC London (south as): Write On. See S 0345.
0030 UK, BBC London (am): The Farming World. See S 1445.
0030 UK, BBC London (as pac/south as): Good Books. See S 1145.
0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Saturdays

0005 UK, BBC London (south as): Words and Music. See S 2310.
0010 UK, BBC London (south as): Seven Days. Roundup of the week's news, plus sports highlights, finance and the weather.
0025 UK, BBC London (south as): Words of Faith. See S 0025.
0030 UK, BBC London (am): Seven Days. See A 0010.
0030 UK, BBC London (as pac/south as): From the Weeklies. Review of the British weekly press.
0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Frequencies

0100-0200	Australia, Radio	11855as	13605pa	13745as	15240pa
		15365pa	15415as	15510as	17705as
		17795pa	17860pa		
0100-0200 vl	Australia, VL8A Alice Spg	2310do			
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200	Australia,DefenseForces R	13525as			
0100-0200 vl	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFCX Montreal	6005do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0200	Costa Rica,RF Peace Intl	6205am	7385am		
0100-0110	Croatia, Croatian Radio	5895eu	7370eu		
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB	9745am	21455va		
0100-0150	Germany, Deutsche Welle	5960na	6040na	6085na	6145na
		9555na	9640na	9670na	
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0130	Hungary, Radio Budapest	6190na	9850na	11870na	
0100-0200	Indonesia, Voice of	9525na			
0100-0127	Iran, VOIRI	6015na	6175na	9022na	
0100-0110	Italy, RAI Intl	6005na	9645na	11800na	
0100-0200	Japan, NHK/Radio	5960as	11790as	11840as	11860as
		11910as	17810as	17845as	
0100-0200	Lebanon, Wings of Hope	9960va			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0130	Netherlands, Radio	5905as	7305as		
0100-0125	Netherlands, Radio	6020na	6165na		
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0130 m	Norway, Radio Norway Intl	9560na			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	5950na	6030na	7105na	7345na
		9580na	12030na	13640na	15425na
0100-0130	Serbia, Radio Yugoslavia	6195na	7130na		
0100-0127	Slovakia, R Slovakia Intl	5930na	7300na	9440sa	
0100-0200	Spain, R Exterior Espana	6065na	9540ca		
0100-0200	Sri Lanka, Sri Lanka BC	15425as			
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0100-0200	United Kingdom, BBC WS	5965as	5970sa	5975va	6175va
		6195as	7265as	7325va	9560va
		9590va	9915va	11750sa	11955as
		15360as			
0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	USA, KVOH Los Angeles CA	9975am			
0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	USA, Voice of America	5995am	6130am	7115as	7205as
		7405am	9455am	9635as	9775am
		11705as	11725as	13740am	15170as
		15205as	15250as	17740as	17820as
0100-0200	USA, WEWN Birmingham AL	5825eu	7425na	7520sa	
0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0130 m	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	3315am	5065am	5935am	7435am
0100-0200	USA, WYFR Okeechobee FL	6065na			
0100-0130	Uzbekistan, R Tashkent	5955eu	5975eu	7285eu	
0100-0200	Vietnam, Voice of	5940na	9840na	15010na	
0104-0200	USA, WYFR Okeechobee FL	9505na			
0115-0130 f	Greece, Voice of	6260na	7448na	9420na	
0130-0200	Austria, R Austria Intl	9655na			
0130-0150	Greece, Voice of	6260na	7448na	9420na	
0130-0200	Netherlands, Radio	5905as	7305as	9860as	11655as
0130-0200	Sweden, Radio	7120as			
0138-0155 1st m	Denmark, R Denmark Intl	6120am	7465am		
0140-0200	Vatican State, Vatican R	5980as	7335as		
0145-0200	Albania, R Tirana Intl	6140na	7160na		

Selected Programs

Sundays

0100 USA, WWCR #1 Nashville TN: Foundation of Truth Broadcast. Ed Reese with a chronological bible study and a profile of a great Christian.
0100 USA, WWCR #3 Nashville TN: The American Way. Andrew Gause pushes the rare coin market.
0130 UK, BBC London (am): People and Politics. Background to the British political scene.
0130 USA, WWCR #1 Nashville TN: The Lights of Spiritual Guidance. Gospel and song with J. Harold Lowman.
0135 UK, BBC London (as pac/south as): Sports Roundup. The latest sports news.
0145 UK, BBC London (as pac/south as): Letter from America. See S 0030.

Mondays

0100 USA, WWCR #1 Nashville TN: Newswatch Magazine. David Smith compares world news to bible prophecy.
0100 USA, WWCR #3 Nashville TN: Free at Last. Mike Seymour with a half-hour of music and scripture.
0118 Germany, Deutsche Welle (am): Living in Germany. Warnemunde (Jun 1). See H 1643.
0130 UK, BBC London (am): Seeing Stars (1). See S 0430.
0130 UK, BBC London (am): Short Story. See S 0430.
0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
0145 UK, BBC London (am): Write On. See S 0345.
0145 UK, BBC London (as pac/south as): The Farming World. See S 1445.
0155 UK, BBC London (am): Words of Faith. See S 0025.

Tuesdays

0100 USA, WWCR #1/#3 Nashville TN: Protecting Your Wealth (live). See T 0000.
0105 USA, WWCR #4: The Golden Age of Radio Theater. See S 0605.
0130 UK, BBC London (am): Outlook. See M 1405.
0130 UK, BBC London (as pac): Development '96. See S 0615.
0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
0145 UK, BBC London (south as): Development '96. See S 0615.
0155 UK, BBC London (am): Words of Faith. See S 0025.

Wednesdays

0100 USA, WWCR #1/#3 Nashville TN: Protecting Your Wealth (live). See T 0000.
0105 USA, WWCR #4: The Golden Age of Radio Theater. See S 0605.
0130 UK, BBC London (am): Outlook. See M 1405.
0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
0145 UK, BBC London (as pac/south as): Health Matters. See M 0445.
0155 UK, BBC London (am): Words of Faith. See S 0025.

Thursdays

0100 USA, WWCR #1/#3 Nashville TN: Protecting Your Wealth (live). See T 0000.
0105 USA, WWCR #4: The Golden Age of Radio Theater. See S 0605.
0130 UK, BBC London (am): Outlook. See M 1405.
0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
0145 UK, BBC London (as pac/south as): From Our Own Correspondent. See S 0330.
0155 UK, BBC London (am): Words of Faith. See S 0025.

Fridays

0100 USA, WWCR #1/#3 Nashville TN: Protecting Your Wealth (live). See T 0000.
0105 USA, WWCR #4: The Golden Age of Radio Theater. See S 0605.
0130 UK, BBC London (am): Outlook. See M 1405.
0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
0145 UK, BBC London (as pac/south as): The Learning World. See S 1130.
0155 UK, BBC London (am): Words of Faith. See S 0025.

Saturdays

0100 USA, WWCR #1/#3 Nashville TN: Protecting Your Wealth (live). See T 0000.
0105 USA, WWCR #4: The Golden Age of Radio Theater. See S 0605.
0130 UK, BBC London (am): Outlook. See M 1405.
0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
0145 UK, BBC London (as pac/south as): Global Concerns. See M 1230.
0154 Radio Netherlands: Documentary. Living by the Water (20th,27th). See W 1154.
0154 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (4th,11th). A two-part series from Jaldeep Katwala about a conflict in culture.
0155 UK, BBC London (am): Words of Faith. See S 0025.

THANK YOU ...

Additional contributors to this month's Shortwave Guide:

John Babbis, Silver Spring, MD; Capt. Ken Barry, Blackpool, England, Paul R. Donegan, Glendale, CA; Bob Fraser, Cohasset, MA; Jim Moats, Ravenna, OH; Loyd Van Horn, Brasstown, NC; BBCMS; BBC *World Media*; BBC *Summary of World Broadcasts*; Internet Shortwave Newsgroups.

Frequencies

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, Radio	13605pa	15240pa	15365pa	15415as
		17715as	17750as	17795pa	17860pa
0200-0300 vl	Australia, VL8A Alice Spg	2310do			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
0200-0300	Australia,DefenseForces R	13525as			
0200-0300 vl	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFCX Montreal	6005do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0300	Canada, R Canada Intl	5905na	6010ha	9535am	9755na
		11725am			
0200-0300	Costa Rica,RF Peace Intl	6205am	7385am		
0200-0210	Croatia, Croatian Radio	5895eu	7370eu		
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB	9745am	21455va		
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	6035as	6130na	7265as	7285as
		7355as	9515as		
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0200-0300	Lebanon, Wings of Hope	9960va			
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0230	Netherlands, Radio	5905as	7305as	9860as	11655as
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0200-0300	Russia,Voice of Russia WS	5920na	5940na	6030na	7105na
		7175na	7270na	7330na	7345na
		9580na			
0200-0300	South Korea, R Korea Intl	7275am	11725am	11810am	15575am
0200-0230	Sri Lanka, Sri Lanka BC	15425as			
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		11825as	15345as		
0200-0300	United Kingdom, BBC WS	5970sa	5975va	6135af	6175va
		7235va	9560va	9590va	9605va
		9915sa	11955as	15360as	
0200-0300	USA, KAIJ Dallas TX	5810am	9815am		
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	USA, KVOH Los Angeles CA	9975am			
0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	USA, Monitor Radio Intl	5850na	9430am		
0200-0300	USA, Voice of America	7115as	7205as	9635as	11705as
		11725as	15170as	15250as	17740as
		17820as			
0200-0300	USA, WEWN Birmingham AL	5825eu	7425na		
0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300	USA, WRNO New Orleans LA	7395am			
0200-0300	USA, WWCR Nashville TN	3315am	5065am	5935am	7435am
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0300	Vietnam, Voice of	5940na	9840na	15010na	
0215-0225	Nepal, Radio	7165do			
0230-0300	Albania, R Tirana Intl	6140na	7160na		
0230-0300	Austria, R Austria Intl	9655na	9870ca	13730sa	
0230-0300	Hungary, Radio Budapest	5965na	9850na	11870na	
0230-0255	Moldova, R Moldova Intl	7500na			
0230-0300	Netherlands, Radio	9860as	11655as		
0230-0245	Pakistan, Radio	7290as	15190as	17705as	17725as
		21730as			
0230-0300	Philippines, R Pilipinas	17760me	17865me	21580me	
0230-0300 twhha	Portugal, R Portugal Intl	6095am	9570am		
0230-0300	Sweden, Radio	7115na			
0238-0255 1st m	Denmark, R Denmark Intl	6120am	7465am		
0250-0300	Vatican State, Vatican R	6095na	7305na		

Selected Programs

Sundays

0200 USA, WWCR #1 Nashville TN: Open Bible Dialog. Joseph Chambers preaches bible prophecy from North Carolina.
0200 USA, WWCR #3 Nashville TN: Spectrum (live). SWLs and Hams call 1-800-774-7435 with technical questions and comments.
0230 UK, BBC London (af): Music Review. News and views from the world of music.
0230 UK, BBC London (am): Science in Action. The latest in science and technology.
0230 UK, BBC London (as pac): In Praise of God. Weekly programme of worship and meditation.
0230 UK, BBC London (eu): Music Review. See S 0230.
0230 UK, BBC London (south as): In Praise of God. See S 0230.

Mondays

0200 USA, WWCR #1 Nashville TN: World of Prophecy. See S 0000.
0230 UK, BBC London (af/am/as pac/eu/south as): Variable Feature. See S 1130.

Tuesdays

0200 USA, WWCR #1 Nashville TN: Truth House. Evangelistic teachings by E.C. Fultcher plus his global shortwave club.
0205 USA, WWCR #3 Nashville TN: Radio Free America (live). Tom Valentine hosts this talk/interview program.
0205 USA, WWCR #4: The John Bryant Show (live). Talk radio.
0230 UK, BBC London (af/am/as pac): Meridian. See S 0630.
0230 UK, BBC London (as pac/south as): Discovery. See M 1430.

Wednesdays

0200 USA, WWCR #1 Nashville TN: Truth House. See T 0200.
0205 USA, WWCR #3 Nashville TN: Radio Free America (live). See T 0205.
0205 USA, WWCR #4: The John Bryant Show (live). See T 0205.
0230 UK, BBC London (af/am/eu): On Screen. See T 1401.
0230 UK, BBC London (as pac/south as): Meridian. See S 0630.

Thursdays

0200 USA, WWCR #1 Nashville TN: Truth House. See T 0200.
0205 USA, WWCR #3 Nashville TN: Radio Free America (live). See T 0205.
0205 USA, WWCR #4: The John Bryant Show (live). See T 0205.
0230 UK, BBC London (af/am/eu): Meridian. See S 0630.
0230 UK, BBC London (as pac/south as): Assignment. A weekly examination of a topical issue.
0254 Radio Netherlands: Documentary. Buddy, can you spare a home? (30th). See F 1454.
0254 Radio Netherlands: Documentary. Living by the Water (18th,25th). See W 1154.
0254 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (2nd,9th). See A 2354.

Fridays

0200 USA, WWCR #1 Nashville TN: Truth House. See T 0200.
0205 USA, WWCR #3 Nashville TN: Radio Free America (live). See T 0205.
0205 USA, WWCR #4: The John Bryant Show (live). See T 0205.
0230 UK, BBC London (af/am/as pac/eu/south as): 30-Minute Drama. See W 1130.

Saturdays

0200 USA, WWCR #1 Nashville TN: Truth House. See T 0200.
0205 USA, WWCR #3 Nashville TN: Radio Free America (live). See T 0205.
0205 USA, WWCR #4: The John Bryant Show (live). See T 0205.
0230 UK, BBC London (af/eu): Meridian. See S 0630.
0230 UK, BBC London (am): Science in Action. See S 0230.
0230 UK, BBC London (as pac/south as): People and Politics. See S 0130.

Hauser's Highlights
NEW ZEALAND: RNZI

Feature Programmes

Travel Pacific/Mail Box	0430 Mon, 0830 Thu, 1930 Fri
Dateline Pacific	0717, 1130, 1710, 1910 Fri
Trade Winds	0915, 1735, 2015, 1145 Thu
Hymns for Today	0730 Mon
Songs of Praise	0915 Mon
Around the World	0930 Tue, 0430 Fri (monthly)
He Waiata	0405, 0717, 1710, 2135 Wed
World in Sport	0430, 0717, 2135 Tue
Vaka Moana	1710 Tue, 0430, 0745 Wed
Trading Post	2115 Tue, 0745, 1130 Thu
On the March	1130 Tue, 0915 Thu
Pacific Is News	0718, 0945, 1710, 2135 Thu
Fruit & Veg Report	2115 Thu, 0745, 1740 Fri
Kiwi Music Magazine	0815 Fri

Frequencies

0300-0400	Australia, Radio	13605pa	15240pa	15245as	15365pa
	15415as	15510as	17750pa	17795pa	17860pa
0300-0400 vl	Australia, VL8A Alice Spg	2310do			
0300-0400 vl	Australia, VL8K Katherine	5025do			
0300-0400 vl	Australia, VL8T Tent Crk	4910do			
0300-0400 vl	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFCX Montreal	6005do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0330 twhfa	Canada, R Canada Intl	6010na	9755na		
0300-0400 sm	Canada, R Canada Intl	6010na	9755na		
0300-0400	China, China Radio Intl	9690na	9710na	11715na	
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0400	Costa Rica,RF Peace Intl	6205am	7385am		
0300-0310	Croatia, Croatian Radio	5895eu	7370eu		
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB	9745am	21455va		
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6045na	6085na	6120na	9530na
		9650na			
0300-0315 s	Greece, Voice of	6260na	7448na	9420na	
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400 vl	Italy, IRRS	7100va			
0300-0400	Japan, NHK/Radio	5960na	9605na	11840as	
0300-0330	Japan, NHK/Radio	11885na	11895ca	11960na	
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0300-0400	Lebanon, Wings of Hope	9960va			
0300-0330	Mongolia, R Ulan Bator	9960na	12000na		
0300-0325	Netherlands, Radio	5905as	7305as	9860as	11655as
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0330 m	Norway, Radio Norway Intl	6030na			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0330	Philippines, R Pilipinas	17760me	17865me	21580me	
0300-0400	Russia,Voice of Russia WS	5920na	6030na	7105na	7175na
		7180na	7270na	7330na	7345na
		9580na	12050na		
0300-0400	S Africa, Channel Africa	5955af	9585af		
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655na	11890na		
0300-0400	Turkey, Voice of	9445na	9560as	9655na	9685eu
		9760au			
0300-0315	Uganda, Radio	3340do	4976do		
0300-0400	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na
		6055na	7205na		
0300-0330	United Kingdom, BBC WS	5970sa	6135af	7235va	7325sa
		15360as			
0300-0400	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
	6175va 6190af	6195eu	9410va	9590va	9600af
	9605as 11760va	12095af	15310as		
0300-0400	USA, KAIJ Dallas TX	5810am	9815am		
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	USA, Voice of America	6035af	7105af	7340af	7405af
		7415af	9575af	9885af	
0300-0400	USA, WEWN Birmingham AL	5825eu	7425na		
0300-0400	USA, WHRI Noblesville IN	5760am	7315am		
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400	USA, WWCR Nashville TN	3315am	5065am	5935am	7435am
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0315	Vatican State, Vatican R	6095na	7305na		
0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do			
0320-0350	Vatican State, Vatican R	7360af			
0330-0357	Czech Rep, Radio Prague	6200as			
0330-0355	Moldova, R Moldova Intl	7500na			
0330-0400	Slovakia, Adv World Radio	9465eu			
0330-0400	Sweden, Radio	7115na			
0330-0400 vl	Tanzania, Radio	5050af			
0330-0400	UAE, Radio Dubai	13675na	15395eu	21605na	
0330-0400	United Kingdom, BBC WS	9610af	11730af	11955as	15280as
0338-0355 1st m	Denmark, R Denmark Intl	5965am	7165am	7465am	
0340-0350	Greece, Voice of	6260na	7448na	9420na	
0345-0400 irreg	Burundi, Radio Nationale	6140do			
0345-0400	Tajikistan, Tajik Radio	7245as			

Selected Programs

Sundays

0300 USA, WWCR #1 Nashville TN: Voice in the Wilderness. Dennie and Cher Corbin.

0300 USA, WWCR #3 Nashville TN: Morning Watch Chapel. Terry Parker of California teaches from the Bible.

0305 UK, BBC London (am): World Business Review. A look back at the previous week's business and a preview of upcoming events.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0315 USA, WWCR #1 Nashville TN: America's Promise Ministries. Dave Barley teaches the bible from Idaho.

0330 UK, BBC London (am/as pac/south as): From Our Own Correspondent. BBC correspondents comment on the background to the news.

0330 UK, BBC London (eu): Fourth Estate. John Eidinow and his team review the European press.

0335 UK, BBC London (af): Postmark Africa. Expert answers to any question under the sun.

0345 UK, BBC London (eu): Write On. Air your views about World Service; write to PO Box 76, Bush House, Strand, London WC2B 4PH.

0345 USA, WWCR #1 Nashville TN: A Study in God's Word. From North Carolina, Hezakiah Smith reads Scripture.

0350 UK, BBC London (am/as pac/south as): Write On. See S 0345.

0355 UK, BBC London (eu): Pop Short. A five-minute popular music program.

Mondays

0300 USA, WWCR #1 Nashville TN: Solutions. Mike Brown talks about the militia movement.

0300 USA, WWCR #3 Nashville TN: The Extraordinary Science Radio Hour. J.W. McGinnis of the Tesla Society.

0305 UK, BBC London (am): World Business Brief. See S 1205.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0318 Germany, Deutsche Welle (am): Living in Germany. Warnemunde (Jun 1). See H 1643.

0330 UK, BBC London (af): Network Africa. Breakfast show of news, sport, personalities, music, and listener's comments.

0330 UK, BBC London (am): In Good Voice (6th). see W 0530.

0330 UK, BBC London (am): Variable Comedy/Quiz Feature. These programs are panel quizes and other light entertainment in a format heard in America decades ago.

0330 UK, BBC London (as pac/south as): Off the Shelf. Daily readings from the best of world literature.

0330 UK, BBC London (eu): Europe Today. See S 1600.

0330 UK, BBC London (south as): Off the Shelf. See M 0330.

0345 UK, BBC London (as pac): Country Style. See S 0010.

Tuesdays

0300 USA, WWCR #1 Nashville TN: The Radio Bible Hour (T-A). J. Harold Smith.

0305 UK, BBC London (am): World Business Report. See M 1205.

0305 USA, WWCR #3 Nashville TN: Radio Free America (live) (T-A). See T 0205.

0305 USA, WWCR #4: The John Bryant Show (live) (T-A). See T 0205.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0330 UK, BBC London (af): Network Africa. See M 0330.

0330 UK, BBC London (am): The World Today. See M 0615.

0330 UK, BBC London (as pac/south as): Off the Shelf. See M 0330.

0330 UK, BBC London (eu): Europe Today. See S 1600.

0330 UK, BBC London (eu): John Peel (Alternative). See M 1330.

0330 USA, WWCR #1 Nashville TN: The Prophecy Club (T-A). Stan Johnson discusses bible prophecy from Topeka, Kansas.

0345 UK, BBC London (am): Off the Shelf. See M 0330.

0345 UK, BBC London (as pac/south as): Country Style. See S 0010.

Wednesdays

0305 UK, BBC London (am): World Business Report. See M 1205.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0330 UK, BBC London (af): Network Africa. See M 0330.

0330 UK, BBC London (am): The World Today. See M 0615.

0330 UK, BBC London (as pac/south as): Off the Shelf. See M 0330.

0330 UK, BBC London (eu): Discovery (Alternative). See M 1430.

0330 UK, BBC London (eu): Europe Today. See S 1600.

0345 UK, BBC London (am): Off the Shelf. See M 0330.

0345 UK, BBC London (as pac/south as): Let's Go (1st,8th). See T 0530

Thursdays

0305 UK, BBC London (am): World Business Report. See M 1205.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0330 UK, BBC London (af): Network Africa. See M 0330.

0330 UK, BBC London (am/as pac/south as): Off the Shelf. See M 0330.

0330 UK, BBC London (eu): Europe Today. See S 1600.

0330 UK, BBC London (eu): New Ideas (Alternative). See S 2330.

0345 UK, BBC London (af/as pac): Soundbyte (6th). See M 0615.

0345 UK, BBC London (as pac/south as): Folk Routes. See S 0030.

0350 UK, BBC London (eu): Songs for Children. See S 1550.

Fridays

0305 UK, BBC London (am): World Business Report. See M 1205.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0330 UK, BBC London (af): Network Africa. See M 0330.

0330 UK, BBC London (am): The World Today. See M 0615.

0330 UK, BBC London (as pac/south as): Off the Shelf. See M 0330.

0330 UK, BBC London (eu): Europe Today. See S 1600.

0330 UK, BBC London (eu): Focus on Faith (Alternative). Alison Hilliard talks to church leaders about their hopes for the future.

0345 UK, BBC London (am): Off the Shelf. See M 0330.

0345 UK, BBC London (as pac/south as): On the Move. See M 0030.

Saturdays

0305 UK, BBC London (am): World Business Report. See M 1205.

0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.

0330 UK, BBC London (am): The World Today. See M 0615.

0330 UK, BBC London (as pac/eu/south as): The Vintage Chart Show. See W 1215.

0331 UK, BBC London (af): African Quiz (1). A monthly test of the listener's knowledge of Africa.

0331 UK, BBC London (af): This Week and Africa. A roundup of the week's political developments across the continent.

0345 UK, BBC London (am): Off the Shelf. See M 0330.

0400 UTC SHORTWAVE GUIDE 12:00 M EDT 9:00 PM PDT

Frequencies

0400-0500	Australia, Radio	11880pa	13605as	15240pa	15365pa
		15415pa	17715pa	17750as	17795pa
0400-0500 vl	Australia, VL8A Alice Spg	2310do			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500	Bulgaria, Radio	7480na	9700na		
0400-0500 vl	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFCX Montreal	6005do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, R Canada Intl	6150me	9505me	9645me	
0400-0500	China, China Radio Intl	9730na			
0400-0500	Costa Rica,RF Peace Intl	6205am	7385am		
0400-0410	Croatia, Croatian Radio	5895eu	7370eu		
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na
0400-0500	Ecuador, HCJB	9745am	21455va		
0400-0450	Germany, Deutsche Welle	6015af	6045af	6065af	7225af
		7265af	9565af		
0400-0500 twtfa	Guatemala, Radio Cultural	3300do			
0400-0415	Israel, Kol Israel	7465na	9435na	17545va	
0400-0500 vl	Italy, IRRS	7100va			
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Wings of Hope	9960va			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0400-0500	Russia,Voice of Russia WS	5905na	5920na	5930na	6030na
		7105na	7175na	7180na	7270na
		7330na			
0400-0500	S Africa, Channel Africa	5955af	9585af		
0400-0427	S Africa, Trans World R	7165af			
0400-0430	Slovakia, Adv World Radio	11600af			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0400-0500	Switzerland, Swiss R Intl	9905na			
0400-0430	Tanzania, Radio	5050af			
0400-0415	Uganda, Radio	3340do	4976do		
0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6180eu	6190af	6195eu
		7160af	9410va	9600af	11760va
		11955as	12095af	15280as	15310as
		15575va			
0400-0430	United Kingdom, BBC WS	3955eu	5975va	6180eu	6195eu
		9610af			
0400-0500	USA, KAIJ Dallas TX	5810am	9815am		
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17510as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, Voice of America	6035af	7170va	7405af	9575af
		9885af	11965va	15205va	
0400-0430	USA, Voice of America	6145af	7340af		
0400-0500	USA, WEWN Birmingham AL	5825eu	7425na		
0400-0500	USA, WHRI Noblesville IN	5760am	7315am		
0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	USA, WWCR Nashville TN	3315am	5065am	5935am	7435am
0400-0500	USA, WYFR Okeechobee FL	6065na	9985af		
0400-0445	USA, WYFR Okeechobee FL	9505na			
0400-0430	Vietnam, Voice of	7360na	9840na	12020na	
0400-0500	Zambia, Christian Voice	6065af			
0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0425-0440	Italy, RAI Intl	5990eu	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0430-0500	Australia, Radio	15510pa			
0430-0500	Australia,DefenseForces R	13525as			
0430-0500	Netherlands, Radio	5995na	6165na		
0430-0500	Swaziland, Trans World R	3200af	5055af	6070af	
0430-0500	United Kingdom, BBC WS	7150eu	15420af		
0438-0455 1st m	Denmark, R Denmark Intl	5965va	6040va	6195va	7305va
0455-0500	Nigeria, Voice of	7255af			
0459-0500	New Zealand, R NZ Intl	9570pa			

Selected Programs

Sundays

0400 USA, WWCR #1 Nashville TN: The Old Land Mark Church. R. L. Mitchell presents the Holy Way Hour from Chicago.
0400 USA, WWCR #3 Nashville TN: Morning Watch Chapel. See S 0300.
0416 Germany, Deutsche Welle (af/me): Working Together for Peace (4th). The participation of German troops with NATO forces is Bosnia is the subject of International Talking Point.
0430 UK, BBC London (am): Science in Action. See S 0230.
0430 UK, BBC London (as pac/south as): Seeing Stars (1). A discussion of astronomical observations and special events for the near future.
0430 UK, BBC London (as pac/south as): Short Story. Fifteen-minute dramas written by listeners from around the world.
0430 UK, BBC London (eu): Weekend. European magazine program co-produced by European broadcasters.
0435 UK, BBC London (af): The Art House. No information available.
0445 UK, BBC London (as pac/south as): Record News. Focus on the most interesting new releases of classical recordings.

Mondays

0400 USA, WWCR #1 Nashville TN: Scriptures for America. Peter J. Peters exposes the world's evils.
0400 USA, WWCR #3 Nashville TN: Ham Radio and More. Amateur radio and satellite news and techniques with Len Winkler.
0430 UK, BBC London (af): Network Africa. See M 0330.
0430 UK, BBC London (am): The Learning World. See S 1130.
0430 UK, BBC London (as pac): Multitrack Hit-List. The UK Top 20.
0430 UK, BBC London (eu): Europe Today. See S 1600.
0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
0430 UK, BBC London (south as): Composer of the Month. In depth looks at classical composers and their music. A different composer is featured each month.
0445 UK, BBC London (am): Health Matters. Keeps track of new developments in the world of medical science, as well as ways of keeping fit.
0445 UK, BBC London (eu): Country Style (Alternative). See S 0010.

Tuesdays

0400 USA, WWCR #1 Nashville TN: The Voice of Liberty (T-A). See M 2300.
0400 USA, WWCR #3 Nashville TN: The Hour of the Time (live) (T-A). William Cooper talk show.
0406 USA, WWCR #4: Point of View (T-A). Marlin Maddoux interviewing on current events of interest to Christians.
0430 UK, BBC London (af): Network Africa. See M 0330.
0430 UK, BBC London (am): Outlook. See M 1405.
0430 UK, BBC London (as pac): Multitrack Hit-List. See M 0430.
0430 UK, BBC London (eu): Europe Today. See S 1600.
0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
0430 UK, BBC London (south as): Multitrack Hit-List. See M 0430.
0445 UK, BBC London (eu): Health Matters (Alternative). See M 0445.
0455 UK, BBC London (am): Press Review. A look at what the papers say.

Wednesdays

0430 UK, BBC London (af): Network Africa. See M 0330.
0430 UK, BBC London (am): Outlook. See M 1405.
0430 UK, BBC London (eu): Europe Today. See S 1600.
0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
0445 UK, BBC London (as pac/south as): Artyfacts (8th,15th). See M 1230.
0455 UK, BBC London (am): Press Review. See T 0455.

Thursdays

0430 UK, BBC London (af): Network Africa. See M 0330.
0430 UK, BBC London (am): Outlook. See M 1405.
0430 UK, BBC London (as pac/south as): Multitrack X-Press. See W 1615.
0430 UK, BBC London (eu): Europe Today. See S 1600.
0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
0445 UK, BBC London (eu): From Our Own Correspondent (Alternative). See S 0330.
0454 Radio Netherlands: Documentary. Buddy, can you spare a home? (30th). See F 1454.
0454 Radio Netherlands: Documentary. Living by the Water (18th,25th). See W 1154.
0454 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (2nd,9th). See A 2354.
0455 UK, BBC London (am): Press Review. See T 0455.

Fridays

0430 UK, BBC London (af): Network Africa. See M 0330.
0430 UK, BBC London (am): Outlook. See M 1405.
0430 UK, BBC London (as pac/south as): Focus on Faith. See F 0330.
0430 UK, BBC London (eu): Europe Today. See S 1600.
0430 UK, BBC London (am/eu): Off the Shelf (Alternative). See M 0330.
0445 UK, BBC London (eu): Folk Routes (Alternative). See S 0030.

Saturdays

0430 UK, BBC London (am): Outlook. See M 1405.
0430 UK, BBC London (as pac/eu/south as): Jazz Now and Then. See S 1230.
0431 UK, BBC London (af): African Quiz (1). See A 0331.
0431 UK, BBC London (af): This Week and Africa. See A 0331.
0445 UK, BBC London (as pac/eu/south as): Seven Days. See A 0010.
0455 UK, BBC London (am): Press Review. See T 0455.

Frequencies

0500-0600	Australia, Radio	11880pa	13605as	15240pa	15245as
		15365pa	15415as	17715pa	17795pa
0500-0600 vl	Australia, VL8A Alice Spg	2310do			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500 0600	Australia,DefenseForces R	13525as			
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500 0600	Canada, CFVP Calgary	6030do			
0500 0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0600	China, China Radio Intl	9560na			
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca	
0500-0600	Costa Rica,RF Peace Intl	6205am	7385am		
0500-0510	Croatia, Croatian Radio	5895eu	7370eu		
0500-0600	Cuba, Radio Havana	9505na	9830na		
0500-0600	Ecuador, HCJB	9745am	21455va		
0500 0550	Germany, Deutsche Welle	5960na	6045na	6120na	6185na
0500 0600 vl	Italy, IRRS	3985va			
0500 0530 vl	Italy, IRRS	7125va			
0500-0600	Japan, NHK/Radio	5975eu	6110na	6150eu	9605na
		11725as	11740as	11885na	17810as
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0500-0600	Lebanon, Wings of Hope	9960va			
0500-0525	Netherlands, Radio	5995na	6165na		
0500-0600	New Zealand, R NZ Intl	9570pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4990do		
0500-0600	Nigeria, Voice of	7255af			
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia, Adv World Radio	9895me			
0500-0600	Russia,Voice of Russia WS	5905na	5920na	5930na	7175na
		7270na	7330na	9825na	12025na
0500-0600	S Africa, Channel Africa	7185af	11900af		
0500-0600	Slovakia, Adv World Radio	7215eu			
0500-0600	Spain, R Exterior Espana	9530na	9540na		
0500-0530	Swaziland, Trans World R	6070af			
0500-0600	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6180eu	6190af	6195eu
		7150eu	7160af	9410va	9600af
		9640va	9740as	11760va	11955as
		15280as	15310as	15360va	15420af
	15575va	17640af	17885af		
0500-0600	USA, KAIJ Dallas TX	5810am	9815am		
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, Voice of America	6035af	7170va	7295af	9775af
		9885af	11965va	15205va	
0500-0600	USA, WEWN Birmingham AL	5825eu	7425na		
0500-0600	USA, WHRI Noblesville IN	5760am	7315am		
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WWCR Nashville TN	3315am	5065am	5935am	
0500-0600	USA, WYFR Okeechobee FL	5985na	11580af		
0500-0530	Vatican State, Vatican R	7360af	9660af	11625af	
0500-0520	Vatican State, Vatican R	4005va	5880eu		
0500-0530	Vietnam, Voice of	7360na	9840na	12030na	
0500-0600	Zambia, Christian Voice	6065af			
0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0505-0600	Swaziland, Trans World R	3200af	5055af	9500af	
0515-0530	Switzerland, Swiss R Intl	6165eu	7410eu		
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0600	Austria, R Austria Intl	6015na			
0530-0600	Georgia, Georgian Radio	11910eu			
0530-0600	Kazakhstan, Radio Almaty	5985eu	6060eu	6075eu	7115eu
		7235eu	7280eu	9560eu	9690eu
		9705eu			
0530-0600	Romania, R Romania Intl	11940af	15250af	15365af	17745af
		17790af			
0530-0600	Slovakia, Adv World Radio	11600eu			
0530-0600	Swaziland, Trans World R	6070af			
0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			
0538-0555 1st m	Denmark, R Denmark Intl	5965va	7180va		
0555-0600	Malaysia, Voice of	6175as	9750as	15295au	

Selected Programs

Sundays

0500 USA, WWCR #1 Nashville TN: These Last Days. Apparitions and prophecies of the Lady of the Roses.
0500 USA, WWCR #3 Nashville TN: Tempered Steel. Dale Early plays heavy metal.
0530 UK, BBC London (am): Play of the Week. A different radio drama program each week.
0530 UK, BBC London (as pac/south as): Anything Goes. A variety of music and much more with Bob Holness.
0530 UK, BBC London (eu): In Praise of God, See S 0230.
0530 USA, WWCR #1 Nashville TN: The Lutheran Reformation Hour. Richard Shekner preaches from Chicago Heights, Illinois.
0535 UK, BBC London (af): Postmark Africa. See S 0335.

Mondays

0500 USA, WWCR #1 Nashville TN: Rock the Universe. Rich Adcock's selections of rock recordings includes some rare treats.
0500 USA, WWCR #3 Nashville TN: Bible Gems. Jim Kristoff evangelizes from Indiana.
0515 USA, WWCR #3 Nashville TN: The Old Time Religion Hour. Brother Hogan will send you a Bible.
0518 Germany, Deutsche Welle (am): Living in Germany. Warnemunde (Jun 1). See H 1643.
0530 UK, BBC London (af): Network Africa. See M 0330.
0530 UK, BBC London (as pac): Omnibus. Each week a half-hour programme on practically any topic under the sun.
0530 UK, BBC London (eu): Composer of the Month (Alternative). See M 0430.
0530 UK, BBC London (eu): Europe Today. See S 1600.
0530 UK, BBC London (south as): Blues World. Tony Russell returns with a new series about the blues.
0530 USA, WWCR #3 Nashville TN: The Hour of Courage. Ron Wilson talks politics and the precious metals market.

Tuesdays

0500 USA, WWCR #3 Nashville TN: Herald of Truth (T-A). Bible-based solutions to personal and national problems.
0503 USA, WWCR #1 Nashville TN: The Dave Hinkson Show (T-A). Ozone and silver water, patriot radio, plus listener phone calls to the Freedom Radio Network.
0515 USA, WWCR #3 Nashville TN: The Old Time Religion Hour (T-F). See M 0515.
0530 UK, BBC London (af): Network Africa. See M 0330.
0530 UK, BBC London (am/as pac/south as): Omnibus. See M 0530.
0530 UK, BBC London (eu): Europe Today. See S 1600.
0530 UK, BBC London (eu): Let's Go (7th). Geoff Barker of Roll Over Beethoven fame presents a look at the latest rock music as well as some great hits of the past.
0530 UK, BBC London (eu): Variable Music Feature (Alternative). See S 1401.
0530 USA, WWCR #3 Nashville TN: The Hour of Courage (T-F). See M 0530.
0545 UK, BBC London (eu): The Learning World (Alternative). See S 1130.

Wednesdays

0530 UK, BBC London (af): Network Africa. See M 0330.
0530 UK, BBC London (am): Composer of the Month. See M 0430.
0530 UK, BBC London (as pac): Variable Comedy/Quiz Feature. See M 0330.
0530 UK, BBC London (as pac/south as): In Good Voice (1st,8th). Maddy Prior, one of Britain's top traditional vocalists, features some of her favorite recordings of unaccompanied (a cappella) singing.
0530 UK, BBC London (eu): Omnibus. See M 0530.
0530 UK, BBC London (south as): Variable Comedy/Quiz Feature. See M 0330.

Thursdays

0530 UK, BBC London (af): Network Africa. See M 0330.
0530 UK, BBC London (am): Assignment. See H 0230.
0530 UK, BBC London (as pac/south as): Variable Feature. See S 1130.
0530 UK, BBC London (eu): Assignment (Alternative). See H 0230.
0530 UK, BBC London (eu): Europe Today. See S 1600.

Fridays

530 UK, BBC London (af): Network Africa. See M 0330.
0530 UK, BBC London (am): Focus on Faith. See F 0330.
0530 UK, BBC London (as pac/south as): Network UK. See H 1430.
0530 UK, BBC London (eu): Europe Today. See S 1600.
0530 UK, BBC London (eu): Record News (Alternative). See S 0445.
0545 UK, BBC London (eu): The Insider's Guide (Alternative). See F 0005.

Saturdays

0515 USA, WWCR #3 Nashville TN: Lyon Gold and Silver Magnet Program. Jackie Lyon hawks a variety of products for healing.
0530 UK, BBC London (am/as pac/south as): Music Review. See S 0230.
0530 UK, BBC London (eu): Science in Action. See S 0230.
0530 USA, WWCR #3 Nashville TN: Inspirations Across America. Bert Johnson.
0531 UK, BBC London (af): Talkabout Africa. See W 1615.

Hauser's Highlights

SWEDEN: R. Sweden

Z-96 in English

1130	11650, 15240 NAm
1230	13740, 15240 As/Pac
1330	11650, 15240 NAm, 9835 As/Pac
1830	1179, 6065, 9655, 11615 Eur
1930	1179, 6065 Eur
2030	1179, 6065, 9430, 9655 Eur Sat,Sun
2130	1179, 6065, 9430, 9655 Eur daily
0030	6065 LAm
0100	7120, 9435 As/Pac
0130	7290 LAm
0230	7290 NAm
0330	7155 NAm

(*MediaScan* via gh)

Frequencies

0600-0700	Australia, Radio	9860pa	11880pa	11910pa	13605as
		15240pa	15365pa	15415as	15510as
		15530as	17715as	17795pa	
0600-0700 vl	Australia, VL8A ALice Spg	2310do			
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0630	Australia,DefenseForces R	13525as			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFCX Montreal	6005do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0630	Canada, R Canada Intl	6050eu	6150eu	9740eu	9760eu
		11905eu			
0600-0700	Costa Rica,RF Peace Intl	6205am	7385am		
0600-0700	Cuba, Radio Havana	9505na			
0600-0700	Ecuador, HCJB	9745am	21455am		
0600-0650	Germany, Deutsche Welle	6100af	9565af	11765af	13790af
		15185af	17820af	21705me	
0600-0615	Ghana, Ghana Broadc Corp	3316do	4915do		
0600-0700 vl	Italy, IRRS	3985va			
0600-0700	Japan, NHK/Radio	11725as	17810as		
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Wings of Hope	9960va			
0600-0700 vl	Liberia, Radio ELBC	7275do			
0600-0700	Liberia, Radio ELWA	4760do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au	
0600-0700	New Zealand, R NZ Intl	9570pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4990do		
0600-0700	Nigeria, Voice of	7255af			
0600-0700	North Korea, R Pyongyang	15180as	15230as		
0600-0630 s	Norway, Radio Norway Intl	7180au			
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0700	Russia,Voice of Russia WS	5905na	5920na	7175na	7270na
		7330na	7345na	9825na	12025na
		17570na			
0600-0700	S Africa, Trans World R	11730af			
0600-0630	Slovakia, Adv World Radio	13715af			
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0630	Switzerland, Swiss R Intl	9885af	12070af	13635af	
0600-0700	United Kingdom, BBC WS	3955eu	5975va	6005af	6175va
		6195eu	7145pa	7160af	9410va
		9600af	9640va	9740as	11760va
		11780eu	11940af	11955as	12095va
		15070va	15280as	15310as	15360va
	15420af	15575va	17640af	17790as	
	17885af				
0600-0700	USA, KAIJ Dallas TX	5810am	9815am		
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, Voice of America	6035af	6140va	7170va	7285af
		11805va	11950af	11965va	12080af
		15205va			
0600-0630	USA, Voice of America	9435af			
0600-0700	USA, WHRI Noblesville IN	5760am	7315am		
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WWCR Nashville TN	3315am	5065am	5935am	
0600-0700	USA, WYFR Okeechobee FL	5985eu	7355eu	9985af	
0600-0645 mtwhf	Vatican State, Vatican R	4005va	5880va	7250eu	9645eu
0600-0700	Yemen, Yemeni Rep Radio	9780as			
0600-0700	Zambia, Christian Voice	6065af			
0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0603-0610 mtwhf	Croatia, Croatian Radio	5920eu	7370eu	9830eu	13830eu
0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
		11730af			
0615-0630	Switzerland, Swiss R Intl	6165eu	7410eu		
0630-0700	Austria, R Austria Intl	6015na			
0630-0700	Belgium, R Vlaanderen Int	5985eu	9925va		
0630-0700	Vatican State, Vatican R	9660af			
0638-0655 1st m	Denmark, R Denmark Intl	5965va	7180va	9590va	11735va
0645-0655 a	Monaco, Trans World Radio	7115eu			
0645-0655 s	Monaco, Trans World Radio	7115eu			
0645-0700	Romania, R Romania Intl	15250pa	15405pa	17720pa	17805pa
0655-0655 mtwhf	Monaco, Trans World Radio	7115eu			

Selected Programs

Sundays

0600 UK, BBC London (am): Play of the Week (from 0530). See S 0530.
0600 USA, WWCR #3 Nashville TN: Prophecy Flash. William Dankenbring preaches about the second coming.
0605 USA, WWCR #1 Nashville TN: The Golden Age of Radio Theater. Relive the golden moments of radio's yesteryear.
0615 UK, BBC London (af): Development '96. Aid and development issues.
0615 UK, BBC London (as pac/south as): Letter from America. See S 0030.
0615 UK, BBC London (eu): Development '96. See S 0615.
0616 Germany, Deutsche Welle (af): Working Together for Peace (4th). See S 0416.
0630 UK, BBC London (am/eu): Jazz for the Asking. Record requests with Malcolm Laylock.
0630 UK, BBC London (as pac): Meridian. Three topical programmes weekly about the world of the arts.
0630 UK, BBC London (south as): Meridian. See S 0630.
0630 USA, WWCR #3 Nashville TN: Music City Discovery. Listen to the latest singers to hit Nashville.
0631 UK, BBC London (af): African Perspective. A considered view of life and issues facing the African continent.

Mondays

0600 USA, WWCR #1 Nashville TN: The Old Record Shop. Thirty minutes of selections of music from the days of the 78 rpm record. Recommended.
0606 USA, WWCR #3 Nashville TN: Freedom Calls. Bo Grites hosts this talk radio program.
0615 UK, BBC London (af): Sports Roundup. See S 0135.
0615 UK, BBC London (am): Fine Tuning (6th,13th). See S 1401.
0615 UK, BBC London (as pac): The World Today. Examines thoroughly a topical aspect of the international scene.
0615 UK, BBC London (eu): Soundbyte (6th). Quentin Cooper presents the magazine program that brings the listener the latest stories and developments in the world of computers and digital communications.
0615 UK, BBC London (south as): The Learning World. See S 1130.
0630 UK, BBC London (as pac): Meridian. See S 0630.
0630 UK, BBC London (eu): Andy Kershaw's World of Music. See S 1230.
0630 UK, BBC London (south as): Jazz for the Asking. See S 0630.
0630 USA, WWCR #1 Nashville TN: Ken's Country Classix. Key Berryhill with country music from a bygone era.
0645 UK, BBC London (am): Mastersingers (6th,13th). See S 1430.

Tuesdays

0600 USA, WWCR #1 Nashville TN: The Dave Hinkson Show (T-A). See T 0503.
0606 USA, WWCR #3 Nashville TN: Freedom Calls (T-F). See M 0606.
0615 UK, BBC London (af): Sports Roundup. See S 0135.
0615 UK, BBC London (am): The Greenfield Collection. See M 1515.
0615 UK, BBC London (as pac/eu/south as): The World Today. See M 0615.
0630 UK, BBC London (af): Network Africa. See M 0330.
0630 UK, BBC London (as pac/south as): Meridian. See S 0630.
0630 UK, BBC London (eu): Anything Goes. See S 0530.

Wednesdays

0615 UK, BBC London (af): Sports Roundup. See S 0135.
0615 UK, BBC London (am): John Peel. See M 1330.
0615 UK, BBC London (as pac/eu/south as): The World Today. See M 0615.
0630 UK, BBC London (af): Network Africa. See M 0330.
0630 UK, BBC London (as pac/south as): On Screen. See T 1401.
0630 UK, BBC London (eu): Megamix. See M 1615.
0645 UK, BBC London (am): Development '96. See S 0615.

Thursdays

0615 UK, BBC London (af): Sports Roundup. See S 0135.
0615 UK, BBC London (am): Jazz Now and Then. See S 1230.
0615 UK, BBC London (as pac/eu/south as): The World Today. See M 0615.
0630 UK, BBC London (am): Sports International. Live commentaries and interviews, features and discussions.
0630 UK, BBC London (as pac/south as): 30-Minute Drama. See W 1130.
0630 UK, BBC London (eu): Sports International. See H 0630.

Fridays

0615 UK, BBC London (af): Sports Roundup. See S 0135.
0615 UK, BBC London (am): Seeing Stars (1). See S 0430.
0615 UK, BBC London (am): Short Story. See S 0430.
0615 UK, BBC London (as pac/eu/south as): The World Today. See M 0615.
0630 UK, BBC London (am): Variable Feature. See S 1130.
0630 UK, BBC London (as pac/south as): Jazz Score (3rd,10th). See T 1230.
0630 UK, BBC London (eu): Blues World. See M 0530.
0645 UK, BBC London (am): Artyfacts (10th,17th). See M 1230.
0645 UK, BBC London (am): Variable Feature. See S 1130.

Saturdays

0600 USA, WWCR #3 Nashville TN: Inspirations Across America (from 0530). See A 0530.
0615 UK, BBC London (af/as pac/eu/south as): The World Today. See M 0615.
0615 UK, BBC London (am): From the Weeklies. See A 0030.
0630 UK, BBC London (am): Multitrack Alternative. See F 1330.
0630 UK, BBC London (as pac/south as): Meridian. See S 0630.
0630 UK, BBC London (eu): Fourth Estate. See S 0330.
0630 USA, WWCR #3 Nashville TN: Words of Hope. See S 1100.
0631 UK, BBC London (af): African Quiz (1). See A 0331.
0631 UK, BBC London (af): This Week and Africa. See A 0331.
0645 UK, BBC London (eu): Global Concerns. See M 1230.
0645 USA, WWCR #3 Nashville TN: What Sayeth the Scriptures. Victor McGee teaches.

FREQUENCIES

0700-0800	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15415as	15530as
		17715pa			
0700-0730	Australia, Radio	11880as	13605as	15245as	15365as
0700-0800 vl	Australia, VL8A Alice Spg	4835do			
0700-0800 vl	Australia, VL8K KAtherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	6205am	7385am		
0700-0727	Czech Rep, Radio Prague	5930eu	7345eu		
0700-0800	Ecuador, HCJB	5900pa	6050eu		
0700-0800 as	Eqt Guinea, R East Africa	15190af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15190af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0730 vl	Italy, IRRS	3985va			
0700-0800	Japan, NHK/Radio	5975eu	7230eu	11725as	11740as
		11850pa	15165me	17810va	17815af
		21610as			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Wings of Hope	9960va			
0700-0800 vl	Liberia, Radio ELBC	7275do			
0700-0800	Liberia, Radio ELWA	4760do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	9750as	15295au		
0700-0710	Malaysia, Voice of	6175as			
0700-0800	Monaco, Trans World Radio	7115eu			
0700-0715	New Zealand, R NZ Intl	9570pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0800	Russia,Voice of Russia WS	9685as	12005va	12025va	15160va
		17860va			
0700-0710	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	3955eu	5975va	6175va	6190af
		6195eu	7145va	7325eu	9410eu
		9600af	9640va	9740as	11760as
		11940af	11955as	12095va	15070va
		15280as	15310as	15360va	15400va
	15575me	17640va	17790as	17830af	
	17885af				
0700-0730	United Kingdom, BBC WS	6180eu	11780eu	11860af	
0700-0715	United Kingdom, BBC WS	6005af	7160af	11860af	
0700-0800	USA, KAIJ Dallas TX	5810am	9815am		
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KWHR Naalehu HI	9930as			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	7425na		
0700-0800	USA, WHRI Noblesville IN	5760am	7315am		
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	3315am	5065am	5935am	
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985af		
0700-0800	USA, WYFR Okeechobee FL	13695na			
0700-0800	Zambia, Christian Voice	6065af			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0703-0710 as	Croatia, Croatian Radio	5950eu	7370eu	9830eu	13830eu
0705-0800	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0710-0800 vl	Papua New Guinea, NBC	4890do			
0716-0800	New Zealand, R NZ Intl	6100pa			
0730-0800	Austria, R Austria Intl	6155eu	13730eu	15410me	17870me
0730-0800	Georgia, Georgian Radio	11910eu			
0730-0745 s	Greece, Voice of	9375eu	9425eu	11645au	
0730-0800 vl	Italy, IRRS	7125va			
0730-0800	Netherlands, Radio	9720au	11895pa		
0738-0755 1st m	Denmark, R Denmark Intl	5965va	7180va	9590va	
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	9375eu	9425eu	11645au	
0755-0800	Guam, AWR/KTWR	15200as			

0800 UTC

0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15530as	17715pa
		21725as			
0800-0900 vl	Australia, VL8A Alice Spg	2310do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0900 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Australia,DefenseForces R	15607af	18194af		
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	China, China Radio Intl	11755pa	15440pa	17690pa	
0800-0900	Costa Rica,RF Peace Intl	6205am	7385am		
0800-0830	Ecuador, HCJB	6050eu			
0800-0900	Ecuador, HCJB	5900pa			
0800-0900 as	Eqt Guinea, R East Africa	15190af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15190af			
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	
0800-0820 mtwhf	Monaco, Trans World Radio	7115eu			
0800-0805 a	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9720au	11895pa		
0800-0900	New Zealand, R NZ Intl	6100pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 s	Norway, Radio Norway Intl	17860eu			
0800-0850	Pakistan, Radio	15470eu	15475eu	17895eu	
0800-0900	Palau, KHBN/Voice of Hope	9960as			
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	7305as	9450as	9685as	12005va
		12025va	17860va		
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670eu		
0800-0900	United Kingdom, BBC WS	6190af	6195va	9410eu	9600af
		9740as	9805va	11760as	11940af
		11955as	15070af	15280as	15310as
		15400va	15575me	17640va	17790as
		17830af	17885af		
0800-0815	United Kingdom, BBC WS	3955eu	7145va	12095eu	
0800-0900	USA, KAIJ Dallas TX	5810am	9815am		
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	9425pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	7425na		
0800-0900	USA, WHRI Noblesville IN	5760am	7315am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5065am	5935am	7435am	
0800-0900	Zambia, Christian Voice	6065af			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0803-0810	Croatia, Croatian Radio	5920eu	7370eu	9830eu	13830eu
0805-0835 mtwhf	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900	Georgia, Georgian Radio	11910me			
0830-0900	Netherlands, Radio	9720au	11895pa	13700pa	
0830-0857	Slovakia, R Slovakia Intl	11990au	17485au	21705au	
0838-0855 1st m	Denmark, R Denmark Intl	9590va	13800va		
0855-0900	Guam, TWR/KTWR	11830pa			

HAUSER'S HIGHLIGHTS

NORWAY: R. NORWAY INTERNATIONAL

Sun + UT Mon
English, Z-96 original version, until 27 Oct

0600 7180, 7295, 9590
0800 17860
1200 9590, 13800, 15305
1300 15340 NAm
1600 11840 NAm, 11860, 13805
1800 7485, 9590, 13805, 15220
2000 9590
2200 9495
0100 9560 NAm
0400 7465 NAm

(via Joe Hanlon, George Thurman, Doug Dine, Diane Mauer)

FREQUENCIES

0900-1000	Australia, Radio	5995as	7240as	9510as	9580pa
		9860pa	13605as	21725as	
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	4910do			
0900-1000	Australia,DefenseForces R	15607af	18194af		
0900-0930 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15545af	17595af	
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755pa	15440pa	17690pa	
0900-1000	Costa Rica,RF Peace Intl	6205am	7385am		
0900-1000	Ecuador, HCJB	5900pa			
0900-1000 as	Eqt Guinea, R East Africa	15190af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15190af			
0900-0950	Germany, Deutsche Welle	6160pa	7380as	11725af	15145af
		15410af	17780pa	17820as	21600af
		21680as			
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000	Guam, TWR/KTWR	11830pa			
0900-1000 vl	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	9685as	13785as	15490va
		15560va	17755as	17860va	
0900-0930	Switzerland, Swiss R Intl	9885au	11640au	13685au	
0900-1000	United Kingdom, BBC WS	6190af	6195va	9410eu	9740as
		11750as	11940af	12095eu	15070va
		15190sa	15280va	15400va	15575va
		17640va	17705eu	17830va	17885af
0900-0915	United Kingdom, BBC WS	6065as	7180as	9580as	11760as
		11955as	15310as	15360as	17790as
0900-1000	USA, KAIJ Dallas TX	5810am	9815am		
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13615pa
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na		
0900-1000	USA, WHRI Noblesville IN	5760am	7315am		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000	USA, WWCR Nashville TN	5065am	5935am	7435am	
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
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 mtwhfa	Austria, R Austria Intl	6155eu	13730eu	17870au	
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Netherlands, Radio	7260pa	9720au	9810pa	11895pa
		13700pa			
0930-1000	Philippines, FEBC/R Intl	11635as			
0938-0955 1st m	Denmark, R Denmark Intl	15175va	15230va		

1000 UTC

1000-1100	Australia, Radio	5995as	7240as	9510as	9580pa
		9860pa	13605as	15170as	21725as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	4910do			
1000-1100	Australia,DefenseForces R	13525as			
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755pa	15440pa		
1000-1100	Costa Rica,RF Peace Intl	6205am	7385am		
1000-1030	Czech Rep, Radio Prague	15640as	17845af		
1000-1100	Ecuador, HCJB	5900pa			
1000-1100 as	Eqt Guinea, R East Africa	15190af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15190af			
1000-1100	Guam, AWR/KSDA	9370as			
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	13785as	15490va	15560va
		17755va	17860va		
1000-1100	Singapore, SBC Radio One	6155do			
1000-1100	United Kingdom, BBC WS	6190af	6195va	9410eu	9740as
		11750as	11760as	11940af	12095eu
		15070va	15190sa	15280va	15310as
		15400af	15575va	17640va	17705va
		17790as	17830va	17885af	
1000-1100	USA, KAIJ Dallas TX	5810am	9815am		
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13840as
1000-1100	USA, Voice of America	5985va	6165am	7405am	9590am
		11720va	15425va		
1000-1100	USA, WEWN Birmingham AL	7425na	15665eu		
1000-1100	USA, WHRI Noblesville IN	6040am	6185am		
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5065am	5935am	9475am	15685am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	7360na	9840as	12020as	15010as
1000-1100	Zambia, Christian Voice	6065af			
1030-1100	Austria, R Austria Intl	15450as	17870au		
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100	Guam, AWR/KSDA	9530as			
1030-1030	Switzerland, Swiss R Intl	6165eu	9535eu		
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1038-1055 1st m	Denmark, R Denmark Intl	7295eu	11830eu		

HAUSER'S HIGHLIGHTS
MEXICO: XERMX

9705 and/or 5985
Eng/Span programs until June

1400-1430	M-F	Antenna Radio Summary (news)
1900-1930	M-F	"
0300-0330	T-A	"
1500-1530	Mon	*Poetic Space*
	Tue	*Mail Bag*
	Wed	*Tour Through Mexico*
	Thu	*Creators of Mexican Art*
	Fri	*Tour Through Mexico*
	Sat	Org of American States
	Sun	*Creators of Mexican Art*
2000-2030	Mon	*Tour Through Mexico*
	Tue	*Creators of Mexican Art*
	Wed	*Tour Through Mexico*
	Thu	*Mail Bag*
	Fri	*Poetic Space*
	Sat	*Creators of Mexican Art*
	Sun	Org of American States
0400-0430	Mon	*Mail Bag*
	Tue	*Poetic Space*
	Wed	*Mail Bag*
	Thu	*Tour Through Mexico*
	Fri	*Creators of Mexican Art*
	Sat	*Tour Through Mexico*
	Sun	Org of American States
1400-1430	Sat	*Poetic Space*
	Sun	*Mail Bag*
1900-1930	Sat	*Tour Through Mexico*
	Sun	*Poetic Space*
0300-0330	Sun	*Poetic Space*

(via George J. Poppin)

Frequencies

1100-1200	Australia, Radio	5995as	7240as	9510pa	9580pa
		9615as	9860pa	13605as	15170as
		15530as	15565as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	4910do			
1100-1200	Australia,DefenseForces R	13525as			
1100-1200	Canada, CFCX Montreal	6005do			
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica, Adv World R	5030am	7375am	9725am	13750am
1100-1200	Costa Rica,RF Peace Intl	6205am	7385am		
1100-1130	Ecuador, HCJB	5900pa			
1100-1200	Ecuador, HCJB	12005am	15115am		
1100-1200 as	Eqt Guinea, R East Africa	15190af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af
1100-1200	Iraq, Radio Iraq Intl	13680eu			
1100-1200 vl	Italy, IRRS	7125va			
1100-1200	Japan, NHK/Radio	6090as	6120na	15350as	
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1200	New Zealand, R NZ Intl	6100pa			
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na	
1100-1115	Pakistan, Radio	15470as	17895as		
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Russia,Voice of Russia WS	4740as	9725as	9820as	12030na
		13785va	17755as	17860as	
1100-1200	Singapore, SBC Radio One	6155do			
1100-1200	Singapore,R Singapore Int	6015as			
1100-1130	Sri Lanka, Sri Lanka BC	11835as	15120as	17850au	
1100-1130	Switzerland, Swiss R Intl	9885as	11640as	13635as	
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
		9410eu	9580as	9740va	11750as
		11760as	11940af	11955as	12095eu
		15070va	15220va	15310as	15575va
		17640va	17705va	17830af	17885af
		21660af			
1100-1130	United Kingdom, BBC WS	9700au	15190sa	15400eu	17790va
1100-1200	USA, KAIJ Dallas TX	5810am			
1100-1200	USA, KAIJ Dallas TX	5810am	9815am		
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395ca	9355as	9430au
1100-1200	USA, Voice of America	5985va	6110va	6165am	7405am
		9590am	9645va	9760va	11720va
		15160va	15425va		
1100-1200	USA, WHRI Noblesville IN	6040am	6185am		
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1100-1200	USA, WYFR Okeechobee FL	5950na	11830na		
1100-1200	Zambia, Christian Voice	6065af			
1120-1130	Vatican State, Vatican R	5880va	11740eu	15570af	17550af
1130-1200	Austria, R Austria Intl	13730na			
1130-1200	Bulgaria, Radio	9810as	11605as		
1130-1200 vl	China, China Radio Intl	8660as	11445as	11700as	
1130-1200	Finland, YLE/R Finland	11900na	15400na		
1130-1200	Iran, VOIRI	11745as	11790as	11875me	11930me
		15260af	17750me		
1130-1200 a	Monaco, Trans World Radio	7115eu			
1130-1155 s	Monaco, Trans World Radio	7115eu			
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	7190eu		
1130-1200	Russia,Voice of Russia WS	9755as	9875as		
1130-1200	South Korea, R Korea Intl	9650eu			
1138-1155 1st m	Denmark, R Denmark Intl	7295va	15270va		

Selected Programs

Sundays

1100 USA, WWCR #1 Nashville TN: Words of Hope. Eugene Brown preaches from Nashville, Tennessee.
1100 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live daily). Brother R. G. Stair preaches about the last days.
1115 USA, WWCR #1 Nashville TN: First Hand. Rick Livingood with a world evangelism update.
1130 UK, BBC London (af/as pac): Play of the Week. See S 0530.
1130 UK, BBC London (am/eu): Variable Feature. Special features and new series.
1130 UK, BBC London (south as): The Learning World. News and views about worldwide education.
1130 USA, WWCR #1 Nashville TN: Staff of Life. Irene Armstrong.
1145 UK, BBC London (south as): Good Books. Recommendation of a book to read.
1145 USA, WWCR #1 Nashville TN: Back to the Bible Baptist Church. Floyd Hendren preaches.

Mondays

1100 USA, WWCR #1 Nashville TN: The Hour of Courage (M-F). See M 0530.
1105 UK, BBC London (am): Caribbean Report (Alternative). Weekday coverage of current affairs in the Caribbean region with emphasis on political and economic analysis.
1130 UK, BBC London (af/as pac): Meridian. See S 0630.
1130 UK, BBC London (am/south as): Jazz Score (6th). See T 1230.
1130 UK, BBC London (eu): Omnibus. See M 0530.
1130 USA, WWCR #1 Nashville TN: World of Radio. See S 0030.
1145 UK, BBC London (south as): BBC English. See S 1515.

Tuesdays

1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
1130 UK, BBC London (af): Meridian. See S 0630.
1130 UK, BBC London (am): Jazz Now and Then. See S 1230.
1130 UK, BBC London (as pac/eu): Meridian. See S 0630.
1130 USA, WWCR #1 Nashville TN: Unshackled. Pacific Garden Mission's radio drama.
1145 UK, BBC London (am): Let's Go (7th). See T 0530.
1145 UK, BBC London (south as): BBC English. See S 1515.

Wednesdays

1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
1130 UK, BBC London (af/am/as pac/eu): 30-Minute Drama. Variable drama programs.
1130 UK, BBC London (south as): BBC English. See S 1515.
1130 USA, WWCR #1 Nashville TN: Afterglow. Don Johnson plays beautiful sacred music.
1154 Radio Netherlands: Documentary. Buddy, can you spare a home? (29th). See F 1454.
1154 Radio Netherlands: Documentary. Microchips Yes. Potato Chips No (1st,8th). See A 2354.

Thursdays

1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
1130 UK, BBC London (af/eu): On Screen. See T 1401.
1130 UK, BBC London (am): From Our Own Correspondent. See S 0330.
1130 UK, BBC London (as pac): Artyfacts (9th,16th). See M 1230.
1130 UK, BBC London (as pac): Meridian. See S 0630.
1130 USA, WWCR #1 Nashville TN: Ken's Country Classix. See M 0630.
1145 UK, BBC London (am): The Learning World. See S 1130.
1145 UK, BBC London (south as): BBC English. See S 1515.

Fridays

1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
1130 UK, BBC London (af/eu): Meridian. See S 0630.
1130 UK, BBC London (am): Focus on Faith. See F 0330.
1130 UK, BBC London (as pac): Music Review. See S 0230.
1130 UK, BBC London (south as): BBC English. See S 1515.
1130 USA, WWCR #1 Nashville TN: The Old Record Shop. See M 0600.

Saturdays

1105 USA, WWCR #1 Nashville TN: Word of Wisdom. Howard Kirkwood.
1110 USA, WWCR #1 Nashville TN: The View from Europe. Harvey Thomas presents the European point of view on current events.
1115 USA, WWCR #1 Nashville TN: Rhema Radio Church. Kenneth Hagin, Jr. preaches from Tulsa, Oklahoma.
1130 UK, BBC London (af): Focus on Faith. See F 0330.
1130 UK, BBC London (am): People and Politics. See S 0130.
1130 UK, BBC London (as pac/eu/south as): Meridian. See S 0630.
1145 USA, WWCR #1 Nashville TN: Brother Ed. Ed Skultety evangelizes from Oregon.

Hauser's Highlights
NEW ZEALAND: RNZI

Island Dedication Programmes

Cook Islands	0405 Mon
Samoa	0815 Mon & Wed
Tonga	0405 Tue
Vanuatu	1915 Tue Monthly
Kiribati	0915 Tue Monthly
French Pacific	0915 Tue Monthly
Solomons	0405 Thu Fortnight
Niue	0405 Fri
Tokelau	0430 Fri Monthly
Pitcairn & Norfolk	0430 Fri Monthly
Fiji	0915 Fri

National Radio Feature Programmes

Faith and Works	1130 Mon
Checkpoint	0500 Mon to Fri
Ears	0630 Mon to Fri
Late Edition	1015 Mon to Fri
Whenuai (Of the Land)	1600 Sat
Saturday Night	0602 Sat
Sounds Historical	0702 Sun

FREQUENCIES

1200-1300	Australia, Radio	5995pa	6060pa	6080pa	7260as
	9560as	9580pa	9615as	11800pa	15565as
1200-1300	Brazil, Radio Bras	15445na			
1200-1230	Bulgaria, Radio	9810as	11605as		
1200-1215	Cambodia, Natl Voice of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFCX Montreal	6005do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1300	China, China Radio Intl	7385na	7410as	9715as	11660as
		11795pa			
1200-1230 vl	China, China Radio Intl	8660as	11445as	11700as	12110as
1200-1300	Costa Rica, Adv World R	5030am	7375am	9725am	13750am
1200-1300	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1200-1300	Ecuador, HCJB	12005am	15115am		
1200-1300 as	Eqt Guinea, R East Africa	15190af			
1200-1300	Eqt Guinea, Radio Africa	9530as			
1200-1300	France, Radio France Intl	9805eu	11615na	13625na	15155eu
		15195eu	15325af	15530na	17575ca
1200-1230	Iran, VOIRI	11745as	11790as	11875me	11930me
		15260af	17750me		
1200-1300	Iraq, Radio Iraq Intl	13680eu			
1200-1300 vl	Italy, IRRS	7125va			
1200-1300	Jordan, Radio	11940va	11970va		
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1250	Myanmar, Voice of	5990do			
1200-1300	Netherlands, Radio	6045eu	7190eu		
1200-1206	New Zealand, R NZ Intl	6100pa			
1200-1230 s	Norway, Radio Norway Intl	9590eu	13800eu	15305eu	
1200-1300 vl	Palau, KHBN/Voice of Hope	9965as			
1200-1255	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu
		11815eu			
1200-1300	Russia,Voice of Russia WS	4740va	4975va	12030na	15470va
		17880as			
1200-1300	Singapore, SBC Radio One	6155do			
1200-1300	Singapore,R Singapore Int	6015as			
1200-1300	South Korea, R Korea Intl	7285as			
1200-1300	Switzerland, Swiss R Intl	6165eu	9535eu		
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
	9410eu 9580as	9740va	11750as	11760as	11940af
	11955as 12095eu	15070va	15220va	15310as	15575va
	17640va 17705va	17830af	17885af	21660af	
1200-1300	USA, KAIJ Dallas TX	5810am	9815am		
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9430au	9455sa
1200-1300	USA, Voice of America	6110va	9645va	9760va	11715va
		15160va	15425va		
1200-1300	USA, WEWN Birmingham AL	7425na	15665eu		
1200-1300	USA, WHRI Noblesville IN	6040am	6185am		
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300 s	USA, WRMI/R Miami Intl	9955am			
1200-1300	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1200-1300	USA, WYFR Okeechobee FL	5950na	11830na	17750eu	
1200-1245	USA, WYFR Okeechobee FL	6015eu			
1200-1230	Uzbekistan, R Tashkent	5060as	5975as	6025as	9715as
1200-1300	Zambia, Christian Voice	6065af			
1207-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1215-1300	Egypt, Radio Cairo	17595as			
1230-1300	Bangladesh, Radio	7185as	9648as		
1230-1255 s	Belgium, R Vlaanderen Int	13605na	15540na		
1230-1300	Canada, R Canada Intl	6150as	11730as		
1230-1300 mtwhf	Finland, YLE/R Finland	11900na	15400na		
1230-1300 w	Indonesia, RRI Sorong	4875do			
1230-1300	Serbia, Radio Yugoslavia	11835au			
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670au	
1230-1300	Sweden, Radio	9835as	13740pa	15240pa	
1230-1300	Turkey, Voice of	9445eu	9630as	9675as	
1230-1300	Vietnam, Voice of	7360as	9840as	12030as	
1238-1255 1st m	Denmark, R Denmark Intl	9590va	9795va	11840va	15605va
1240-1250	Greece, Voice of	15630af			

SELECTED PROGRAMS

Sundays

1200 UK, BBC London (af): Play of the Week (from 1130). See S 0530.
1200 UK, BBC London (as pac): Play of the Week (from 1130). See S 0530.
1200 USA, WWCR #1 Nashville TN: Voice of Hope. Oliver Fenison.
1200 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live daily). See S 1100.
1205 UK, BBC London (am/eu/south as): World Business Brief. Focus on the market week.
1215 UK, BBC London (am): Anything Goes. See S 0530.
1215 UK, BBC London (eu): Britain Today. See S 0045.
1215 UK, BBC London (south as): A Jolly Good Show. Dave Lee Travis presents your record requests and dedications.
1230 UK, BBC London (af): Jazz Now and Then. Sarah Ward presents a mixture of jazz for all ages.
1230 UK, BBC London (as pac): Andy Kershaw's World of Music. Recordings of diverse music from around the world.
1230 UK, BBC London (eu): Anything Goes. See S 0530.
1230 USA, WWCR #1 Nashville TN: Words of Hope. See S 1100.
1245 UK, BBC London (af/am): Sports Roundup. See S 0135.
1245 USA, WWCR #1 Nashville TN: Church of the Lord Jesus Christ. Shelton Rapha preaches.

Mondays

1200 USA, WWCR #1 Nashville TN: New Harvest International. Dennis Dentz.
1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. Latest from Far East, Europe and the USA.
1210 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
1215 UK, BBC London (am): Variable Feature. See S 1130.
1215 USA, WWCR #1 Nashville TN: Words of Truth (M-F). Bible teaching by Jim Whitfield of Raleigh, NC.
1230 UK, BBC London (af): Global Concerns. Update on environmental issues.
1230 UK, BBC London (am): Artyfacts (6th,13th).Key concepts of the artistic world, starting with the symphony.
1230 UK, BBC London (am): Variable Feature. See S 1130.
1230 UK, BBC London (as pac): Off the Shelf. See M 0330.
1230 UK, BBC London (eu/south as): Andy Kershaw's World of Music. See S 1230.
1230 USA, WWCR #1 Nashville TN: Bread of Life Victory Hour (1). Brother Jack Meeks free bible study correspondence course.
1230 USA, WWCR #1 Nashville TN: The Hour of Grace (3/5). Gene Griffin.
1230 USA, WWCR #1 Nashville TN: Victory Baptist Church (2/4). David Robinson preaches from Hildebrand, NC.
1245 UK, BBC London (af/am/south as): Sports Roundup. See S 0135.
1245 USA, WWCR #1 Nashville TN: Walking Through the Land of Promises. Bobbie Lively evangelizes from Tennessee.

Tuesdays

1200 USA, WWCR #1 Nashville TN: The King is Coming. Steve Johnson.
1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
1210 UK, BBC London (am): Carib Report (Alt.). See M 1105.
1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
1215 UK, BBC London (am): John Peel. See M 1330.
1230 UK, BBC London (af): Folk Routes. See S 0030.
1230 UK, BBC London (as pac): Off the Shelf. See M 0330.
1230 UK, BBC London (eu): Jazz Score (7th). Benny Green visits some of Britain's top clubs with the jazz quiz in which stories and jokes earn as many points as correct answers.
1230 UK, BBC London (south as): Multitrack Hit-List. See M 0430.
1230 USA, WWCR #1 Nashville TN: World of Radio. See S 0030.
1245 UK, BBC London (af/am/south as): Sports Roundup. See S 0135.

Wednesdays

1200 USA, WWCR #1 Nashville TN: Faith & Truth. Ken Megilligan.
1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
1210 UK, BBC London (am): Carib. Report (Alt.). See M 1105.
1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
1215 UK, BBC London (am): The Vintage Chart Show. Each week a classic Top 20 from the past with Paul Burnett.
1230 UK, BBC London (af): Let's Go (1st,8th). See T 0530.
1230 UK, BBC London (as pac): Off the Shelf. See M 0330.
1230 UK, BBC London (eu): Composer of the Month. See M 0430.
1230 UK, BBC London (south as): Megamix. See M 1615.
1230 USA, WWCR #1 Nashville TN: The Chapel Hour. Otis Tillman evangelizes from Buffalo, New York.
1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.

Thursdays

1200 USA, WWCR #1 Nashville TN: Abounding Grace. Gary Jones.
1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
1210 UK, BBC London (am): Carib. Report (Alt.). See M 1105.
1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
1215 UK, BBC London (am): Assignment. See H 0230.
1230 UK, BBC London (af): From Our Own Correspondent. See S 0330.
1230 UK, BBC London (as pac): Off the Shelf. See M 0330.
1230 UK, BBC London (eu): Assignment. See H 0230.
1230 UK, BBC London (south as): Multitrack X-Press. See W 1615.
1230 USA, WWCR #1 Nashville TN: Jesus is Coming. Jim Everett evangelizes from New Jersey.
1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.

Fridays

1200 USA, WWCR #1 Nashville TN: The Voice of God. Vincent Cheung.
1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
1210 UK, BBC London (am): Carib. Report (Alt.). See M 1105.
1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
1215 UK, BBC London (am): New Ideas. See S 2330.
1230 UK, BBC London (af): The Farming World. See S 1445.
1230 UK, BBC London (as pac): Off the Shelf. See M 0330.
1230 UK, BBC London (eu): Science in Action. See S 0230.
1230 UK, BBC London (south as): Focus on Faith. See F 0330.
1230 USA, WWCR #1 Nashville TN: Battle Cry Sounding. Deborah Green evangelizes.
1235 UK, BBC London (am): The Insider's Guide. See F 0005.
1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.
1254 Radio Netherlands: Documentary. Buddy, can you spare a home? (31st). See F 1454.
1254 Radio Netherlands: Documentary. Living by the Water (19th,26th). See W 1154.
1254 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (3rd,10th). See A 2354.

Saturdays

1200 USA, WWCR #1 Nashville TN: Brother Ed (from 1145). See A 1145.
1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
1215 UK, BBC London (af/eu/south as): Britain Today. See S 0045.
1215 UK, BBC London (am): A Jolly Good Show. See S 1215.
1215 UK, BBC London (as pac): Science in Action. See S 0230.
1215 USA, WWCR #1 Nashville TN: Bible Prophecy for Today. Tom Benvenutti analyzes the news and Bible prophecy.
1230 UK, BBC London (af): Seven Days. See A 0010.
1230 UK, BBC London (eu): Variable Comedy/Quiz Feature. See M 0330.
1230 UK, BBC London (south as): Multitrack Alternative. See F 1330.
1230 USA, WWCR #1 Nashville TN: Battle Cry Sounding. See F 1230.
1245 UK, BBC London (af): The Insider's Guide. See F 0005.
1245 UK, BBC London (as pac): Letter from America. See S 0030.
1255 UK, BBC London (af): Book Choice. See S 1525.

Frequencies

1300-1400	Australia, Radio	5995pa	7240as	9560pa	9580pa
		9610as	11800pa		
1300-1330	Australia, Radio	6060pa	6080as	9510pa	
1300-1330 mtwhfa	Belgium, R Vlaanderen Int	13605na	15540as		
1300-1320	Brazil, Radio Bras	15445na			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFCX Montreal	6005do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400	Canada, R Canada Intl	9640na	11855na		
1300-1400	China, China Radio Intl	7385na	9715as	11660pa	
1300-1330	China, China Radio Intl	7410as			
1300-1400	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1300-1400	Ecuador, HCJB	12005am	15115am		
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	15190af			
1300-1400	Eqt Guinea, Radio Africa	9530as			
1300-1400	Iraq, Radio Iraq Intl	13680as			
1300-1330 vl	Italy, IRRS	7125va			
1300-1400	Lebanon, Wings of Hope	9960va			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia, RTM Kuching	7160do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1325	Netherlands, Radio	6045eu	7190eu		
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
		15430as			
1300-1330 s	Norway, Radio Norway Intl	15340na			
1300-1400 vl	Palau, KHBN/Voice of Hope	9965as			
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1400	Romania, R Romania Intl	11940eu	15390eu	17745eu	
1300-1400	Russia,Voice of Russia WS	7130as	7165as	9470va	12030na
		12065me	17880as		
1300-1400	Singapore, SBC Radio One	6155do			
1300-1400	Singapore,R Singapore Int	6015as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	11640as	13625as
1300-1330	Turkey, Voice of	9445eu	9630as		
1300-1400	United Kingdom, BBC WS	5965na	5990as	6190af	6195va
		9410eu	9515va	9590va	9740as
		11750as	11760as	11940af	12095eu
		15070va	15220am	15310as	15420af
		15575va	17640va	17705va	17830af
	17885af	21470af	21660af		
1300-1400	USA, KAIJ Dallas TX	5810am			
1300-1400	USA, KJES Mesquite NM	11715na			
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455na	13625au
1300-1400	USA, Voice of America	6110va	9645va	9760va	15160va
		15425va			
1300-1330	USA, Voice of America	11715va			
1300-1400	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1300-1400 fas	USA, WGTG McCaysville GA	9370am			
1300-1400	USA, WHRI Noblesville IN	6040am	15105am		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WRNO New Orleans LA	15420am			
1300-1400 a	USA, WVHA Greenbush ME	15745eu			
1300-1400	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1300-1400	USA, WYFR Okeechobee FL	5950na	11830na	13695na	17750eu
1300-1400	Zambia, Christian Voice	6065af			
1315-1400	Bhutan, Bhutan BC Service	5030do			
1330-1400	Austria, R Austria Intl	6155eu	13730eu		
1330-1357	Canada, R Canada Intl	6150as	9535as		
1330-1400	Guam, AWR/KSDA	9650as			
1330-1400	India, All India Radio	11620as	13750as		
1330-1400 vl	Italy, IRRS	3985va			
1330-1400	Netherlands, Radio	9895as	13700as	15150as	
1330-1400	Sweden, Radio	11650na	15240na		
1330-1355	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1330-1400	Uzbekistan, R Tashkent	5060as	5975as	6025as	9715as
1330-1400	Vietnam, Voice of	7360as	9840as	12030as	
1335-1345	Greece, Voice of	15175na	15650na		
1338-1355 1st m	Denmark, R Denmark Intl	9590va	11840va	15605va	
1345-1400	Vatican State, Vatican R	9500as	11625as	15585as	

Selected Programs

Sundays

1300 USA, WWCR #1 Nashville TN: Wings of Healing. Evelyn Wyatt directs this international broadcast from Los Angeles.
1300 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See S 1100.
1330 USA, WWCR #1 Nashville TN: Wayne Avenue Church of God. J.C. Wilber preaches from Columbus, Ohio.

Mondays

1300 UK, BBC London (af): Variable Feature (Alternative). See S 1130.
1300 USA, WWCR #1 Nashville TN: Hurricane. Ann Whitman evangelizes from West Virginia.
1300 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See S 1100.
1315 UK, BBC London (af): BBC English (Alternative). See S 1515.
1315 USA, WWCR #1 Nashville TN: It Happened Today. Gerald Davis.
1320 USA, WWCR #1 Nashville TN: Bible Pathway. Rick Hash with five minutes of Bible readings.
1325 USA, WWCR #1 Nashville TN: Life Issues. John Wilke on events affecting everyday living.
1330 UK, BBC London (af): John Peel. Tracks from newly released albums and singles from the contemporary music scene.
1330 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. Five minutes of evangelizing by Mickey Bonner.
1335 USA, WWCR #1 Nashville TN: The Bright Spot Hour. Music and meditation by Harold Sightler of Greenville, South Carolina.

Tuesdays

1300 UK, BBC London (af): BBC English (Alternative). See S 1515.
1300 USA, WWCR #1 Nashville TN: Hurricane. See M 1300.
1300 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See S 1100.
1315 USA, WWCR #1 Nashville TN: It Happened Today. See M 1315.
1320 USA, WWCR #1 Nashville TN: Bible Pathway. See M 1320.
1325 USA, WWCR #1 Nashville TN: Life Issues. See M 1325.
1330 UK, BBC London (af): Multitrack Hit-List. See M 0430.
1330 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1330.
1335 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1335.

Wednesdays

1300 UK, BBC London (af): BBC English (Alternative). See S 1515.
1300 USA, WWCR #1 Nashville TN: Hurricane. See M 1300.
1300 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See S 1100.
1315 USA, WWCR #1 Nashville TN: It Happened Today. See M 1315.
1320 USA, WWCR #1 Nashville TN: Bible Pathway. See M 1320.
1325 USA, WWCR #1 Nashville TN: Life Issues. See M 1325.
1330 UK, BBC London (af): Megamix. See M 1615.
1330 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1330.
1335 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1335.
1354 Radio Netherlands: Documentary. Buddy, can you spare a home? (29th). See F 1454.
1354 Radio Netherlands: Documentary. Living by the Water (17th,24th). See W 1154.
1354 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (1st,8th). See A 2354.

Thursdays

1300 UK, BBC London (af): Artyfacts (9th,16th). See M 1230.
1300 USA, WWCR #1 Nashville TN: Hurricane. See M 1300.
1300 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See S 1100.
1315 UK, BBC London (af): BBC English (Alternative). See S 1515.
1315 USA, WWCR #1 Nashville TN: It Happened Today. See M 1315.
1320 USA, WWCR #1 Nashville TN: Bible Pathway. See M 1320.
1325 USA, WWCR #1 Nashville TN: Life Issues. See M 1325.
1330 UK, BBC London (af): Multitrack X-Press. See W 1615.
1330 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1330.
1335 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1335.

Fridays

1300 UK, BBC London (af): BBC English (Alternative). See S 1515.
1300 USA, WWCR #1 Nashville TN: Hurricane. See M 1300.
1300 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). See S 1100.
1315 USA, WWCR #1 Nashville TN: It Happened Today. See M 1315.
1320 USA, WWCR #1 Nashville TN: Bible Pathway. See M 1320.
1325 USA, WWCR #1 Nashville TN: Life Issues. See M 1325.
1330 UK, BBC London (af): Multitrack Alternative. Latest developments on the British music scene.
1330 USA, WWCR #1 Nashville TN: The Spiritual Warfare Broadcast. See M 1330.
1335 USA, WWCR #1 Nashville TN: The Bright Spot Hour. See M 1335.

Saturdays

1300 USA, WWCR #1 Nashville TN: King Goodie Records. Kossie Gardner.
1300 USA, WWCR #3 Nashville TN: Hour of Truth. William Bonner.
1330 USA, WWCR #1 Nashville TN: Hour of Reasoning. P. Mobley preaches to his congregation in Oakland, California.

Frequencies

1400-1430	Australia, Radio	7240pa	9560as	9610pa	11695pa
1400-1500	Australia, Radio	5995pa	9580pa	9615as	11800pa
1400-1500	Australia,DefenseForces R	8743af	10623af		
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFCX Montreal	6005do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500	Canada, R Canada Intl	9640na	11855na		
1400-1500	China, China Radio Intl	7405na	9530as	9785as	
1400-1500	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1400-1430	Czech Rep, Radio Prague	13580na	17845af		
1400-1500	Ecuador, HCJB	12005am	15115am		
1400-1500 as	Eqt Guinea, R East Africa	15190af			
1400-1500	France, Radio France Intl	7110as	12030as	15405as	17560me
1400-1500	India, All India Radio	11620as	13750as		
1400-1430	Israel, Kol Israel	12077eu	15615eu		
1400-1500 vl	Italy, IRRS	3985va			
1400-1500	Japan, NHK/Radio	6090as	9535na	9695as	11705na
		11895as			
1400-1500	Lebanon, Wings of Hope	9960va			
1400-1500	Malaysia, Radio	7295do			
1400-1500 vl	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1500	Netherlands, Radio	9895as	13700as	15150as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa			
1400-1430 s	Norway, Radio Norway Intl	11840na			
1400-1500 vl	Palau, KHBN/Voice of Hope	9965as			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	4740as	4940as	4975as	7115va
		7130va	7165va	9470va	9635va
		9905as	11765va	11945as	12065me
1400-1500	Singapore, SBC Radio One	6155do			
1400-1500	United Kingdom, BBC WS	5990as	6190af	6195va	7205as
		9410eu	9590va	9740va	11750as
		11940af	12095eu	15070va	15260na
		15575va	17640va	17705va	17830af
		17840va	21470af	21660af	
1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	USA, Voice of America	6110va	7125as	7215as	9645as
		9760va	15255va	15395as	15425va
1400-1500	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1400-1500 fas	USA, WGTG McCaysville GA	9370am			
1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400-1500	USA, WYFR Okeechobee FL	5950na	11830na	17750eu	
1400-1415	Vatican State, Vatican R	9500as	11625as	15585au	
1400-1500	Zambia, Christian Voice	6065af			
1415-1425	Nepal, Radio	7165do			
1415-1500 a	USA, WVHA Greenbush ME	15745eu			
1430-1500	Australia, Radio	6060na	6080as	6090me	11660eu
		11695pa			
1430-1500	Canada, R Canada Intl	9555eu	11915eu	11935eu	15325eu
1430-1500 vl	China, China Radio Intl	8660as	9880as	11445as	15135as
1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
1430-1500 mtwhf	Portugal, R Portugal Intl	21515me			
1430-1500	Romania, R Romania Intl	11740as	11810as	15335as	
1430-1500	Russia,Voice of Russia WS	7325va	9630va		
1430-1500	Sweden, Radio	11650na	15245na		
1430-1500	United Kingdom, BBC WS	15400af			
1438-1455 1st m	Denmark, R Denmark Intl	11720va			
1440-1500	Myanmar, Voice of	5990do			
1445-1500	Mongolia, R Ulan Bator	7530as	9950as		
1458-1500 mtwhfa	Seychelles, FEBA Radio	9810as			
1458-1500 s	Seychelles, FEBA Radio	11870as			

Selected Programs

Sundays

1400 USA, WWCR #1 Nashville TN: Foursquare Gospel Tidings. J.E. Cartier presents a half-hour of gospel music and meditation.
1400 USA, WWCR #3 Nashville TN: Church of the Harvest. Clarence McClendon.
1401 UK, BBC London (af): Variable Music Feature. Different features of 15, 30, and 45 minutes length with a musical theme.
1401 UK, BBC London (am/as pac/eu/south as): Fine Tuning (5th,12th). Chris de Souza invites leading young classical musicians to play live and to talk about themselves.
1415 UK, BBC London (am): Music Review. See S 0230.
1430 UK, BBC London (am/as pac/eu/south as): Mastersingers (5th,12th). John Steane plays and talks about old recordings made by the vocalists of yesteryear that have been remastered with new fidelity.
1430 USA, WWCR #1 Nashville TN: A Temple of Jesus Christ. Cleveland Waters preaches from Philadelphia.
1445 UK, BBC London (af): Letter from America. See S 0030.
1445 UK, BBC London (am): Seeing Stars (1). See S 0430.
1445 UK, BBC London (am): Short Story. See S 0430.
1445 UK, BBC London (as pac): Write On. See S 0345.
1445 UK, BBC London (eu): Letter from America. See S 0030.
1445 UK, BBC London (south as): The Farming World. Reports on new developments from around the world.
1455 UK, BBC London (as pac): Voicebox. Experts and ordinary people take a light-hearted look at the English language.

Mondays

1400 USA, WWCR #1 Nashville TN: The Olympic Report (M-F). Bruce Jenner reports from Atlanta.
1401 UK, BBC London (af): Omnibus. See M 0530.
1402 USA, WWCR #1 Nashville TN: The Grace Hour (live) (M-F). Carl Stevens of Baltimore answers listener questions about religion.
1405 UK, BBC London (am/as pac/eu/south as): Outlook. An up-to-the-minute mix of conversation, controversy and color from around the world.
1405 USA, WWCR #3 Nashville TN: Prescription for Health (M-F). ü program about natural health foods and diet supplements.
1430 UK, BBC London (af): Off the Shelf. See M 0330.
1430 UK, BBC London (am): Omnibus. See M 0530.
1430 UK, BBC London (as pac): Discovery. In-depth look at scientific research.
1430 UK, BBC London (eu): John Peel. See M 1330.
1430 UK, BBC London (south as): Record News. See S 0445.
1445 UK, BBC London (af): The Farming World. See S 1445.
1445 UK, BBC London (south as): Development '96. See S 0615.

Tuesdays

1401 UK, BBC London (af): On Screen. Film reviews and movie news from around the world.
1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M 1405.
1430 UK, BBC London (af): Off the Shelf. See M 0330.
1430 UK, BBC London (am): Health Matters. See M 0445.
1430 UK, BBC London (as pac): Discovery. See M 1430.
1430 UK, BBC London (eu): Multitrack Hit-List. See M 0430.
1430 UK, BBC London (south as): Soundbyte (7th). See M 0615.
1445 UK, BBC London (af): The Learning World. See S 1130.
1445 UK, BBC London (am): Jazz Now and Then. See S 1230.
1445 UK, BBC London (south as): Health Matters. See M 0445.

Wednesdays

1401 UK, BBC London (af): Discovery. See M 1430.
1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M 1405.
1430 UK, BBC London (af): Off the Shelf. See M 0330.
1430 UK, BBC London (am): Country Style. See S 0010.
1430 UK, BBC London (as pac): Omnibus. See M 0530.
1430 UK, BBC London (eu): Megamix. See M 1615.
1430 UK, BBC London (south as): Let's Go (1st,8th). See T 0530.
1445 UK, BBC London (af/am/south as): Good Books. See S 1145.

Thursdays

1401 UK, BBC London (af): Health Matters. See M 0445.
1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M 1405.
1415 UK, BBC London (af): Record News. See S 0445.
1430 UK, BBC London (af): Artyfacts (9th,16th). See M 1230.
1430 UK, BBC London (af): Off the Shelf. See M 0330.
1430 UK, BBC London (am): Network UK. Issues and events affecting the lives of people throughout the UK.
1430 UK, BBC London (as pac): Assignment. See H 0230.
1430 UK, BBC London (eu): Multitrack X-Press. See W 1615.
1430 UK, BBC London (south as): Sports International. See H 0630.
1445 UK, BBC London (af): Country Style. See S 0010.

Fridays

1401 UK, BBC London (af): Science in Action. See S 0230.
1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M 1405.
1430 UK, BBC London (af): Off the Shelf. See M 0330.
1430 UK, BBC London (am): Science in Action. See S 0230.
1430 UK, BBC London (as pac): Focus on Faith. See F 0330.
1430 UK, BBC London (eu): Multitrack Alternative. See F 1330.
1430 UK, BBC London (south as): The Insider's Guide. See F 0005.
1440 UK, BBC London (south as): Voicebox. See S 1455.
1445 UK, BBC London (af): On the Move. See M 0030.
1445 UK, BBC London (am): The Farming World. See S 1445.
1445 UK, BBC London (south as): Global Concerns. See M 1230.
1454 Radio Netherlands: Documentary. Buddy, can you spare a home? (31st). Mindy Ran looks at Amsterdam's homeless people.
1454 Radio Netherlands: Documentary. Living by the Water (19th,26th). See W 1154.
1454 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (3rd,10th). See A 2354.

Saturdays

1400 USA, WWCR #1 Nashville TN: Free at Last. See M 0100.
1400 USA, WWCR #3 Nashville TN: Morning Watch Chapel. See S 0300.
1405 UK, BBC London (af/am/as pac/eu/south as): Sportsworld. The weekly sports magazine.

Frequencies

1500-1600	Australia, Radio	5995pa	6060pa	6080pa	6090as
		7260as	9580pa	9615as	9710pa
		11660as	11695pa	11800pa	
1500-1600	Australia,DefenseForces R	8743af	10623af		
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFCX Montreal	6005do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, R Canada Intl	9640na	11855na		
1500-1600	China, China Radio Intl	7405na	9785as		
1500-1600	Costa Rica,RF Peace Intl	6200am	7385am	15050am	
1500-1600	Ecuador, HCJB	12005am	15115sa	21455va	
1500-1600 as	Eqt Guinea, R East Africa	15190af			
1500-1530	Georgia, Georgian Radio	6230me			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1600	Italy, Adv World Radio	7230eu			
1500-1600 vl	Italy, IRRS	3985va			
1500-1600	Japan, NHK/Radio	7240as	9535na	9695as	15355af
1500-1600	Jordan, Radio	11940va	11970va		
1500-1600	Lebanon, Wings of Hope	9960va			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1515	Mongolia, R Ulan Bator	7530as	9950as		
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9895as	13700as	15150as	
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa			
1500-1600	Nigeria, Voice of	7255af			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1530 s	Norway, Radio Norway Intl	9520me	11730me		
1500-1600 vl	Palau, KHBN/Voice of Hope	9965as			
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1530	Romania, R Romania Intl	11740as	11810as	15335as	
1500-1600	Russia,Voice of Russia WS	4740va	4940va	4975va	6085va
		7115va	7180as	7325eu	7330eu
		9470va	9490va	9635as	9905as
		11945as	13670as		
1500-1600	S Africa, Channel Africa	7155af	9530af		
1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as			
1500-1530 s	Seychelles, FEBA Radio	11870as			
1500-1600	Singapore, SBC Radio One	6155do			
1500-1600	Sri Lanka, Sri Lanka BC	9720as	15425as		
1500-1530	Switzerland, Swiss R Intl	9885as	12075as	13625as	
1500-1600	United Kingdom, BBC WS	5990as	6190af	6195va	7205as
		9410eu	9590va	9740va	11750as
		12095va	15070va	15260na	15400va
		17705va	17830af	17840va	21470af
		21660af			
1500-1530	United Kingdom, BBC WS	11860af	11940af	15420af	17880af
		21490af			
1500-1600	USA, KAIJ Dallas TX	13815am			
1500-1600	USA, KTBN Salt Lk City UT	15590am			
1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, Voice of America	7125as	7215as	9645as	9700va
		15255va	15395as		
1500-1600	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1500-1600 fas	USA, WGTG McCaysville GA	9370am			
1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1600 a	USA, WVHA Greenbush ME	15745eu			
1500-1600	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500-1600	USA, WYFR Okeechobee FL	11830na	17750eu		
1500-1600	Zambia, Christian Voice	6065af			
1520-1530 mtwhf	Estonia, Radio	5925eu			
1530-1600	Austria, R Austria Intl	11780as			
1530-1600	Iran, VOIRI	11875as	15260as	17750as	
1530-1600	Netherlands, Radio	9895as	15150as		
1530-1600	United Kingdom, BBC WS	7180as	11720as		
1538-1555 1st m	Denmark, R Denmark Intl	9485na	9520na	11730me	

Selected Programs

Sundays

1500 USA, WWCR #1 Nashville TN: Prophetic Word Program. A message of salvation from Dan Kubish of the House of Yaweh.
1500 USA, WWCR #3 Nashville TN: Answers for Life. Gospel music and a sermon by Pastor Hoover of Wichita, Kansas.
1501 UK, BBC London (south as): Play of the Week. See S 0530.
1505 UK, BBC London (af): The Art House. See S 0435.
1505 UK, BBC London (am): From Our Own Correspondent. See S 0330.
1506 UK, BBC London (as pac/eu): Sports Roundup. See S 0135.
1515 UK, BBC London (as pac): Concert Hall. Classical music concerts.
1515 UK, BBC London (eu/af): BBC English. For learners of English.
1525 UK, BBC London (am): Book Choice. Opening a newly published book.
1530 UK, BBC London (eu): From Our Own Correspondent. See S 0330.
1530 USA, WWCR #1 Nashville TN: Cross Roads Baptist Church. Lloyd Ferguson preaches from Lawrenceville, Georgia.
1550 UK, BBC London (eu): Songs for Children (5th,12th). Poets and children themselves read the verse that amuses, surprises and sustains young people.

Mondays

1500 UK, BBC London (af): John Peel (Alternative). See M 1330.
1500 UK, BBC London (as pac): East Asia Today. See S 2310.
1505 UK, BBC London (af): Focus on Africa. Up-to-the-minute reports on the day's events from all over the continent.
1505 UK, BBC London (am/eu/south as): Sports Roundup. See S 0135.
1505 USA, WWCR #1 Nashville TN: Messianic Minutes (M-F). Ted Simon presents five minutes of scriptural interpretation for Jewish listeners.
1506 USA, WWCR #3 Nashville TN: Freedom Calls (live) (M-F). See M 0606.
1510 USA, WWCR #1 Nashville TN: Spiritual Awakening (M-F). Wisdom from the scriptures.
1515 UK, BBC London (am): The Greenfield Collection. This classical music program replaces Ray on Record.
1515 UK, BBC London (south as): Concert Hall. See S 1515.
1515 USA, WWCR #1 Nashville TN: The Living Waters Broadcast (M-F). Father Bob Guste evangelizes from Louisiana.
1530 UK, BBC London (af): Outlook. See M 1405.
1530 UK, BBC London (eu): Omnibus. See M 0530.
1530 USA, WWCR #1 Nashville TN: The Time of Deliverance (M-F). Benjamin Smith preaches from the Time of Deliverance Evangelistic Church in Philadelphia.
1545 UK, BBC London (as pac): Slow-Speed News. News reports read slowly for listeners who are learning English.
1545 USA, WWCR #1 Nashville TN: Wisdom from the Word (M-F). From the New Covenant Church in Philadelphia.
1555 UK, BBC London (af): Words of Faith. See S 0025.

Tuesdays

1500 UK, BBC London (af): Multitrack Hit-List (Alternative). See M 0430.
1500 UK, BBC London (as pac): East Asia Today. See S 2310.
1505 UK, BBC London (af/am/eu/south as): Focus on Africa. See M 1505.
1515 UK, BBC London (am): Songs for Children. See S 1550.
1515 UK, BBC London (south as): The Greenfield Collection. See M 1515.
1525 UK, BBC London (am): Pop Short. See S 0355.
1530 UK, BBC London (af): Outlook. See M 1405.
1530 UK, BBC London (am): Discovery. See M 1430.
1530 UK, BBC London (as pac): Megamix. See M 1615.
1530 UK, BBC London (eu): The Learning World. See S 1130.
1545 UK, BBC London (eu): Let's Go (7th). See T 0530.
1555 UK, BBC London (af): Words of Faith. See S 0025.

Wednesdays

1500 UK, BBC London (af): Megamix (Alternative). See M 1615.
1500 UK, BBC London (as pac): East Asia Today. See S 2310.
1505 UK, BBC London (af): Focus on Africa. See M 1505.
1505 UK, BBC London (am): Sports Roundup. See S 0135.
1505 UK, BBC London (eu/south as): Sports Roundup. See S 0135.
1515 UK, BBC London (am): Soundbyte (1st,8th). See M 0615.
1515 UK, BBC London (south as): From Our Own Correspondent. See S 0330.
1530 UK, BBC London (af): Outlook. See M 1405.
1530 UK, BBC London (am): Blues World. See M 0530.
1530 UK, BBC London (south as): On Screen. See T 1401.
1554 Radio Netherlands: Documentary. Buddy, can you spare a home? (29th). See F 1454.
1554 Radio Netherlands: Documentary. Living by the Water (17th,24th). See W 1154.
1554 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (1st,8th). See A 2354.
1555 UK BBC London (af): Words of Faith. See S 0025.

Thursdays

1500 UK BBC London (af): Multitrack X-Press (Alternative). See W 1615.
1500 UK. BBC London (as pac): East Asia Today. See S 2310.
1505 UK BBC London (af): Focus on Africa. See M 1505.
1505 UK. BBC London (am/eu/south as): Sports Roundup. See S 0135.
1515 UK. BBC London (am): The Farming World. See S 1445.
1515 UK. BBC London (south as): Assignment. See H 0230.
1530 UK. BBC London (af): Outlook. See M 1405.
1530 UK. BBC London (am): Megamix. See M 1615.
1530 UK. BBC London (eu): Network UK. See H 1430.
1545 UK BBC London (south as): The Learning World. See S 1130.
1555 UK. BBC London (af): Words of Faith. See S 0025.

Fridays

1500 UK, BBC London (as pac): East Asia Today. See S 2310.
1505 UK, BBC London (af): Focus on Africa. See M 1505.
1505 UK, BBC London (eu/south as): Sports Roundup. See S 0135.
1515 UK. BBC London (am): Concert Hall. See S 1515.
1530 UK. BBC London (af): Outlook. See M 1405.
1530 UK. BBC London (eu): Music Review. See S 0230.
1545 UK. BBC London (south as): Seeing Stars (1). See S 0430.
1545 UK. BBC London (south as): Short Story. See S 0430.
1555 UK. BBC London (af): Words of Faith. See S 0025.

Saturdays

1500 USA, WWCR #1 Nashville TN: Let the Bible Speak. James Hickey with a program from New Testament Christianity in Oklahoma.
1500 USA, WWCR #3 Nashville TN: Morning Watch Chapel. See S 0300.
1505 UK BBC London (af/am/as pac/eu/south as): Sportsworld. See A 1405.
1515 USA, WWCR #1 Nashville TN: Eternal Good News. Germaine Lockwood teaches from the Old Testament.
1530 USA, WWCR #1 Nashville TN: The Showers of Blessings Broadcast. Ed McAbee sermonizes before a live congregation.

Frequencies

1600-1700	Australia, Radio	5995pa	6060pa	6080pa	6090pa
		7260as	9580pa	9615va	11660pa
		11695pa	11800pa		
1600-1615	Bangladesh, Radio	7185as	9568as		
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFCX Montreal	6005do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1700 s	Canada, R Canada Intl	9640na	11955na		
1600-1700	China, China Radio Intl	11575as	15110af	15130af	
1600-1700	Costa Rica,RF Peace Intl	6200am	15050am		
1600-1627	Czech Rep, Radio Prague	5930eu	9430eu		
1600-1630	Ethiopia, Radio	7165af			
1600-1700	France, Radio France Intl	6175eu	9485eu	11615af	11700af
		12015af	15210af	15460af	15530af
1600-1650	Germany, Deutsche Welle	6170as	7225as	7305as	9585as
1600-1700	Germany, Deutsche Welle	7195af	9735af	11965af	
1600-1700	Guam, AWR/KSDA	7395as			
1600-1615 mt	Guam, TWR/KTWR	11580as			
1600-1630 whfas	Guam, TWR/KTWR	11580as			
1600-1630	Iran, VOIRI	11875as	15260as	17750as	
1600-1700 vl	Italy, IRRS	3985va			
1600-1700	Jordan, Radio	11940va	11970va		
1600-1630	Kazakhstan, Radio Almaty	5940eu	5970eu	9505eu	
1600-1700	Lebanon, Voice of Hope	6280va			
1600-1700	Malaysia, Radio	7295do			
1600-1700 vl	Mexico, Radio Mexico Intl	9705na			
1600-1625	Netherlands, Radio	9895as	13700as	15150as	
1600-1650 occsnal	New Zealand, R NZ Intl	6100am			
1600-1700	Nigeria, Voice of	7255af			
1600-1630 s	Norway, Radio Norway Intl	11840na	11860eu	13805eu	
1600-1700	Pakistan, Radio	9485af	9785af	11570af	11745af
		13590af	15555af		
1600-1700 vl	Palau, KHBN/Voice of Hope	9965as			
1600-1700	Russia,Voice of Russia WS	5940va	5995va	6055va	6085va
		7115va	7130va	7205va	7255va
		7325va	7330eu	9470va	9490va
		9955va	13670af		
1600-1700	S Africa, Channel Africa	7155af	9530af	15240af	
1600-1700	S Africa, Trans World R	9500af			
1600-1700	Singapore, SBC Radio One	6155do			
1600-1700	South Korea, R Korea Intl	5975eu	9515eu	9870af	15575me
1600-1630	Sri Lanka, Sri Lanka BC	9720as	15425as		
1600-1700	Swaziland, Trans World R	9500af			
1600-1640	UAE, Radio Dubai	13675eu	15395me	17825me	21605me
1600-1700	United Kingdom, BBC WS	3915as	6190af	6195va	7135as
		7205as	9410va	9515va	9590na
		9740va	11750as	12095va	15070va
		15400af	15420af	17830af	17840va
		21470af	21660af		
1600-1615	United Kingdom, BBC WS	5990as	7180as	7205as	17705va
		17830af			
1600-1700	USA, KAIJ Dallas TX	13815am	15725am		
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9355af	15715eu	17510af	21640af
1600-1700	USA, Voice of America	7125as	7215as	9645as	9700va
		11920af	12040af	13710af	15205va
		15225af	15255va	15395as	15410af
		15445af	17895af		
1600-1700	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1600-1700 fas	USA, WGTG McCaysville GA	9370am			
1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700 a	USA, WVHA Greenbush ME	15745eu			
1600-1700	USA, WWCR Nashville TN	12160am	13845am	15685am	
1600-1700	USA, WYFR Okeechobee FL	15695eu	17750eu	21525eu	21745eu
1600-1620	Vatican State, Vatican R	9940as	11640as		
1600-1630	Vietnam, Voice of	7360na	9840eu	12030as	
1600-1700	Zambia, Christian Voice	6065af			
1604-1700	USA, WYFR Okeechobee FL	11705na			
1615-1630	Albania, R Tirana Intl	7155eu	9740eu		
1615-1625	Egypt, Radio Cairo	11874af			
1615-1700	United Kingdom, BBC WS	9510as	11860af		
1630-1657	Canada, R Canada Intl	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Russia,Voice of Russia WS	9585eu			
1638-1655 1st m	Denmark, R Denmark Intl	9590na	11840af		
1645-1700 mtwhf	Canada, R Canada Intl	9555eu	11935eu	15325eu	17820eu
1650-1700	Eqt Guinea, Radio Africa	15190af			
1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa			

Selected Programs

Sundays

1600 UK, BBC London (eu): Europe Today. All the latest news, analysis and comment.
1600 USA, WWCR #1 Nashville TN: Latin Catholic Mass. Father Gommar De Pauw conducts the traditional Latin Mass.
1600 USA, WWCR #3 Nashville TN: Apostolic Assembly. Lonnie Wollard preaches from Milltown, Connecticut.
1615 UK, BBC London (af/am): Jazz Score (5th). See T 1230.
1615 UK, BBC London (am): Meridian. See S 0630.
1615 UK, BBC London (as pac): In Praise of God. See S 0230.
1615 UK, BBC London (south as): Letter from America. See S 0030.
1630 UK, BBC London (eu): Play of the Week. See S 0530.
1645 UK, BBC London (am): Britain Today. See S 0045.
1645 UK, BBC London (as pac): Seeing Stars (1). See S 0430.
1645 UK, BBC London (as pac): Short Story. See S 0430.
1645 UK, BBC London (south as): Artyfacts (5th,12th). See M 1230.

Mondays

1600 UK, BBC London (eu): Europe Today. See S 1600.
1600 USA, WWCR #1 Nashville TN: Faith Alive (M-F). Steve Onoja speaks from the Chapel of Praise in Houston.
1606 USA, WWCR #3 Nashville TN: The Hour of Courage (M-F). See M 0530.
1615 UK, BBC London (af): Fast Track. The latest African sports news and action.
1615 UK, BBC London (am): Meridian. See S 0630.
1615 UK, BBC London (as pac): Megamix. A youth magazine series which covers new trends, entertainment, sport and other issues.
1615 UK, BBC London (south as): Omnibus. See M 0530.
1615 USA, WWCR #1 Nashville TN: Day of the Challenge (M-F). Gary R. Lightfoot talks about reasons for righteous living.
1630 UK, BBC London (eu): World Business Report. See M 1205.
1630 USA, WWCR #1 Nashville TN: The Spoken Word of God (M-F). Alexander Scourby narrates the King James version of The New Testament.
1635 USA, WWCR #3 Nashville TN: World Wide Country Radio (live) (M-F). News, weather and the best of country music.
1645 UK, BBC London (af/south as): The World Today. See M 0615.
1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
1645 UK, BBC London (eu): Soundbyte (6th). See M 0615.
1645 USA, WWCR #1 Nashville TN: The Living Word Broadcast. An evangelization by Bobby Hoover of Bethel Church, Mitchellville, Maryland.

Tuesdays

1600 UK, BBC London (eu): Europe Today. See S 1600.
1615 UK, BBC London (af): Money Focus. African business magazine.
1615 UK, BBC London (am): On Screen. See T 1401.
1615 UK, BBC London (as pac/south as): Megamix. See M 1615.
1630 UK, BBC London (eu): World Business Report. See M 1205.
1645 UK, BBC London (af/south as): The World Today. See M 0615.
1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
1645 USA, WWCR #1 Nashville TN: The Living Word Broadcast. See M 1645.

Wednesdays

1600 UK, BBC London (eu): Europe Today. See S 1600.
1615 UK, BBC London (af): Talkabout Africa. Telephone conversations with BBC correspondents on late-breaking African events.
1615 UK, BBC London (am): Meridian. See S 0630.
1615 UK, BBC London (as pac): Multitrack X-Press. New pop records, interviews, news and competitions.
1615 UK, BBC London (south as): Discovery. See M 1430.
1630 UK, BBC London (eu): World Business Report. See M 1205.
1645 UK, BBC London (af/south as): The World Today. See M 0615.
1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
1645 UK, BBC London (south as): Artyfacts (8th,15th). See M 1230.
1645 USA, WWCR #1 Nashville TN: The Living Word Broadcast. See M 1645.

Thursdays

1600 UK, BBC London (eu): Europe Today. See S 1600.
1615 UK, BBC London (af): Jive Zone. Get in the groove with all the latest sounds on the Afro music scene.
1615 UK, BBC London (am): Sports International. See H 0630.
1615 UK, BBC London (as pac): Sports International. See H 0630.
1615 UK, BBC London (south as): Network UK. See H 1430.
1630 UK, BBC London (eu): World Business Report. See M 1205.
1643 Germany, Deutsche Welle (af/me): Living in Germany. Warnemunde (30th). Hear how this suburb of the port city of Rostock on the Baltic Sea has become a sailing and holiday paradise.
1645 UK, BBC London (af/south as): The World Today. See M 0615.
1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
1645 USA, WWCR #1 Nashville TN: The Living Word Broadcast. See M 1645.

Fridays

1600 UK, BBC London (eu): Europe Today. See S 1600.
1615 UK, BBC London (af): African Perspective. See S 0631.
1615 UK, BBC London (am): Meridian. See S 0630.
1615 UK, BBC London (as pac): Multitrack Alternative. See F 1330.
1615 UK, BBC London (south as): Science in Action. See S 0230.
1630 UK, BBC London (eu): World Business Report. See M 1205.
1645 UK, BBC London (af/south as): The World Today. See M 0615.
1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
1645 USA, WWCR #1 Nashville TN: The Living Word Broadcast. See M 1645.

Saturdays

1600 USA, WWCR #1 Nashville TN: Cleansed by the Blood. Billy Dykes.
1607 USA, WWCR #3 Nashville TN: Ham Radio and More. See M 0400.
1615 UK, BBC London (af/am/as pac/eu/south as): Sportsworld. See A 1405.
1615 USA, WWCR #1 Nashville TN: Walking Through the Land of Promises. See M 1245.
1630 USA, WWCR #1 Nashville TN: The Word of Victory. Joyce Corbitt preaches.
1645 USA, WWCR #1 Nashville TN: The American Catholic. John Powell.
1645 USA, WWCR #1 Nashville TN: Words of Hope. See S 1100.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	7260as
		9580pa	9615as	9860pa	11660pa
		11695pa	11880pa		
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	5220af	7150af	7405af	9535as
		11575af			
1700-1800 as	Costa Rica, Adv World R	13750am			
1700-1800	Costa Rica,RF Peace Intl	6200am	15050am		
1700-1727	Czech Rep, Radio Prague	5835eu	9430eu		
1700-1800	Ecuador, HCJB	15540eu			
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15190af			
1700-1730	France, Radio France Intl	9485af	11615af	15210af	15460af
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, NHK/Radio	6150as	7280as	9535na	9580as
		11930me			
1700-1730	Jordan, Radio	11940va	11970va		
1700-1800	Lebanon, Voice of Hope	6280va			
1700-1730	Lebanon, Wings of Hope	9960va			
1700-1800 mtwhf	New Zealand, R NZ Intl	6145pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1750	Pakistan, Radio	5825eu	11570eu		
1700-1800 vl	Palau, KHBN/Voice of Hope	9965as			
1700-1755	Poland, Polish R Warsaw	6095eu	7270eu	7285eu	
1700-1800	Russia,Voice of Russia WS	6085va	7180eu	7205va	7255va
		7330eu	9490va	9955va	13670af
1700-1800	S Africa, Channel Africa	7240af	9545af		
1700-1800	Swaziland, Trans World R	9500af			
1700-1730	Switzerland, Swiss R Intl	5850va	9885va	13635va	
1700-1800	United Kingdom, BBC WS	3955eu	6190af	6195eu	7150eu
		9410va	9710as	9740as	11750as
		11760as	11860af	15070va	15400af
		15420af	17830af	17840va	
1700-1745	United Kingdom, BBC WS	3915as	7135as	9630af	12095va
1700-1715	United Kingdom, BBC WS	9515va	9590na		
1700-1800	USA, KAIJ Dallas TX	13815am	15725am		
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	6120as			
1700-1800	USA, Monitor Radio Intl	9355af	15715eu	17510af	21640af
1700-1800	USA, Voice of America	7125as	7215as	9645as	9700va
		9760va	11920af	12040af	13710af
		15255va	15395as	15410af	15445af
		17895af			
1700-1800 mtwhf	USA, Voice of America	5990va	6045va	7125as	7150va
		7170va	9550va	9770va	11870va
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1700-1800 fas	USA, WGTG McCaysville GA	9370am			
1700-1800	USA, WHRI Noblesville IN	13760am	15105ca		
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, WRNO New Orleans LA	15420am			
1700-1800 th	USA, WVHA Greenbush ME	15745af			
1700-1730 s	USA, WVHA Greenbush ME	9930eu			
1700-1800 mwf	USA, WVHA Greenbush ME	9930eu			
1700-1800	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WYFR Okeechobee FL	15695eu	17555ca		
1700-1745	USA, WYFR Okeechobee FL	21745eu			
1700-1800	Zambia, Christian Voice	4965af			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1715-1800	United Kingdom, BBC WS	7160va			
1715-1730	Vatican State, Vatican R	4005eu	6245eu	7250eu	11810af
1730-1800	Austria, R Austria Intl	6155eu	9665me	11780as	13730eu
1730-1800	Georgia, Georgian Radio	6080eu			
1730-1800	Guam, AWR/KSDA	9370as			
1730-1800	Romania, R Romania Intl	9750af	11740af	11940af	
1730-1745	Sweden, Radio	6065eu			
1730-1800	United Kingdom, BBC WS	6180eu			
1730-1800	Vatican State, Vatican R	9660af	11625af	11635af	
1738-1755 1st m	Denmark, R Denmark Intl	7485eu	7525eu	9590af	
1745-1800 mtwhf	Canada, R Canada Intl	5995eu	9555eu	11915eu	11935eu
		15325eu	17820eu		
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935af	13750as	15075me	
1745-1800 mtwhf	Swaziland, Trans World R	3200af			
1800-1900	Algeria, R Algiers Intl	11715me	15160eu	15205eu	
1800-1900	Australia, Radio	6060pa	6080pa	6090pa	7260eu
		9580pa	9860pa	11660as	11695pa
		11880pa			
1800-1830	Belgium, R Vlaanderen Int	5910eu	13645af		
1800-1900	Brazil, Radio Bras	15265eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica,RF Peace Intl	6200am	15050am		
1800-1900	Ecuador, HCJB	15540eu			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15190af			
1800-1900	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13750as	15075as	
1800-1900 vl	Italy, IRRS	3985va			
1800-1900	Kuwait, Radio	11990na			
1800-1900	Lebanon, Voice of Hope	6280va			
1800-1825	Netherlands, Radio	6020af	9605af	11655af	
1800-1850 mtwhf	New Zealand, R NZ Intl	6145pa			
1800-1830 s	Norway, Radio Norway Intl	7485af	9590af	13805af	15220af
1800-1900 vl	Palau, KHBN/Voice of Hope	9965as			
1800-1900	Russia,Voice of Russia WS	5940eu	5995eu	6055eu	6085va
		7180eu	7205eu	7255va	9470va
		9490va	9585eu	9955va	13670af
1800-1900	Sudan, Radio Omdurman	9000af	9025af		
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1900	United Kingdom, BBC WS	3255af	3955eu	6180eu	6190af
		6195eu	9410va	15070af	15400af
		15420af	17830af	17840ca	
1800-1830	United Kingdom, BBC WS	7150eu	7160va	9510as	11750as
1800-1900	USA, KAIJ Dallas TX	13815am	15725am		
1800-1900	USA, KJES Mesquite NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9385eu	13770va	17510af	
1800-1900	USA, Voice of America	9760va	9770va	11920af	12040af
		13710af	15410af	15580af	
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1800-1900 fas	USA, WGTG McCaysville GA	9370am			
1800-1900	USA, WHRI Noblesville IN	9495am	13760eu		
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900 mtwhf	USA, WRMI/R Miami Intl	9925am			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900 ths	USA, WVHA Greenbush ME	15745af			
1800-1900 mwf	USA, WVHA Greenbush ME	9930eu			
1800-1900	USA, WWCR Nashville TN	9400am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	15695eu	17555eu		
1800-1830	Vietnam, Voice of	7360na	9840eu	12030as	
1800-1900	Yemen, Yemeni Rep Radio	9780as			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1802-1900 s	Morocco, RTVM Marocaine	17815af			
1815-1900	Bangladesh, Radio	7190eu	9568as		
1830-1900	Albania, R Tirana Intl	7270eu	9740eu		
1830-1900 irreg t	Belarus, Radiosta Belarus	5940eu	7105eu	7205eu	7210eu
1830-1900	Georgia, Georgian Radio	6080eu			
1830-1900	Netherlands, Radio	4945af	6015af	6020af	9605af
		9860af	9895af	11655af	15315af
		17605af			
1830-1857	S Africa, Trans World R	9525af			
1830-1900	Serbia, Radio Yugoslavia	6100eu	9720eu		
1830-1857	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1830-1855 irreg	Somalia, Radio Mogadishu	6710af			
1830-1900	South Korea, R Korea Intl	6480eu			
1830-1900	Sweden, Radio	6065eu	7240af	9655me	
1830-1900	Turkey, Voice of	9445eu			
1830-1900	United Kingdom, BBC WS	6005af	9630af	9740va	
1833-1900	Cote D' Ivoire, RDTV	11920do			
1838-1855 1st m	Denmark, R Denmark Intl	5960af	7485eu	9590eu	
1840-1850	Greece, Voice of	15150af			
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1851-1900	New Zealand, R NZ Intl	9810pa			

FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345va			
1900-2000	Australia, Radio	6060pa	6080pa	6150as	7240pa
		7260as	9560as	9580pa	9860pa
		11660pa	11695pa	11880pa	
1900-1930	Azerbaijan, Voice of	4957eu			
1900-1920	Brazil, Radio Bras	15265eu			
1900-2000	Bulgaria, Radio	7335eu	9700eu		
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	Canada, R Canada Intl	15275va			
1900-2000	China, China Radio Intl	6955me	9440af		
1900-2000	Costa Rica, Adv World R	13750am	15460am		
1900-2000	Costa Rica,RF Peace Intl	6200am	15050am		
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB	11960eu			
1900-2000	Eqt Guinea, Radio Africa	15190af			
1900-1930 mh	Estonia, Radio	5925eu			
1900-1950	Germany, Deutsche Welle	9670af	9765af	11785af	11810af
		11865af	13790as	15145af	15425af
1900-2000	Guatemala, Adv World R	5980am			
1900-1930	Hungary, Radio Budapest	3975eu	5970eu	7250eu	9835eu
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13750as	15075as	
1900-1930	Israel, Kol Israel	7465na	9435eu	11605ca	15615sa
		15640na			
1900-2000 vl	Italy, IRRS	3985va			
1900-2000	Japan, NHK/Radio	6150as	7140pa	9535na	9580as
		11850pa	11920as		
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-2000	Kuwait, Radio	11990eu			
1900-1930 as	Latvia, Radio	5935eu			
1900-2000	Lebanon, Wings of Hope	9960va			
1900-2000	Liberia, Radio ELBC	7275do			
1900-2000	Liberia, Radio ELWA	4760do			
1900-1930	Lithuania, Radio Vilnius	9710eu			
1900-2000	Netherlands, Radio	4945af	6015af	6020af	9605af
		9860af	9895af	11655af	15315af
		17605af			
1900-1950	New Zealand, R NZ Intl	9810pa			
1900-2000	Nigeria, Voice of	7255af			
1900-2000	Romania, R Romania Intl	6105eu	7105eu	7195eu	9510eu
1900-2000	Russia,Voice of Russia WS	5940eu	5995eu	6030va	6055eu
		7180eu	7205eu	9470va	9490va
		9585af	13670af		
1900-1930	Russia,Voice of Russia WS	9955va			
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-1930	Switzerland, Swiss R Intl	6165eu			
1900-2000	Thailand, Radio	9655eu	11805eu		
1900-1930	Turkey, Voice of	9445eu			
1900-2000	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195va	9410va
		9630af	9740va	15070af	15400af
		17830af			
1900-2000	USA, KAIJ Dallas TX	13815af	15725am		
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9385af	13770va	15665eu	17510af
1900-2000	USA, Voice of America	7415af	9525va	9760va	9770va
		11870va	11920af	12040af	13710af
		15180va	15410af	15580af	
1900-2000	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1900-2000 fas	USA, WGTG McCaysville GA	9370am			
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WMLK Bethel PA	9465eu			
1900-2000 mtwhf	USA, WRMI/R Miami Intl	9925am			
1900-2000	USA, WRNO New Orleans LA	15420am			
1900-2000 ths	USA, WVHA Greenbush ME	15745af			
1900-2000 mwfa	USA, WVHA Greenbush ME	9930eu			
1900-2000	USA, WWCR Nashville TN	9400am	12160am	13845am	15685am
1900-2000	USA, WYFR Okeechobee FL	17555eu			
1900-1930	Vietnam, Voice of	7360na	9840eu	12030as	
1900-2000	Zambia, Christian Voice	4965af			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1930-2000	Austria, R Austria Intl	9655me	13730af		
1930-2000	Iran, VOIRI	7260af	9022eu		
1930-2000	Mongolia, R Ulan Bator	4080as	7530as		
1930-2000 vl	Papua New Guinea, NBC	4890do			
1930-2000	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
1935-1955	Italy, RAI Intl	6030eu	7235eu		
1938-1955 1st m	Denmark, R Denmark Intl	5930af	5960af	7485eu	9590eu
1945-2000	Togo, Radio	5047do			
1951-2000	New Zealand, R NZ Intl	11735pa			
2000-2100	Algeria, R Algiers Intl	11715me	15160eu		
2000-2100	Angola, Radio Nacional	3355do	9535do		
2000-2100	Australia, Radio	6060pa	6080pa	6150pa	7260as
		9580pa	9860pa	11660pa	11695pa
		11855as	11880pa		
2000-2100	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	China, China Radio Intl	6950eu	9440af	9920eu	11715af
		15110af			
2000-2100	Costa Rica,RF Peace Intl	6200am	15050am		
2000-2100	Ecuador, HCJB	11960eu			
2000-2100	Eqt Guinea, Radio Africa	15190af			
2000-2050	Germany, Deutsche Welle	5960eu	7285eu		
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2010	Greece, Voice of	7430eu			
2000-2100	Guatemala, Adv World R	5980am			
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI	7260af	9022eu		
2000-2100 vl	Italy, IRRS	3980va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2100	Lebanon, Wings of Hope	9960va			
2000-2100	Liberia, Radio ELBC	7275do			
2000-2100	Liberia, Radio ELWA	4760do			
2000-2025	Netherlands, Radio	4945af	6020af	9605af	9860af
		9895af	11655af	15315af	17605af
2000-2100	New Zealand, R NZ Intl	11735pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
2000-2100	Nigeria, Voice of	7255af			
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2030 s	Norway, Radio Norway Intl	9590af			
2000-2100 vl	Papua New Guinea, NBC	4890do			
2000-2025	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2000-2030 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	15515af
2000-2100	Russia,Voice of Russia WS	5940eu	5995eu	6055eu	7180eu
		7205eu			
2000-2015	Sierra Leone, SLBS	3316do			
2000-2030	South Korea, R Korea Intl	3970eu			
2000-2015	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	9770af	9885af	11640af	
2000-2100	Turkey, Voice of	9445eu			
2000-2015	Uganda, Radio	3340do	4976do		
2000-2100	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195va	7325eu
		9410va	9630af	9740va	11750sa
		11835va	15400af	17830af	
2000-2100	USA, KAIJ Dallas TX	13815am	15725na		
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100 s	USA, KVOH Los Angeles CA	17775am			
2000-2100	USA, KWHR Naalehu HI	11980as			
2000-2100	USA, Monitor Radio Intl	9570pa	13770eu	15665eu	
2000-2100	USA, Voice of America	7415af	9760va	9770va	13710af
		15410af	15580af	17725af	17755af
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2000-2100 fas	USA, WGTG McCaysville GA	9370am			
2000-2100	USA, WHRI Noblesville IN	9495am	13760eu		
2000-2100	USA, WJCR Upton KY	7490na	13595na		
2000-2100	USA, WMLK Bethel PA	9465eu			
2000-2100 mtwhf	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	15420am			
2000-2100 ths	USA, WVHA Greenbush ME	15745af			
2000-2100 mwfa	USA, WVHA Greenbush ME	5850eu			
2000-2100	USA, WWCR Nashville TN	9400am	12160am	13845am	15685am
2000-2100	USA, WYFR Okeechobee FL	17555eu	17845eu	21525eu	
2000-2030	Vatican State, Vatican R	7365af	9645af		
2000-2030	Zambia, Christian Voice	4965af			
2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do			
2005-2100	Syria, Radio Damascus	15095na			
2015-2045 as	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Intl	5990af	7110af	9710af	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Finland, YLE/R Finland	9855eu	15440eu		
2030-2035 mtwhf	Latvia, Radio	5935eu			
2030-2100 mwh	Moldova, R Dniester Intl	6205na			
2030-2100	Russia,Voice of Russia WS	7170eu	7400eu		
2030-2100	Slovakia, Adv World Radio	9455af			
2030-2045	Thailand, Radio	9655eu	11805eu		
2030-2100	Vietnam, Voice of	7360as	9840eu	12020eu	
2038-2055 1st m	Denmark, R Denmark Intl	7520eu	9480na		
2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
		11715pa	15225pa		
2050-2100	Vatican State, Vatican R	4055eu	5880eu	7250eu	

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2100-2200	Australia, Radio	6060pa	6080pa	7240pa	7260as
		9580pa	9660pa	11660pa	11855as
		11880pa	11955pa	13745pa	
2100-2110	Bahrain, Radio	6010do			
2100-2130	Belgium, R Vlaanderen Int	5910eu			
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	5995eu	7260eu	9755eu
		9805eu	11945eu	13650eu	13690eu
		15150eu	17820eu		
2100-2200	China, China Radio Intl	5220eu	6950eu	9920eu	
2100-2130	China, China Radio Intl	3985eu	11715af	15110af	
2100-2200	Costa Rica,RF Peace Intl	6200am	15050am		
2100-2110	Croatia, Croatian Radio	5895eu	7370eu		
2100-2200	Cuba, Radio Havana	9550eu			
2100-2127	Czech Rep, Radio Prague	5930na	7345na		
2100-2200	Ecuador, HCJB	11960eu			
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15190af			
2100-2150	Germany, Deutsche Welle	6185as	7225af	9670as	9690af
		9765as	11785as	11810af	11905af
		15270af			
2100-2200	Guatemala, Adv World R	5980am			
2100-2130	Hungary, Radio Budapest	3975eu	5935eu	7250eu	9835eu
2100-2200	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 vl	Italy, IRRS	3980va			
2100-2200	Japan, NHK/Radio	6035as	7125as	7140as	11850pa
		11865eu			
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	5990eu	7105eu	7195eu
		9510eu			
2100-2200	Russia,Voice of Russia WS	5940eu	6055eu	7140eu	7180eu
		7205eu	7360eu	7400eu	
2100-2130	Serbia, Radio Yugoslavia	6100eu	6185eu		
2100-2200	Slovakia, Adv World Radio	6055eu			
2100-2130	Slovakia, Adv World Radio	9455af			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2110	Uganda, Radio	3340do	4976do		
2100-2200	Ukraine, R Ukraine Intl	4795eu	4820eu	5905eu	5940eu
		6010eu	6020eu	6055eu	6080eu
		6130eu	7135eu	7205eu	7240eu
		9620eu			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5975va
		6005af	6120as	6180eu	6190af
		6195va	7325eu	9410va	9740au
		11750sa	11835va	11955as	
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am	15725am		
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, Monitor Radio Intl	13770va	13840au	15665eu	
2100-2200	USA, Voice of America	6160va	7415af	9535va	9760va
		11870va	13710af	15185va	15410af
		15580af	17725af	17735va	17755af
2100-2130	USA, Voice of America	11855af			
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200 s	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200 w	USA, WVHA Greenbush ME	9852eu			
2100-2200 s	USA, WVHA Greenbush ME	15745af			
2100-2200	USA, WWCR Nashville TN	9400am	12160am	13845am	15685am
2100-2145	USA, WYFR Okeechobee FL	17555eu			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2105-2200	Syria, Radio Damascus	12085na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	15390am	17715am		
2130-2200	Armenia, Voice of	7480na	9965na		
2130-2200	Australia, Radio	9610as	9645as	15365pa	17795pa
		17860pa			
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6175au			
2130-2200	Liberia, Radio ELWA	4760do			
2130-2200	Lithuania, Radio Vilnius	9710eu			
2130-2200	Russia,Voice of Russia WS	7105eu			
2130-2200	Sweden, Radio	6065eu	7230af		
2130-2145	United Kingdom, BBC WS	11680sa			
2138-2155 1st m	Denmark, R Denmark Intl	5960as	7315au	9480na	
2145-2200 s	Greece, Voice of	9425au			
2145-2200	United Kingdom, BBC WS	5990as	7160as	9580as	

2200 UTC

2200-2300	Australia, Radio	9475as	9580pa	9610as	9645as
		9660pa	11660pa	11695pa	11855as
		11880pa	11955pa	13745pa	13755as
		15365pa	17795pa	17860pa	
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, R Canada Intl	5925am	5960am	5995eu	7260eu
		9755am	9805eu	11705as	11945eu
		13690eu			
2200-2300	China, China Radio Intl	7170eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	15050am		
2200-2300	Cuba, Radio Havana	6180na	9505na		
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15190af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2300	Guatemala, Adv World R	5980am			
2200-2230	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
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	9495as			
2200-2208 vl	Papua New Guinea, NBC	4890do			
2200-2300	Russia,Voice of Russia WS	5940na	7105na	7125na	7170na
		7180na	7205na	7330na	9550na
2200-2215	Sierra Leone, SLBS	3316do			
2200-2230	South Korea, R Korea Intl	5965eu			
2200-2300	Spain, R Exterior Espana	6125eu	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	5905as	5975va	6175va
		6195va	7110as	9590va	9915va
		11695au	11750sa	11835va	11955as
2200-2230	United Kingdom, BBC WS	9410eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	13840va	15405as	15665sa	
2200-2300	USA, Voice of America	7215va	9705va	11760va	15185va
		15290va	15305va	17735va	17820va
2200-2230 mtwhf	USA, Voice of America	7415af	12080af	13710af	
2200-2300	USA, WEWN Birmingham AL	7425na	11820eu	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
2200-2300	USA, WYFR Okeechobee FL	11580na	15566na		
2200-2245	USA, WYFR Okeechobee FL	17845eu	21525eu		
2210-2300 vl	Papua New Guinea, NBC	9675do			
2216-2300	New Zealand, R NZ Intl	15115pa			
2230-2300	Austria, R Austria Intl	5945eu	6155eu		
2230-2257	Czech Rep, Radio Prague	5930na	7345na		
2230-2300	Sweden, Radio	6065eu			
2230-2300	United Kingdom, BBC WS	7325va			
2238-2255 1st m	Denmark, R Denmark Intl	5905na	6200na		
2240-2250	Greece, Voice of	9425au			
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
2245-2300	Vatican State, Vatican R	7305au	9600au	11830au	

Frequencies

2300-0000	Australia, Radio	9610as	9660pa	11645as	11660pa
		11695as	11855as	13745pa	13755as
		15365pa	17795pa	17860pa	
2300-0000	Bulgaria, Radio	7480na	9700na		
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFCX Montreal	6005do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-0000	Canada, R Canada Intl	5960am	6040am	9535am	9755am
		11940am			
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am	15460am		
2300-0000	Costa Rica,RF Peace Intl	7385am	15050am		
2300-2310	Croatia, Croatian Radio	5895eu	7315eu		
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	6000as	6160as	7250as	
2300-0000	Guam, AWR/KSDA	11775as			
2300-0000	Guatemala, Adv World R	5980am			
2300-0000	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
2300-0000	Japan, NHK/Radio	6055eu	6155eu	7125as	7140as
		11850pa			
2300-0000	Lebanon, Voice of Hope	6280va			
2300-0000	Lebanon, Wings of Hope	9960va			
2300-0000	Malaysia, Radio	7295do			
2300-0000	New Zealand, R NZ Intl	15115pa			
2300-2315	Nigeria, FRCN/Radio	3326do	4990do		
2300-2350	North Korea, R Pyongyang	11700na	13650na		
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-0000	Russia,Voice of Russia WS	7105na	7125na	7180na	
2300-0000	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2300-0000	United Kingdom, BBC WS	3955eu	5975va	6175va	6195va
		7110as	7295as	7325va	9580as
		9590va	9915va	11750sa	11945as
		11955as			
2300-2330	United Kingdom, BBC WS	3915as			
2300-2315	United Kingdom, BBC WS	11835va			
2300-0000	USA, KAIJ Dallas TX	13740am	13815am		
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	13625as	13770sa	15405as	
2300-0000	USA, Voice of America	7215va	9705va	9770va	11760va
		15185va	15290va	15305va	17735va
		17820va			
2300-0000	USA, WEWN Birmingham AL	7425na	11820eu	13615na	
2300-0000	USA, WHRI Noblesville IN	5745am			
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000 twhfa	USA, WRMI/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000	USA, WWCR Nashville TN	5065am	7425am	9475am	13845am
2330-0000	Australia, Radio	9645as	9850as	13605as	15240pa
2330-0000	Belgium, R Vlaanderen Int	9925na	11815sa		
2330-0000	Lithuania, Radio Vilnius	9710na			
2330-0000	Netherlands, Radio	6020na	6165na		
2330-0000	Palau, KHBN/Voice of Hope	15140as			
2335-2345	Greece, Voice of	9375sa	11595sa	11645sa	
2338-2355 1st m	Denmark, R Denmark Intl	5905am	7465as		

Selected Programs

Sundays

2300 USA, WWCR #1 Nashville TN: The Down Home Gospel Program. Brother Gary and Sister Wanda evangelize.
2300 USA, WWCR #3 Nashville TN: Harvest Time. Gospel music and inspiration from the United Pentecostal Church International.
2310 UK, BBC London (af): Words and Music. Martin Hendley tells the story of a song.
2310 UK, BBC London (am): Invitation to the Dance. Jenny Bild traces dances such as the polka, the waltz and the polonaise from village square to concert hall.
2310 UK, BBC London (as pac): East Asia Today. News, analysis, press reviews and reports from BBC correspondents.
2310 UK, BBC London (eu): Words and Music. See S 2310.
2315 UK, BBC London (am): The Learning World. See S 1130.
2315 USA, WWCR #3 Nashville TN: Harvest House. Frederick Johnson preaches from New Jersey.
2330 UK, BBC London (am): In Praise of God. See S 0230.
2330 UK, BBC London (as pac): New Ideas. Window on the world of technology, innovation and new products.
2330 USA, WWCR #1 Nashville TN: A Visit with Mrs. G. Bible stories for children.
2345 USA, WWCR #1 Nashville TN: Words of Hope. See S 1100.
2350 UK, BBC London (as pac): Write On. See S 0345.

Mondays

2300 USA, WWCR #1 Nashville TN: The Overcomer Broadcast (live) (M-F). See S 1100.
2300 USA, WWCR #3 Nashville TN: The Voice of Liberty (live) (M-F). A Christian patriot program dedicated to spreading the word against corruption.
2306 USA, WWCR #4: Blueprints for Survival (live) (M-F). Steve Quail.
2310 UK, BBC London (af/am/eu): Take Five. A short series of human interest stories.
2310 UK, BBC London (as pac): East Asia Today. See S 2310.
2315 UK, BBC London (am/eu): Record News. See S 0445.
2330 UK, BBC London (am): Multitrack Hit-List. See M 0430.
2330 UK, BBC London (as pac): The World Today. See M 0615.
2330 UK, BBC London (eu): Multitrack Hit-List. See M 0430.
2345 UK, BBC London (as pac): Development '96. See S 0615.
2345 UK, BBC London (as pac): Soundbyte (5th). See M 0615.

Tuesdays

2310 UK, BBC London (af/am/eu): Voicebox. See S 1455.
2310 UK, BBC London (as pac): East Asia Today. See S 2310.
2315 UK, BBC London (af/am/eu): Let's Go (7th). See T 0530.
2330 UK, BBC London (am/eu): Megamix. See M 1615.
2330 UK, BBC London (as pac): The World Today. See M 0615.
2345 UK, BBC London (as pac): Development '96. See S 0615.

Wednesdays

2310 UK, BBC London (af/am/eu): Science View. See W 0040.
2310 UK, BBC London (as pac): East Asia Today. See S 2310.
2315 UK, BBC London (am/eu): Country Style. See S 0010.
2330 UK, BBC London (am/eu): Multitrack X-Press. See W 1615.
2330 UK, BBC London (as pac): The World Today. See M 0615.
2345 UK, BBC London (as pac): From Our Own Correspondent. See S 0330.

Thursdays

2310 UK, BBC London (af/am/eu): Take Five. See M 2310.
2310 UK, BBC London (as pac): East Asia Today. See S 2310.
2315 UK, BBC London (af/am/eu): Soundbyte (2nd,9th). See M 0615.
2330 UK, BBC London (as pac): The World Today. See M 0615.
2345 UK, BBC London (as pac): The Farming World. See S 1445.
2345 UK, BBC London (eu): Blues World. See M 0530.

Fridays

2310 UK, BBC London (af/am/as pac/eu): Spotlight. See S 0005.
2315 UK, BBC London (am/as pac/eu): The Insider's Guide. See F 0005.
2325 UK, BBC London (am/eu): Book Choice. See S 1525.
2325 UK, BBC London (as pac): Words and Music. See S 2310.
2330 UK, BBC London (am): Multitrack Alternative. See F 1330.
2330 UK, BBC London (as pac): The World Today. See M 0615.
2330 UK, BBC London (eu): Multitrack Alternative. See F 1330.
2345 UK, BBC London (as pac): Seeing Stars (1). See S 0430.
2345 UK, BBC London (as pac): Short Story. See S 0430.
2354 Radio Netherlands: Documentary. Buddy, can you spare a home? (31st). See F 1454.
2354 Radio Netherlands: Documentary. Living by the Water (19th,26th). See W 1154.
2354 Radio Netherlands: Documentary. Microchips Yes, Potato Chips No (3rd,10th). See A 2354.

Saturdays

2300 UK, BBC London (af/am/eu): Play of the Week (from 2230). See S 0530.
2300 USA, WWCR #1 Nashville TN: Weekly Presidential Radio Address. Bill Clinton's weekly report to the nation.
2300 USA, WWCR #3 Nashville TN: The Hour of Courage. See M 0530.
2305 USA, WWCR #1 Nashville TN: The Republican Response. A noted Republican rebuts the President's weekly radio message.
2310 UK, BBC London (as pac): From Our Own Correspondent. See S 0330.
2315 USA, WWCR #1 Nashville TN: The Blessed Word of Life. Perry L. Johnson preaches in Spanish and English from Washington, DC.
2330 UK, BBC London (am/as pac/eu): Anything Goes. See S 0530.
2330 USA, WWCR #1 Nashville TN: The People's Gospel Hour. From Nova Scotia, Canada, Perry Rockwood interprets scripture for Christian life.

Your Name in Lights!

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

ANARC DXer of the Year Award

The Association of North American Radio Clubs (ANARC) announced at the Winter SWL Festival that the recipient of their annual DXer of the Year award is Tom Bryant, an avid AM, FM, TV DXer who is on the staff of the Worldwide TV-FM DX Asssociation and works for radio station WSM-650 in Nashville, Tennessee. A certificate of recognition was presented to Fred Vobbe and the staff of the DX Audio Service for ten years of producing the DX Audio Service tapes. A certificate of recognition was also presented to Michael Murray of Huntingdon, England, for his service as Secretary General of the European DX Council from 1979 through 1966.

Listener's Nets

You are invited to post your North American amateur radio net in this bi-monthly listing if its primary emphasis is devoted to the radio monitoring hobby (not amateur radio).

Central Florida Listeners Group
146.730 MHz, Sun 8pm ET, Central Florida; any radio communications outside amateur bands
Net Mgr: Andy Fountain, KD4OKJ
Telephone gateways announced; CFLG BBS conference on LASER BBS 407-647-0031
Call Andy Fountain, KD4OKJ, (407)898-6784 for info

Larkfield's ARC SW-Scanner Net
147.210 MHz, Fri 9pm ET, Long Island, NYC, NJ, Conn; Shortwave BCers & utes, MW, amateur radio, scanning
Net Mgr: Hank Lukas, N2GCN
Open to all amateurs on air; by letter for scanner listeners
Contact: P.O.Box 115, Plainview, NY 11803-0115

Listening Post
147.03, 224.96, 447.725 (W3DID/R), Sun 8pm, Baltimore and metro area; non-amateur transmissions DC to Daylight except ECPA-related items or tacticals
Net Mgr: Mike Agner KA3JJZ
Open to all amateurs on air; by maildrop at: 6710-F Ritchie Hwy #236, Glen Burnie, MD 21060.
Packet: KA3JJZ @ WB3FFV.md.ena.usa

Montreal DX Listeners Net
146.910 MHz, Sun 8:15 pm ET, Montreal PQ area; MW SW, & Scanner
Net Mgr: Sheldon Harvey VE2SHW
Telephone gateways announced

Monitoring the Long Island Sounds Net
146.805 Tues 8pm ET, Long Island, NY; Primarily scanning
Net Mgr: WB2RVA, 2134 Decker Ave, North Merrick, NY 11566

Monix SW and Scanner Listeners Info Net
146.835 MHz, Thurs. 9:30 pm ET; Cincinnati/ Tri-State Area; All band
Net Mgr: Mark Meece, N8ICW, (513) 777-2909 (no collect calls)
Open to all amateurs; Telephone gateways to net mgr up to 1/2 hr before net; The Listening Post BBS (513) 474-3719

New York DX Association
145.190 (PL 141.3) Wed 8pm ET, Montclair, NJ/NYC area; "DC to Light"
Net Mgr: Charles Hargrove N2NOV, 723 Port Richmond Avenue, Staten Island, NY 10302-1736. Meet World Financial Center last Sundays @ 4pm
Gateways: telephone (212) 978-3375 up to 1/2 before net. email: n2nov@planet.earthcom.net. TCP/IP: n2nov@n2nov.ampr.org. BBS/packet 145.630 MHz or 718-876-7928 24hrs. Hams use callsign as username, others use 1st initial and lastname.

News Monitor Scanner and SWL Listeners Net
462.725 GMRS 24 hrs/day, Greater Cincinnati, OH, area; All bands scanner and SW
Net Mgr: Bryan Hoffman, Unit 601 (KAE9858)
24 hr telephone gateway (513) 269-6720
Mail drop: News Monitor, P.O. Box 18072, Greenhills, OH 45218
Closed repeater. Must have permission from rptr owner or net mgr first. Must be licensed GMRS user for this frequency.

Northeast SW Listeners and Scanners Net; Rip Van Winkle Society
147.21 MHz (WB2UEB) Wed 8pm, Albany, NY, area.
Net Mgr: Ray Loeper N2RAD

Ontario DX Association - Listeners Net
442.375+ (VA3ODX; 103.4Hz CTCSS tone), Sun 8:30pm ET; Toronto area coverage; LW, MW, SW, FM, VHF/UHF topics discussed
Net Mgr: Stephen Canney, VA3ID
Open to all; repeater used daily by ODXA members

Rocky Mountain Monitoring Net
147.225, 224.980 Denver; 145.460 Boulder; 145.160 Colorado Springs Sun 20:00; communications monitoring
Brian Gould, KB0MEP, Mt. News Net

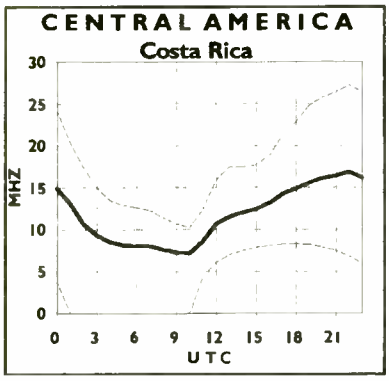
Shortwave Listeners Net, Association of North American Radio Clubs
7.240 MHz LSB, Sun 10am ET, Eastern US moveS to 3.940 MHz after the 40m session closes for an informal session. Shortwave broadcasts and utilities, medium wave, longwave. Net info: http://www.trsc.com/swl_nte.htm
Net Mgr: Tom Sundstrom, W2XQ, PO Box 2275, Vincentown, NJ 08088-2275
Telephone gateways announced. Contributions accepted via the Internet Relay Chat (IRC) channel #swl while the net is in progress.

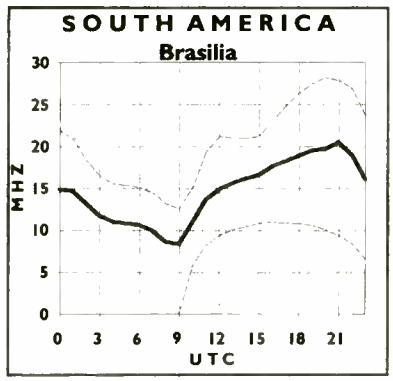
Southern Wisconsin SW Listeners Net; MARA
147.150 MHz, alt 146.760 MHz. Madison, WI, area First Sun 8pm CT. Shortwave, scanning, dc to daylight, equipment notes and comments.
Net Mgrs: N9LTD, KA9SRU, N9EWO
Contact: N9EWO, Dave Zantow, 1609 Ontario Drive, Janesville, WI 53545

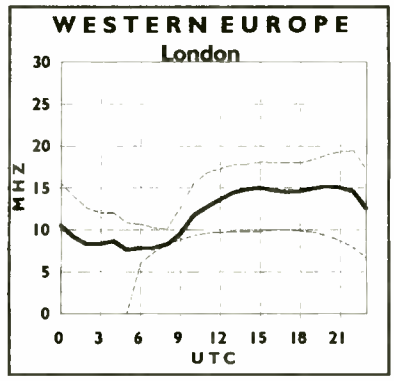
DecalcoMania: Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (908)591-2522. Worldwide AM, FM and collecting radio related items. *DecalcoMania.* $10 US, $11 Can/Mex, $16 Eur, $17.50 Asia/Pac.
DX Audio Service (National Radio Club): Ken Chatterton, P.O. Box 164, Mannsville, NY 13661-0164, (315) 387-3583; http://wcoil.com/~gnbc. Worldwide. North American Broadcasters. *DX-Audio Service* (90-min.tape). Sample $3.
Fire Net: Tom Kravitz, Box 1307, Culver City, CA 90232, 310-838-1436, internet mpage@netcom.com. All of California; fire, EMS, tied in with nationwide notification net.
Houston Area Scanners & Monitoring Club: Glen Dingley, 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW. Paging network. *HASMC Newsletter.* Meets Jan & June.
Hudson Valley Monitors Association (HVMA): Patrick Libretti, P.O. Box 706, Highland, NY 12528. Mid-Hudson valley and surrounding counties; VHF/UHF, public safety. *The Hudson Valley Monitor.*
International 11 Meter Alliance: Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands, esp. 11 meters.
Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor (34 x)* $25 US, $27 Can/Mex, $28.50 ww. First-class stamp or 2 IRCs for sample.
Longwave Club of America: Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215) 945-0543. Worldwide; Longwave only. *The Lowdown.* $18 US, $19 Can/Mex, $26 ww.
Memphis Area Shortwave Hobbyists (MASH): P.O. Box 3888, Memphis, TN 38173, Jim Pogue (901)873-4291 or Brandon Jordan 373-8046. Memphis area; SW, MW, FM, TV, utilities, pirates, etc.
Metro Radio System: Julian Olansky, P.O. Box 26, Newton Highlands, MA 02161, (617) 969-3000. New England states; Public Safety. *M.R.S. Newsletter.*
Michigan Area Radio Enthusiasts: P.O. Box 530933, Livonia, MI 48153-0933. E-mail xx024@detroit.freenet.org. Great Lakes Region. All bands. *Great Lakes Monitor.* $9.50 annual US & Canada. $1 sample.
Minnesota DX Club: James Dale, 16330 Germane Court West, Rosemount, MN 55068. All bands. Meets every 2nd Friday at 7:00 p.m. at various locations. *MDXC Newsletter,* send SASE. $10 annual.
Monitoring the Long Island Sounds: Ed, 2134 Decker Ave, North Merrick, NY 11566. Primarily scanner, some SWL. 50 mi. radius of LI. Net Tues 8pm 146.805. *Monitoring the Long Island Sounds.*
MONIX (Cincinnati/Dayton Area Monitoring Exchange): Mark Meece, 7917 Third St., West Chester, OH 45069-2212, (513)777-2909. SW Ohio, SE Ind., N Ken; All bands. Meets 2nd Sats 7pm. Net Thurs 9:30 145.210/4.610. No dues.
Mountain NewsNet: James Richardson, P.O. Box 4488, Estes Park, CO 80517-4488, (970) 586-4325vx; 4357fax; Internet jimfun@aol.com. Colorado statewide. Public Safety notification group. *Mile High Pages.*
National Radio Club: Paul Swearingen, Publisher. P.O. Box 5711, Topeka, KS 66605-0711, (913)266-5707; http://wcoil.com/~gnbc/ Worldwide; AM DXing. *DX News* 30 times yearly, sample for a first class stamp. Annual Labor Day convention.
New England Scanner Group: P.O. Box 1024, Derry, NH 03038. CT, ME, MA, NH, RI, VT. $29.95 annual.
North American SW Assoc: Bill Oliver, 45 Wildflower Lane, Levittown, PA 19057, naswa1@aol.com (215) 945-0543. Worldwide; Shortwave broadcast only. *The Journal.* Web site: http://www.mcs.com/~ralph/html/naswa/. Regional meetings. $26 annual in NA.
North Central Texas SWL Club: Alton Coffey, 1830 Wildwood Drive, Grand Prairie, TX 75050. North Central TX area; All bands.
Northeast Ohio SWL/DXers: Donald J. Weber, P.O. Box 652, Westlake, OH 44145-0652. NE Ohio; SWBC and utilities. Check for new meeting sked.

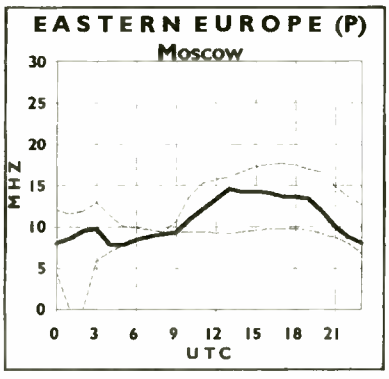
Propagation Conditions: Eastern United States

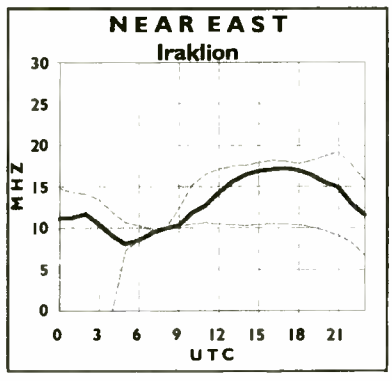
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the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

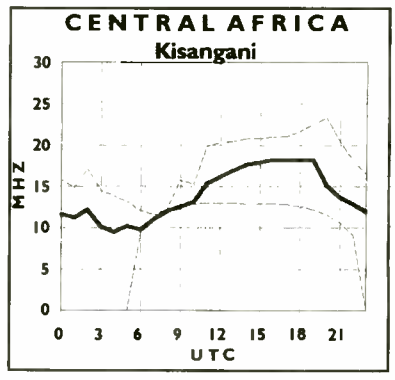


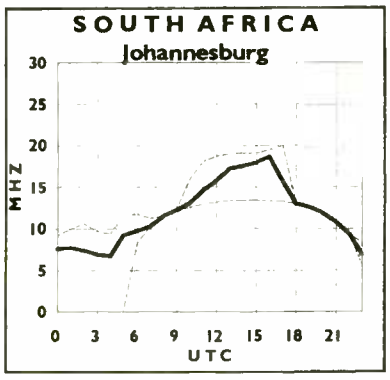


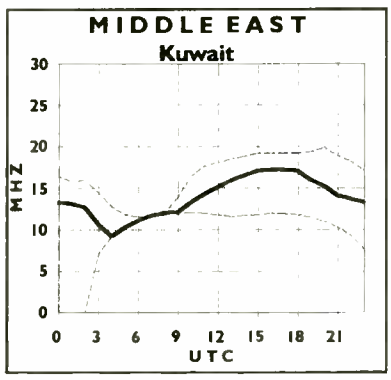


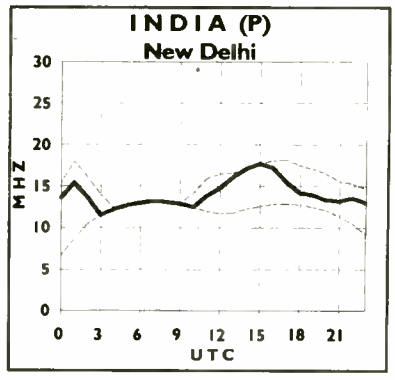


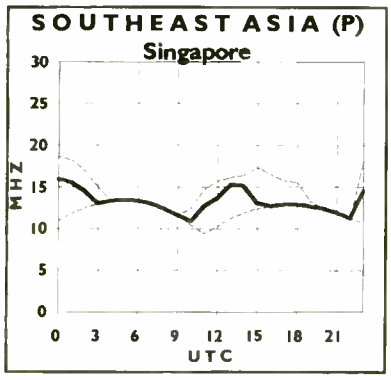


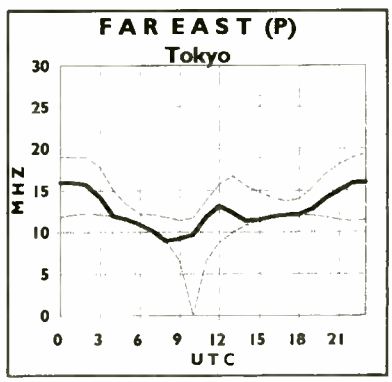


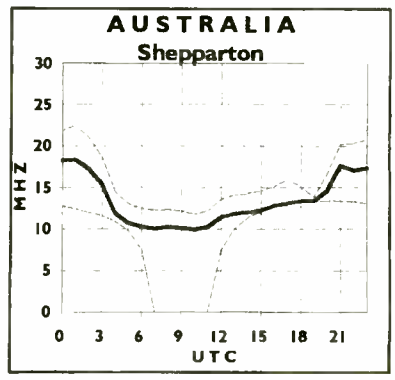






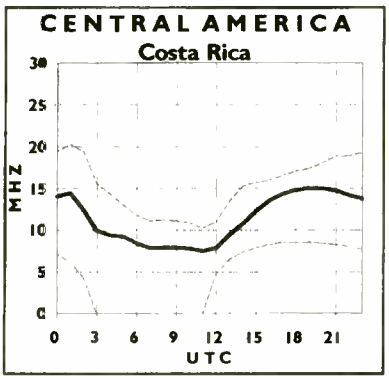


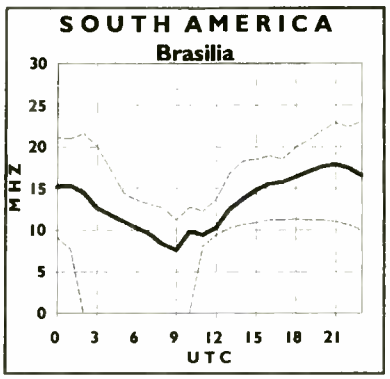


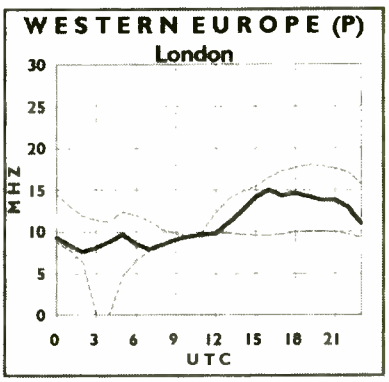


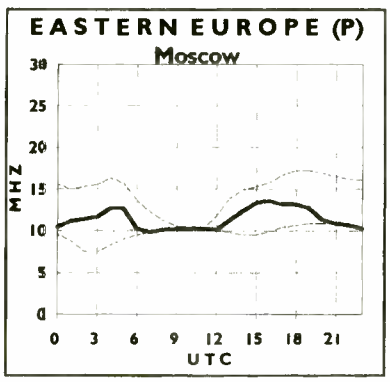
Propagation Conditions: Western United States

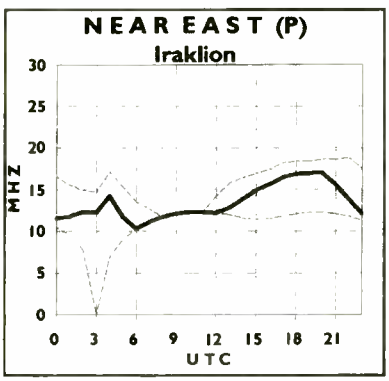
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom 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.

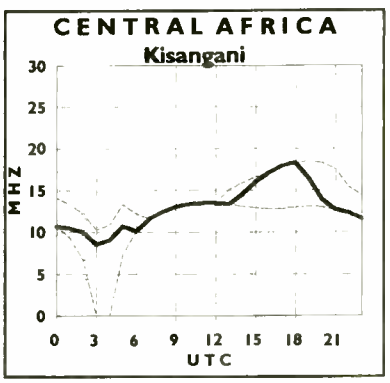


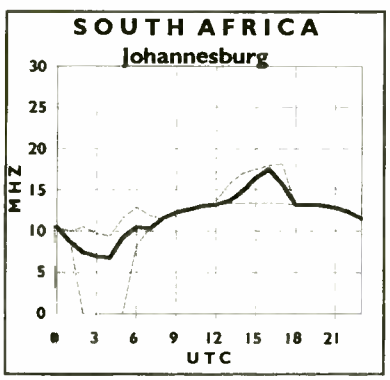


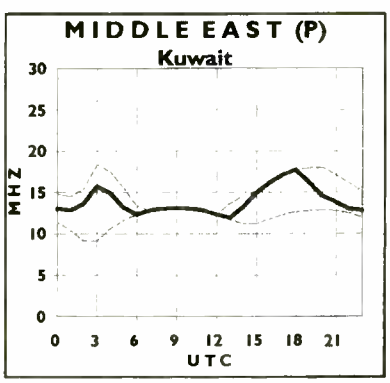


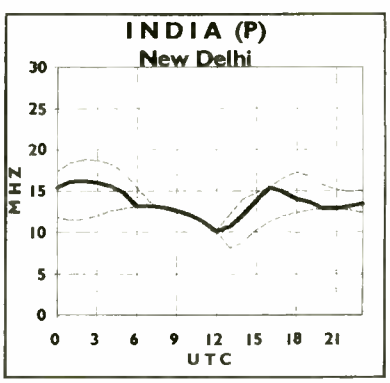


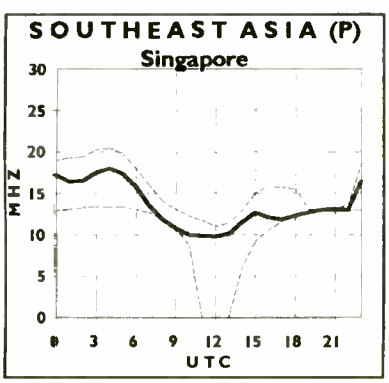


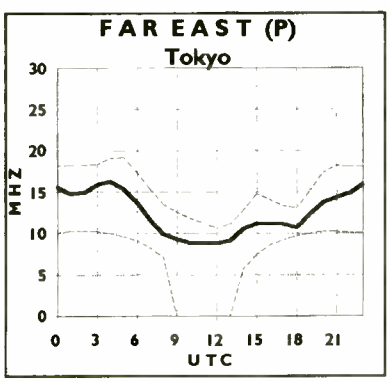


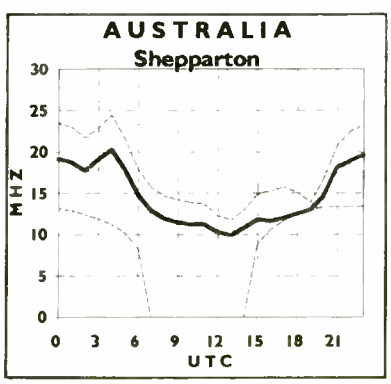












Kevin Carey, WB2QMY
kevinc@mdsroc.com

QSLing Your Catch

Many listeners are amazed to learn that you can get a QSL (verification card) from a beacon station. All it takes is a little research and creativity on your part. This month we'll discuss the basics of how to design a suitable QSL card and a cover letter that will help you get something tangible for your DXing efforts.

One thing you must understand about QSLing beacons (or any utility) is that the station operators are under no obligation to respond to hobbyist requests for verification. The majority of operators will, however, be happy to oblige when you've done your homework. This includes writing a brief, yet concise cover letter, creating a prepared-form QSL card (commonly called a PFC), and including a self-addressed stamped envelope.

Let's begin with the card itself. In all but a few cases, beacon operators do not have ready-made cards to send out to hobbyist listeners. This is why you'll need to make a PFC.

The card does not need to be anything fancy—remember, after all, this is a *utility* station. I've seen excellent results from simple PFCs made up on plain card stock. With a stencil, some colored pencils and a typewriter, you can make a pretty decent card in this way. You could also create a more elaborate design using one of the popular desktop publishing programs. The whole point is to make something that displays your genuine interest in obtaining a response.

The exact content and layout of the card is up to you. Typically, the beacon call sign and its frequency are displayed prominently near the top of the card. Beneath this, in smaller type, are entries for the date and time of reception as well as some blank lines for technical details about the beacon (power level, antenna type and elevation, for example). Most importantly, you'll want to include a line for the Engineer's verification signature. Figure 1 shows an example of a suitable homebrew design.

The Cover Letter

Equally important is the accompanying cover letter. The keep-it-simple approach works best here. Avoid technical jargon. Simply introduce yourself as a radio hobbyist seeking to verify reception of the beacon noted.

In plain language, tell where you were listening from, how well you heard the beacon, and politely ask the recipient to sign the card and return it to you in the SASE. You may also want to mention what type of receiver and antenna you used to hear the beacon.

Addressing Your Request

In most cases QSL requests should be mailed to the airport/FAA field office nearest the beacon, or, in the case of the few remaining Coast Guard beacons, to the nearest Coast Guard facility. I've found that including "Aids to Navigation" in the address helps direct your letter to the right people. By all means, don't forget to enclose a self-addressed stamped envelope with your request.

An almost indispensable tool for identifying beacons and obtaining mailing addresses is *The Aero/Marine Beacon Guide* published by Ken Stryker. The *Guide* contains data for virtually all North American beacons and the information necessary to "concoct" a proper mailing address. *The Aero/Marine Beacon Guide* is available for $15.00 from Ken Stryker, 2856-G West Touhy Avenue, Dept. MT, Chicago, IL

A close-up view of the tower base at beacon "O", 344 kHz in Ottawa, Ontario. The overall tower height is about 175 feet. (Photo submitted by Jacques d'Avignon, VE3VIA)

Mailbag

• Speaking of QSLs, *MT* reader Allen Renner (PA) is having excellent results with this activity. Allen recently sent a summary of his favorite QSLs to *Below 500 kHz*.

The QSL from his first Caribbean catch (PV, 387 kHz—Turks and Caicos Islands—shown here) included two surprises from the Engineer-in-Charge: the Engineer's own ham QSL card, and a travel brochure from the Islands! The reply from one stateside catch (LI, 353 kHz—Little Rock, AR) came complete with stickers, a postcard, and an aeronautical chart for Arkansas. While these "extras" can't be counted on in every case, it does show the enthusiasm on the part of some beacon operators.

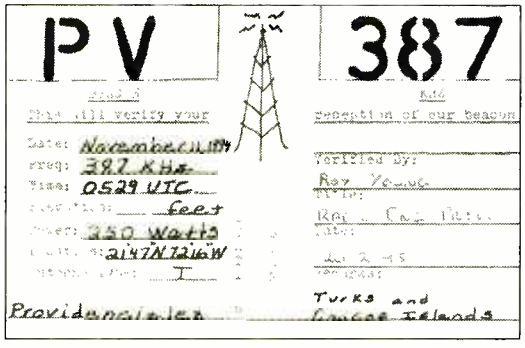


FIGURE 1: A Homebrew Beacon QSL, courtesy of Allen Renner, PA

• In the "New LF Products" department, Dick Pearce (VT) was among the first to receive an L-111 Active Antenna & Converter system from LF Engineering Co. This new product combines LFE's popular L-400B Active Antenna (reviewed here in November 1995) along with a newly designed LF-to-HF converter. This plug 'n play arrangement allows you to tune the spectrum from 3 to 530 kHz using a standard shortwave receiver.

Dick is already planning a Florida getaway with his system to DX Caribbean and South American beacons. If you'd like more information on the L-111, or any other LFE products, write for their free catalog at: 17 Jeffry Road, East Haven, CT 06513. These folks have a long history of serving the needs of LF enthusiasts, and their catalog includes some excellent tutorial information.

Grove Expo '96

Longwave will be back in the Expo lineup this year with a seminar on VLF Natural Radio. I will present this program which will cover topics such as whistlers, earthquake precursors, and indirect solar flare detection. Join us in October for this non-technical look into nature's radio spectrum!

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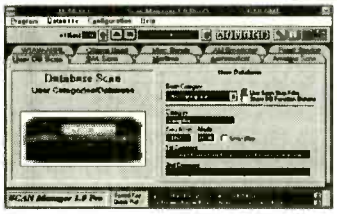
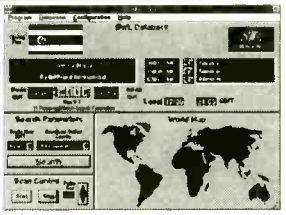


Scan Manager 1.1 Pro



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Welcome to TV Season

Many of us like to categorize the seasons according to DX. Winter is for AM and the tropical bands. Late spring is for FM and TV. Fall is for hamfests. Summer is for antenna maintenance (in the cooler areas of the country) or fishing (in the South, where it's too hot to work outdoors)!

I don't like to limit my DXing this way—there can be useful openings (as well as good hamfests and biting fish) year 'round. But most of use have limited time in front of our radios; we have to make the time we do have count, by choosing the most productive frequencies. As we enter late spring, those frequencies are the VHF and UHF ones used by FM and TV broadcasts.

One of the great things about domestic-band DXing is the low cost of equipment. Any serious AM DXer can tell you of excellent catches made on his car radio, or on a cheap portable on vacation. Same goes for TV/FM DX; you already have the equipment it takes to get started. In most cases, a car radio is an effective FM DX receiver. Many home stereo receivers are also good. If your home stereo mutes when tuned to weak signals, try switching to FM mono. This often defeats the muting circuits and allows the DX signals through.

Home stereos come with a small wire or T-antenna which will deliver DX in many openings. If you've lost yours, Radio Shack sells a variety of indoor antennas suitable for FM use.

Your home TV is also nearly DX-ready. If you have cable or a satellite dish, you will need to disconnect it and hook up an antenna instead. If your set is cable-ready, you'll need to turn that function off in order to DX UHF stations.

If you have a choice of TVs to DX with, note that the older sets with rotary tuners are often better for DX. Electronically-tuned TVs usually mute weak signals; if they don't, they still may not "lock in" properly. Newer VCRs are especially prone to the "blue screen" phenomena—especially disturbing as many TV DXers like to tape their DX. The rabbit ears/loop antenna combination provided with most TVs will provide a good start in TV DX.

As with all radio hobbies, increased expenditures bring increased results. And, as with all radio hobbies, your antenna system should be your first priority when allocating your hobby budget. A good rule of thumb is to install the biggest antenna you can afford, as high as possible. For UHF, dish antennas are preferred over Yagi or corner-reflector designs, though many DXers can't install a tall enough mast to support a dish. Special antennas specifically for FM are available, but any decent VHF-TV antenna will work nicely.

Even a modest outdoor antenna system can bring impressive results. I use a Radio Shack "125-mile" VHF and "75-mile" UHF antenna, only 15 feet off the ground. My best VHF-TV and FM catches are from over 1,400 miles away, and I've seen UHF TV stations over 900 miles distant.

WPBY-TV Huntington is the first West Virginia logging for many TV DXers, myself included. Its sister station WSWP-TV Grandview allows you to take "snapshots" over the Internet - see the text.

When to listen/watch

There is one fundamental difference between AM and FM/TV DX. There's *always* DX on AM, at least at night. On FM and TV, on the other hand, you need to watch when the DX is in. One type of DX ("tropo") is more likely shortly before and after sunrise. The other common form ("E-skip") tends to peak in late morning and early evening. But both types can appear at any hour.

I suggest you make note of some "indicator channels." These are frequencies that don't normally have signals in your area. If a signal does appear on one of these channels, you know DX is in. Try to find three indicator channels for TV. One should be a "low-band" channel between 2 and 6, for skip DX. Another should have a station in an adjacent city, maybe 75-100 miles away; a signal here indicates an opening (even a minor one) is in progress. Finally, you should have a channel with no station anywhere near your location. A signal here means a major opening is in progress.

I use channels 3, 25, and 26 as my indicators, and I check these channels every morning. On FM, 92.5 and 97.1 are good indicators here. Of course, different indicators will be in order at your location.

The tools for identifying TV DX are essentially the same as those for radio. A good station list, an atlas, and careful attention to local commercials and the top-of-the-hour ID contribute to plenty of DX catches. Now, WSWP-TV channel 9 in West Virginia offers another way to identify their station. If you're on the Internet, point your browser to **www.wvptv.wvnet.edu**. One link allows you to take a "snapshot" of WSWP-TV's air signal. Compare it to your screen, and you'll know whether you can add West Virginia to your log!

New product

Kiwa Electronics has announced a new Pocket Loop. This antenna is a 12-1/2" air-core loop which can be folded to fit in one's pocket. It's designed for use throughout the AM band (as well as most of shortwave) with portable receivers. No direct connection to the receiver is necessary; simply place the provided coupler near the built-in ferrite antenna in the receiver. The loop is expected to retail for $120. Contact Kiwa at (509) 453-5492, or on the Internet at **http://www.wolfe.net/~kiwa**. Grove Enterprises is also carrying it (800-438-8155).

Expanded-band news

Surprise! Everyone (myself included) thought WJDM would be the only station to operate in the expanded band until the FCC re-allocated the new frequencies. Of course, KTRK-1670, mentioned last month, was the first surprise, but now we have another one. KXBT (1190 AM) Vallejo, California, began tests on 1640 kHz on Sunday, March 10, and began regular broadcasts the next day.

KMXS-103.1 FM Anchorage and KCCN-100.3 FM Honolulu are not likely FM DX targets for anyone in the Lower 48 - but we can dream, can't we?!

Programming is satellite-fed soul hits from the 1960s and 1970s. Signals are weak but readable at my location in central Tennessee. Because of its clear channel, KXBT is your best bet for a California logging if you live east of the Mississippi River. If you hear this station, reports can be sent to 3267 Sonoma Boulevard, Vallejo, California, 94590. Thanks to Joshua Heide KD6KML of Napa, California, for the early notice of this test.

Bits and Pieces

• We generally don't think of AM DX as having many ongoing expenses. Maybe a new pen or logbook every few months, or new batteries for the receiver, but for most of us those costs are negligible. For many Third World residents, however, a set of batteries is a major expense. According to a Tampa *Tribune* article forwarded by Martin Theil, British inventor Trevor Bayliss has found a unique and inexpensive source of power—the listener him/herself. A factory in Milnerton, South Africa, is producing 20,000 "BayGen Freeplay" radios every month. The user spends about a minute turning a crank 60 times; this winds up a spring (much like an alarm clock) which generates electricity as it unwinds. One winding allows the set to play for 38 minutes. The radio's coverage includes AM/FM and shortwave frequencies.

• Charlene Vickers reads *MT* in the Northwest Territories of Canada (where any TV stations besides the locals are excellent DX'). She has a correction to the caption to the CICT-TV logo that appeared in February, in which I mentioned the "7" referred to a relay station in Lethbridge. Quoting, "It did back in the 60s. Nowadays, it refers to CICT's location on cable." This trend—for stations to promote their cable channel when it differs from their air channel—seems especially common in Canada. Indeed, says Charlene, CFCN-TV channel 4 in Calgary only mentions its cable channel, not the broadcast channel!

• Speaking of Canada, if you're hearing Asian-language programming on 1430 kHz, sorry: it isn't China, Japan, or Korea. All-sports station CJCL-1430 has moved to 590 kHz. They've turned over the 1430 channel to an ethnic group.

Are you seeing anything exotic on your TV? Are you hearing KXBT-1640? Do you have any tips for summertime DX on any of the domestic bands? Let us know. Write P.O. Box 98, Brasstown NC 28901, or 72777.3143@compuserve.com. Good DX!

George Zeller
George.Zeller@acclink.com

Cuban Clandestines Worth Watching

Following the international incident caused when the Cuban Air Force downed two private aircraft from Florida that were skirting Cuban airspace, President Clinton responded in part by extending the broadcast hours from **Radio Martí.** This quasi-clandestine now uses the VOA Delano, California, transmitter for five hours at 0700 UTC on 5890 kHz, two additional hours at 1200 UTC on 7405 kHz in what used to be an active 41 meter pirate band, and five hours of extra broadcasts at 1800 UTC on 13655 kHz.

The USA also increased the power of the 1180 kHz AM band medium wave Radio Martí transmitter in Marathon, Florida. The VOA noted during its regular *Communications World* show that all of these frequencies are heavily jammed, but except for a groundwave jamming signal in the Havana area, the programs can be heard in much of Cuba. We can hear the jamming on many of these frequencies from other North American locations.

This newly intensified conflict between the USA and Cuba might result in increased clandestine broadcasting toward Cuba. So far we have not seen this. But, as we pointed out last month, the daytime 9941.7 kHz and late evening 6305 kHz frequencies of **La Voz del CID** are newly reactivated after a brief absence. If you want to check out the Cuban jamming signals, these channels are another good place to look.

In the past, the area between 6900 and 7100 kHz has spawned several other anti-Castro clandestine operations, some of which have led to FCC busts. Given the current political climate, this range is a good place to bandscan. If you hear a new Cuban clandestine, you will have a great DX catch. Let us know if you hear anything!

■ Two Good Web Sites

The explosion of activity on the internet has created a demand for World Wide Web sites on tens of thousands of topics. Unlicensed pirate and clandestine stations have their own presence on the internet. If you're searching for clandestine station schedules by time, *MT* contributor Harald Kuhl has a web site in Germany that is very interesting. A trip to **http://up4c03.gwdg.de/~huhl/cla** gives you access to four pages of known clandestine station schedules. The information includes station names, target areas, language, and the date, time, and frequency of operation.

CELL: The automatic 800 MHz scanner mod

Pirate stations are covered in another excellent web site maintained by veteran DXers John Cruzan and Kirk Trummel. This one is reached via a **http://www.clandjop.com/~jcruzan/frn.html** address. The site includes pirate station information, graphics of QSL's, and actual audio checks from several pirate shows that you can download. You'll like this one!

■ Texas Pirate?

MT received a press release from **TROT,** an organization that has future plans to operate "the first actually legal non-FCC-licensed radio station." The organizers say that Texas officially became a republic again on September 22 last year, creating a loophole that the FCC has no jurisdiction there. A 50,000 watt station is planned in the regular medium wave AM broadcast band. It's unclear if this effort will ever materialize, but there is a "Back to Republic of Texas" home page on **http://www.flash.net/~robertk/formal.htm**

■ More Local Pirates

Our *MT* feature this month on Steven Dunifer's **Radio Free Berkeley** profiles the most notorious local FM pirate in the USA. But, he is by no means the only station that is on the air. Ed Rausch of Cedar Grove, New Jersey, forwards a *New York Times* feature about **Steal This Radio,** which operates on Friday evenings on 88 7 MHz in the FM broadcast band from Manhattan. Station operator "Fast Forward" says that he was inspired by Dunifer's projects in the California Bay Area.

The *Times* notes that 91.9 MHz is another frequency that is regularly used by pirates in the New York City area. Dave Schmidt of Wilmington, Delaware, points out that *Radio World* regularly chronicles FCC busts of New York pirates on this frequency. **Nasty Radio** suffered this fate earlier this year, but others such as **WJQR** are sometimes heard on this channel.

■ PiPa and FRW Merger

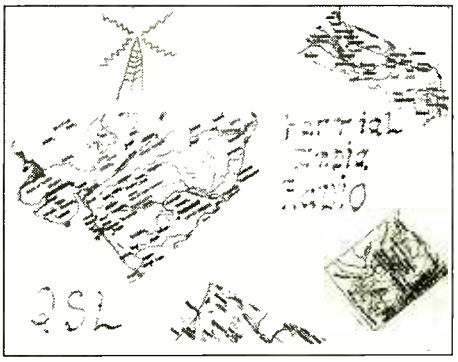
The biweekly *Pirate Pages* newsletter and the *Free Radio Weekly* pirate email newsletter have announced a temporary merger for the next few months. Both resources are excellent timely listings of very recent pirate radio activity in North America. Hard copies are available by mail to *PiPa* subscribers for $10.00 annually via the Blue Ridge Summit maildrop listed below. "FRW" is *free* to persons contributing logs during a week (otherwise $5.00 annually) via the **piradio@usa1.com** email address.

■ What We Are Hearing

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; PO Box 17534, Atlanta, Georgia 30316; 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.

North American pirate activity continues at a brisk pace, as we see here. All frequencies are in kHz, with times that our readers heard the stations listed in UTC. You can send in your logs via PO Box 98, Brasstown, NC 28902, or via the internet at the address atop this column.

Bill Cosmic Space Radio- 6955 at 0300. This odd one mixes a diverse selection of rock and country



Part of the Partial India Radio QSL

music, but it's best noted for the conversations with space aliens that are always featured. Addr: Ytterby. (Basil Shelley, Blythe, CA)

Caribbean Sound System- 6956 at 0000. Count Whip always broadcasts from a cruise ship, but for some reason he recently encountered icebergs. One of his shows was dedicated to *MT* contributor Neil Wolfish. Addr: Stoneham. (Isaac Kelly, Houston, TX; Shelley)

Cell Block 13- 6955 at 2330. The Warden at this pirate always emphasizes jail themes during his shows of music and sketches. Addr: Stoneham. (Shelley)

CELL, Cell Phone Radio- 6955 at 0400. Here's one for illegal scanner buffs. It plays taped recordings of actual cellular telephone calls. The slogan on their QSL reads, "This station violates all the rules and provisions of the Emergency Communications Act of 1986." Addr: Wellsville. (Pat Murphy, Chesapeake, VA)

Free Hope Experience- 6955 at 2000. Major Spook's elaborate productions are frequently entertaining. David says that he'll have to take out a small loan for stamps to write all of the pirates that he's heard lately! Addr: Blue Ridge Summit. (David Chapchuk, Scranton, PA; Shelley; Kelly)

Friday Radio- 6955 at 2330. Themes are diverse in pirate radio. This operator extols the great virtues of Friday, since it is the beginning of the weekend. Addr: Providence. (Kelly; Shelley)

KAOS- 6955 at 0130. This longtime pirate callsign has a new incarnation. The current operator plays a mix of rock music and humorous phony commercials. Addr: None, gives a bogus 800 phone number for QSL's that is actually a sex line. (Randy Ruger, North Hollywood, CA; Murphy)

KDED- 6955 at 0400. Reports of this station's demise were greatly premature. They have diversified their programming, though, so Grateful Dead music is not their only fare. Addr: Providence. (Ruger; Kelly; Shelley)

KIWI- 7460 at 0830. Graham Barclay's weekend shows sometimes use this alternate frequency instead of his usual 7445 kHz spot. Jesse heard them relaying North American pirate **Radio Doomsday,** which is certainly the hard way to hear a local pirate. Addr: Napier. (Jesse Rose, Hampton, VA)

KMOM- The station has produced a funny *"The Lace"* parody of the ACE bulletin. Supplies are limited, but $2 to their address should get you a copy of this booklet. Addr: Wellsville (direct from the station)

KOLD- 6955 at 0030. Aldo Batista accurately claims that he has the only shortwave pirate that features a big band music format from the 30's and 40's. Addr: Stoneham. (Kelly; Chapchuk; Shelley; Ruger)

KTLA- 6955 at 0500. Some pirates, including this rocker with a female announcer, can still be heard at late hours, despite the currently very low sunspot counts. Addr: Providence. (Mike Lundstrom, St. Louis, MO; Shelley; Kelly)

Mystery Radio- 6955 at 2045. This unusual station is usually dominated by techno pop music, but it adds sound effects and electronic sound edits to create an odd effect. Addr: Stoneham. (Murphy)

North American Pirate Relay Service- 6955 at 0045. Richard T. Pistek still relays many other pirates, including several European stations that are otherwise extremely difficult catches in North America. Barry heard their relay of **Sunshine Radio.** Addr: Wellsville. (Barry Williams, Enterprise, AL)

Northern Music Radio- 6955 at 1930. Although this rock music station is a Europirate, it uses a United States address for North American listeners. **NAPRS** usually supplies the transmitter relay. Addr: Providence. (Robert Ross, London, Ontario; Neil Wolfish, Toronto, Ontario)

Outlaw Radio- 6955 at 0000. Gigi was pleased to find QSL #60 from them in her mailbox in 180 days. Look for their air raid siren interval signal. Addr: Providence. (Gigi Lytle, Lubbock, TX; Shelley; Kelly)

Partial India Radio- 6955 at 1915. This new and extremely funny DX parody station is now verifying reception reports, as we see here this month. The banter from Harry Krishna and Sanjay is extremely well produced. Addr: Stoneham. (Chapchuk; Shelley)

Radio Airplane- 6956 at 2245. All of Captain Eddy's shows are supposedly transmitted from a piper cub aircraft in flight. Rock, comedy, and Looney Tunes cartoon audio make up the programming. Addr: Wellsville. (Kelly)

Radio Azteca- 6955 at 1800. Bram Stoker went all out at the Kulpsville Winter SWL Festival in mid-March. He ran a low power transmitter there with constant relays of this DX parody station's funny shows. Addr: Wellsville. (Chapchuk; Shelley; Ruger; direct from the station)

Radio Doomsday- 6955 at 2200. Nemesis is not as active as he used to be, but when he's not being relayed by stations in Oceania or Europe, he still takes to the North American airwaves occasionally. Addr: Ytterby. (Ruger; Kelly)

Radio Free Euphoria- 6955 at 0000. Like **KNBS,** this station is a marijuana advocacy operation. Addr: Wellsville. (Ruger)

Radio Free Speech- 6955 at 0445. Bill O. Rights always makes a statement about the First Amendment during his shows. On some occasions he relays other pirates. The station mails out elaborate QSL packages and a station ruler in response to reception reports. Addr: Wellsville. (Murphy; Chapchuk; direct from the station)

RBCN- 6955 at 2045. Radio Bob's Communications Network always features a clever mix of originally produced comedy. During a recent show, Radio Dave took over the show and announced that there would be no more disco music. Addr: Atlanta. (Murphy, Rose)

The Fox- 6955 at 0130. This station's programming usually concentrates on discussions of pirate radio and advocacy for the free radio scene. Addr: Blue Ridge Summit. (Shelley)

Up Against the Wall Radio- 6955 at 0145. Owsley combines parody sketches with 60's and 70's political rock. He once substituted **CSIC**'s "Psycho Chicken" interval signal for his normal "oogah" klaxon horn IS, so be careful. Addr: Providence. (Kelly; Shelley; Ruger)

Voice of the Runaway Maharishi- 6955 at 0145. The Maharishi's mix of rock music and off the wall commentary seems to appear on the pirate bands several times a year. Addr: Providence. (Kelly; Shelley)

WBYR, Brick Yard R.- 6955 at 1800. The male announcer on this new one is programming a rap music format. Addr: Providence. (Robert Ross, London, Ontario)

WEED- 6955 at 0300. This marijuana advocacy station is not nearly as active as it was a year ago, but it still pops up on the bands with its slick productions of rock and novelty music. Addr: Huntsville. (Jerry Coatsworth, Merlin, Ontario)

WLIS- 6954 at 1715. Jack Boggan still plays actual licensed shortwave broadcast interval signal tuning melodies on his broadcasts. He has over 50 different QSL designs to choose from, and you can request any one of them when you write in. Addr: Blue Ridge Summit. (Murphy, Rose)

WPN, World Parody Network- 6955 at 0000. Theme music from Monty Python always begins and ends the mix of rock and comedy that is transmitted by this fairly active pirate. Addr: Huntsville. (Kelly)

WREC- 6955 at 2230. A case could be made that P. J. Sparx has been the most active North American pirate during the last several months. He plays rock and novelty music, often with cameo identification announcements by other pirates. But, he also frequently relays shows from other free radio stations. Addr: Wellsville or Blue Ridge Summit. (William T. Hassig, Mt. Prospect, IL; Lundstrom; Shelley; Wolfish; Chapchuk; Kelly; Coatsworth)

WRV- 6955 at 1915. Pete the Pirate promotes the pirate radio scene during his broadcasts, even though "The Radio Virus" still is a slogan that nobody wants to catch. Addr: Wellsville. (Coatsworth)

WWWW- 6955 at 1915. The format at "Four W Radio" is rock music. David says that this one had the strongest signal that he's heard this year. Addr: Wellsville. (Chapchuk)

Ike Kerschner, N3IK

Better QSO'S

A subject I have mentioned several times in this column is how to have better QSOs. Checking my log book last winter, I was interested to discover that my average contact was over seven minutes. When discussing this with a good friend he asked me why I wasted so much time per contact and proudly informed me that his average QSO was under two minutes!

Needless to say, I was really confused. I explained that I thought the idea was to get to know the folks I contacted and become friends. Ted countered with, "all I am interested in is working the state, county, or country for an award, or to see how many QSO's I can make in a weekend."

Ted does have a point: there are many people in ham radio who do not want to chew the rag. Awards and contesting do have a place in the hobby, and it appears that more and more hams are leaning in this direction. A poll on the subject would be interesting. If you have any thoughts on it, please drop me a note and say "yes, let's rag chew" or "down with the rag chew!" I'll report the results in a later issue of *MT*.

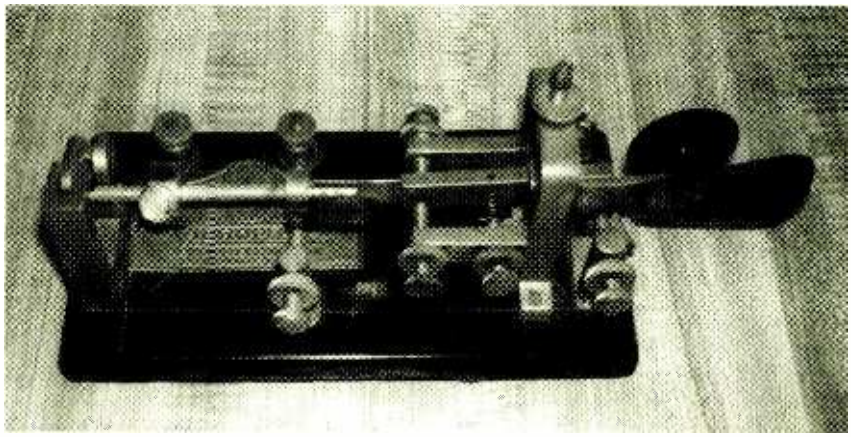
Games People Play

Do you play games on the air? Some years ago, a group of hams met on 80 and 20 meters to play chess. That group seems to have gone away, but it was a fun bunch of guys who provided each other with many interesting QSO's. Chess is the only game I ever conceived as being possible to play on the air.

However, with the advances in digital techniques it seems we should be able to come up with some creative ideas for game playing. Put your mind to it and drop me a note about your idea or about the games you may already play.

One Last Question

I have a small collection of Vibroplex Bugs. I never did a lot of heavy research on any of my bugs, as most are fairly new and not uncommon. However, a few years ago I acquired an unusual bug manufactured by Vibroplex. The serial number is 88238, so I assume it is not a very rare item. But I am intrigued by the unit, and would like to know if it had a model name and the year it was built (often the serial number tells the year; could it be 1938?). The gold trim appears to have arrowheads at each corner.



Can anyone shed some light on this Vibroplex bug?

Take a look at the photo, and if you can tell me anything about this bug, please let me know. A letter to Vibroplex has gone unanswered, so they may not know any more than I do.

Electrical Storms

This is the season for electrical storms. Is your station protected? There are many devices on the market to protect the rig in case of a nearby lightning strike. However, none are infallible, and nothing will protect the rig from a direct strike! The best protection is to be sure your station is disconnected from the antenna and power line during a storm. When you are using the rig during the season of high electrical storm activity, be sure to completely disconnect everything when you are done operating.

Outdoor Fun

I have a 16 foot aluminum fishing boat and wanted to have something to do when the fishing action gets slow. I built a 16 foot whip antenna for use on 20 meters and top loaded the whip with a coil for 40 meters. I also have a half-wave vertical on 6 meters.

I made a simple mount from PVC and plywood and clamped it to the side of the boat. The aluminum boat provides a super ground. A K-Mart $39.95 battery powers my TS-680 for a full weekend without problem. Now when the fish stop biting, I find some shade and ham away till the fish are hungry again. This rig has provided me with lots of fun on what might otherwise become a dull day.

Field Day

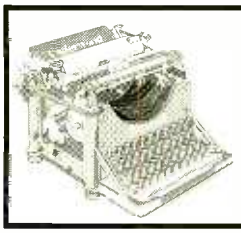
The last weekend of June is the ARRL Field Day—one of the most enjoyable contests of the year. If you have never been on a Field Day, contact your local club and join them for a weekend of great hamming. The point of Field Day or FD is to contact as many stations as possible while using emergency power. If you do not have a club nearby, get a copy of the rules in the May issue of *QST* and take to the fields on your own or with a bunch of friends.

Even if you hate contests you'll love FD, because it is not just a contest; it's plain fun to set up an emergency station and spend a weekend with your ham buddies. 73 de Ike, N3IK

SPECIAL EVENT CALENDAR

Monitoring Times is pleased to run brief announcements of radio events open to our readers. Send your anouncements at least 60 days before the event to: Monitoring Times Special Events Calendar, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net

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	Manahawkin, NJ	Old Barney ARC Banquet / Jim Bangert, 259 Station Drive, Forked River, NJ 08731
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. Location: Hagerstown Jr College Rec Center. Talk-in 146.940- 146.520(s). $5 adm.
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 29-Jun1	Denver, CO	Natl Assoc for Search & Rescue Conf & Ex, Denver Marriott Tech Center. Contact 703-222-6277
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
May 31-Jun2	Seaside, OR	NW Div Conv / Randy Stimson KZ7T, 9890 SW Inglewood St, Portland, OR 97225, 503-297-1175
Jun 1	Loveland, CO	N CO ARC / Michael Robinson AA0UB, 2236 Silver Trails Dr, Ft. Collins, CO 80526-6414; 970-282-1167. Location: Larimer Co Fairgrounds, 8am-3pm. Talk-in 145.515/145.115
Jun 1	Hermon, ME	Pine State ARC / Roger Dole KA1TKS, RR2 Box 730, Bangor, ME 04401; 207-848-3846
Jun 1	Friendship, WI	Adams Co ARC / PO Box 232, Friendship, WI; 608-564-7887. Packet N9TD-1 on 145.03.
Jun 2	Butler, PA	Breezeshooters / Bob Ferrey Jr. N3DOK, 412-367-2393. Butler Farm Show grounds, Rte 68. $2 adm. Talk-in 147.96/.36
Jun 2	Princeton, IL	Starved Rock RC / Debbie Burton N9DRU, 1153 Union St, Marseilles, IL 61341-1710; 815-795-2201
Jun 2	Manassas, VA	Ole Virginia Hams ARC / Kenneth Moan KM4UH, 12019 Bradley Forest Rd, Manassas, VA 22111; 703-369-5287
Jun 8	Rathdrum, ID	Kootenai ARS / PO Box 5222, Coeur d'Alene, ID 83814; 208-773-0863
Jun 8	Winston-Salem, NC	Forsyth ARC / Bill Patterson KD4RGB, PO Box 11361, Winston-Salem, NC 27116-1361; 910-723-7388
Jun 8-9	Atlanta, GA	GA State Conv / Marty Reynolds AA4RM, 960 Lindridge Dr, Atlanta, GA 30324; 404-365-9280
Jun 9	Queens, NY	Hall of Science ARC / Arnie Schiffman WB2YXB, 47-01 111 St, Flushing Meadow, Queens, NY; 718-343-0172. Talk-in 444.200 rptr, 146.52s. 9am-3pm. $5 adm.
Jun 9	Willow Springs, IL	Six Meter Club of Chic / Joseph Gutwein WA9RU, 7109 Blackburn Ave, Downers Grove, IL 60516-3925; 708-963-4922
Jun 9	Winfield, PA	Susquehana Valley & Milton ARCs / David Welker AA3BO, 229 Ridge Ave, Sunbury, PA 17801; 717-286-0787
Jun 9	Woodstock, IL	Cook Co Hamfest / 91st and Wolf Rd, McHenry County Fairgrounds
Jun 14-15	Albany, GA	Albany GA ARC / Terry Lewis KD4KVY, 3821 Slade Ave, Albany, GA 31707; 912-432-0437
Jun 15	Dunellen, NJ	Raritan Valley ARC / Robert Pearson WB2CVL, 149 Emerson Rd, Somerset, NJ 08873; 908-846-2056. Location Columbia Park near Rt 259 & 28. 7am-2pm. $5 adm. Talk-in 146.625(r), 146.520(s)
Jun 15	Milford, OH	Milford ARC / Gerry Reisert KF8YB, 6464 Wardwood Dr, Loveland, OH 45140; 513-677-9255
Jun 16	Cambridge, MA	MIT RS & Harvard Wireless Club / Steve Fineberg W1GSL, PO Box 397082, MIT Branch, Cambridge, MA 02139; 617-253-3776
Jun 16	Monroe, MI	Monroe Co Radio Communications Assoc / Fred Van Daele, 4 Carl Dr, Monroe, MI 48162; 313-242-9487. Location: Monroe Co Fairgrounds on M50 at Raisinville Rd. Talk-in 146.72, 442.825. 8am-2pm $5 adm.
Jun 20-23	Washington, DC	Talk Radio '96, Nat'l Assoc of Radio Talk Show Hosts, Omni Shoreham Hotel, 617-437-9757
Jun 23-24	Asheville, NC	DERA Workshops on Community Emergency Preparedness and Response Team Mgt. Contact 414-587-3636



Just do it!

Do you have a topic you've always "thought about" writing up for Monitoring Times? Now is the time! Given our full-spectrum coverage, plus the interest in new technology on the one hand and nostalgia for the past on the other, there is no limit to appropriate subject matter to write about. Bone up on your research, warm up your pen, and you, too, can earn a little spending money!

Pitch your idea to the editor at mteditor@grove.net or call 704-837-9200 and ask for Rachel. Writer's Guidelines are available on the MT homepage at www.grove.net, or for an SASE.

Build a Noise Squelcher

In last month's *MT* column I described antennas that reduced man-made noise. The text also provided information about where to purchase two commercially-made noise canceling gadgets. This month you will learn how to build your own Noise Squelcher for use between your antennas and your receiver.

Removal of man-made local noise, such as that from power lines and appliances, is done most effectively when the noise is canceled ahead of the receiver. The noise blankers we have in our store-bought receivers are seldom effective for dealing with QRN. Also, they cause strong signals to sound distorted. The Noise Squelcher does not do that, nor does it impair the dynamic range of most receivers.

Principle of Operation

Let's stroll through the circuit in Figure 1 and learn how it works. A short, sense antenna (20 to 30 feet of wire should suffice) is attached at J1. The main receiving antenna is connected to J2. Both antennas contain man-made noise when that type of QRN prevails.

R1 provides an electrical center tap for the secondary winding of T1. This could be accomplished without R1 if T1 had a bifilar-wound secondary winding, which would provide a balanced center tap. However, the Figure 1 scheme is easier for beginners to manage, and hence it is used.

Phasing control R2 selects noise that is 180 degrees out of phase with the noise from J2. When the amplitudes of the two components of noise are the same (R3 GAIN control), and the phases of the two noise energies are 180 degrees apart (R1 and R2 adjustment), the noise is canceled. This circuit can null up to 50 dB of local noise. The desired signal is attenuated only 3 to 6 dB in a typical situation.

Q3 has been added to compensate for signal loss through the system. It also matches the Q3 source (200 ohms) to the 50-ohm input of your receiver by means of broadband transformer T2.

The effective operating range of the Figure 1 circuit is 100 kHz through 60 MHz. T1, T2, and the rest of the circuit provide broadband response over this range.

Noise cancelers of this variety do not reduce atmospheric static crashes. However, the atmospheric "white noise" heard during the winter months on 160 meters before dawn can be nulled effectively. This is an asset when copying weak DX signals on 1.8 MHz. Without this useful gadget there would be many days when the line noise from the 10-kV power line near my home would prevent me from copying, let alone finding, signals weaker than 10 dB over S9.

Construction Tips

Although the generic MPF102 JFETs specified at Q1, Q2, and Q3 provide acceptable performance, 2N4416 or other high performance JFETs are a better choice. In any event, both types ensure low-noise reception to preserve the receiver NF characteristics.

The Figure 1 circuit can be tacked together on a piece of Perf Board. It is important to keep all leads as short as you can. The circuit around T1, R1, R2 and Q1 must be as symmetrical as possible. Panel controls R1, R2 and R3 need to be close to the circuit board. Try to keep their connecting leads shorter than 1-1/2 inches.

T1 and T2 are wound on Amidon Assoc., Inc., FT-37-43 ferrite toroids.[1] These are 3/8-

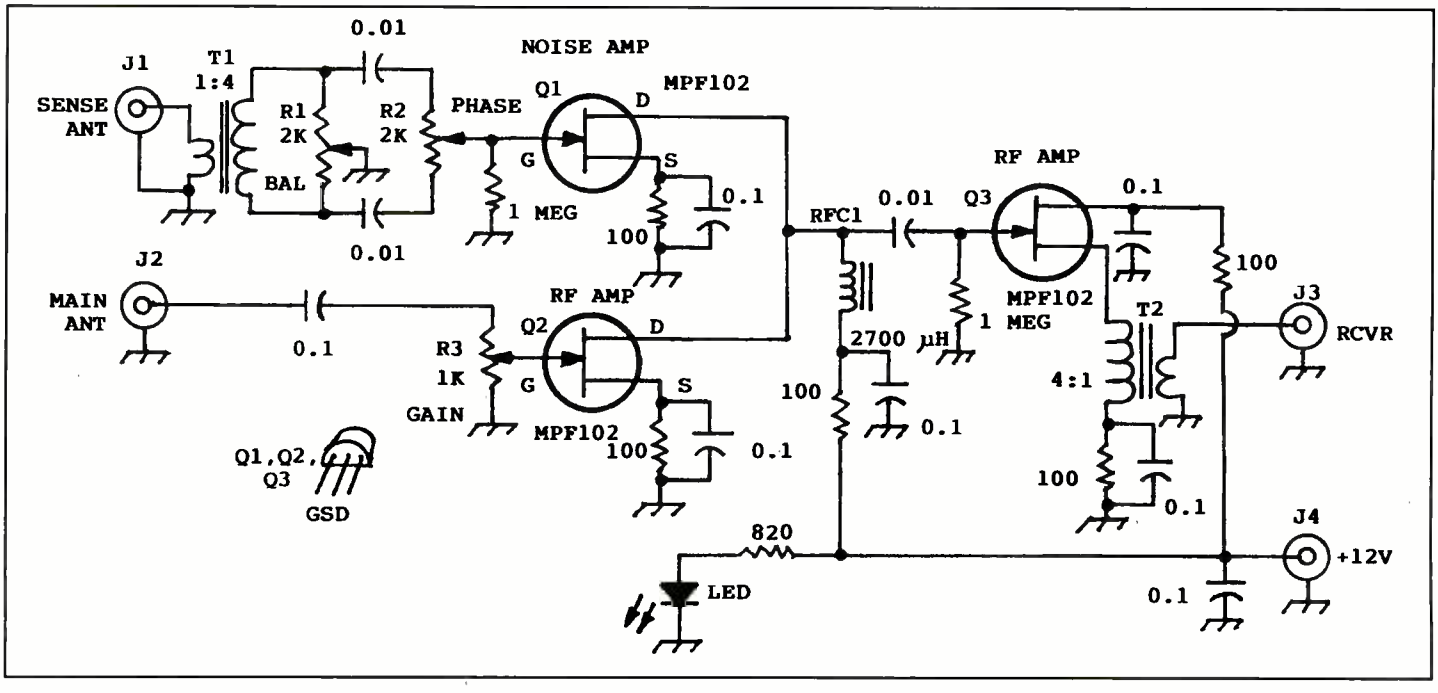


FIGURE 1: Schematic diagram of the W1FB Noise Squelcher. Capacitance is in µF. Resistors are 1/4-W carbon film. J1 through J4 are jacks of the builder's choice. R1 and R2 are 2K-ohm linear-taper controls (Mouser 31VA302). R3 is a 1K-ohm audio-taper control (Mouser 31VJ301). RFC1 is a 2700-µH (2.7 mH) RF choke (Mouser 434-17-272J). T1, T2 (see text).

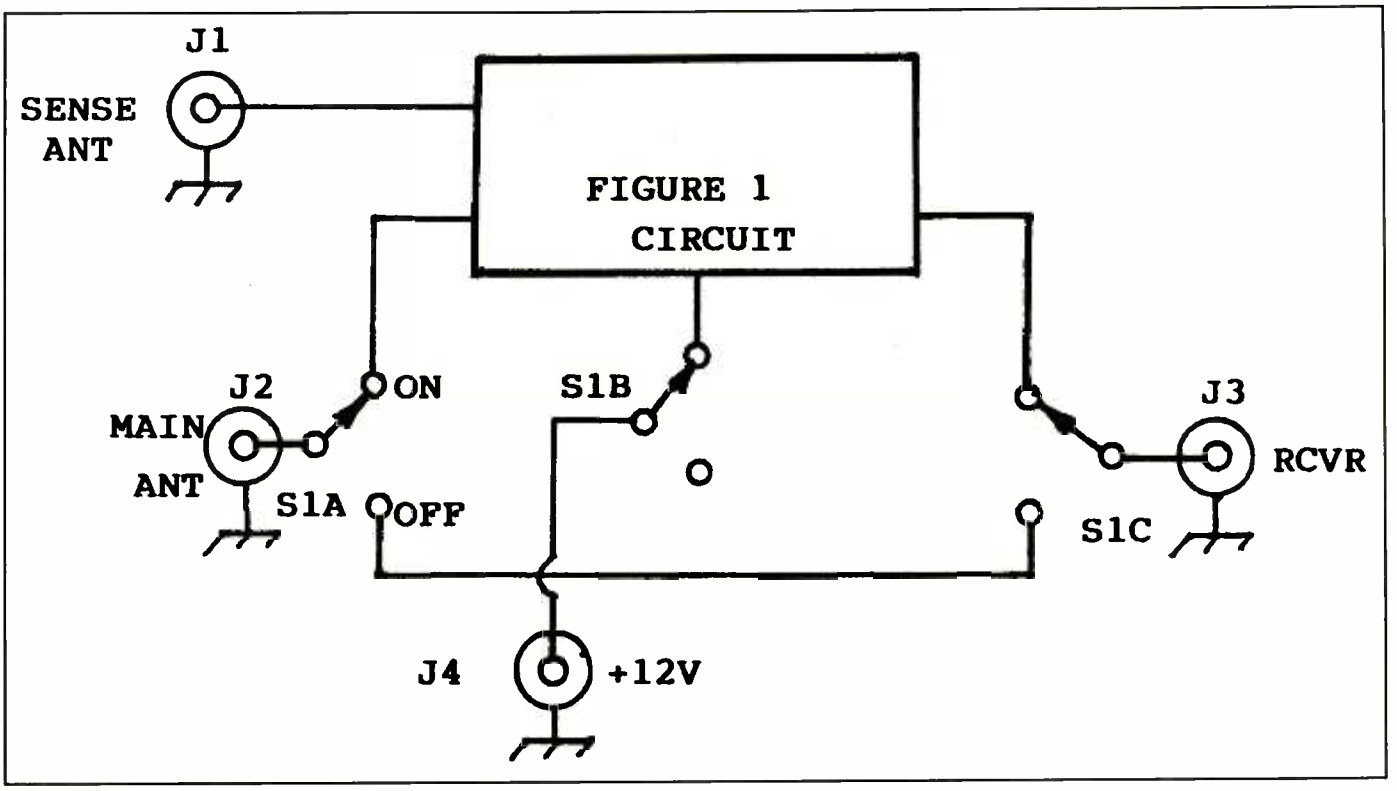


FIGURE 2: Method for switching around the Figure 1 circuit when it is not needed. S1 is a 3-pole, 2-position miniature phenolic or ceramic wafer switch. Mouser 10WW033 (one section unused) suitable.

inch OD cores with a permeability of 850. Use 14 turns of no. 28 enamel wire for the large windings. The smaller windings each have seven turns of the same size wire. They are wound over the large winding to occupy all of the core.

R1 and R2 are linear-taper carbon controls. R3 is an audio-taper control. This makes adjustment of the RF amplifier less critical as you approach maximum null depth. These and most of the other parts in the circuit are available by mail from Mouser Electronics.[2]

The Noise Squelcher should be contained in a metal box to prevent stray pickup of noise. It is a good idea to connect an earth ground to the cabinet. You can make an inexpensive project box from sections of double-sided PC board stock. Join the box seams with solder while using a 30- or 40-watt soldering pencil.

Using Your Squelcher

Tune in a moderately strong signal. Adjust the GAIN control for a signal reduction of roughly 10 dB. Now, tune off the signal to a nearby unused frequency. Alternately adjust R1 and R2 for the deepest noise null obtainable. The noise should disappear. Next, advance the GAIN control until an S unit of noise registers on your S meter. Readjust R1 and R2 for a null. Continue this procedure until the noise is not completely nulled out. Reduce the setting of the GAIN control slightly to obtain an S zero noise reading. Adjusting the Noise Squelcher is similar to manipulating an antenna tuner with three controls for an SWR of 1:1.

When you don't need to use the Squelcher you can leave it in the antenna line and advance the GAIN control to the fully on position. However, you may want to include a switch-around circuit that will turn off the unit. Figure 2 shows how this can be done with a 3-pole, 2-position miniature wafer switch. This circuit draws less than 50-mA, thereby making it practical to power it with an inexpensive wall transformer.

Tag Ends

A more elaborate version of the Noise Squelcher is scheduled to appear in my *CQ* magazine column (Doug's Desk). It contains a relay-controlled switch-around circuit to permit transmitting up to 150 watts through it. It also uses the circuit shown in Figure 2, along with extensive diode protection circuits that prevent RF power from damaging the unit. A circuit board for that model (QRN Squasher) will be available from the vendor listed in that article.

Two commercial products that eliminate man-made noise are available if you are not motivated to build the Figure 1 circuit. These companies are S.E.M. and JPS Communications.[3] I have tested both devices and found them to perform effectively.

Notes

1 — Amidon Assoc., Inc., 3122 Alpine Ave., Santa Ana, CA 92704. Phone: (714) 850-4660. Catalog available.

2 — Mouser Electronics, 958 N. Main St., Mansfield, TX 76063-4827. Phone: (800) 346-6873 for catalog or for ordering.

3 — S.E.M. Co. QRM Eliminator MK-II. 8 Fort William, Douglas, Isle of Man IM1 5BQ. Phone: 01624 662131 for one-day service. Also, JPS Communications, Inc., model ANC-4. P.O. Box 97757, Raleigh, NC 27624.

Jean Baker, KIN9DD

Fifty Years Before the Concorde

Welcome aboard! During the past year, we've featured the supersonic Concorde in great detail. For a change of pace, let's indulge in some airline nostalgia as we go back in time 50 years to look at an aircraft that was as famous in its own right as Concorde is today: the Lockheed Constellation, affectionately dubbed the "Connie."

Fifty years ago, the "Connie" broke records crossing the Atlantic. Photo courtesy TWA.

In 1946 a voyage on an ocean liner was still the most conventional way of crossing the Atlantic. However, that year TWA's record-breaking Flight #934 to Paris marked the dawn of a new age of long-distance travel. On a bone-chilling winter's day—5 February 1946—at 1911 hours (2:11 p.m. EST), TWA's brand new Constellation *Star of Paris*, piloted by Captain Harold Blackburn, took off from New York's LaGuardia Airport on a record-breaking flight: the first regularly scheduled transatlantic air service between the United States and Europe, taking less than 30 hours! The flight lasted 19 hours and 46 minutes and carried 36 passengers along with eight crew members. No airline had ever flown from New York to Paris so quickly, nor carried so many passengers at one time.

TWA was the first airline to put the famed Constellation into scheduled service on its transcontinental and overseas routes. The *Star of Paris* and the *Star of California* were shortly followed by the *Star of Rome*, the *Star of Lisbon*, and the *Star of Cairo*, as TWA extended its services around the globe. By the end of 1947, nearly 25,000 passengers had flown over the Atlantic on TWA's "Star" fleet.

Here are some statistics from the *Star of Paris* inaugural flight log: After leaving LaGuardia Airport in New York at 1911 hours (2:11 EST) on 5 February 1946, the aircraft arrived at Orly Airport in Paris at 2057 (3:57) hours on 6 February 1946. There were two interim fuel stops—one each at Gander and Shannon; average cruising speed—300 mph; total time spent in flight was 8 eight hours and 5 minutes; fare for a one-way ticket was $375 and $675 bought you a round-trip. (It costs that much on some airlines today to just fly from coast to coast.) Last but not least, the flight carried a special cargo—one million vials of penicillin bound for Rome.

The Connie proved to be the luminary of the skies that year. Less than two weeks after the historic Paris flight, TWA's *Star of California* made the first non-stop transcontinental flight from Los Angeles to New York. Covering the distance in just 7 hours, Howard Hughes piloted the aircraft carrying a group of celebrity passengers including Cary Grant, Walter Pidgeon, and Edward G. Robinson.

An interesting bit of information is that the earlier overseas flights carried radio operators and/or navigators. Wouldn't that traffic have been interesting to monitor?!

Several years ago, the Save-A-Connie Society—a group of retired TWA pilots and mechanics who at one time either had flown or worked on Constellations—started to restore several Connies to flying status. They presently appear at airshows and other festivities all over the country.

A static aircraft display was held here in Indianapolis a few years back. Although there was only ground activity, there was plenty to see and do that day, with warbirds and transports of every kind to inspect, including the good ol' C-47. There was only one civilian airliner present that day, however: a Connie, almost completely restored to its former glory. The public was invited to come aboard and tour the aircraft which was flown in for the occasion by several Save-A-Connie members.

Resemblance to the Connies back when I had been a passenger on them was remarkable. The flight deck was magnificent to see, and all of the radios (VHF and HF) were in working condition. I plunked myself down in a seat in the passenger cabin for a moment, and as the pilots started the engines for a brief demonstration, the years seemed to roll back. It was the 1950's once more, and I recalled my numerous flights on the Constellation with affection for that extraordinary airliner.

More Volmets

As you'll recall, Volmets are broadcast-only stations which feature city and airport weather, forecasts, and other relevant information for pilots. Transmissions are on single side band.

North Central Asia: (in English) - 4663, 5676, 10090, 13279: Khabarovsk, Russia - 5 and 35 minutes after the hour; Tashkent, Uzbekistan - 10 and 40 minutes after the hour; Kiev, Ukraine - 15 and 45 minutes after the hour; Moscow, Russia - 25 and 55 minutes after the hour; Novosibirsk, Russia - 20 and 50 minutes after the hour.

Southeast Asia: 2965, 6676, 11387: Sydney, Australia - On the hour and on the half hour; Calcutta, India - 5 and 35 minutes past the hour; Bangkok, Thailand - 10 and 40 minutes after the hour; Karachi, Pakistan - 15 and 45 minutes after the hour; Singapore, Singapore - 20 and 50 minutes after the hour; Bombay, India - 25 and 55 minutes after the hour.

Software Assistance

A helpful hint for readers who ordered the software offered in the January 1996 issue and are relative newcomers to the computer field: Those who bought the 3-1/2 disksettes containing Dulles, 747, and AIRTRAX will find that these programs are in subdirectories of the root directory, which is named Dulles. Change to the A drive, insert your diskette and don't be alarmed when you type **dir** and only see the directory name with 0 bytes listed after it. You have to **change** directories to get at the programs. Type chdir and the name of the program (i.e. chdir Dulles). If you have any questions or problems, please contact me immediately.

John Fulford, WA4VPY

Is This a Mountain or a Molehill?

I'm always running into small mysteries down here in South Florida. One of the radio frequencies I have programmed into my scanner is 167.2000 MHz. In early spring a mystery began to unfold when I started hearing a repeater output on it. The mystery deepened because the voice was scrambled—not your ordinary speech inversion scrambling. This sounded like a very sophisticated audio scrambling format. I could hear the units re-syncing after each transmission.

It was the use to which the frequency was put that started the mystery. 167.2000 MHz is not a legitimate IRAC frequency. The closest legitimate federal frequency is 167.196875 (weird, I know) MHz. What makes this interesting to me is that this is one of the main frequencies that Audio Intelligence Devices of Ft. Lauderdale, Florida, uses for their surveillance transmitters. We used it at the agency where I used to work and it is in the receiver package of nearly every surveillance package AID ships.

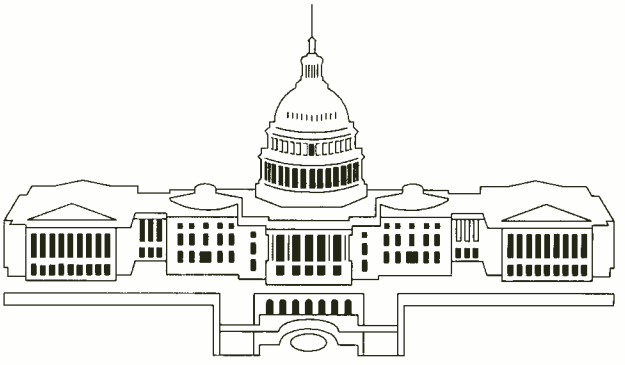
Could I therefore be hearing the output of a surveillance repeater? It's doubtful. Audio Intelligence Devices places their surveillance repeater outputs up in the 171/172 MHz band. Besides, I was hearing a lot of units checking in on the repeater. There was no way this was a surveillance transmitter.

I got out the spectrum monitor and looked for an input. Nothing was seen up here in the Palm Beaches. Who and/or what I was hearing still remains a mystery... Yes, it is still active from time to time, but nothing like the traffic of that night.

Foreign Surveillance?

An idea came to mind while listening to this mystery traffic. I have visited the United Kingdom a few times (my family is Scottish/English). On my last trip I made a lifelong friend who does some serious monitoring over there. He will remain unidentified because of their Official Secrets Act. The monitoring we take for granted over here is *illegal* over there. Some monitors have even gone to jail. The average policeman has the authority to stop a vehicle and see if you have a scanner in it. If you do, it's usually big trouble. The police have even gone so far as to broadcast false information over their radio systems—UFO sightings, big accidents, etc.—and then waited to see who shows up to watch. Then they just start checking vehicles for scanners. Big trouble.

Back to my idea: The United Kingdom uses a different frequency plan than we do in the U.S. Our federal frequencies are in the middle of their land mobile band—also known as the PMR (Personal Mobile Radio) band. This is especially true of the 162/174 band. The radio shops and radio dealers have three sets of frequencies they use nationwide for demonstrations of radios to prospective buyers. The VHF frequency pair is 167.2000 base/172.0000 mobile.



Could it be remotely possible that I was hearing a foreign operation (i.e., intelligence/police) going on under our noses? A covert foreign operation here in the States by a foreign nation probably would not go through our government for frequency coordination. (I can hear it now: "I say, my good chap—a few of our lads are doing a bit of spook work in your country. Very hush hush. Could we have some of your frequencies to operate on?" I don't think so.)

The Bahamas are just 90 miles from me. I tried hearing the usual Bahamian traffic—nothing. This was not coming from the islands. Why was this significant? The Bahamas were once part of the British Commonwealth, and even though they are now independent, old British customs still apply. One of their main taxi frequencies is 167.5000 MHz. This used to be the main Miami FBI frequency for simplex and the input to their 163.9625 MHz rptr (with private line turned on) until the interference became so bad the FBI had to practically quit using it. That is why I was wondering if I could be hearing something from the islands.

I also considered whether I might be hearing an image. The amateur band images from the two meter band show up in the 167/168 MHz band. But, no; I heard our mystery signal on two different radios with two different intermediate frequencies.

So what did I hear? I don't know. The channel died off a few days ago. I haven't heard anything but a couple of the local police department's body bugs when I am out driving. I am still listening. Maybe they will come back.

As a footnote, HRH Prince Phillip visited our fair city a few days ago. Could I have been hearing preliminary operations related to his visit? I don't know. All of the traffic for HRH (His Royal Highness) was conducted on the Department of State frequencies—the 409.625 MHz combinbinations we have written about before. I have worked diplomatic security for the Royal Family when Prince Charles used to visit our area before he got married. The Scotland Yard Special Branch always used our radios—they never brought their own. Maybe I was hearing something I was not supposed to hear.

Field Offices Fold

The big day is coming. I received information that June 12, 1996, will be the beginning of the end for the FCC monitoring stations. June 12 is the day the Vero Beach, Florida, monitoring station will close its doors. The equipment will be removed and essential equipment will be moved to the Tampa field office (which is *not* a monitoring station). The remainder will go to Patrick Air Force Base to be distributed among other government agencies.

The giant long wire antennas will be taken down. The really exotic high frequency antennas designed for 2/8 and 8/30 MHz will be given to other agencies if no one can come in and officially take them down. In my opinion, it will signal a dark day for communications.

■ Capitol Monitoring

I received some mail from a Washington, D.C. source that wishes to remain anonymous. He sent me some of the frequencies used by the lesser known agencies in the Washington area. Some of them are:

Department of Energy

Channel	Use	Input	Output
01	Security	simplex	167.8500
02	Security	simplex	168.4500

Health and Human Service

Channel	Use	Input	Output
01	Security	408.0500	413.4250
02	Security	simplex	413.0250
03	Security	simplex	407.7000
None	Utility	simplex	166.8250

Housing and Urban Development

Channel	Use	Input	Output
01	Operations	Simplex	168.0000

Department of Justice

Channel	Use	Input	Output
01	HQ Admin	Simplex	170.6250
02	Same	172.6250	170.6250
03	HQ Security	Simplex	173.0750
04	Same	170.7750	173.0750
05	HQ Escorts	Simplex	173.0250
06	Same	168.1250	173.0250
07	Tac 1	Simplex	173.1250
08	Tac 2	Simplex	173.1750
09	Utility	Simplex	165.8500

Department of the Treasury

Channel	Use	Input	Output
None	Security	Simplex	407.9250
None	Exec. Cour.	Simplex	172.2250

National Gallery of the Arts

Channel	Use	Input	Output
01	Security	Simplex	406.550C
02	Security	411.5500	406.550C
03	Maintenance	Simplex	408.000C

Environmental Protection Agency

Channel	Use	Input	Output
01	Motor pool	Simplex	164.4500
02	Motor pool	165.4125	164.4500
None	Utility Natwde	Simplex	416.63000
01	Same	Simplex	406.1000
02	Same	Simplex	406.1250
None	Pag. nat. wde	Simplex	163.4375

National Science Foundation

Channel	Use	Input	Output
01	Operations	Simplex	138.5400

Smithsonian Institution

Channel	Use	Input	Output
01	Security	Simplex	169.2000
02	Same	169.3750	169.2000
03	Same	Simplex	169.0375
04	National Zoo	Simplex	169.7250
05	Paging	Simplex	163.7000
06	Air/Spe Video	Simplex	409.7750
07	National Use	Simplex	165.0375
08	Motor Pool	Simplex	169.050

United States Supreme Court

Channel	Use	Input	Output
01	Police Pri	Simplex	163.2750
02	Police Sec	Simplex	163.1000

United States Tax Court

One channel reported---409.4000

Architect of the Capitol

Channel	Use	Input	Output
01	Maintenance	409.1750	414.8750
02	Same/Security	Simplex	414.8750
03	Paging	Simplex	416.1500
04	Misc use	Simplex	408.4000

Congressional Paging--Dial System

Use	Frequency
House Democrat	170.3750
House Republican	169.5750
Senate Democrat	171.1750
Senate Republican	171.9750

Library of Congress

Channel	Use	Input	Output
01	Sec/Opns	411.4000	408.1250
02	Same	Simplex	408.1250

Government Printing Office

Channel	Use	Input	Output
01	Security	Simplex	410.2000
02	Same	Simplex	415.4500
03	Same	410.2000	415.4500
04	Same	Simplex	411.2000
05	Same	Simplex	415.3000

■ Info Exchange

• I had a reader write in to ask if there were any frequencies available for the Voice of America transmitters. It seems our friend lives near one of the massive shortwave outlets and wonders what local frequencies they might use. I located two frequencies that still may be in use. They are:

173.9625 MHz for wireless microphones and 166.6125 MHz for transmission facilities. There are probably frequencies in use for guards, perimeter patrol, etc. I don't have them yet, but will keep looking for them and let you know. Readers, your information is welcome as well.

• Several weeks ago we here in South Florida were witness to the shooting down of two unarmed civilian aircraft by Cuban MIGs. My question for *MT* readers is: what frequencies do the MIGs use for their operations? Are they in the 225-400 MHz band, just as our military planes use? Or do they use something else? I don't know: I am asking if anyone else does.

Additionally, I would welcome any help that travelers to that island might be able to provide as to active frequencies and their uses. For example, I know low band, 30-50 MHz is in heavy use down there, especially on the farms and plantations. The Cuban Border Guards supposedly operate around 153 MHz. Can anyone fill in the gaps in our knowledge of Cuban communications? I just can't resist a mystery...

Ken Reitz, KS4ZR

TVRO Meets the Internet

When we last saw Joe Overholt and Bill Beason, they were selling TVRO gear and everything else on the Shop At Home channel—a channel Joe founded from his home town of Newport, Tennessee. Since then, he sold most of his interest in that channel (which moved to nearby Knoxville) and started a new service.

It seems Joe has always had a nose for the future. Following the pioneering success of Shop At Home, Overholt started Skylink Communications in 1991, an attempt to combine satellite television with the new "information superhighway."

Anyone who has ever "surfed the Net" knows that there's more information to be found on-line than a reasonably sane person can possibly look at. If you have to pay on-line charges while you do the searching, you could be disappointed at the results. Wouldn't it be nice if you could take your time "web browsing" and not worry about the meter running?

How It Works

Skylink is a digital data stream which is sent on an audio subcarrier of Telstar 4 channel 4, Galaxy 4 channel 6, and part time on Galaxy 1 channels 9 and 14. When your satellite receiver is tuned to one of these channels the data is fed via the "baseband video output" or "composite video" jack on the back of the receiver to the Skylink data demodulator. This unit is basically an interface between your satellite receiver and your computer.

With the Skylink program running, you'll have access to hundreds of software programs; a 24 hour/day weather service (including satellite imagery and ground-based radar images); a national news service (called USHeadlines) and a complete TV listing specifically designed for satellite TV viewers.

The TV listing service should be of interest to all TVRO viewers as it allows subscribers to customize their own daily listing: You can tell it to discard programs you don't subscribe to or have no interest in. (Imagine: if you could do that to your current paper listing, it wouldn't be more than a few pages!) Information is only hours old, not weeks old as with the paper versions, so that listings should be more accurate.

You'll also have access to 50 selected conferences, and Skylink allows use of a toll free number to access the Skylink BBS which subscribers can use to join the conferences.

Skylink offers a toll free technical support line, as well, for their customers; technical support is available Monday through Saturday from 10 am until 12 midnight Eastern Time.

What You'll Need

The only piece of equipment you'll have to buy (assuming you have a C band TVRO system) is the demodulator, which Skylink sells for $149. Your computer will need to be an IBM compatible with a 286 or better processor. You'll need 640 K of RAM and a hard drive with at least 10 megs of free space. You'll also need an unused serial port. A high density floppy disk drive is recommended for installation of the software.

It is not necessary to have a color monitor for most of the files but if you want the TV listings and the weather maps etc., you'll need a color monitor.

A Rural Advantage

The bulk of satellite TV viewers are outside of the urban areas. This has been the reason for the success of TVRO; it provided an entertainment service to people who lived considerably outside the cable market. Until now, rural households have also had to pay long distance charges just to access Internet connections. Skylink gives these people their own "on ramp" to the "information superhighway."

A one year subscription to Skylink is $96, which works out to just $8 per month. For more information on Skylink contact Bill Beason or Joe Overholt at 1065 Cosby Highway, Newport, TN 37821, phone: 423-623-8300, FAX: 423-623-8751, Data: 423-623-8111, Email: Skyinfo@Ns1.Planetc.com.

Transponder Notes

• National Public Radio is switching its SCPC services, which are currently running on Galaxy 4 on channels 1 and 3, to a digital SCPC system from Comstream/Musicam on the same channels. While these particular services are no longer available, it should be noted that TVRO users still have a wealth of commercial-free listening to enjoy. The following is a list of public radio stations which are available via satellite without any special equipment. WUSF-FM Tampa, FL (C4, 10, 8.235); KLON-FM Long Beach, CA (G5, 2, 5.58/5.76); Georgia Public Radio (T401 Ku, 14, 5.4/5.58); KUCV-FM, Lincoln, NE (S3, 2, .76/5.94).

When these stations are having their fund drives and you find that you're a regular listener, call them up and pledge a little money. They'll be surprised to know they have a national audience, and you'll help defray the cost of uplinking.

Closely linked to these audio services are the reading services for the sight-impaired. Here's a list of what's available: Satcom C1, channel 3 "Radio Reading Service of the Rockies" (5.58 MHz); Satcom C4, channel 10, "In Touch" (7.875 MHz.); Anik E1, channel 16 "Voice Print" (7.425 MHz.); Telstar 401, channel 14 (Ku) "Georgia Radio Reading Service" (5.4/5.58 MHz; this service has been known to read *Monitoring Times* on the air!); and Spacenet 3, channel 2 "Radio Talking Book Network" (6.48 MHz.).

• A new Arabic video programmer is on T401 (Ku) called Egyptian Satellite Channel on channel 9. Twenty-four hour/day programming is sent live from Egypt via Intelsat 702.

• All of Galaxy 3R's Ku band channels are allocated to the Spanish language DBS service known at Galaxy Latin America. Coverage area is said to be only Mexico, Central America, and portions of South America. Programming will be similar to that on North American DSS and Primestar services.

DSS Break

Many readers sent in clippings from various newspapers which reported the DSS satellite system has allegedly been hacked. As with all of these systems, the programmer uses the datastream to be able to turn on and off each subscriber for the various services. The VCII system used from 1986 until 1993 by General Instrument was well known for its ease of compromise. The updated version currently in use for all C band services uses the VCII RS (Renewable Security) module and remains, to date, unbroken. The DSS/USSB/Primestar services all began with a renewable security plan and had hoped not to have to use it.

It remains unclear whether or not such a break has, in fact, occurred. Usual Internet rumor mills notwithstanding, DSS officials are apparently not confirming the break. Meanwhile, reports indicate that thousands of hacked boxes are in use. USSB is staying mum on the subject and Primestar notes no such break in their system.

The original VCII debacle should have provided excellent instruction on how *not* to do a secure video service. Most people are naturally honest and want to pay for services they receive. The two typical mistakes are over-pricing the initial product, and denying access to certain geographic regions. These conditions provide an open invitation to the criminal element to ferret out and exploit the weaknesses inherent in hardware and software security.

If the DSS footprint includes Canada, then Canadians should be allowed to buy the units and subscribe to the services. After all, isn't that what NAFTA was all about?

Mailbag

• David Sheley of Blytheville, Arkansas, would like to have the addresses of companies making Single Channel Per Carrier (SCPC) receivers as well as teletext decoder makers. He would also like to know where to find the BBC Television news, and whatever happened to The Weather Network which was formerly on Anik E1?

First, the two companies which make consumer grade SCPC receivers are: Avcom, 500 Southlake Boulevard, Richmond, VA 23236. Phone: 804-794-2500 FAX 804-794-8284. To receive brochures on-line via Avcom's new AVFAX, call from your FAX and be ready to receive: 804-379-0500. Also: Universal Electronics, Inc., 4555 Groves Road, Suite 12, Columbus, OH 43232. Phone 614-866-4605 FAX 614-866-1201.

Second, as to teletext decoders, there is good news and bad news. The good news is that there are plenty of brand new teletext decoders on the market. The bad news is that there may be little to decode. Teletext was one of those terrific ideas whose time had come and gone before anyone in this country knew what it was. Teletext fell victim to superior technology (computers and phone line or satellite-delivered data streams).

Teletext users out there may be able to inform me to the contrary, but it seems that the two services which used teletext in the past, Infotext and Electra, have ceased operations. There is little if any service and, consequently,

no particular reason to have such a device. The curious thing is that, for some unknown reason, folks selling these devices aren't aware of the situation and are keeping the prices as high as they were when teletext was a going concern.

At any rate here are the sources: Astro Products Co., 757-6 Twin Oaks Valley Road, San Marcos, CA 92069. Phone 619-471-9930 FAX 619-471-9943. Their teletext decoder sells for around $300. An Astro Products salesperson informs me there are a few services still available using teletext on the VBI of TBS Superstation. Page 200 has Tempo Index; 201, 202, 203 are International News (encrypted). Page 204 is WRN Radio Listings. Page 209 is stock market instructions for page 210 which contains a stock index. Sports information is also available through subscription.

There is a surplus electronic company which advertises several teletext units. They sell new Teletext decoders which output on a channel 3 demodulator. Catalog price for this model is $89.95 plus shipping. They also offer a Teletext Decoder Card for IBM compatible computers. This model features a built-in TV tuner together with a video card which allows viewing of data and graphics on your computer screen. It's designed for PC, XT, AT machines using MS DOS 2.11 or higher with at least 512K memory. VGA, CGA, or EGA display is recommended. Price for this model is listed at $199 plus shipping.

They also have a do-it-yourself special which they call "Heart of the teletext decoder." It comes with a board, documentation, schematic, and parts list which they say "...will help you build your own teletext decoder." This model is $9.95 plus shipping. The company is Alltronics, 2300 Zanker Road, San Jose, CA 95131 Phone: 408-943-9773 FAX: 408-943-9776.

In my opinion one would be better off joining Skylink. Their $149 demodulator is looking inexpensive!

Third, the *BBC Breakfast News* was alive and well when I first wrote this column, but has just moved to parts unknown. *BBC World* has been seen on Galaxy 4 Channel 5 at 11:00 am Eastern. As to the Weather Network, I believe it went the way of all of the other Canadian programming and is part of a Canadian digital compression package using a Scientific-Atlanta digital video scheme. Still remaining in the clear on Anik E1 are CBC North (channel 11); CBMT, Montreal; and CBC North (channel 23). The numerous FM subcarriers remain, as do the SCPC channels.

• Kenneth Farmer of Georgia has asked DSS why they don't offer the same Adult programming on their system as is available on C band. He didn't get an answer, but they did send a brochure. Apparently they do offer adult movies on Pay-Per-View. At last count there were no fewer than 11 full-time adult movie channels on C-band which have emerged over the last three years. They all seem to be doing very well, but competition has certainly affected the prices, which have steadily declined.

My guess is that the DBS services are waiting to have a broader customer base before offering the service. They probably need a certain percentage "buy rate" guaranteed before they'll commit to the programming. I believe they are also waiting to see if there will be any widespread legal action against the C band programmers as has happened previously. I think they would like to be well established in the yards of America before offering such potentially risky fare. You can bet that if they think there's money to be made, they'll be there at just the right time.

EXPERIMENTER'S WORKSHOP

TWEAK, TUNE, AND MODIFY!

Bill Cheek

Internet: bcheek@cts.com; BBS & FAX: 5:30-1:30 p.m. PDT: 619-578-9247
Compuserve: 74107,1176; World Wide Web: http://ourworld.compuserve.com/homepages/bcheek

Cool Ways to Design Circuits—Part 2

Not too many years ago, if you wrote a book you needed a publisher. Now you can publish anything you want with a computer and a decent word processor or "desktop publishing" program. Likewise, only a few years ago, printed circuit engineering and design were the domain of million-dollar, high-end board shops and engineering firms. Now you can whip up some convoluted electronic circuits and do everything but connect them to your radio without ever leaving your computer. "Desktop engineering" has come of age.

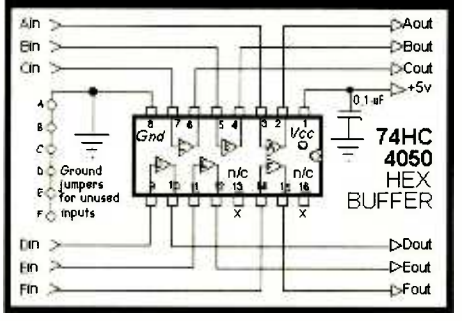
Making PC boards is nothing novel or new. Hobbyists have rolled their own PCB's for 20-25 years, and may have even invented the process, for all I know. But dedicated couch potatoes and casual hobbyists don't generally make their own printed circuit boards; at least not until now. For years, I (who am anything *but* casual) either farmed my board work out to the pro-shops or drew them by hand. The former is prohibitively expensive while the latter is rank amateurish. Now, routine software can bridge that gap and to help make desktop engineering a little more within reach of the casual hobbyist and maybe even some couch potatoes.

It's harder to talk about than to do, so review last month's column for the preliminaries of designing printed circuits. If you can lay out and design a circuit on your "virtual perfboard" like I showed last month, then you're almost done producing the actual printed circuit! Therefore, it makes sense to consider the final plunge if you're curious about midnight/desktop engineering. I did it on a leap of faith and never turned back.

The Sample Circuit

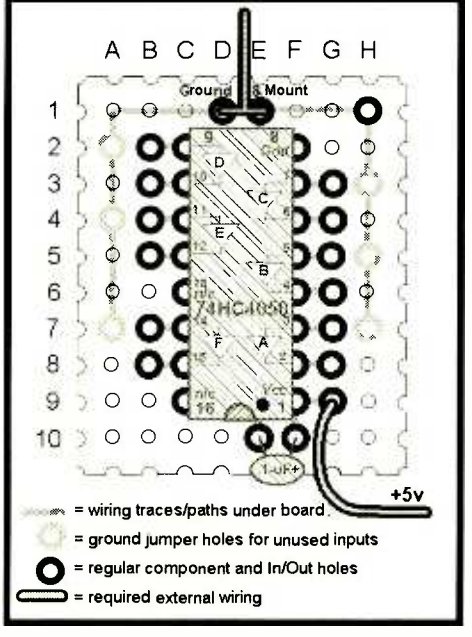
Refer to Figure 1 for our example circuit: a non-inverting high speed CMOS buffer that isolates outputs from inputs with a few hundred megohms. This circuit is ideal and almost mandatory for certain kinds of mods, like scanner/computer interfaces, where connections to the scanner's CPU and memory circuits are required. You don't want a noise pulse from outside the scanner to slither into the scanner's CPU, right? A buffer isolates an output from an input, and still passes the signal. The 74HC4050 buffer is a simple, but useful device that makes an excellent teething ring for a PCB design. The schematic of Fig-1 goes to a virtual perfboard per Figure-2.

FIG-1: SAMPLE CIRCUIT



Caveat: CMOS gate circuits need to be at either logic "high" or "low," in this case, 0v or +5v. Therefore, unused gates should be grounded to keep the chip from self-oscillating the unused gates. Refer to Figs 1 and 2 where we provide a means of ground connection for each gate in case it is not to be used. In Fig-2, the holes at A2, A4, A7, H3, H5, and H7 are the ground spots that correspond with the buffer inputs. Holes B2-B5, B7-B8, and G3-G8 are the input/output ports for the buffer. Hookup wires can be soldered to these holes to interface with the outside world as needed.

FIG-2: COMPONENT SIDE



G9 is for DC power input of +5v. E10 and F10 are for the standard 0.1-iF decoupling capacitor. C2-C9 and F2-F9 are holes for the 74HC4050 chip. D1 and E1 are for a stiff ground wire that makes mounting of the board a lot easier. H1 is a spare ground hole in the event that you don't use D1/E1.

The Technique

First draw in the parts on the virtual perfboard, and change the line size/style of those holes that will be used for component leads. I use "hairline" thickness for unused holes and 6-pt or 8-pt thickness for active holes.

Draw in circuit traces that should appear on the bottom side of the board, but use a light density, thinner line width to suggest an "x-ray" view, so to speak. You won't be able to draw everything at this stage, but do what you can. Then "send" the components to the background for a moment to expose the holes that were underneath them. You can now finish the "wiring." Then bring the components back to the front.

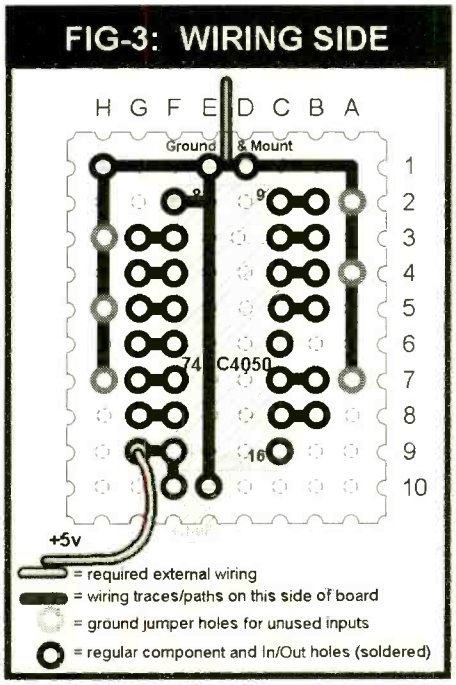
When you are satisfied with the appearance and probable accuracy of the virtual perfboard design of Fig-2, save the file under a different name and then use the Draw program to flip the graphic in the horizontal plane. Change unused perfboard holes to dotted lines to make them less visible. Send components to the background and change the styles of their lines so that they're unobtrusive and barely noticeable. You'll want to see little more than the required holes and circuit traces on this side of the board.

Complete the drawing of all required traces from hole-to-hole (remember playing "dot-to-dot" in kindergarten?). Use wide, black lines of 8-pt or 10-pt pitch. See Fig-3 for the result.

Almost Done

Save the drawing under a different name and then edit it one more time for the PCB traces and holes. This is the easy part, because you delete everything except traces and holes! You'll end up with a positive "right-reading" image as shown in Fig-4.

Depending on your preferred PCB process, the positive image may be good enough. I prefer the "toner transfer" process which



requires a mirror image (not a negative!), so I use the Draw program to "flip" the positive in the horizontal plane to obtain the mirror image as shown in Fig-4.

Now for a little imagination and intuition. PCB etchant solutions are expensive; the more copper has to be "eaten" from the PCB, the more quickly it is used up. Fig-5 shows how I filled in the ground areas of the mirror image in Fig-4 to leave as much copper on the board as possible.

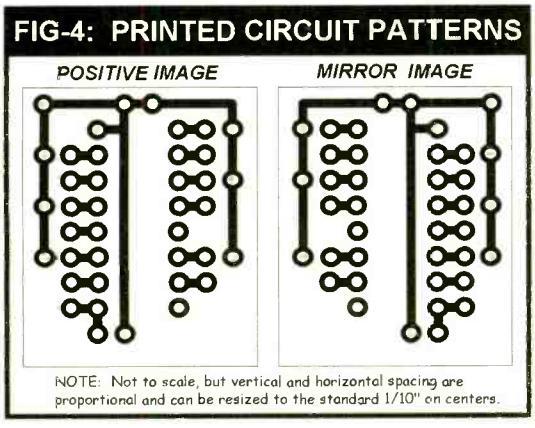
This technique is optional for most applications, but can be requisite for RF boards. Use black-filled rectangles and elipses to overlay or underlay areas of interest on the PCB. Fig-5 is mostly an example of "underlays" that do not cover the ground holes.

Create the Proof Image

When you reach the stage of Fig-5, save the file as a common BMP image and then fire up a word processor program and import the image as a "picture." It will probably be much too large, but that's okay. If you are using modern software in a Windows or OS/2 environment, you can "grab" a corner of the image with the mouse and shrink or enlarge it to requirements. In most cases, it will have to be shrunk.

You need a standard of measure to fit your image to: a combination of perfboard and a DIP IC sockets will suit fine. Size the image to what you think is close to those standards and then print it on a laser printer (details and options next month). Use the perfboard and IC socket to see how far you're off. Adjust the image and print it again.

Repeat this procedure until the IC socket pins match the hole spacings on the printed image. It usually takes me three or four prints to get it right, but so what? Once it's right, save the word processor file so that it can be used again and again.

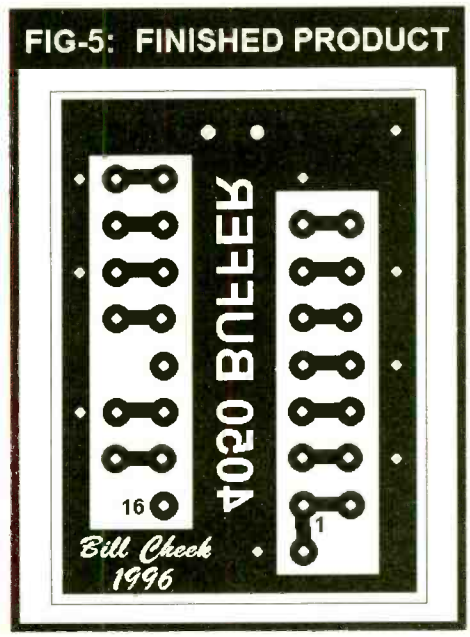


Making the PC Board

Space is too limited to go into the mechanics of PC board-making this month, so I will conclude it next month. Besides, you have some homework to do: deciding on the process best suited to your needs. There are two from which to choose.

The one I like the least and won't talk much about is the "photo-resist" process, where you buy specially-treated PC boards that are coated with a light-sensitive film. Your proof image must be printed on a clear transparency; and depending on the chemistry of the board, it may have to be a negative image. The proof image on transparency has to be held over the light-sensitive PC board and then exposed to a strong light for a certain period of time.

The emulsion on the board changes its chemistry like photographic film, so that when placed into the etch solution, the part exposed to light behaves in one fashion while the part not exposed behaves differently. This process is probably the best in terms of total quality, but it is expensive, wasteful, time consuming, and error-prone. I don't like it, though I'll admit I haven't learned all there is to know about it. I prefer the "Toner Transfer System," pioneered by DynaArt Designs, in which you print the PCB design to a specially treated paper, iron it onto a copper PC board, soak the paper off (in water), etch the board in standard etchant, then rinse, drill holes, and build the circuit! I will cover this process in detail as a wrap-up next month.



Meanwhile, your homework is to acquire detailed product info and/or materials. If you have any interest whatsoever in desktop engineering, you probably owe yourself the favor to make contact with the good folks at DynaArt Designs, 3535 Stillmeadow Lane, Lancaster, CA 93536-6624, Voice: (805) 943-4746 (9am-6pm, PST) FAX: (805) 943-3776, WWW: http://www.dynaart.com, E-mail: dynaart@netport.com

Tech support and clarification of this article series are always available by e-mail via any of my addresses in the header of this column.

Contest Time

Remember my offer for the next two 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*.

Wayne Mishler, KG5BI

Let there be Wireless

Last month I mentioned the industrial rush to build an infrastructure for the wireless industry, which seems poised for explosive growth. You don't see much of the backstage goings on because most are workaday projects of little interest to news media.

It's a bit like the dirtwork for a downtown skyscraper. The bulldozers blend with surrounding work and go unnoticed. Then one day—shazam! They're pouring the first floor, then the second, and ultimately the 80th. Likewise, the wireless industry is in its dirtwork stage. But stand by for the topping-out ceremony. A few examples:

PCS on the move

● A Chinese firm, Asia Pacific Mobile Telecommunications Satellite, just weeks ago hired U.S.-based Hughes Space and Communications International to build a satellite-based mobile phone system to begin operation in 1998. The system will support satellite telephone transmissions from handheld phones, vehicles, ships, aircraft, and fixed land-based phones.

Hughes will provide two satellites, launch and mission support, ground facilities, and training. The first satellite is to be launched in early 1998. Service is to begin that summer. The second satellite will serve as a spare. Each of the satellites will handle 16,000 simultaneous duplex circuits. The service will cover China, Singapore, Japan, Korea, Southeast Asia, Indonesia, Pakistan and the Philippines. Try *that* with telephone wire!

● The American Mobile Satellite Corporation (AMSC) early this year signed a letter of intent to support the National Rural Telecommunications Cooperative in providing communications service for its members nationwide—regardless of location. Its membership includes more than 800 rural telephone and electric service providers.

● AMSC just this year began offering satellite-delivered telephone communications services for customers in the U.S. "Our committed investors and business partners have invested $500 million and nine years to bring America's first mobile satellite service to market," says AMSC president and CEO Brian Pemberton. His firm now offers mobile phone voice, fax, and data services.

This summer they will add voice dispatch capability which will enable a central dispatcher to establish and manage up to 15 different talk groups traveling anywhere in the nation. Their services are marketed under the SKYCELL brand name and are now available at two-way radio dealers, marine electronics dealers, aeronautical completion centers, and specialty electronic shops nationwide.

● A company called ORBCOMM Global this year began providing personal communications services using low-orbit satellites. "We made the commitment to ourselves and to future customers six years ago to launch an affordable two-way wireless global messaging system," says ORBCOMM president Alan Parker. "More than 300,000 messages have been sent via the first two satellites we launched in April 1995."

● A new PCS system to be launched by ICO—a global mobile satellite communications company—in the year 1999 will feature low-cost world wide communications service using pocket-size terminals smaller and lighter than today's cellular telephone handsets.

Wireless and the air transportation industry

Airline companies are replacing the conventional navigational systems aboard their aircraft with GPS navigation and flight management systems which depend on wireless transmissions from satellites. ATA, which offers low-cost flights to popular vacation sites from Boston, Chicago, Indianapolis, and Milwaukee, plans to install GPS systems in its 34 aircraft this summer. The systems will be provided jointly by the Honeywell and Trimble companies.

Trimble's director of air transport products explains that the type of system chosen by ATA, known as the HT9100, offers a technology foundation consistent with future communication, navigation, surveillance, and air traffic management in the airline industry. The HT9100 has a built-in worldwide navigation database and can accommodate up to 200 user-defined flight plans with 100 waypoints each.

Evergreen International Airlines is replacing the navigation systems in its Boeing 747 fleet with Trimble GPS systems and has flown around the world navigated completely by GPS. The quality of navigation and communication ground facilities sometimes "fall short of modern standards" as one Evergreen flight captain put it. "Our airline sees the accuracy of GPS anywhere on the globe as a big investment in flight safety which will yield economic and performance dividends for decades to come."

The trucking industry goes wireless

The G&P trucking company of Gaston, South Carolina, is buying 500 satellite-based mobile communications systems for its truck fleet and expects the investment to pay off big by cutting miles off routes and increasing the efficiency of its dispatchers and drivers.

"Every hour is important in our business because we are always trying to add one more pickup or delivery each day," says G&P president Clifton Parker. "Since time will be better spent with (satellite) systems we expect our business to grow without increasing the number of dispatchers."

Just last month R&J Trucking of Youngstown, Ohio, recently purchased the same type of system and after only two weeks of operating with the system company president Gary Carrocce proclaims "the phones aren't ringing, our dispatchers are able to better plan loads and handle the fleet more efficiently. Now we have more time to focus on our customers," he says.

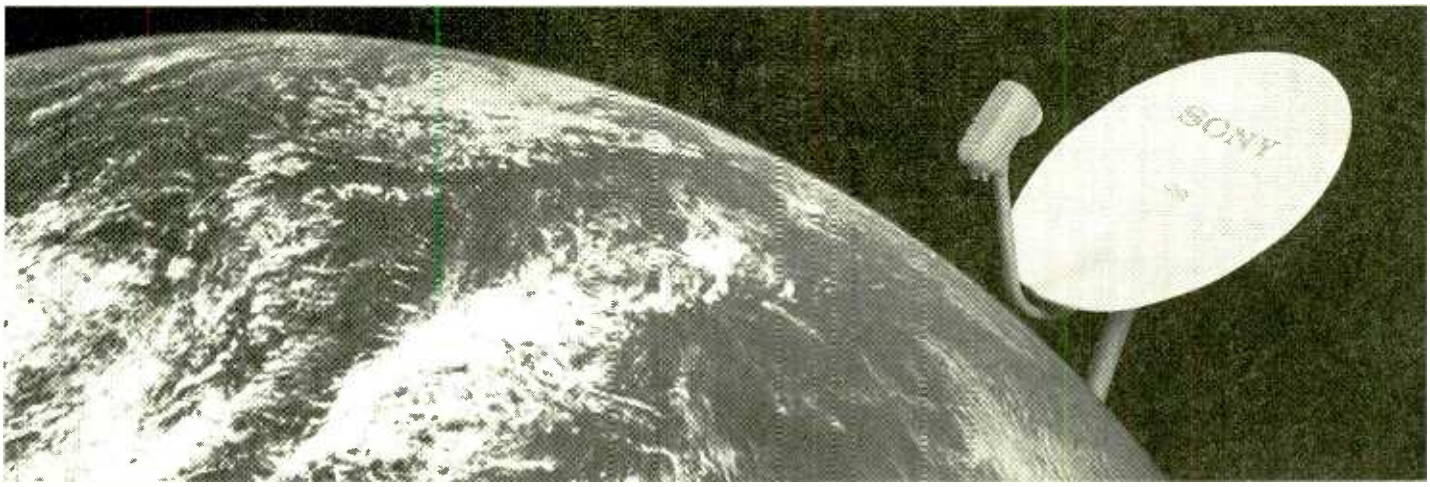
Maritime communications switching to wireless

Any SWL who has heard marine traffic checking in morning and evening with their headquarters offices via shortwave radio knows how important quality communications is to that industry. Now there's a New Orleans-based company called SmartBoat, Inc., which sells satellite communication systems to shipping companies to track barges and monitor engine performance of their vessels, among other things. "The government has been asking barge owners to report on where their barges are located, especially if they are carrying chemicals, gasoline, or other petroleum products," says SmartBoat president Frank Lensmyer. "Now we can offer a monitoring product that satisfies this need."

The list goes on

Businesses of all descriptions, large and small, are depending increasingly on wireless technology for monitoring their operations and their communications. So are government organizations. The wireless infrastructure is progressing. But as they say in my neck of the woods: "You ain't seen nothin' yet."

There's a New Player on the DSS Horizon...



And It Has SONY Written All Over It.

The new Sony Digital Satellite System rises head and shoulders above competing systems, offering technological innovations that make it easier and faster to set up and use—at a price you can afford!

Now available directly from Grove, the package includes an 18" diameter dish that mounts almost anywhere. Inside your home, the Sony brand DSS receiver processes the incoming digital signals from service providers like USSB® and DirecTV®—and helps you select stations with on-screen navigation menus that are fast and easy to understand. You can even switch from satellite to your over-the-air broadcast antenna for access to local channels.

Best of all, you can hook up easily to your TV, home stereo, or home theater system using installation aids that no competitor offers. Some of the Sony's advantages over other DSS systems include:

- Sony's available UHF remote control allows hideaway placement of receiver.
- Dish can be locked onto the satellite by using Sony's exclusive Signal Seeker® LED indicator, allowing a single person to install system.
- Provides better and easier use of menu screens.
- Sony's Express Navigator® offers simplified point and click menu selection.
- Rust-proof aluminum dish, not plastic or steel like others.
- Sony's remote control also operates Sony and other major brands of TVs and cable boxes.
- Sony has exclusive multi-event programmable timer (with AD1 receiver only).
- Access card in the Sony receiver is hidden—not easily accessed by children as with other brands.
- Purchasers subscribing to USSB at time of order get first month of service free.

There's no other DSS package on the market that offers so much for so little. Order yours today!

DSS01	Dual LNB* w/ UHF Remote (SAS-AD1) Pkg.	$Call
DSS02	Dual LNB* w/ Infrared Remote (SAS-BD1) Pkg.	$Call
DSS03	Single LNB w/ Infrared Remote (SAS-BS1) Pkg.	$Call
DSS04	Add-on Rcvr. (SAT-A1) w/ UHF Remote	$Call
DSS05	Add-on Rcvr. (SAT-B1) w/ Infrared Remote	$Call

ACCESSORIES

DSA02	Diplexer (EAC-DD1)	$Call
DSA01	Installation Kit (ANS-DS1)	$Call
DSA03	UHF Remote Control (RM-4130)	$Call

*Dish supports two receivers. Additional receiver not included.

GROVE ENTERPRISES, INC.
1-800-438-8155; 704-837-9200;
FAX 704-837-2216
7540 Highway 64 West
Brasstown, NC 28902

Please visit our site on the World Wide Web
www.grove.net

John Catalano, PhD

Will the Signal Log In, Please

Last month we briefly looked at Computer Aided Technologies' (CAT) computer-to-radio interface, Uni-Versatile. It worked pretty well with both our ICOM and Yaesu test radios.

However, I am sure that you noticed we didn't cover one aspect of a total monitoring environment that is especially important for applications to scanning receivers. Although we discussed controlling the receiver by computer, we didn't look at controlling the computer from the receiver. (That's when the receiver "hits" a signal and tells the computer to stop scanning and start logging.)

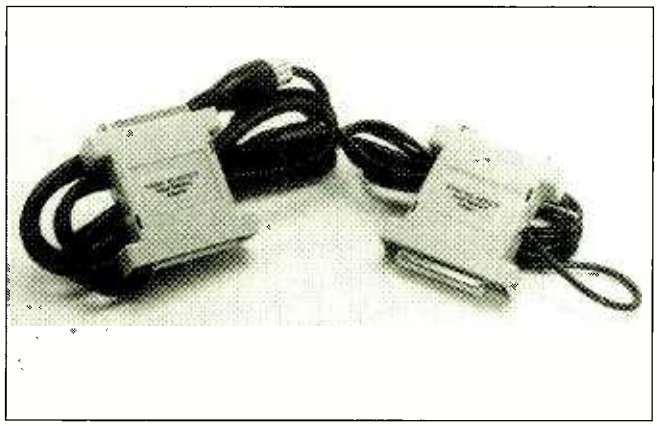


Photo of CAT's Yaesu and ICOM Squelch Detect Adapters

The Uni-Versatile Interface allows programs such as ScanCat to control the frequency, mode, and scanning of a large number of receivers and scanners. However, in order for the computer to perform unattended scanning and logging, it must also have a means of detecting the presence of a signal.

Some form of signal detection is already present in VHF/UHF scanners, of course. It can also be a useful feature for shortwave receivers under favorable noise and propagation conditions.

Without cutting and modifying the circuitry of our receivers, signal detection can be achieved in a number of ways. The receiver's squelch circuit monitors the receiver's Automatic Gain Control (AGC) circuitry. The AGC detects a signal's presence and strength. It then controls the amount of amplification the receiver's amplifier stages add (or subtract) to provide a signal at the level required for the remainder of the receiver circuitry.

Once the AGC detects a signal, the squelch turns on the audio amplifier to let the monitor hear the signal. Many receivers, such as the FRG-9600 and ICOMs, have either the AGC signal or the audio on/off signal available at a jack on their rear panel. By conditioning these signals they can be connected to a computer and used to stop it scanning.

An audio squelch works in a similar manner, but monitors the detected audio. If it "hears" audio which sounds like voice communication and not noise, it turns on the audio amplifier. Audio detection circuitry can vary wildly from a simple diode to a complex digital signal processing speech pattern detection circuit. The latter method does the job much better, but is significantly more costly.

"Listening" for audio can be used to indicate the presence of a signal in order to start/stop frequency scanning, but it takes a little longer to perform, since it adds another level of detection. It is actually an indirect detection of the AGC, which opens up the audio amplifier when a signal is detected.

Using software like ScanCat or ScanStar, once the computer detects a signal, in addition to stopping the frequency scan it can also log details of the intercept for later review and recall. So, we come back to the fact that in order to really have a computer-controlled monitoring environment we need the computer to be capable of detecting a signal.

The Uni-Versatile alone does not have this scan control capability. To be fair to CAT, I have not seen an interface at this price range (under $100) that *does* include this feature. But ...

■ His Master's Voice

Preparing the ScanCat program to "listen" for a signal is quite easy. All squelch adapters are enabled from ScanCat in the same way as is the Yaesu—by using the "Z" function on the "F" key screen.

The first thing we noticed was that enabling any of ScanCat (Gold)'s squelch detection features slowed the scan speed *way down*. The maximum scanning speed was reduced by over 50% to about three frequencies per second scan rate on a 486 DX2 33MHz. However, for the convenience of unattended logging I personally found this an acceptable trade-off.

CAT's first attempts at squelch control utilized adapters which connected to the computer via the joystick port. They worked OK, but required plugging and unplugging. After all, sometimes a real joystick is required to save the world from alien invasion! Also, since joystick triggers are relatively slow, mechanical switches, the joystick ports and drivers were never intended to perform at blazing speeds.

Chronologically, the next signal/squelch detect adapters which CAT brought out were for Yaesu radios, such as the FRG-9600, and ICOM radios. CAT's Yaesu Squelch Detect Adapter is priced at $24.95 and is housed in the same small box as the interface and the rest of the adapters (see photo). Each end of the adapter has a 25 Pin connect (female/male) which allows it to be connected in series with your computer control interface and which then connects to the computer's serial port.

BUT, looking at the Yaesu Adapter on the left side of the photo, note that the connections which detect the radio's squelch condition are made via 6 Pin DIN cables. These cables come from either side of the adapter. Mechanically these will mate only with the Yaesu FIF-232 interface.

If you have an FIF-232, as I do, you're off and running. If you don't, then you will have to modify the cables to suit your interface. This is an easy job if you have a schematic diagram of your interface and the radio port. But don't try it if you're not comfortable with electronic construction methods.

■ I-COM-mand the Squelch to Work!

Users of ICOM radios will fare much better using CAT's ICOM Squelch Detect Adapter. This looks just like the Yaesu version and connects into the computer's serial port in a similar manner. In the case of the ICOM R-71, the squelch control cable plugs into the control relay output on the back of the

R-71. This is a mechanical relay driven by the squelch.

After using both of these serial adapters for the past year or so I found them to be very reliable and easy to enable from the latest ScanCat software versions. Since the ICOM R-71 uses a mechanical relay as its squelch on/off output, it is noticeably slower than the Yaesu semiconductor switching squelch. However, the newer ICOM VHF/UHF receivers use semiconductor squelch switching.

New and Improved?

Now a new adapter has been brought out by CAT. Called the Audio Squelch Detect Adapter, it does just that. This uses the second method of signal detection we discussed above—audio detection. It can be used with any receiver that has a squelch and an Audio Out or Tape Out jack.

At $39.95 this adapter comes in the same small case as the rest and connects to the serial port in the same manner. But it is no longer radio manufacturer specific. This should give it longer life and wider utilization. But how well does it work?

First we compared the audio adapter against the performance of CAT's Yaesu FIF-232-connected adapter. We found setting of the volume control while using the audio output was very critical to the operation of the audio adapter. Using the tape output was more reliable, since it is at a fixed level. Even so, it failed to stop on some weak stations.

Using either output, scanning a previously saved database of frequencies showed up some bad habits. One problem was that for weak-to-medium strength signals it stopped on the frequency following the active one, unless a very, very low scan rate was used. Computer noise seemed to be a bigger problem with the audio adapter. It did not shine as compared to the IF-232 connected adapter, which had the edge in all tests we ran. Would using the audio adapter versus the dedicated ICOM adapter show any different results?

Keeping the exact same setting while scanning Time Interval Stations such as WWV resulted in the audio adapter still being beat out by the dedicated ICOM Adapter. Three stations were reliably detected and stopped the computer with ICOM's relay adapter. Using the same settings and the Record Output with the audio adapter produced only one real station computer stop. Changing the squelch control made it so unreliable it appeared to be stopping almost at random.

Conclusions and Suggestions

I regret I cannot report better results, but for now, if your receiver allows you to get at its AGC or squelch signals, and if you want to add signal control to your computer, obtain one of CAT's two, non-joystick, radio-dedicated adapters: the ICOM or Yaesu Squelch Detect Adapters. These perform quite well when used with the Uni-Versatile Interface, and are backed by CAT's policy of giving their customers all day technical support and advice.

Although we didn't test them, the Uni-Versatile Interface and Audio Squelch Adapter can also be used in combination with AOR products and Optoelectronics' Radio Shack scanner interfaces.

I'd suggest you pass on the Audio Adapter unless you have no other method of detecting a signal on your receiver. Although you should be prepared for 1980 scanning speeds, at least you will have some form of squelch/computer control. Computer Aided Technologies can be reached at P.O. Box 18285, Shreveport, LA 71138. Their order telephone line is (318) 636-1234. Check CAT's latest *MT* ads, or call them for availability and price.

Rumors are Flying

Mike Agner reports that Computer Aided Technologies, who also distribute the very fine Hoka decoders, have released preliminary information on a Code 3 Gold software upgrade which includes ACARS.

Back when we looked at the more expensive Hoka Code 30 in Oct. '94, it did include ACARS, whereas the Code 3, which I use, does not. However, when I spoke with the good people at CAT, they told me that Code 3 Gold will not be a software upgrade. It will be a totally separate, third decoder, added to the Hoka family. We will share its operation with you as soon as we get one.

Back to Work

We're getting ready with many more new monitoring computer products for next time: lots of new AEA products, new Buckmaster CD-ROMS, and the answer to the riddle: Why is a plumbing company interested in scanning software? (Hint) It has to do with the Message Tracker decoding package.

We'll also do some more computer market trends and predictions in the coming months. For now, just remember where you first heard that DRAM prices would hit today's low prices: right here!

Bill Grove
bill@grove.net

Beating Our Own Drum

This column has been discussing great links and radio-related places to go on the Internet. Because of conflict of interesat, I have avoided mentioning one unique site. However, after taking a new look at *Monitoring Times*' own web site at Grove.net, I decided that it would be even more unfair not to point out the exciting changes and additions that have been taking place at the Grove/*MT*/*ST* web sites. If it's been a while since you have visited them, the useful information for radio, satellite, and computer hobbies will make it well worth a few minutes of your time. Plus, these pages are fun!

Pointing your browser to **http://www.grove.net** will lead you to Grove's WebCom receiver. This virtual receiver is the lead-in to the rest of the sites at Grove Enterprises. Grove is unique in many areas because of the diversity of the company. We have two magazines, a radio catalog, and are an Internet service provider. From the WebCom receiver, you can choose which of these several directions you wish to go.

One of the obvious options is the "Grove Catalog" button. To give you an idea of the innovative, behind-the-scenes design of some web pages, let me tell you that the catalog web pages you see don't really exist. When information on a requested item comes up, the page is custom-built for you, each time you ask! The way we do this is to build "template" pages. There is a shell that tells the computer where to put the picture, where to put the text, where to put the price, etc. But until you ask the computer for the information, there's nothing in that shell.

When you ask the computer for the information on the AOR 8000, for example, the computer asks a database for the current information. If there has been a price change, a new picture added, or a new accessory included, the page will have all that new information without us ever designing a thing! As soon as the information in the database changes, so do the web pages! With this technology, you are guaranteed the most up-to-date and accurate information.

One very popular item on the Grove pages is Bob's Bargain Bin. Often, when we put "previously owned" or "slightly-less-than-perfect" items in the printed catalog, by the time some of you read it the items were already gone! What the Internet has done for us is to allow us to update the information on a weekly and even daily basis. This way, everyone has a fair shot at getting the items they want, and it definitely works! There is an amazing turnaround in Bob's Bargain Bin, so keep your eyes on that area if you're looking for a good deal.

Although readers who are not online can call to see if we have a specific piece of used equipment, one feature that is offered exclusively to Internet customers is the Daily Special. We want people to use the Internet to browse our catalog and visit our other sites as often as possible. We offer these deals as an incentive for the customer to use our online service.

The two sites that are most pertinent to this article are, of course, the *Monitoring Times* and *Satellite Times* sites. On the *Monitoring Times* home pages you will find the current and upcoming contents pages, a by-state list of dealers carrying the magazines and/or Grove products, and guidelines for submitting feature articles. A few current columns appear, such as "Ask Bob," "Closing Comments," "What's New?" and product reviews. Other great resources are exclusive to *MT*'s web page, such as the 1996 Thunderbird and Blue Angel air show schedules, Air Route Traffic Control Center frequencies nationwide, radioteletype news services, late-breaking news and broadcast schedules which arrived too late to make the magazine, and much more.

If you know what you're looking for, but don't know where to find it, check out Grove's *Excite* Web Site Search button. This search service looks through all our pages for information that you request. If you explore the Grove site you can also find pictures of the Grove staff, Grove Communications Expo information, plus non-radio-related news, businesses, and products from Western North Carolina.

Hopefully I haven't lost too much credibility with my readers. I really do believe our site is one of the best on the Net, and I hope that you'll visit it often and get some good use out of it. Our staff puts a lot of time into the site, and the input will only continue to grow as we attract interest from around the world.

Thanks for all your great letters and comments, and remember: if you see a site worth sharing, send the address to bill@grove.net and I'll check it out!

WHAT'S NEW?

BOOK REVIEWS AND NEW PRODUCTS

by Larry Miller

Guest reviewers: Bob Grove, Rachel Baughn

Grove FCC CD v6.0

There's no question that scanning is a fast-changing hobby, especially in recent years. Technology is roaring ahead and with it a changing kaleidoscope of frequencies. You must have hot, up-to-date information to stay ahead of your monitoring targets and you have to have quick, pinpoint access. Grove has just release an enhanced, 1996 version (v6.0) of their FCC Database and it's just what the doctor ordered.

Covering virtually every licensee in the FCC master file, you get public safety (police, fire, and emergency medical), railroad, business, industrial, broadcast, maritime, and many others. Version 6.0 features updated records, a faster search speed, comprehensive service codes, pop-up windows, dynamic prompts, and improved accuracy.

There are two versions of the FCC CD ROM, one with mapping ($169.95) and one without ($99.95). Mapping allows you to not only find a frequency but pinpoint the location of the transmitter on a map. The mapping program requires a VGA card, 386 or higher processor, 4M RAM, 10M free hard disk space, and a mouse.

The Grove 1996 FCC database is also available on high-density diskettes at prices ranging from $49.95 for big states like California, Texas, and Florida, to $39.95 for other states. Shipping for either CD or diskette is $4.00. To order, call Grove at 800-438-8155.

Shortwave Utility DXing

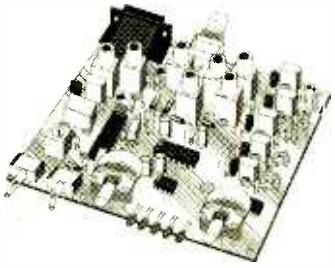
Shortwave utility monitoring is a unique hobby niche. It is exciting listening, but can also be somewhat obscure. You are listening in on the communications of industries ranging from the maritime services to embassy operations. Aside from an education in shortwave, it helps to know something about the organizations whose communications you are intercepting in order to understand what it is you're hearing—not to mention not being intimidated by transmission modes like MFSK, FEC, or the little-known Russian types.

A few years back a small shortwave club called SPEEDX became particularly noted for their highly praised *SPEEDX Guide to Utilities*. One of the editors of the utility column, Chuck Yarbrough, has now come out with a much-needed book, *Shortwave Utility Station DXing*.

SUSDXing covers the entire subject, from airlines to embassies to numbers, NATO, military, and maritime. Yarbrough even shows how to identify digital signals, even those foreign languages. *Shortwave Utility Station DXing* is scheduled for release by Tiara Publications this month and costs $17.95 plus $2.00 shipping. You can use your credit card and order via their toll-free line, 800-420-0579, or you can send a check or money order to P.O. Box 493, Lake Geneva, WI 53147. Tell the good folk at Tiare you read it in *Monitoring Times*.

WeSat Kit

Hamtronics has made it easy for anyone wanting to directly access the NOAA or Russian Meteor weather satellites. Their R139 weather satellite receiver comes in a variety of configurations to suit your pocketbook or your kit-building experience.



Specifically designed to receive the wideband FM signals of weather satellites, this third generation receiver incorporates the suggestions of its users over the years. One particularly helpful feature is a scan circuit which allows the unit to look for an active satellite for unattended operation. If a satellite is detected, the R139 can activate a tape recorder for later viewing. Real-time or taped output from the R139 may be fed through any popular tone demodulator and software to display the satellite images on your computer monitor.

Pres. Jerry Vogt promises assembly of the $159 kit is relatively simple, but warns you will need a signal generator for alignment. The R139 is also available with a cabinet and power adapter for $189, or already wired and tested with a cabinet and adapter for $239. Ask for a spec sheet (and a catalog) from Hamtronics, Inc., 65-F Moul Rd., Hilton, NY 14468-9535 or call 716-392-9430 fax: -9420.

— RB

TV 2001: A Space Idiocy

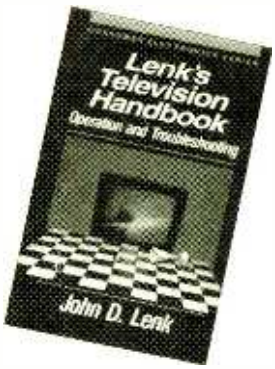
We've been told that it's coming. It's touted like the Holy Grail. Imagine! The TV of tomorrow! Five hundred channels of programming at our fingertips. (Yesterday, unbelievably, I heard an ad for a TV system promising 2,000 channels.)

The truth is, of course, that we've been hearing this talk for years. Just what does the video future look like? (And does anyone really care or is this just another case of media over-hyping?)

Advanced Television Systems offers a thorough explanation of the new TV technologies that author Joan Van Tassel says "will soon burst into our living rooms." Says Van Tassel, "High definition, digital, interactive, compressed, connected and switched television will change the way we work and live."

Van Tassel's new book, *Advanced Television Systems: Brave New TV*, will help you learn about emerging TV systems, including the terms, technologies, players, programming, and markets. Get your copy from Focal Press at 800-366-2665. The price is $36.95.

TV Handbook



During the early vacuum tube days, servicing a TV set was pretty simple; if the picture lost horizontal synch, you replaced the 6SN7, and if the picture drew in from the sides, it was the 6BG6. I could do that myself. But with the arrival of solid-state integration, the procedures became more difficult.

Lenk's Television Handbook by John D. Lenk takes a modular approach, examining each of the subsystems in a modern TV receiver, explaining how it works and what to look for if it doesn't

work. In easy-to-read style, and with schematics to back him up, Lenk walks us completely through the television set, from front end to speaker. Testing and adjustment procedures are covered as well.

Whether you are a home electronics buff or a service professional, the *Handbook* is an excellent repair-shop reference. *Lenk's Television Handbook* is published by McGraw-Hill, 11 West 19th St., New York, NY 10011.

— BG

SCA Primer

Here's one of those slightly offbeat, near-give-aways we find for you once in a while. Ever hear of SCA? It's a kind of "hidden" signal that FM broadcasters overlay on their regular audio. You don't hear it, but with an SCA decoder, an entirely new world of stations is unveiled.

That hard rock station you hear, when tuned with an SCA decoder, turns out to have 24-hour business news. The classical station harbors an array of ethnic music programs. Others may reveal medical briefings for doctors, reading services for the blind, and more.

Dr. Bruce Elving is considered the king of SCA and produces not only a directory of stations with SCA but also sells radios capable of picking these signals up. (By the way, it's illegal to listen to SCA without authorization, although it's not illegal to own a radio that picks up SCA. Does this sound familiar to scanner listeners?)

In any case, Dr. Elving has put together an informational flyer entitled, "SCA: Radio the FCC Doesn't Want You to Own." You can get a copy for a buck, postpaid. Dr. Elving knows that once you hear a sample of the programming on SCA, you're going to want to listen for yourself (and presumably purchase one of his gizmos). So he has also put together a demo FM/SCS Demo Tape. The cost for this little gem is $4.00, also postpaid.

Check it out. Contact Dr. Bruce Elving at P.O. Box 336, Esko, MN 55733-0336. You can reach him by phone at 218-879-7676.

Making the Computer Connection

Optoelectronics has released the new Optolinx PC-Radio universal interface (a replacement for the CX12AR).

The Optolinx adapts to a wide variety of radios, scanners, decoders, frequency counters, frequency recorders, GPS receivers, and other devices with an RS-232C personal computer serial port. The Optolinx incorporates special provisions for connecting the AR2700 and AR8000 to a PC for full-featured computer-controlled scanning, even allowing the user to control multiple radios at one time. Interface the AR3000A receiver with the DC440 decoder, and the Optolinx will even allow for decoding DCS and CTCSS tones and DTMF characters.

For more information contact Grove at 704-837-7081, or 800-438-8255 to order. The retail price is $129.95.

Stand and Deliver!

Looking for a way to use your handheld transceiver or scanner as a desktop unit, powering or charging it from the AC line? A new accessory from Grove Enterprises fits a need long felt by hobbyists. Slip your handheld radio into this stand, adjust the tilt for easy viewing of the display, and you have all the features of a desktop.

Two cables are provided to fit the majority of radios which require 12 VDC, center pin positive. A second charge jack allows powering an accessory or second radio simultaneously. The Desktop Stand/Charger is $59.95 plus $6.50 shipping from Grove Enterprises (800-438-8155) or PO Box 98, Brasstown, NC 28902.

— RB

More Power

A firm called Cutting Edge, Inc. is offering AC and DC power supplies that could be of interest to the radio hobbyist. Power Port is a combination 12V 7 amp hour gel cell battery combined with an on-board inverter. The result is a unit that produces both 12 volt DC and 115 volt AC. It can be charged with an supplied AC wall-adapter or from your car or truck.

Power Port will reportedly produce 50 watts (75 watts peak surge power). It is available for $89.50 plus $6.50 shipping. Power Port Jr. is similar to the Power Pocket Extended Life battery sold by Grove and several other dealers. Also like the Power Pocket, Power Port Jr, hangs on your belt, comes with a free AC adapter/charger and offers roughly 12 volts of 2 amp hour power. The price is the same, too: $59.95. Add $6.50 shipping when ordering.

To order or to get more information, contact Cutting Edge Enterprises at 1803 Mission Street, #546, Santa Cruz, CA 95060 or call 800-206-0115. Tell them that *MT* sent you.

Conversion Experiences

Regardless of your equipment or where in the world you may be, two new accessories from the Grove Enterprises catalog have you covered. An array of six different power plugs will fit your DC-powered gear for mobile operation from the cigarette lighter of your car. Power is switchable between 1.5/3/4.5/6/7.5/9 or 12 volts at up to 8mA

of current. Never worry about batteries during a long trip again with the $12.95 Universal Mobile DX Power Converter.

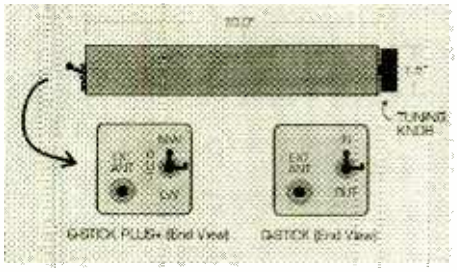
If your trip takes you out of the country, DC isn't the problem: it's finding an outlet that will accept your AC plug! The nifty Universal Power Converter adapts to five different socket configurations for any 50 or 60 Hz, 120 or 240 VAC outlet. A color-coded country selection chart is attached. Being able to use your own radios or appliances makes it well worth the $34.95 ($7 shipping). Call Grove to order at 800-438-8155.

—RB

Medium Wave Kicker

The Quantum Stick and Quantum Stick Plus (also known as the Q-Stick and Q-Stick Plus) are passive antenna boosters designed by dedicated broadcast band DXer Gerry Thomas to "give a kick" to the medium and longwave performance of portable radios.

The basic approach is not hi-tech: the antennas are oversized ferrite rods that magnetically couple their high signals levels to your radio's internal ferrite rod antenna. The Q-Stick covers the MW band from 530 to 1700 kHz



and the Q-Stick Plus adds the longwave band. It mounts directly on the radio or can simply be placed near it.

The price of the Quantum Stick is $52.00. The Q-Stick Plus is $72.00. Shipping is $3.00. To order or for more information, contact Gerry at Radio Plus+ Electronics, 3635 Chastain Way, Pensacola, FL 32504.

Palomar Preselector

Palomar's new preamp for medium- and shortwave listeners packs a double punch: as an active preamplifier it provides over 20 dB gain for weak signals that need a boost, while adding increased front-end selectivity to aid reception in a high signal density environment. The new design reduces overload from strong signals as well. Secified frequency coverage is 200 kHz to 30 MHz. The Model P-508 is available for $99.95 plus $6 shipping from Palomar Engineers, P.O. Box 462222, Escondido, CA 92029. Phone 619-747-3343, FAX 619-747-3346. The AC power adapter (9-15v DC 60ma.) PS-90 is $9.95.

— RB

Badge Guide

Scanner enthusiasts often become public safety buffs, many of whom collect patches and badges. Bill Mauldin, whose name is well known among scanning aficionados, has released an excellent collectors' guide to state police and highway patrol badges, listed state by state..

Nearly 200 badges are pictured with detailed accompanying text on how to recognize real issues from reproductions, along with pricing information for collectors. *The State Police and State Highway Patrol Badge Guide* is available for $15.95 plus $3 shipping from William Mauldin Productions, 1010 Canonero Drive, Greensboro, NC 27410-3804.

— BG

Ham Price Guide

Ham radio operators who cruise the flea market circuit will be happy to have a copy of *Ham Price Guide* handy as they search the aisles for bargains. Based on actual ad, sale, or auction prices, *Ham Price Guide* covers transmitters, receivers, transceivers, antennas, tuners, linears, power supplies, and accessories, with over 300 items of ham gear identified by model names or numbers based on over 2,500 differently priced items.

The book itself follows a growing and admirable trend toward more reasonable book prices. It checks in at $9.95 postpaid. Get your copy from Sound Values, P.O. Box 9, Auburn, CA 95604.

Having it All

For the radio hobbyist who has everything—it's the personalized mouse pad! Now you can have that great photo of you in your shack, a prized QSL, or your club logo and membership number imprinted—in color—on an 8 x 9.5" mouse pad. Man, is this living, or what?

The custom radio hobbyist mouse pad is just $10.95 plus $3.50 shipping. Send your money (Don't wait! Do it now!) to Personalized Photo, P.O. Box 370244, West Hartford, CT 06137. For more information or a brochure, pick up the phone and call — 860-233-7277. Mention *MT* when you call.

Mac Attack for the AR8000

A firm called Eddyworks has announced the unveiling of their AR8000 software for the Macintosh called AR8000 ToolKit. According to information received in Brasstown, the new program "provides users with an easy way to enter, edit and organize the 1,000 memory banks" of the AR8000. In addition to editing frequency banks, it also allows users to edit the search banks and scanner settings as well as data not accessible through the keypad, like the auto-mode bandplan table and restricted frequencies.

The AR800 ToolKit is available on the World Wide Web at **http://www.mich.com/~eddy/works**. It can also be obtained by sending a check or money order for $35.00 to Eddy J. Gurney, 18712 Westbrook Way, Livonia, MI 48152.

Radio Spirits

MT reader and host of the late-night program on Chicago's "The Loop" (97.9 FM), Ed Schwartz, has written with news of an interesting catalog full of radio goodies.

"Since this is the 75th anniversary of my industry," says Ed, "I am sending you the catalog from 'Radio Spirits.' The founder of this impressive company is Carl Amari, a young local radio producer."

Radio Spirits contains tapes, CDs, and memorabilia from radio's Golden Age. There's an incredible selection of old-time radio shows, ranging from the well-known to the utterly obscure (but nonetheless entertaining). Best of all, the prices are surprisingly inexpensive, with some cassettes as low as $6.98 and CDs at $8.99.

MT readers can get a free copy of the catalog by calling 1-800-723-4648 or by writing P.O. Box 2141, Schiller Park, IL 60176.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.

MT REVIEW

ANLI VHF/UHF Antenna Product

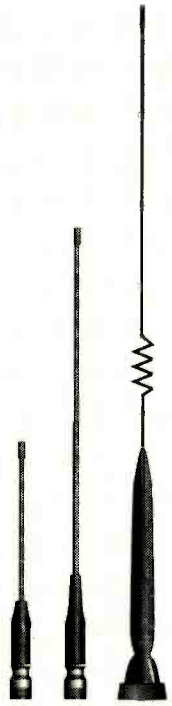
By Bob Grove

At the urging of several readers, we recently obtained three VHF/UHF antennas from ANLI Antenna and ran them through their paces—one mobile antenna and two rubber duckies. Ruggedly assembled and professional in appearance, the antennas are designed for amateur two meter and 70 centimeter transceivers (144-148/420-450 MHz). We found them to be excellent for scanner reception well beyond those limits; our results follow.

Using a hand-held Radio Shack PRO-43 scanner we entered several test frequencies into memory and started interchanging the original with the three test antennas, noting best reception.

The RD8H 6" flex whip is very slim with a gold-plated BNC connector with virtually identical reception as the original "rubber ducky" except on low band (30-50 MHz) where it was much poorer since the PRO-43 was designed for that range as well as the others. We would recommend the RD8H for its original purpose: 144-148/420-450 MHz transmitting and 140-174/406-512/806-960 MHz receiving. Suggested retail is $19.95.

The RD78H, a slim, 15 inch, flex whip, has a design gain of 2.15 dBd on two meters and 3.25 dBd on 70 cm. On-air tests validated the improvement over the original equipment antenna, with stronger reception in the 150 and 420 MHz portions of the spectrum. Reception was acceptable on low band (30-50 MHz) due to the antenna's aperture (length), not its design. We would recommend the RD78H as it was originally intended: for replacement of original equipment antennas on amateur dual-band handhelds. Suggested retail is $26.90.



Predictably, the AT-2 mobile antenna was the best performer of the three; it is a 24 inch, spring-supported, dual-bandwhip for the same frequency ranges as the two duckies, but with one notable exception: Its low-Q design allows a wider bandwidth of operation (better than 2:1 VSWR) with excellent gain (3 dBd @ 130-174 MHz, and 5.6 dBd @ 406-512 MHz). General coverage reception is also useful in the 30-50 and 806-960 MHz bands. Suggested retail is $49.95.

The MC-1-NMO six-inch-diameter magnet deserves comment on its own. It's the strongest we've seen, giving the impression that the top of your vehicle will come off before the magnet will! It has a suction release tab which aids in removal. Very effective. Suggested retail is $28.95.

For further information, contact ANLI Antenna at 20277 Valley Blvd., #J, Walnut, CA 91789, or call 800-666-ANLI (2654).

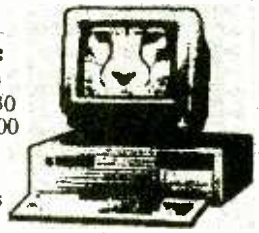
THE LATEST SOFTWARE AVAILABLE AT YOUR FAVORITE DEALER!

Remote Computer Scanning System

The RCSS, Windows '95 compatible Software significantly enhances the AOR AR8000 receiver's capabilities by providing automate Personal Computer control over the receiver's scanning, logging and memory functions! These features and many more make this software a great choice for Windows use:

- Auto detection and storage of active frequencies and add'l. info while scanning
- Scan user specified tuning steps from 10Hz - 100 MHz
- Scan by mode, class of service, or type of unit
- 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

SCANCAT GOLD



SCANCAT

presently supports:

- **AOR** 3000/3000(A) & AOR2500, AR3030 HF receiver, AR8000 (Newest handheld)
- **Drake** R-8
- MOST **Icom** Radios
- **Kenwoods** including TS-440, TS-450, TS850 & R5000
- MOST **Yaesu's** including FRG-8800 & FRG-9600 Yaesu, PLUS FRG-100, FT-840 and more!
- The NRD-525 & 535 **JRC**.
- **LOWE** HF-150m
- **Watkins Johnson** HF-1000
- **Opto Electronics** add-on boards for **PRO** series Radio Shack Radios.

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

SCANCAT allows you to:

1. Enter any one frequency and increment up-down from that point.
2. Enter any two frequencies and scan between them with ANY increment, time delay or pause.
3. Scan a file of frequencies, search by description or wildcards.
4. Create Databases of frequency files. Sort by any field, and save to disk and/or send to printer.
5. Create 30 personal "Preset" frequency BANDS for SW, aircraft etc. including increment and mode. The most popular presets are included in the program.

- **Multiple Scanning Banks**
- **Multiple Scanning Diskfile Banks**
- **Unlimited Files Sizes**
- **Dual Radio Simultaneous Scanning**
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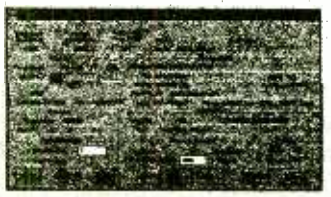
- **Direct Import of TRS**
- **Macro Control per Record**
- **Command Line Control**
- **Automatic Birdie Lockout**
- **Top Hits Table**

WINDOWS™ Control for Scanners 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 multiple groups, banks, or search ranges in the same session.
- Birdie control file. • Unlimited file size.
- Import PerCon Database and comma-delimited ASCII.
- Special Eprom 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/R71000/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.
- NEW slave- master scanning with CIV protocol, scan on your receiver and all hits are transferred to the slave receiver for monitoring.
- NEW minimize window allows viewing of freq status while in any other WINDOWS or DOS application.



Computer Interface for the AR8000 & AR2700

Unlike some of the European devices sold today, this unit is smaller, lighter, and makes no power demands on your receiver. With the extra shielding and smaller size there is less chance of additional interference leaking into your radio. The AR8000INF is also the only interface that is upgradeable for use with the optional Tape recorder controller.

- △ **Low Power, powered by your serial port**
- △ **No Drain on the batteries in the radio**
- △ **Light weight, perfect for Laptop use**
- △ **Hi-Tech Surface mount design for reliability**
- △ **100% Shielded cable to receiver for reduced interference**
- △ **PC Software included for Windows and DOS**
- △ **Detailed Programers documentation available**
- △ **Designed and Manufactured In the USA**

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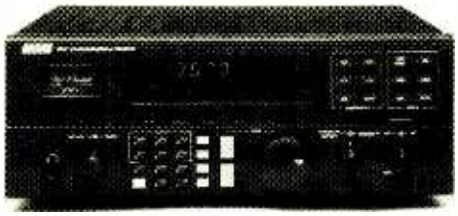
Lawrence Magne
Editor-in-Chief, Passport to World Band Radio

Is the Drake R8A Receiver Better?



Few radios have elicited the interest that has been shown in the Drake R8A, the replacement to the highly rated Drake R8 that came on the market in 1991. Various problems—including oddities the *PASSPORT* team discovered during intensive testing, some of which have subsequently been corrected—have delayed the final verdict on the R8A. But now, after having thoroughly tested a number of samples over several months, the jury is well and truly in.

So, is the R8A as good as, or better than, the R8? Read on!

■ Laden with features

Like its predecessor, the R8A is a tabletop communications receiver with coverage from 0.1-30.0 MHz; an optional VHF converter adds coverage of 35-55 and 108-174 MHz. Reception modes are AM, LSB, USB, CW, and narrow-band FM. The R8A can be operated from 90-110, 108-132, 180-220 or 216-264 VAC, 50-60 Hz, or from 11-16 VDC through a connector on the rear panel.

The R8A is laden with juicy features. Among these are no less than five usable bandwidths (four for voice), passband offset control (for all modes except NBFM), selectable-sideband synchronous detection, two VFOs, 440 memory presets that store just about every receiver operating parameter, two selectable antenna inputs, keypad and multi-speed knob tuning, up/down slewing in 100 kHz increments, all-mode squelch, a variety of sophisticated scanning options, a tunable audio notch filter, two-level noise blanking, two 24-hour clocks (which don't show while the frequency is displayed), a timer, an attenuator, a switchable shortwave preamplifier, an analog signal-strength meter, a front-panel-display dimmer, plus RF gain and tone controls.

On the back panel there are two audio-line output connectors, plus an interface for using a computer to control the receiver. Also on the back panel, there's a jack for connecting an external speaker, and a switch for choosing the internal speaker, external speaker or both. On the front panel, there is a standard 1/4" headphone socket.

■ 440 tunable/non-tunable alphanumeric presets

While most receivers have either tunable presets or non-tunable presets, R8A listeners have the best of both worlds: all 440 memory presets—a big jump over the R8—can be non-tunable (in which case the tuning knob can be used as a kind of manual scanner) or, tunable by pressing and holding the MEM button until MEM TUNE appears on the display. The memory presets can then be tuned *without* changing the information that is stored. When the MEM TUNE function is activated, neither VFO is affected. As a result, the MEM TUNE function gives the R8A, in effect, a *third* VFO.

In addition, each memory preset can be assigned a seven-digit alphanumeric name as well as its numeric frequency, and this is displayed on the LCD. With 440 memory presets, it would be extremely difficult to remember what is stored in each one without some sort of chart or table. But with a name assigned to each preset, knowing what's what is a lot easier. For example, you don't have to remember that 2182 USB is the Maritime Rescue frequency if the display suddenly pops up with "MRESCUE."

With the R8A, unlike the R8, memory names can be entered when the frequency is stored. Letters and numbers for each of the seven digits that can be used for a name are selected by rotating the main tuning knob. A function key allows the listener to decide whether or not the name of the preset should be displayed when poking through the memory channels.

■ Improved frequency display

The R8A can display the frequency as, for example, 9.750, 9.750.0 or 9.750.00 MHz; or 9750, 9750.0 or 9750.00 kHz, depending upon which display and tuning step options you select. This is a welcome improvement over the R8, which omitted the right-hand-most decimal. In addition, you can now choose to have a completely black display when the receiver is turned off, another improvement over the R8.

■ Added keys and tilt bail improve operation

The most visible change to the R8A is the addition of 12 buttons to the receiver face. Now there is a single button for selecting each of the five bandwidths, plus an AUTO button that will automatically select the bandwidths for you. There is also a button for each of the operating modes, so if you want to go from FM to CW, it requires only a single button-push. If you want the AM synchronous mode, though, it requires that the AM SYNC button be pressed a second time. Nevertheless, this is a major improvement over the annoying "ring around the rosy" exercise that the R8 required.

The R8A comes equipped with a sturdy flip-down metal rod, attached to a pair of substantial plastic posts, that can be adjusted to prop the receiver at a handy operating angle. This is much better than the flimsy, easily-broken plastic feet on the R8.

■ Performance changes a mixed bag

In most measurements of receiver performance, the R8 and R8A are at virtual parity—head to head. But there are differences. In some areas the R8A is clearly stronger; in some, slightly weaker.

Like the R8, the R8A has five bandwidths. The good news is that, in general, the bandwidths on the R8A measure closer to—and sometimes below—the factory specifications than the bandwidths on the R8. The bad news is that, viewed as a group, the shape factors of the R8A's bandwidths aren't quite as good as those on the R8. Overall, the R8A's bandwidths earn one excellent, three good, and one fair rating, while the R8 had two excellent shape factors and three good. When it comes to ultimate rejection, though, each of the R8A's bandwidths earns an excellent rating, beating the R8 across the board.

Dynamic range, however, does not offer much in the way of good news. The dynamic range was not measurable at 20 kHz spacing because of phase noise. At 5 kHz spacing, the dynamic range was only fair-to-good, an acceptable showing, but not quite so good as the R8.

While the R8A is just as quiet and free from

circuit hiss and digital hash as the R8, the R8A is not quite equal to the R8 in sensitivity. Shortwave sensitivity at 10 MHz with the preamplifier off is good-to-excellent, and excellent-to-superb with the preamp on. With the preamp off, sensitivity at 2 MHz and 1 MHz is good, rising to good-to-excellent with the preamp on. At 200 Hz longwave, however, sensitivity with the pre-amp off is only fair-to-good, although it improves to good-to-excellent with the preamp on.

The already-excellent AGC action of the R8 has, for the most part, been improved in the R8A. Our laboratory director, making a compliment, calls the R8A's AGC "more Collins-like" than that of the R8, which he describes as more "Drake-like." However, there are times when there is a brief instant—between the initiation of a really strong signal rise, usually during fading, and the subsequent reaction of the AGC—that dynamic distortion occurs. Really finicky ears may find this annoying, while others won't even notice it.

In the R8A, the notch filter—intended to surgically slice out offending heterodynes—has taken a step backwards. Although the factory specification calls for a -40 dB notch, we could measure only -25 dB, and therefore it receives only a fair rating. Some of the difference may be due to unit-to-unit variations. Nevertheless, as with the R8, the notch on the R8A is so fussy to adjust that we find ourselves using it only as a last resort.

Very low distortion, but sync locks less well

When it comes to audio quality, the R8A again acquits itself with honors, providing a suitable outboard speaker is used (Drake's optional speaker, however, is mediocre). The highest measurement of overall distortion—in our lab, we measure distortion for the *entire* receiver, not just the audio stage—is a high-fi-like 1% at some frequencies, and measurements at other audio frequencies are even better. As a result, this is a receiver that is extremely well suited to hour-after-hour usage, whether for program listening or DXing, without fear of audio fatigue caused by distortion.

However, the fidelity-enhancing synchronous detector on the R8A is a "dis-improvement" over that of the R8. In our listening trials, we found that it loses lock far more easily—notably, and surprisingly, on strong stations—than the synchronous detector on the R8. We suspect that this may be related to the brief instances when, as explained earlier, the AGC is momentarily "playing catchup" with strong signal rises. According to Drake, they have no plans to ameliorate this, as apparently the "fix" poses difficulties.

Pricey aftermarket fix works well

However, there is an aftermarket fix that sounded intriguing, so we tested the R8A with it, as well as without. It's the SE-3 Mark III from Sherwood Engineering (303/722-2257). The SE-3, which among other fidelity-enhancing features includes an unusually effective type of synchronous selectable sideband, is absolutely rock-solid in maintaining lock on world band signals. It also allows much greater "detuning" away from center frequency to avoid adjacent-channel interference.

It works very well, indeed. Unfortunately, good as it is, the SE-3 adds close to 40% to the cost of the R8A and has to be installed by Sherwood Engineering. It also adds somewhat to the complexity of operating the receiver.

Bottom Line

So, the verdict: The ergonomics of the R8A are improved substantially by the new mode and bandwidth buttons. In addition, bandwidth ultimate rejection and audio distortion, which were already commendable, have been improved over the R8. There are now beaucoup more memory presets—with handy alphanumeric display, to boot—and the listener is given the option of making them tunable or non-tunable on the fly.

Unfortunately, the synchronous detector works less effectively than in the previous incarnation, and the only effective "fix" we know of is costly; the dynamic range has been reduced a bit; and sensitivity has decreased slightly at lower frequencies (a point of possible concern mainly to BCB DXers).

The $1,099 Drake R8A very much still "makes the team" among the world's top-gun receivers for program listening and DXing. It is easier to operate than its predecessor, but with a couple of steps backward in performance.

For shortwave DXing, in particular, the R8A is pretty hard to beat. And for gilt-edged SWLing, the R8A with the Sherwood SE-3 continues to be among the top handful of choices available. "Barefoot," though, the earlier R8's better synchronous detector locking performance make it more desirable for fidelity-oriented SWLing than the current R8A.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

Bob Parnass, AJ9S

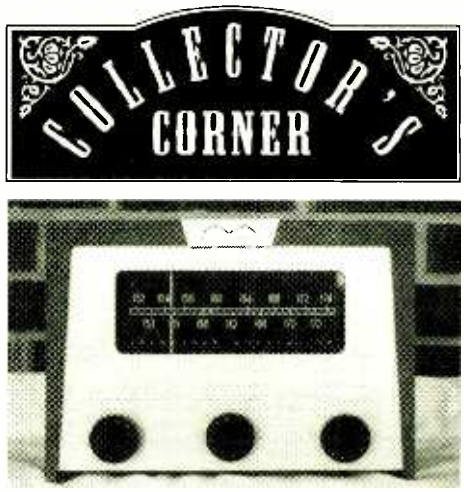
Compendium of I.F. for Scanners

Want to connect a panoramic display to your scanner or calculate an image frequency? You will first need to know your scanner's IFs (intermediate frequencies). Uniden scanner owners must purchase an expensive service manual to learn the IF scheme for their scanners. Radio Shack customers are sometimes provided with IF specifications in the Users' Manual, or can purchase a service manual at a reasonable price.

I have compiled a list of IFs for various scanners and present it for your study. Over 160 scanners are represented, from early, single conversion crystal models through today's triple conversion programmables. I don't have access to the schematics nor block diagrams for all models, so the list is not complete.

The last IF in some models depends on the reception mode. Wide FM signals are often processed through a 10.7 MHz IF stage while narrow FM and AM signals in the same scanner pass through a 0.455 MHz IF. The exact first IF in advanced Radio Shack models manufactured by General Research Electronics, e.g., the PRO-2006, varies depending on the frequency to which the scanner is tuned. In those cases, the table specifies a range of frequencies for the first IF.

Scanner collectors will note that the earliest Radio Shack models used a 44 MHz IF for UHF band coverage, as opposed to 10.7 MHz in later designs. The odd IF explains why common Radio Shack UHF crystals won't work in the original Radio Shack models like the PRO-10.



The 1959 vintage Monitoradio MR-10 receiver, made by Regency Electronics, uses eight tubes and covers 152-174 MHz. Photo by Pam Parnass N9HRZ.

TABLE OF INTERMEDIATE FREQUENCIES

BRAND	MODEL(S)	1st IF	2nd IF	3rd IF
AOR	AR-2700	285.55 or 749.25	58.05	10.7 or .455
AOR	AR-8000	275.45 or 736.25	45.05	10.7 or .455
AOR	AR1000X	556.325 or 249.125	58.075 or 10.7 or .455	10.7 or .455
Bearcat	BC 6	10.8		
Bearcat	BC III	10.8		
Bearcat	BC IV	10.8		
Bearcat	BC-220XLT	10.8	.450	
Bearcat	BC-860XLT	10.8	.450	
Bearcat	BC-890XLT	10.8	.450	
Bearcat	BC-9000XLT	254.4 or 380.7	58.075	5.5 or .455
Bearcat	BC12	10.8		
Bearcat	BC20/20	10.8	.400	
Bearcat	BC200XLT	10.85	.450	
Bearcat	BC210	10.8	.400	
Bearcat	BC220	10.8	.400	
Bearcat	BC250	10.85	.450	
Bearcat	BC760XLT	10.85	.450	
Bearcat	BC800XLT	10.8	.400	
Bearcat	BC950XLT	10.85	.450	
Channel Mast.	6258	10.7	.455	
Courier	Cop-Scan UHFH	10.7	.455	
Courier	Cop-Scan VHF & VHFL	10.7	.455	
Craig	4350	10.7	.455	
Craig	4352	10.7	.455	
Craig	4354	10.7	.455	
Fanon Courier	Scanfare VHFHL-U	10.7	.455	
Fanon	Scanfare UHFH	10.7	.455	
Fanon	Scanfare VHF & VHFL	10.7	.455	
Federal Signal	Voice Command VCRx	10.7	.455	
Fieldmaster	MF-200L	10.7	.455	
Gemtronics	Scanmaster 8 & 12	10.7	.455	
Globe	9700	10.7	.455	
Handic	006	10.7	.455	
Handic	007	10.7	.455	
Heath	GR110	10.7	.455	
Heath	GR740	10.8	.400	
ICOM	R1	266.7	10.7	(AM/NFM) .455
ICOM	R7000	266.7 or 778.7	10.7	.455
ICOM	R7100	266.7 or 778.7	10.7	.455
JIL	SX-100	10.695	.455	
JIL	SX-200	10.7	.455	
Johnson	241-0340-001	10.7	.455	
Johnson	241-0340-002	10.7	.455	
Johnson	241-0352-102	10.7	.455	
Johnson	Duo-Scan Hi & Lo	10.7	.455	
Johnson	Duo-Scan UHF & VHF	10.7	.455	
Johnson	Duo-Scan	10.7	.455	
Johnson	Mono-Scan UHF	10.7	.455	
Johnson	Mono-Scan VHF	10.7	.455	
Kris	Hand Scan VHF 416-155	10.7	.455	
Kris	Tri Band	10.7	.455	
Lafayette	4B-10	10.7	.455	
Lafayette	99-26213W	10.7	.455	
Lafayette	99-26221W	10.7	.455	
Lafayette	99-26288W	10.7	.455	
Lafayette	99-26296W	10.7	.455	
Lafayette	HI-U-100	10.7	.455	
Lafayette	LO-HI-U-Priority 1	10.7	.455	
Lafayette	Porta-Scan 4	10.7	.455	
Midland	13-903 & 13-903B	10.7	.455	
Midland	13-904	10.7	.455	
Midland	13-912	10.7	.455	
Midland	13-915	10.7	.455	
Midland	13-916	10.7	.455	

BRAND	MODEL(S)	1st IF	2nd IF	3rd IF
Midland	13-918	10.7	.455	
Midland	13-919	10.7	.455	
Midland	13-921	10.7	.455	
Midland	13-925H/L/M	10.7	.455	
Midland	13-930	10.7	.455	
Midland	13-934	10.7	.455	
Midland	13-937	10.7	.455	
Midland	13-940	10.7	.455	
Midland	13-944	10.7	.455	
Midland	13-950	10.7	.455	
Morse Elect.	SC600	10.7	.455	
Motorola	Alert VHF-high	11.7	.455	
Motorola	Alert VHF-low	5.7	.455	
Pace	104H/L/U	10.7	.455	
Pace	108-H/L/U	10.7	.455	
Pace	150	10.7	.455	
Pace	208	10.7	.455	
Pace	216	10.7	.455	
Pace	308	10.7	.455	
Pennys	981-606x series	10.8	1.65	
Pennys	981-608x series	10.8		
Plectron	P1 series	10.7	.455	
Plectron	R515 - R520	10.7	.455	
Plectron	R715 - R723	10.7	.455	
Radio Shack	PRO-10 (on UHF)	44	10.7	.455
Radio Shack	PRO-10 (on VHF)	10.7	.455	
Radio Shack	PRO-12	10.7	.455	
Radio Shack	PRO-14 (on UHF)	44	10.7	.455
Radio Shack	PRO-14 (on VHF)	10.7	.455	
Radio Shack	PRO-16 (on UHF)	44	10.7	.455
Radio Shack	PRO-16 (on VHF)	10.7	.455	
Radio Shack	PRO-20	10.7	.455	
Radio Shack	PRO-2001	10.7	.455	
Radio Shack	PRO-2004	607.505 - 611.5	48.5	10.7 or .455
Radio Shack	PRO-2005	607.505 - 611.5	48.5	10.7 or .455
Radio Shack	PRO-2006	607.505 - 611.5	48.5	10.7 or .455
Radio Shack	PRO-2022	10.7	.455	
Radio Shack	PRO-2035	approx. 611	48.5	10.7 or .455
Radio Shack	PRO-2036	10.8	.450	
Radio Shack	PRO-2037	257.5	21.4	.455
Radio Shack	PRO-2040	10.8	.450	
Radio Shack	PRO-2042	approx. 611	48.5	10.7 or .455
Radio Shack	PRO-21	10.7	.455	
Radio Shack	PRO-24	10.7	.455	
Radio Shack	PRO-26	254.4 or 380.7	58.075	5.5 or .455
Radio Shack	PRO-2B	10.7		
Radio Shack	PRO-34	10.7	.455	
Radio Shack	PRO-3A (on UHF)	30.0 - 50.0	10.7	
Radio Shack	PRO-3A (on VHF)	10.7		
Radio Shack	PRO-4	10.7	.455	
Radio Shack	PRO-43	608.005 - 611.2	48.5	.455
Radio Shack	PRO-45	10.7	.455	
Radio Shack	PRO-47	10.7	.455	
Radio Shack	PRO-4A	10.7	.455	
Radio Shack	PRO-52	10.7	.455	
Radio Shack	PRO-53	10.7	.455	
Radio Shack	PRO-6	10.7	.455	
Radio Shack	PRO-60	approx. 609	45	10.7 or .455
Radio Shack	PRO-62	257.5	21.4	.455
Radio Shack	PRO-7	10.7	.455	
Radio Shack	PRO-77	10.7		
Radio Shack	PRO-77B	10.7	.455	
Radio Shack	PRO-7A	10.7		
Radio Shack	PRO-7B	10.7	.455	
Radio Shack	PRO-8	10.7		
Radio Shack	PRO-88 (on UHF)	44	10.7	
Radio Shack	PRO-88 (on VHF)	10.7		
Radio Shack	PRO-9	10.7		
RCA	165200	10.7	.455	
RCA	165300	10.7	.455	
Regency	ACT series (most)	10.7	.455	
Regency	HX1000	21.6	.455	
Regency	M400	10.7	.455	
Regency	MX7000	750	45.03	.455
Regency	TME series	10.7	.455	
Regency	TMR series	10.7	.455	
Robyn	100B Hi Bander	10.7	.455	
Robyn	4000	NFM 10.7/AM 10.5	.455	
Robyn	HL-8+8 Hi-Low Bander	10.7	.455	
SBE	Optiscan SBE-12SM	16.9	.455	
SBE	Sentinal series	10.7		
Sears	934.36390601	10.695	.455	
Sharp	FZ-400	10.7	.455	
Sonar	FR-104	10.7	.455	
Sonar	FR-105	10.7	.455	
Sonar	FR-25xx series	10.7	.455	
Teaberry	T-Scan	10.7	.455	
Unimetrics	Dura Scan-4	10.7	.455	
Unimetrics	Dura Scan-8	10.7	.455	
Wards	GEN-846A	10.7	.455	
Wards	GEN-856A	10.7	.455	

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.

Clem Small, KR6A, CET

The Hydrochloric-Acid Antenna: High, Long, and in the Clear

The old-time shortwave operators used to have a saying—now called "The Old-timer's Rule"—to the effect that a low-gain antenna mounted high was more likely to work weak signals than was a high-gain antenna mounted low. DX authorities sometimes tell us that 40 feet is something of a minimum antenna height for HF DX chasing. At VHF and higher there is a rule of thumb that doubling an antenna's height can often make weak signals 6-dB louder!

Of course, if the arrival path of the signal we're monitoring is already in the line-of-sight of our receiving antenna, then increases in our receiving antenna's height are not too likely to improve reception. On the other hand, there is a reason why the old-timer's rule came into being; there are many situations in which added antenna height will give a welcome increase in received signal strength.

Another factor that can often give an advantage to so-called "all-band" HF antennas is length. When designed for a particular band, antenna elements must often be of a particular length. Making the elements longer than the optimum length may actually decrease the antenna's effectiveness.

On the other hand, for all-band antennas, it is often better to have the antenna as long as is practical for the location. Some antenna workers feel that a long antenna has a kind of space-diversity effect built into it—its greater length gives it more chance to be in the signal's path.

We are all familiar with the idea that radio signals aren't good at penetrating large buildings; thick, leafy vegetation; or hills. It is good practice to keep our antennas sited such that there are no major obstructions to the paths over which the incoming signals arrive at our antenna.

Putting It All Together

An *MT* reader (I think it was Dick Hedlund), once told me that an antenna which was high, in-the-clear, and long was known as the "hydrochloric-acid antenna." It had this name because the initials for "high," "clear," and "long" comprise the acronym "HCL," which is the formula for hydrochloric acid!

Such antennas almost always compare very favorably with dipoles or other wire antennas as a general monitoring skywire for any shortwave band, the AM broadcast band, or even on down into the lower frequencies.

Making the HCL Antenna

1. All that you need to make your own HCL antenna (fig. 1) is a coaxial cable lead-in, a 4-to-1 balun transformer designed to function over the entire HF band, a few strain insulators, and a length of wire. If you can't run the antenna in a straight line, it can be "L" or "Z" shaped, or any configuration which will fit your situation.
2. Choose your tie points as high as practical. Remember that you can get a wire up high by using a slingshot, bow and arrow, or even by throwing a rock. Tie a string to your projectile before you launch it. Once the string is over the tie point, use it to pull up a light rope or strong cord, which can then be used to pull up the antenna.
3. It's best to run the antenna through a strain insulator at each tie point. But for receive-only antennas, if you use insulated wire, it is actually OK to just run the wire over a

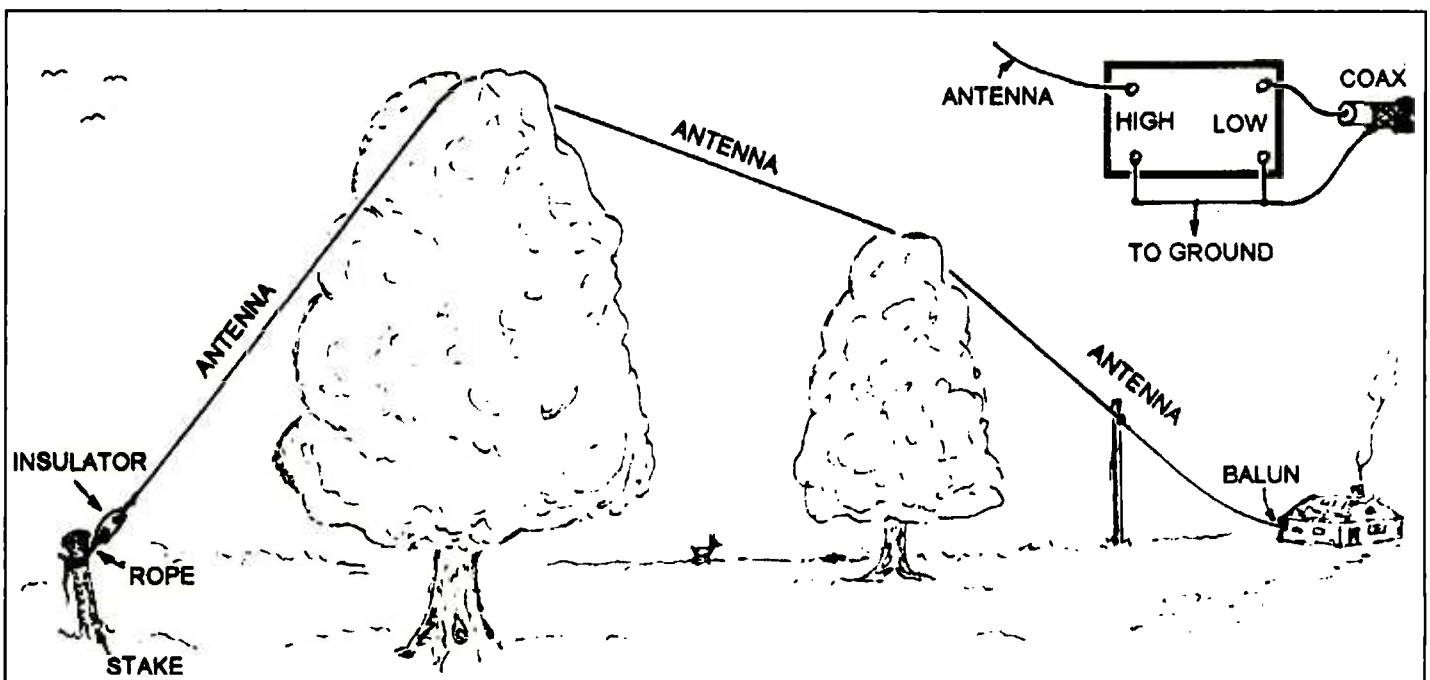


FIGURE 1: *An HCL antenna installation with its balun connections shown in the inset.*

tree branch or right over the top of the tree (fig. 1). I have used insulated wire and no insulators with HCL antennas which I used for transmitting, and they have worked fine. But, this isn't recommended practice, especially if you use a few hundred watts or more of transmitter power.

4. Using ordinary house-wiring wire is OK for short antennas—say, 50 feet or so in length. But the copper in such wire is often so soft that it will gradually stretch and break in a few weeks or months if there is much unsupported length to the antenna, or if the antenna has much pressure on it from wind or ice. For long unsupported spans, multi-strand antenna-wire or copper-clad steel will last much longer than soft copper wire.
5. I have always used a four-to-one balun with the high impedance side connected to the antenna and the low impedance side to the coax (inset fig. 1). There are baluns available made specifically for this sort of antenna.* Unless there are screw terminals for the balun it is best to solder all these connections. Seal any screw terminals, and the coax end, with coax sealant.
6. Use the best ground connection practical for you. A commercial ground rod is OK for this antenna. The ground gives some lightning-damage protection as well as providing for RF return.
7. Use some form of lightning-induced damage protection. The minimum here is to disconnect and ground the antenna, and the power plug, when the radio is not in use. Never use the antenna when lightning is likely.

Once the antenna is in the air with balun and lead-in attached, you are ready to go "on the air." Happy monitoring!

■ Chained to a memory:

Our editor sent me a note received via email from a *Monitoring Times* reader, Richard Koser. Richard found that our limp radial modification (Antenna Topics, July 1995) for handheld antennas perked up his scanner's performance. However, he also found that, for the longer wavelengths, radials can be so long as to be nuisance. For instance, at a frequency of 46.2 MHz—an emergency frequency he monitors—a radial is about five feet long!

For such longer wavelengths he reports that the use of ball chain (as used in electric-light pull-chains) is less unwieldy and less troublesome as a radial than is wire. Thanks for the tip, Richard.

If you didn't catch the July column, here's how to make a radial for your handheld's antenna:

1. Determine its length in inches by dividing 2808 by the monitored frequency in MHz.
2. Make the radial of light, limp wire.
3. Attach one end of the radial to the outer shell of the coax plug at the base of your handheld's antenna.

RADIO RIDDLES

■ Last Month:

I said that the dipole and loop antennas discussed in that column are very popular and useful in today's radio technology. Then I asked "What were the first antennas ever used in the work that led to our current technology?"

Well, it may surprise you to know that Hertz, in the first experiments to demonstrate radio waves to the world, used not only dipole and loop antennas, but also parabolic reflector antennas (the grandfather of today's satellite parabolic dishes) and dielectric antennas. Another surprise to many folks is that his original experiments were done in the VHF band!

The first receiving antennas Hertz used were small loops. His detectors for the Hertzian waves (RF) with which he worked were tiny spark-gaps, some so small that a magnifying glass was used to see the sparks which they yielded to indicate the presence of RF waves.

Grounded vertical antennas came along much later; Marconi derived the first of that line from Hertz's dipole antenna by making one half of a dipole vertical and replacing the other half with a connection to the earth. The groundplane antenna so popular today came even later than that, being developed towards the middle of the present century.

■ This Month:

Who developed the quarterwave groundplane antenna just mentioned above, and why does it usually have three or four radials rather than just two?

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.

* Palomar Engineers, balun model MLB-1, Box 462222, Escondido, CA 92046, phone 619-747-3343; Gilfer Shortwave, magnetic longwire balun, 52 Park Ave., Park Ridge, NJ, 07656, phone 800-GILFER-1.

(Continued from Page 4)

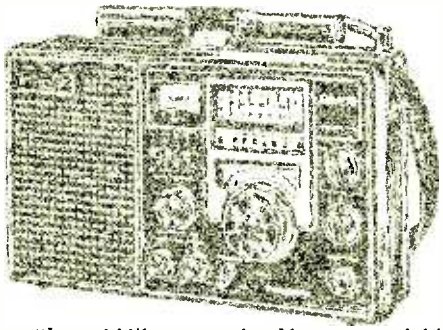
the area and department of even seldom-used frequencies.

"Then, if it is an active frequency, I program it into my Bearcat 9000XLT for regular monitoring."

Walter Koshen III, Racine, Wisconsin

Still Sold on the RF-2200

"The February issue had an excellent article by Skip Arey ("Beginner's Corner") on used receivers. In the article is a drawing of the Panasonic RF-2200, and a description of the incredible performance of this receiver. Mr. Arey advises that people should keep an eye out for this receiver.



"I would like to say that I have owned this receiver for 16 years. I bought it new for CAN $200. Mine is in mint condition, and looks brand new. This is a fantastic radio, in terms of both performance and quality. As an analog portable, it is tops! The fact that it still looks and works as good as the day that I bought it, is testimony to the superb quality of Panasonic. And no, my receiver is not for sale!"

Harvey Kader, Scarborough, Ontario

Uniden: Full Circle on Poor Service

"How many subscribers remember the days when the Electro Corporation produced and sold Bearcat scanners? Do you also remember how it was virtually impossible to contact their parts, repair, and customer service facilities by phone ... let alone get the item or service you called for in the first place?

"Well, guess what? After a brief interlude with an *efficient* Uniden Corporation who actually answered their phones and expedited orders quickly and correctly, we are now again thrust back into the inept, bumbling 'dark ages' of being put 'on hold' for 30 minutes or more; not getting an operator or only a 'busy signal' for hours at a time. If you *do* get through, you will automatically be put on hold with annoying jazz music interspersed with recorded announcements of 'how important your call is to Uniden,' plus the news that their customer service, repair, and parts dept. are now in Fort Worth, Texas. Dialing *any* of the five '800' numbers provided on the recorded announcements or, even the 'paid' (non-800) line gets you deadended into limbo on another musically-oriented 'hold' line. Only the most persistent caller will get a human voice (if not a stiff neck and explosive blood pressure) after at least a 20 minute wait.

"And then, hope your parts order arrives intact! The microchip I ordered for my BC-890XLT was hastily thrown into a plastic bag that was put in a mailing envelope and shipped by UPS. No box, no padding, nor reinforcement. When received, it looked like it had been danced upon by 200 mad Iranians ... totally useless!

"Needless to say, I'm trying to resolve this matter as I write this letter. No small matter, given the aforementioned problems of being unable to reach anyone at Uniden by phone.

"A word to the wise ... if you're going to buy a scanner, I suggest you buy from Radio Shack. Even though many of them are made by Uniden, at least you can call Tandy parts in Forth Worth, get right through on their lines, and talk to courteous, knowledgeable parts persons who are very helpful and intelligent, and can send you the right parts the first time (undamaged and intact).

"Until Uniden 'straightens out their act,' I for one, will not buy any more of their products. Because, if you need parts or service, you're gonna be 'up the creek without a paddle."

Larry Wiland, Youngstown, Ohio

Sad to say, Larry's experiences have been borne out by our own and by the tales told by frustrated callers to the Grove technical support staff. It is a short-term solution when a company's cost-cutting measures cannibalize customer service, only to lose the customers.

MT Read my Mind

"It never fails. You and your staff are always one step ahead. Just prior to one of your former issues which covered Space Shuttle monitoring, I was thinking, 'wouldn't it be handy if *MT* did an article on shuttle frequencies,' and BANG - that very next issue featured shuttle monitoring.

"I had been debating whether or not to send in a copy of a QSL from a special event I happened to catch one Saturday morning last September. I thought to myself, 'Ah, who cares, anyway?' And then, bang! There was the 'Keeping the QSL Fires Burning' article in Feb's issue. Well, that put me over the fence, so I'm enclosing a photocopy of a QSL from a special event.

"For about an hour or maybe longer, Frank Naggy N8BIB was broadcasting from under the wing of a retired B-52D which had been struck by an unexploded SAM missile during the Vietnam War. Various hams called in to ask questions regarding that flight and aviation questions in general. Very interesting."

Ronald Kidder, Ashland, Maine

SPECIAL EVENT STATION N8BIB

GREETINGS FROM YANKEE AIR MUSEUM (WILLOW RUN AIRPORT)
SEPT 17, 1995 OPERATING FROM BENEATH A RETIRED
BOEING B-52D STRATOFORTRESS BOMBER
BEST WISHES TO AMATEUR RADIO STATION
DONALD KIDDER

Ron also asked, "Is WA3NAN out of Greenbelt, MD, still using the same frequencies to relay shuttle transmissions? I tried these frequencies and found nothing." During the early part of the year, when Ronald Kidder was trying to listen to the shuttle, WA3NAN was inactive due to the blizzards and the government shut-down. Their shack is located at Goddard Space Flight Center, which was closed at the time. Both budget allocations and spring weather have experienced several false starts this year, but we hope they and WA3NAN's transmissions are now back on track!

Next month we'll have more on monitoring the Olympics for you, plus more great features and the usual solid advice from *MT* staff editors on getting the most out of your DC-to-daylight monitoring times.

— Rachel Baughn, mteditor@grove.net

Who can improve on the leading desktop/mobile scanner?

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Uniden BC9000XLT

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3. And get the Grove 1996 FCC Database CD-ROM ($99.95 value) **FREE!**

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The GRE Super Converter restores the missing cellular frequencies (unlawful to monitor conversations!).

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Powell Crosley, "The Baron of Homespun"

By Linton G. Robertson

Radio has, in its Gallery of Greats, those who achieved greatness by inheritance, by fortunate birth, by pure luck, genius, or ruthless determination. Armstrong, though few can ever doubt his ingenuity, did have an advantageous upbringing in well-to-do and fortunate circumstances that nurtured his genius. Marconi's education and upbringing would go a long way towards bringing the young man before the public. Sarnoff's relentless aggressiveness, born of poverty and religious discrimination, thrust him like a rocket into the forefront of early radio.

Once in a while, however, a Quixotic figure emerges here and there. Such a man was Powell Crosley, one of radio's early success stories who pulled himself up by his own bootstraps, and did it "his way," as the song says, in a day and time when such things were possible for the person of vision and ingenuity.

Born the son of a prospering lawyer in Cincinnati, Ohio, on September 18, 1886, Powell Crosley's future seemed assured. However, his family's fortune's faltered early on, and, as Crosley would say later, "Though I was born with a silver spoon in my mouth, it was jerked out before I could distinguish its taste from the common dime-store variety." It was good that Crosley had a sense of humor. In the years to come, he would need it.

An aptitude for things technological and mechanical cropped up early in his life. Once, his father, convinced that horseless carriages were just a passing fad, bet his son $10 that he couldn't put together a vehicle that would run a quarter mile through town. Powell won the bet, with a car that whizzed along at five miles an hour.

Graduating from College Hill Public School in 1901, and from Ohio Military Institute in 1905, he went on to study engineering and law, putting himself through school by working as a chauffeur (to familiarize himself with the automobile, one of his great loves) and a bond salesman.

Finally, in 1907, he struck out on his own with $10,000 of borrowed money—he paid himself $12.50 a week as the firm's president—and an intention to manufacture a market-busting economical automobile. The design was good, but the panic of 1907 wiped him out, and Crosley was cast adrift on his own.

For several years he held positions at various motorcar companies. In 1912 he tried to organize another car company. It failed. In 1913 he tried to capitalize on the craze in cycle cars. That went sour, too. Other jobs followed: telephone repairman, auto salesman, publicity man. (He once described himself to a magazine reporter as "a man of fifty jobs!") Powell, probably thoroughly disgusted by now, vowed he would never work for another boss, and kept the vow by selling novelties, aprons, stickers, buttons, and whatnots for advertising firms.

In 1916 he had his first real break, drifting into an association with a mail-order automobile accessories outfit, and was so successful at it, and at marketing his own gadgets, that he bought out his partner shortly thereafter.

One particularly good item was marketed in 1917 when America entered the war: a radiator cap with a flag holder for a small American flag. He did a magnificent business in patriotic radiator caps. Powell Crosley had one very American trait, it seemed; he just didn't know how to give up! It served him well. By 1920, at the age of 34, Crosley was sole owner of a million-dollar operation.

Then, one day in late 1921, his nine-year old son asked for a radio, and radio history was made.

Dear old dad asked how much one of these new devices cost. Junior replied over $100, and Crosley nearly fainted. Convinced that he could produce a set for far less than that, he bought a pamphlet called "The ABC of Radio," which inspired him to try and make a crystal set himself. The diminutive result, which ran on flashlight batteries and sported one tube, he named the "Harko Junior" ($20, but later reduced to $9, including headphones and antenna).

At the same time he and his son built a 20-watt amateur transmitter and played music over it. He then quickly came out with the "Harko Senior," a full vacuum tube set. Americans "harko'd" to this new rig, and this encouraged Crosley to go full-bore with the Crosley Model Ten—the first consumer set made that used a two-stage RF amplifier. (Crosley, it must be said, paid little attention to Armstrong's licensing agreements at the time, though whether this was through ignorance or culpability has been argued to this day.)

By the spring of 1922 Crosley was the largest manufacturer of radio sets in the world. Meanwhile, the establishment of the little amateur station in Cincinnati in 1921 turned into WLW in 1922, and Crosley was off and running at full speed.

WLW (World's Largest Wallop?) eventually attained the status of being the nation's premier station. It helped Crosley sell fantastic quantities of radios. Crosley was very

proud of his station, which became the jewel in his crown of a $16,000,000 concern, the Crosley Broadcasting Corporation. With 500 watts in 1923, 1000 in 1924, 5000 in 1925, and 50,000 in 1928, the output powers were unprecedented.

The station eventually was licensed to transmit with 500,000 watts of power, and could be heard throughout most of the US at night. This thing was a real marshmallow-roaster! The power authorization was something of an experiment, mainly to see how much of the nation could be covered by medium wave. Later the station had its 500,000 watt power reduced to 50,000 to keep it in line with the prevailing maximum level for other stations.

In 1939 the shortwave outlet of WLW was renamed the Voice of America, and was used to broadcast shortwave government propaganda during WWII.

But, the radio empire wasn't alone! Crosley, always seeking to expand his manufacturing base, diversified into his old love of cars, and, oddly enough, refrigerators. (One of his refrigerators actually had a radio in it ... Collectors, take note.)

Every fifteen minutes, twenty-four hours a day, WLW would announce, "This is station WLW, Cincinnati, Crosley Radios, Refrigerators and Automobiles." Midwesterners are a patient lot, but they must have been very long-suffering during the 30's!

Considering Crosley's anti-boss feelings and hard knocks after college, WLW editorial policy was oddly conservative and anti-labor. It seemed that working for a boss was detestable except when *he* was the boss! When the shoe was on the other foot, memories of his tough times working under less than ideal circumstances took a back seat to fears of labor unrest. It was a hypocritical way to treat the working man, especially coming from a fellow who liked to portray himself as the salt of the earth and a self-made fellow.

Crosley himself issued directives barring news of strikes to be broadcast—a move that got him in dutch with the FCC in 1936. Norman Corwin, a radio personality of some note, was fired for having even questioned this policy. Before leaving, Corwin got his hands on the memo issuing said directive, gave it to the ACLU, who promptly gave it to the FCC. Crosley had a very eventful 1936 as a result. Human beings have many parts to their natures, and few are models of consistency; Crosley was no different than many.

But Crosley *did* make a good product, and sold it for less than 90% of the competition. From the Crosley "Pup" (a one-tube little gremlin that looked like a light bulb poking out of a malignant coffee grinder), to the beautiful gold-leaf chased, pictorial designs on the cabinets of the upper-market sets, a Crosley was always a good performer at a substantial savings. Other interesting products that came out of Crosley factories were the "Koolrest" (an air-conditioned bed), the "X-er-vac" (primitive liposuction?), various patent medicines, a scalp exerciser, and the "Icy Ball" (a portable refrigerator).

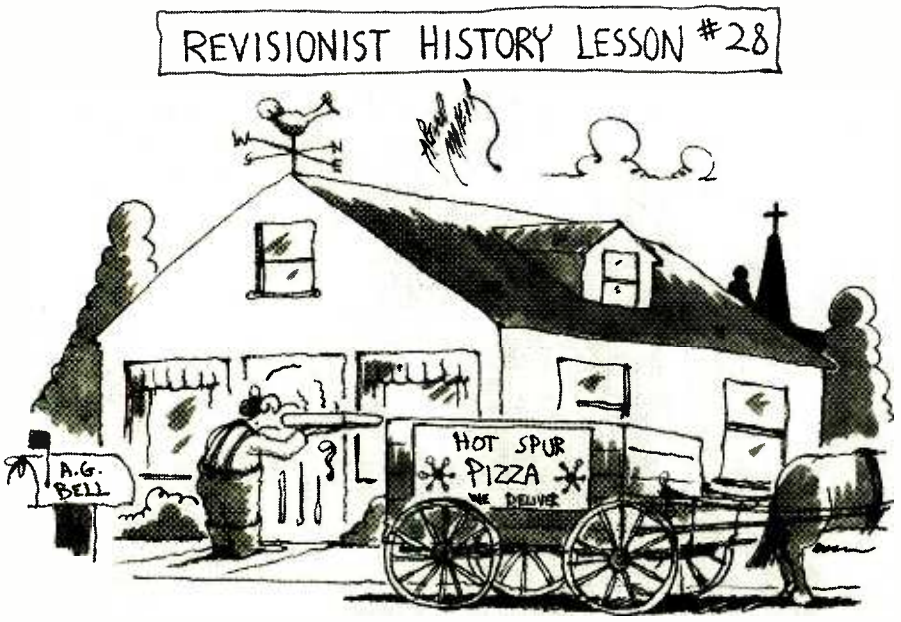
As much of a mark as he put on early radio, Crosley never was to make it big in the automobiles dearly loved. *LIFE* magazine reported, "When, as his own test driver, he jackknifes his six-foot-three-inch, 205-pound frame through the 45-inch door of a Crosley fresh off the assembly line and uncoils under the wheel, ...he is a man at peace with his convictions and pleased with his handiwork."

He wanted to put out a $500, thirty horsepower, small car at a rate of 150,000 a year, but never was able to get the price below $800 nor the production above 28,000 annually.

In 1945, at the age of 59, Crosley sold his radio empire, and, in 1952, his automobile interests. Having acquired controlling interest in the Cincinnati Reds in 1936, the team remained his main interest until the "Baron of Homespun," as he was called later in his life, died in 1961 at the age of 75 in his home town of Cincinnati.

References:

1. *The Golden Web, A History of Broadcasting in The United States*, 1933-1953, Eric Barnouw, Oxford Press, 1968
2. *Empire of The Air, The Men Who Made Radio*, by Tom Lewis, Harper Collins, 1991



ALEXANDER GRAHAM BELL'S CALL TO HIS ASSISTANT WATSON WAS ACTUALLY THE SECOND ONE EVER MADE.

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bob@grove.net

***Q.** I disagree with a statement you made in an earlier column in which you said that an antenna tuner will not help reception of shortwave signals. I have an active tuned antenna amplifier and it improves weak DX signals. (Captain Ken Barry, Blackpool, England)*

A. An antenna preselector is not an antenna tuner. The Grove TUN-4 MiniTuner Plus, now replaced by the improved TUN-4A, has had remarkable success in just the application you described, but it is not an antenna tuner, either. It is a frequency adjustable preselector with a preamplifier. Its purpose, and that of your unit, is to select a narrow swath of radio spectrum and allow it, amplified or unamplified, to pass on to the receiver.

An antenna tuner ("transmatch"), on the other hand, is an impedance matching device designed to reduce transmission line losses which would result from serious impedance mismatches, primarily during transmitting. They have virtually no signal enhancement qualities for HF receivers due to the high sensitivity of modern receivers, the large signal-capturing sizes of shortwave antennas, and the prevalence of atmospheric noise which limits the weak signal threshold.

***Q.** Why do some frequency directories list all the cellular telephone frequencies, not just the lowest and highest? (JK, Salem OR)*

A. Good question; probably because they are frequency directories and the writer wants to be comprehensive, I guess. There really is little point in laboriously listing them all it since there are 832 pairs of frequencies, all separated by 30 kHz, and people who listen scan or search through the entire range since no single frequency is assigned to any one individual. It's illegal, of course, but when that frequency coverage is on your scanner it's hard to ignore.

***Q.** Is it possible to design a converter for monitoring TV audio on a car radio, or even a portable radio with an external antenna jack? (Ron Clark, Pass Christian, MS)*

A. Possible, yes; practical, no. Since the TV spectrum runs from 54-72, 76-88, 174-216, and 470-890 MHz (in some areas), we are trying to crowd almost 500 MHz into 20 MHz (88-108 MHz). The only way this would be possible would be to use bandswitching—25 different bands! Since so many inexpensive TV-audio portable radios abound on the market, such an expensive commercial alternative is unappealing.

There are experimental alternatives, however. You could use one of those cheapie TV audio radios, plug a cassette adaptor like the Grove ACC79 into the radio's earphone jack, and insert the cassette adaptor into the vehicular cassette drive for excellent audio. You could do the same thing with a scanner or shortwave radio.

Finally, if you are really adventurous, get an old TV tuner, or even a cable TV converter, and use it to tune the signals, dumping the converted signal out on TV channel 3 or 4 (60-72 MHz) to be detected by a full-frequency-coverage scanner with wideband FM capability. Its audio, in turn, would be connected between the external speaker jack, through the Grove ACC79, to the car radio.

Bob's Tips of the Month

Invisible Antennas for Apartment Dwellers

Radio hobbyists who live in rental units or neighborhoods and communities with restrictive covenants have a hard time enjoying good reception. A letter from William Mewes of Oakville, Ontario, prompted us to take a hard look at this dilemma. William noted that he could use the cold water pipe (assuming it's metal, not PVC!), an unused wire in the telephone cable, and even the outside shield (not center wire) of his cable TV outlet for scanner monitoring.

Other hobbyists have utilized the third wire (ground, the round pin) in a wall socket for this purpose (Don't use either of the flat pins for this!). We suspect these makeshift antennas could also suffice for emergency shortwave reception as well.

In the "Beginner's Corner" in this issue, Skip Arey also talks about approaches to "stealth antennas." Have we gotten your inventive juices flowing yet? Over the years, readers have suggested disguised antennas such as flagpoles, ladders, false roof vent pipes, lawn ornaments, porch furniture, and more.

If you would like to suggest a disguised antenna which would work in your neighborhood, let us know; your suggestion may become a useful product!

***Q.** Is there a cure for poor-fitting external antenna jacks on portable shortwave receivers? (Richard Dailey, Pittsburgh, PA)*

A. Nothing short of replacing the trashy jack with a real antenna connector. Those sloppy antenna jacks have been a problem for decades. Some radios are better than others in this respect; the European "PAL" connectors, found on Grundig radios, are particularly solid.

***Q.** How can I recognize a cell site? How far apart are they generally spaced? (JK, Salem, OR)*

A. Virtually all cellular telephone towers are revealed by their characteristic triangular antenna array at the top consisting of two receive antennas and one transmit antenna. Such towers may be placed every few miles for roadside coverage, or much closer for dense metropolitan areas.

***Q.** The electric fence around my horse pasture creates a racket on my radio. Is there anything I can do to reduce the interference? (Hans Senn, Conifer, CO)*

A. Depending upon the age and model of your fence charger, try the following:

1. Be sure the box itself is well grounded; use at least one, if not two, 6-8 foot ground rods securely attached to the box by a heavy-gauge wire.

2. Plug an AC line filter onto the end of the power cord close to the box; the Radio Shack 61-2791 should work well.

3. Install a one-watt (not critical) 1000-10,000 ohm resistor (selected by experimentation) between the high voltage terminal and the fence wire; you need the most zap with the least interference!

4. Finally, consider a new fence charger—one with interference suppression and a metal box for grounding.

***Q.** Can I swap out the crystals in a weather cube radio to receive public safety frequencies? (Michael Denney, Carrollton, GA)*

A. Sure. First you need to determine the formula for ordering replacement crystals (the number of overtones and the IF of the radio), then, after installing the crystals, you need to peak the RF stage(s) for best sensitivity.

There are two problems, however; you would have to pay a premium for custom crystals unless the formula just happens to be a stock item from the crystal vendor, and since there is no squelch on a weather radio, you would have to tolerate that annoying hiss between transmissions.

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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ANNOUNCING *Radios by Hallicrafters*, the definitive book on the Hallicrafters company and its products by Chuck Dachis "The Hallicrafter Collector." More than 200 pages, over 600 photographs and 10 years in the making. Available late March 1996 at $29.95 from Schiffer Publishing Ltd., 77 Lower Valley Road, Atglen, PA 19310.

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STANDARD 708A wide band 50-905 MHz VHF-UHF, spectral display scope, communications test receiver, open cellular, $550. AR1000XC scanner 0.5-1300 MHz, good condition with manual, $250. RADIO SHACK LCD frequency counter, like new, $50. John (216) 225-2262 mornings and weekends.

PANASONIC RF2900 portable digital receiver, excellent, SOLD WB9YCJ/6 (714) 564-9010.

NEED schematic or service manual for circa 1974 TENNELEC Memoryscan-MS2 (16 channel) programmable scanner. Will reimburse for all postage and copying costs. Pete Haas, Box 702, Kent, OH 44240-0013.

SELL: MAGNAVOX D2999 PL World Receiver. Excellent working condition, with manual $210. PRO-37 handheld scanner with Nicads and manual, $125. (919) 752-2505.

REALISTIC PRO-43, full coverage, good condition, $185. Call Dan H. (216) 243-5140 weekday eves.

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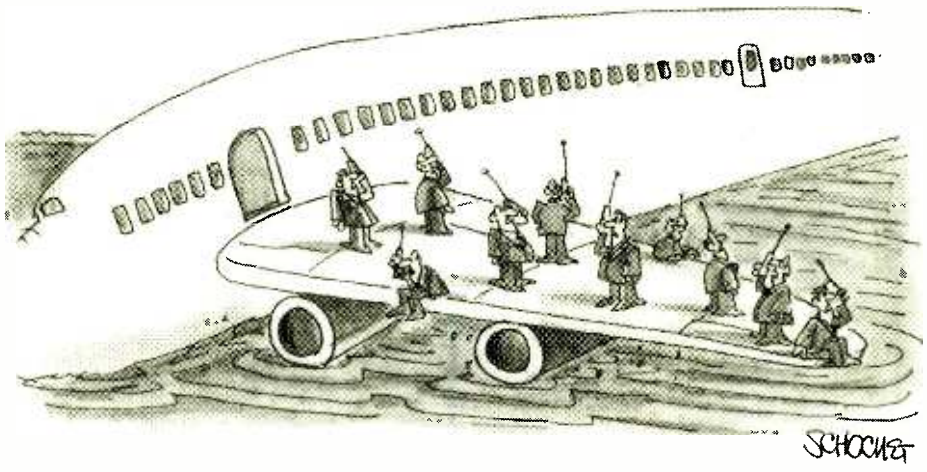
WANTED: Manuals, schematics for SQUIRES SANYERS SS1BS, WLR6-R1451; any BC-969 rcvr. Weber, 4845 West 107th. Street, Oak Lawn, Illinois 60453-5252



CLOSING COMMENTS

A guest editorial
by David Lindsay

The War of the Web: Round Two

In the suburban neighborhood where my mother lives, the crime rate, you could say, has jumped from zero to non-existent. Yet in the past year or two, cars have begun to line up outside the grade-school doors, manned by parents too nervous to let their children walk home. What exactly are the good citizens of America sensing out there in the woods?

A friend of mine suggests that it's a case of insular communities watching too much violence on the news. But, who can recall a time when the weather, with its blistering blizzards of blarney, has topped the hour so often?

The *intimation* of violence, on the other hand, is another story. In the past year, tv programmers have been stepping up their reports of BBS-Nazis, bombmaking recipes and, when those fail, e-mail obscenities. Internet scare stories don't sate you with actual details. They keep your fear nodes palpitating. And so, as V-chips jam the assembly-line gates and the German government blocks on-line services (it blocked the Website of one Ernst Zundel, a neo-Nazi), cyberspace is fast shaping up as the Charybdis of the 90s, jaws waiting to swallow wayward travelers.

Normally, I'd be content to let the whole fiasco pass, but as one who learned everything he needed to know in the 19th century, I feel honor-bound to point out that all this has happened before. And since this year marks the centennial of Guglielmo Marconi's first radio patent, it seems especially fitting to track the fate of wireless as it relates to the Web.

Marconi, like the designers of the Internet, couched his dreams in military terms from the very beginning. (The Internet was designed to withstand a nuclear blast.) Finding an able patron in scientist-inventor Sir William Preece, he left his native Italy for England in 1896 and, on September 2, began inviting Army and Navy observers to his experiments on Salisbury Plain. The armed services were never far from his side after that. When he organized the Wireless Telegraph and Signal Company in 1897, it was to service ship-to-shore communications. "I believe one of the greatest uses to which these instruments will be put," he proclaimed, "will be signaling in wartime."

But just as the Internet fell into the hands of hackers, so too did radio slip into private hands. By 1910, the Wireless Club of America could boast 10,000 amateur operators as members, and by 1912, there were an estimated 122 wireless clubs in the U.S. alone. These amateurs invariably spoke of their hobby with the same fervor that propellerheads reserve for computers. "Imagine a gigantic spider's web," wrote Francis A. Collins in an uncanny choice of metaphor, "with innumerable threads radiating from New York more than a thousand miles over land and sea in all directions... our operator may be compared to the spider, sleepless, vigilant, ever watching for the faintest tremor from the farthest corner of his invisible fabric."

In fact, the amateur operator resembled a hacker in almost every way. Typically a white boy without gymnastic portfolio, he was tinkerer, inventor, and nerd-king rolled into one, operating just outside the niceties of social consensus. He transmitted and received, point-to-point, limited only by the reach of his equipment. Though voice transmissions became feasible after 1906, he often stuck with the older Morse-code methods—much as a contemporary hacker will favor code over icons. Airspace remained wide open, and there was no FCC.

Sadly, the frontier days were short-lived. As the ether grew thick with chatter, the Navy began accusing amateurs of taking up valuable airspace with gossip, spreading false information and—flamers, take note—transmitting obscene messages. In another complaint that should resonate in the modern ear, the amateur could wreak havoc without being detected, which branded him as a threat to national security. The amateurs, for their part, claimed that inept Navy operators were trying to cover for their own mistakes.

The situation came to a head in 1912, when the *Titanic* met its spectacular doom. With emotions running high, it was quickly asserted that amateurs had jammed the lines and slowed the rescue mission. It was also asserted that Marconi's operator at the New York Wanamaker store, David Sarnoff, had been the only operator at the key throughout the catastrophe.

Neither of these assertions was true. The distress signal was first received by a Marconi operator aboard the *Carpathia*, and relayed from there to Cape Race. Two other ships sailing closer to the *Titanic* suffered from inadequate wireless equipment and so missed the signal altogether. As for Sarnoff, he was present at the Wanamaker station to relay some of the news, but other Marconi stations continued on after his was closed.

No matter. Seeing a monopoly in the making, Marconi himself leaped to the fore, recommending "control over amateur experimenters." The Radio Act of 1912, which grew out of the momentary fervor, gave the lion's share of the spectrum over to the Navy, pushing amateurs into the short waves. During the war, the Navy gained control over many radio patents, which, when peace was again restored, were appropriated by that vigilant boy at the key, David Sarnoff. Now grown to be a man, Sarnoff formed RCA and turned radio into a fixed, one-way phenomenon: the broadcast medium familiar to citizens of the late 20th century.

So much for the War of the Web, round one.

Of course, radio transmissions and e-mail are not the same thing. No amount of on-line use is going to prevent an emergency bulletin from reaching the Coast Guard anytime soon. Radio airspace is subject to the laws of scarcity; for all intents and purposes, the Internet is not. But none of this really matters, because amateur operators never interefered during the *Titanic* disaster in the first place.

In fact, the great lesson of the *Titanic* (besides as a caution against the use of adjectives like "unsinkable") is that there's nothing like a catastrophe for regulating new technologies. In the present scenario, all it would take is the introduction of digital cash, followed by an on-line heist or two, and the rights of on-line users could be summarily revoked. But hey—at least then the kids would be able to walk home from school.

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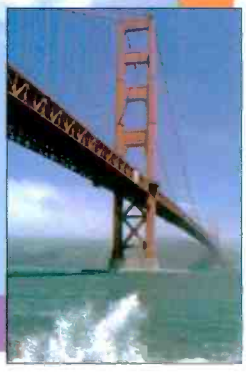

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